

Instruction for Use

English

Health Informatics Suite

Release 5.01

PHILIPS

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1 Introduction

HIS is a software product intended for qualified and trained professionals. This IFU (Instructions for Use) provides a view of the features, how to access and use them.

1.1 Description

Health Informatics Suite is a hospital information management system aiming to:

- Support the registry and management of both non-clinical and clinical workflows in healthcare organizations, by integrating activities, roles and areas, independent bedside devices, and ancillary systems that are connected either directly or through networks, into a unified information flow.
- Make available the complete and accurate patient electronic record data to healthcare professionals at any time in a single and integrated manner.
- Manage workflows in ancillary areas of the healthcare organization such as pharmacy, laboratory, radiology, oncology, nutrition, and blood bank.
- Support workflow of several operational, administrative and managerial activities of the healthcare organization like bed occupancy, patient management, billing, controlling, finance, business intelligence, and stock/warehouse.
- Provide a computer-based tool that can use or combine general medical and administrative information, rules and algorithms with patient-specific data in order to support clinical and operational decision.
- Host segregated computer based clinical decision support modules, like Health Informatics Suite Clinical Decision Support B (HIS CDS B).

1.2 Intended Use

Health Informatics Suite is intended to support professionals in healthcare organizations in documenting, decision support, and managing clinical, operational, and administrative data, integrating activities, roles, and areas into a unified information flow.

1.3 Indications for Use

The Health Informatics Suite is a healthcare information management system that displays, stores, exchanges, and processes clinical, operational and administrative data. It manages single or multiple patient care delivery, embracing inpatient and outpatient care. The system allows manual data input or via other devices or software interfaces.

Health Informatics Suite assists healthcare professionals in diagnosing, monitoring, predicting, prognosticating, treating or alleviating diseases or conditions. It is indicated to support clinical decision making, combining general medical information and algorithms with patient-specific data. The referred capabilities embrace rules and calculations that may be configurable, encoded fixed, or based on interfacing with other external algorithm applications.

Health Informatics Suite it is not indicated to be the sole source of information or replace clinical judgment.

1.4 Contraindications

There are no contraindications related to HIS.

1.5 General Guidance

In addition to information about the Functions included in HIS and its use, this guide contains Warnings, Cautions, and Notes:



WARNING

Warnings are directions, which if not followed, could cause moderate to serious injury to a user, patient or any other person, or could lead to a misinterpretation, and/or loss or damage of patient-related data.



CAUTION

Cautions are directions, which if not followed, could cause damage to the product described in this Instructions for Use and/or any other device.

Directions, which if not followed, could cause damage to the product and to a person, are documented as a warning.

NOTE Notes highlight important points as an aid to an operator.

1.6 Limitations for Use



WARNING

Only use the system for purposes that are specified in the scope of this Instructions for Use document.



WARNING

Do not use this system until you have received proper training. If you are unsure of your ability to operate this software safely and effectively, do not use it.

1.7 Intended User Population

The target population of users consists of clinical, operational, and administrative healthcare professionals as follows:

Clinical professionals:

- Physicians
- Specialists
- Nurses and nurse practitioners
- Pharmacists
- Dietitians
- Physiotherapist
- Psychologists

Non-clinical professionals:

- Hospital managers and administrators
- Accounting and financial professionals

- Clerks
- Technicians

1.8 Patient Target Group

All patients who supply their personal and health related data to a healthcare institution, either directly or by an authorized party.

1.9 Clinical Benefits

If the device is used as specified in the Intended Use under the circumstances and conditions as specified in the Indications for Use the expected indirect benefits are:

- Facilitates better coordination and improved quality of patient care delivery.
- Facilitates better support for health care professionals.

1.10 Potential Risks

Potential risks include but are not limited to the following:

- Patient exposure to data integrity / erroneous data transfer during clinical use
- Patient exposure to unintentional use error during clinical use
- Patient exposure to data integrity / erroneous data transfer during clinical use
- Patient exposure to system failure during clinical use
- Patient exposure to unauthorized system / data access during clinical use
- Patient exposure to network error during clinical use

1.11 Incident Reporting

Any serious incident that has occurred in relation to this device should be reported to Philips and other local and relevant authorities.

1.12 Infrastructure Requirements

Windows is the most common corporate desktop use operating system, so market investments have been mainly on this platform. HIS has interface with other components, devices, and market resources that are available exclusively on the Windows platform.



CAUTION

HIS must be operated in an environment where the minimum specified requirements for hardware and network performance are met.

For more detailed information refer to the Infrastructure Requirements Guide available on the Customer Portal.

1.13 Technical Support

If you encounter difficulty using the features related to HIS, contact the Philips technical support group that is serving your area. To obtain contact information for this group, contact your local Philips Representative.

For more detailed information refer to the Service Guide available on the Customer Portal.

When contacting Philips technical support, please have the following information available:

- Caller name, client organization name, and location.
- Site number, if applicable.
- Detailed description of the problem, including any history of troubleshooting efforts completed before or after the problem first occurred.

For contact details refer to the last page of this Instructions for Use document.

1.14 Compatibility

HIS should not be used in combination with other software, equipment, or components unless Philips expressly recognizes such other software, equipment, or components as compatible. Philips is not responsible for running compatibility validation of non-supported third-party software. If there is a need to use HIS in combination with other software, equipment, or components please contact Philips.

Changes and/or additions to the system should be performed only by the appropriate Philips personnel, or by third parties expressly authorized by Philips to do so. Such changes and/or additions will comply with all applicable laws and regulations, which have the force of law within the jurisdictions concerned, and with best engineering practice.

Changes and/or additions to the system that are carried out by personnel without appropriate training may lead to the product warranty being void.

Philips is not responsible for any malfunction of HIS, if it is run on hardware that is not in accordance with the hardware specifications.

For more detailed information refer to the Infrastructure Requirements Guide and Interoperability Guide available on the Customer Portal.

1.15 Security Requirements

For more detailed information related to network safety, security and privacy refer to the Cyber Security Guide available on the Customer Portal.

1.16 Service Information

At the customer's request, a service engineer may connect to a client computer from a remote location to assist with issues and perform service actions. Remote Service may help reduce system downtime and improve investigation & closure of systemic issues. The remote connection must be granted by the client, after which the service can be provided by Philips personnel or a Philips authorized representative.



CAUTION

HIS does not offer a native feature for remote connections. Software, which offers strong encryption mechanisms, will be used for remote service.

For more detailed information refer to the Service Guide available on the Customer Portal.

1.17 Contingency Computer

In emergency situations, it may be necessary for the healthcare institution to temporarily revert back to paper-based operations. HIS has a functionality, which periodically stores patients' clinical data in human readable files that can be accessed in such a scenario.

Patient information necessary for the continuation of treatment, such as medical orders and treatment plan are stored in separate PDF files for each of the patients receiving medical services in the healthcare

institution. This basic set of information is the system default, but more detailed information can be included in the PDF reports according to the necessities of the healthcare institution.



WARNING

An exhaustive contingency plan must be established to be deployed in cases of system unavailability such as downtime or disaster recovery to guarantee the access to the minimum necessary information for the continuity of patient care activities.

In case of redundant human readable files generated by the HIS server, they should be stored and displayed on alternative places to guarantee access if the main server becomes unavailable.

In case of network issues, a contingency strategy must be deployed to guarantee the access to the minimum necessary information for the continuity of patient care activities.

For more detailed information refer to the Cyber Security Guide available on the Customer Portal.

2 HIS Basics

HIS is a software product intended by qualified and trained professionals. This IFU provides a view of the features, how to access and use.

For more detailed information refer to the Quick Reference Guide available on the Customer Portal.

2.1 Login Screen

Log in to the system using the assigned username and password. The system administrator of the user organization should create the credentials. The system administrator is usually person or personnel from the IT department of the user Organization. A consistent user login process (usernames and passwords) provides good security of protected information.

The minimum login standards recommended by Philips include:

- Change your password on a regular basis to increase the security level of the data.
- Keep your password as confidential as possible; Implement strong passwords.
 - This is the easiest and most effective method to increase security. Strong passwords consist of at least eight alphanumeric, mixed case characters, digits, and special characters like '@' or '*'.

Philips does not recommend:

- Share your credential with others.
- Use word spelling lists, or other lists of words (acronyms, sequences of letters like 'abcdef', '12345' or 'qwerty'...).
- Use short passwords.

2.2 Main Screen

The main screen also known as the home screen, which is displayed after login, displays all the HIS functions that are available to the user that is currently logged in. HIS supports role-based access control and users should only have access to functions that are necessary for completing their assigned activities within the healthcare institution. The user can open a function by clicking once on the function icon. The user can also search for a function using the **search** field and/or the navigation **arrows**.

2.3 General buttons and actions

The action buttons are standard buttons available across the entire system. They have the same purpose.

Purposes such as:

Add: To add a new record or register into the system like new Patient, new Procedure, new Material.

Save: To save a new/edited record or register in the system.

Save and add another: To save the current record and create a new record.

Delete: To delete a record or register from the system (many types of records go through a submission process; in this case the record can only be deleted before it has been submitted. After this type of record has been submitted it cannot be deleted, only disabled.).

Duplicate: To duplicate a record or register in the system like a patient order.

Cancel: To cancel the operation and return to the previous form.

Once the user clicks on the Cancel button, it will pop up a screen to confirm the action.

2.4 Search field

The search bar can appear in several functions throughout the system. It is used to find records such as patients, procedures, medication, materials.

Click on the menu icon located in the top left corner to search for different functions. Multiple function can be opened simultaneously and allows navigating seamlessly among the open functions.



WARNING

Never open multiple instances of the same system function simultaneously. Errors can result from outdated information of a particular patient or selecting information from the wrong patient when more than one patient context appears on the screen.



WARNING

It is highly recommended for the user to always check the patient information in the patient bar on the screen, to ensure the data input is correct for the patient context.

The filter icon is used to filter large amounts of data to find relevant information. It is possible to customize the filter options and save them for future use.

2.5 Tabs

Tabs show the features and/or functionalities that exist in a function. After accessing the function, the navigation components display tabs in a variety of configurations:

- Drop down selection.
- Horizontal tabs.
- Vertical tabs.

Select the tabs to navigate between the different paths and to access different screens within the function. A path may be represented in an abbreviated form using the following notation:

Example Function > Level 1 Tab > Level N Tab > Child Panel 1 > Child Panel N

To navigate to the example path:

1. Select the function “Example Function”.
2. Select the tab “Level 1 Tab”.
3. Select the tab “Level N Tab”.
4. Double-click the table record to open “Child Panel 1”.
5. Double-click the table record to open “Child Panel N”.

Some screens use a component that allows navigation via a tree view. Each option that can be clicked in the tree is referred to as an “item”. Select the item to navigate to the respective location.

2.6 Field Information

Every field has an information button directly to the right of the field. When clicking on the information button it is possible to see more information related to that field, such as:

- Description
- Table
- Attribute

- View
- Data type
- Maximum size

2.7 Core Tables Settings

HIS is very flexible; it is possible to fine-tune the system to achieve a highly customized experience via the configuration of parameters and settings. The function “System Administration” and the utility “Core Tables Settings” are the main tools for configuring the HIS system.



WARNING

HIS is a highly configurable system that incorporates large amounts of data from many different areas in healthcare. There must be multidisciplinary involvement when configuring the system to ensure compliance with all laws, regulations, standards, guidelines and best practices.

It is required for implementation to have a pre-production (or test environment) environment with test cases that accurately reflect the practice of the healthcare institution to ensure safe and effective operation in the final production environment.

Philips provides no warranty and accepts no responsibility or liability for the accuracy of the information, configuration and settings defined by the user. If they are not done properly, it may result in the inability to use the system.



WARNING

Philips does not provide order sets content by default. It must be configured and maintained by a multidisciplinary team of the healthcare organization. Integration with external content providers may also be available.

The Core Tables Settings are stored in separate tables, each for a specific context. These Core Tables are the system tables that contain data used throughout the system and do not belong to one specific function or functionality. The utility Core Tables Settings contains the main records and rules that affect system behavior on a system-wide level. Changing one of these settings will have an impact on all parts of the system that have a dependency on the core table in question.

NOTE Not all core tables are necessary for every healthcare institution because each one uses a specific set of features therefore making certain tables irrelevant.

NOTE It is highly recommended that the healthcare institution configures the HIS system’s Core Tables Settings in partnership with Philips. For assistance with the configuration of the HIS system’s Core Tables Settings, contact your Philips representative.

The main differences between Core Tables Settings and Function Parameters are described below:

Core Tables Settings:

- Not mapped to a specific function.
- Each type of setting requires a unique data model and is stored in a separate table.
- Access can be controlled by profile.

- Settings apply for the entire system; some exceptions allow creating rules to limit scope.

Function Parameters:

- Restricted to a specific function.
- Parameters require only a key-value pair and are stored in a single table.
- Access control follows the same rules set for access to system functions.
- Parameters can be applied by: Establishment, Profile or User.

Typically, only the system administrator and specific key users have access to Core Tables Settings, and even those key users see only a small subset of settings related to their area of expertise. The system administrator can configure access control for Core Tables Settings via the function “System Administration” in Profiles > Record > Table. From there the system administrator can configure which core tables can be accessed by which profiles.

To navigate to Core Tables Settings:

- Go to the Main Screen.
- Click on the tab Utilities.
- Click on the utility icon Core Tables Settings.

Alternatively, the Core Tables Settings utility is accessible directly via the contextual help popup, available by clicking the Info Button to the right of a form field.

Core Tables Settings fall into two main categories, records and rules. Records contain predefined information that is standard across the entire healthcare institution, for example Units of Measure (UoM). In the settings for Unit of Measure the user defines the UoM and its supporting information such as whether or not to use fractions of the UoM, or whether the UoM can be used for administration of medicine without converting to another UoM first.

Rules contain specific values used to trigger specific system behavior, such as selectively displaying certain information to certain users in certain situations or automatically using a certain predefined option in a certain situation. One example is CPOE - display rule.

In the settings for CPOE - display rule a user can define the level of access to clinical ordering information for specific profiles. The name of the core table in the database can be located in the technical details of any of the form fields in the right-side panel.

2.8 Nomenclature: Feature, Functionality and Function

A brief explanation of the way the HIS system is organized, and the terminology used in the document may be helpful before proceeding. The HIS system can be described in terms of Features, Functionalities and Functions.

Features correspond to complex processes that are composed of multiple steps and may involve many users. They are associated with entire workflows or processes inside a healthcare institution, for example, Nutrition Ordering, Medication and Medical Fluids Ordering and Glycemic Control.

A feature is an abstract concept, it maps to a high-level user requirement which is fulfilled by one or more functions. For example, the features for nutrition ordering, medication and medical fluids ordering and medical gases ordering all rely on the same function for placing orders.

Functionalities correspond to basic actions performed by a user. They are most often associated with a button click action, for example, Copy Record, Schedule Appointment, Edit Material or Generate Report.

Functions are collections of various functionalities that are organized into intuitive user interfaces. They are mini applications within the HIS system that can be accessed according to user permissions. These specialized tools aim to help specific types of users accomplish certain tasks, for example, Patient Registration (Receptionist/Clerk), CPOE (Nurse/Doctor), and EPC (Medical Staff/Clinical Support Staff).

3 Features

The following sub sections present the system features. Some HIS features interface with HIS CDS B product, which uses data stored in HIS as the inputs to its clinical decision support algorithms and the output result is then displayed in HIS user interface.



WARNING

The information generated by the clinical decision support available in several multidisciplinary clinical workflows such as nutrition ordering, medication ordering, chemotherapy ordering, blood and blood products ordering, dialysis request, scales and indexes, vital signs and clinical parameters, and glycemic control, or other algorithms from HIS CDS B is never intended to replace clinical judgement or drive any clinical decision without knowledgeable validation by a qualified healthcare professional.



WARNING

The end-to-end process requires essential data input (manual or automatic) in multidisciplinary clinical workflows, such as EPC, PEPC, CPOE, and e-MAR functions. Ensure that the informed clinical data is correct, complete, and updated to the patient context.

The results, warnings, alerts or recommendations displayed in HIS depend directly on the quality and accuracy of the essential data input, and their adequate and proper configuration.

3.1 Business Features

A group of features that support the deployment and implementation of the software.

3.1.1 System run-time quality attributes

A subgroup of non-functional features designed to guarantee both a stable software system and stable environment in which the system can operate.

3.1.1.1 Scalability

Since HIS is a web-based application, the software can be scaled to meet the demand of many uses simultaneously. The ability to dynamically scale software is important in order to avoid underutilization of costly resources, while maintaining sufficient resources for effective operation.

Horizontal scaling refers to meeting demand by having multiple instances of a software application working in parallel. Vertical scaling refers to meeting demand by increasing the computational and networking resources of the execution environment for a single instance of a software application.

Both horizontal and vertical scaling can be done either physically or virtually. Hosting the software in a cloud environment facilitates virtual scaling of the resources. Modern cloud platforms offer a variety of capabilities for managing virtual resources both horizontally and vertically, for example automatic scaling, and load balancing.

Scaling the HIS system will depend on the specific details of each deployment. For more detailed information refer to Infrastructure Requirements Guide available on the Customer Portal.

3.1.1.2 Performance

Overall performance of a software application depends on meeting or exceeding the minimum requirements for hardware sizing and other infrastructure. For more detailed information refer to Infrastructure Requirements Guide available on the Customer Portal.

3.1.1.3 Availability

High availability of software applications aims to provide reliable service with a minimum of downtime in production environments. The goal is to provide availability as close as possible to 24 h a day 7 days a week, with the exception of foreseeable periods for updates and maintenance. High availability depends on system design principals such as eliminating single points of failure, redundancy, failover, combined with failure monitoring. As part of the software as a service (SaaS) delivery model, availability is managed by Philips based on definitions the SLA (Service Level Agreement).

Software applications, and the operational environments in which they run, can be designed for high availability regardless of a cloud or on-premises deployment, however modern cloud platforms offer a variety of the necessary capabilities such as update and patching, instrumentation for monitoring, and database management.

NOTE Specific availability requirements may be established on a per-customer basis in service level agreements.

3.1.1.4 Recoverability

Recoverability is an important aspect to include when implementing a software application that truly offers high availability. No software application is completely protected against catastrophic failure, so there must be mechanisms to guarantee the software is recovered and restored in a timely manner. In such a disaster recovery scenario, both the software application and memory storage elements must be recovered and restored to return the software system to a previously functioning state. As part of the software as a service (SaaS) delivery model, recoverability is managed by Philips based on definitions in the SLA (Service Level Agreement).

Recoverability mechanisms should not depend directly on the software application's own logic or features, instead they should be implemented in an external layer, such as the operational environment where the software application is hosted. Recoverability mechanisms can be implemented for a software application regardless of a cloud or on-premises deployment, however modern cloud platforms offer a variety of mechanisms such as automatic restart of the software application and integration services stack in case of failure, and backup and recovery procedures for the production databases.

3.1.2 Patient data privacy and security

A subgroup of features related to securing confidential patient related data.

For more detailed information refer to the Cyber Security Guide available on the Customer Portal.

3.1.2.1 Data privacy

This feature supports control over the exposure and availability of information of physical persons by implementing privacy by design techniques and strategies. The system offers customizable definitions of sensitive/private information to meet the needs of different markets, pseudonymization of sensitive/private information, privacy mode for support via remote connection, and fine-grained access controls that can be customized to enforce the principle of least privilege for access to specific system content for specific users.

3.1.2.2 Data protection policy and cryptography

Data protection and cryptography governance is a policy focused on the assurance that only the person supposed to access the information, have the necessary permissions to do so.

Applying cryptography to the data at rest and in transit avoids unauthorized access and managing access to the data to only authorized personnel reduces the risk of misuse of personal data. It is possible to cryptograph the data inside of the database using specific tooling.

This feature supports attending the General Data Protection Regulation.

In the “Access Control” function the user can create rules based on user groups, teams, patient profiles, then define the type of access rule, start and end date, and type of access permission. In the “Log Management” function the user can create rules to store logs automatically.

By default, the “Log Management” function stores the following records: access to encounters, access to medical records, access to the system, attempts to access the system, closing of functions, closing of functions due to time limit, deletion of patient data, system access with two-factor authentication (2FA), system exit, system exit due to timeout. Additional logs can be created, such as: changes to data fields, access to functions, access to specific function items, e-mail sent, filters, integrations, report generation, report printing, and Short Message Service (SMS) sent.

3.1.2.3 Authentication methods

The Authentication method feature provides ways for a user to identify himself. The most common method is with a password. Other methods are barcode tag cards and biometric, such as fingerprints and 2FA. The best method may vary according to the situation.

The system should provide alternative methods for a user to log in. Authentication can work via password, a secret word that only the user knows, which is then authenticated either by the system itself or an external authentication server using Lightweight Directory Access Protocol (LDAP) protocol. Another option is a tag with a barcode that only the user has. There is also support for authentication using a fingerprint reader, connected to a computer where restricted accessed is needed. The system supports different authentication methods according to specific levels of security. The system can be configured to perform automatic logoff after a predetermined period of inactivity as defined by the user or the establishment in configuration settings.

The authentication can be configured to use different combinations of methods, such as alternative login + password, automatic login (Kerberos), barcode only, biometrics + password, Active Directory (AD) login or Only Active Directory login, only biometrics, user + password, radio-frequency Identification (RFID) only, user + password / barcode, user + password + biometrics, user / alternative log-in / barcode + password.

Use the “System Administration” function to configure which combination of authentication methods will be used by the healthcare institution. The system requires the user to provide the combination of authentication methods at the login screen, before gaining access to the system. Authentication may be required by the system at other moments, this is also configured in the “System Administration” function. For example, re-authentication in the function “Medical Report Processing”, when an exam needs an additional approval by a specialist. Another example is in the function “Hospital Occupancy”, when the cleaning services team needs to register that the cleaning process was started and/or finished.

3.1.2.4 Password management

This feature allows the system administrator to define the rules that will be validated when the password is entered in the user login. It raises security, preventing unauthorized attacks or done by brute force, by enforcing rules for creating passwords, expiration periods, and password strength.

It is possible to raise the security by applying some policies such as blocking a user after a certain number of wrong attempts in a row, forcing that a new password to be created every 30 days, and ensuring that a

password has a minimum length and set of characters, for example, lowercase, uppercase, numbers, and special characters.

All these characteristics are defined in the function “System Administration”, select the option “Function Parameters” next choosing the option “System Menu”, then it is possible to choose the parameter corresponding to the rule and define it according to necessity.

3.1.2.5 Audit logs and traceability

This feature supports the audit log regarding who, when and from where the system was accessed or has its information modified or deleted.

The purpose of this feature for the administrator user is:

- Enable, disable, or view the logs of the system events and each item inside a function or the access of the items.
- View the system accesses logs.
- Enable, disable, or view the logs of reports and the records of generated reports.
- View access logs of the employee’s alterations histories.
- Add, edit, and delete the access configuration rules to the “Electronic Patient Chart” (EPC) function by patient profile and user profile.
- Define the rules of log storing time or clear the logs according to the storage time.
- Consult the access logs made on the patient’s record by the users in the “Electronic Patient Chart” function.
- Enable or disable logs for each item inside a function.
- Export the result of the logs.
- Query the logs of the attempts to access the system and the related Patient Encounter access.
- Store the changes made in the physician’s records.
- Store and view the logs of the changes made in the scheduling of future preventive planning service orders or the service orders generated through the preventive planning.
- View crash logs that occurred during the version update.
- Export and import reports logs.
- View the alteration logs in records of the tables.
- View the log of corrections made to redundant (duplicity) appointments.
- View the logs of registered profiles, registered users, report generation.

Based on the patient information, this feature aims to:

Add, edit, delete, and maintain the logs in situations such as, the patient’s care access authorizations, the checklist and history for the patients waiting for a vacant bed, patient information access authorizations, consult log of SMS sent after the patient discharge, consult the alteration logs of the information from a person’s record, consult the history of calls to the patient.

Submit and inactivate the access authorization to a patient appointment in the electronic medical record, and the same for the authorization of access to a patient’s electronic medical record.

View and trace accesses to the patient’s chart – in the data of surgery management, in the changes in the patient’s cancer treatments, of the data in the patient’s chart, and the patient’s post-discharge contact history.

In the following functions, it is possible to see the audit logs: “Log Management”, “System Administration”, “Surgeon’s Schedule”, “MPI”, “Employees Record”, “Equipment Control”, “Surgical Schedule Management”, “Bed Management”, “EPC”.

3.1.2.6 Data security

This feature supports the creation, configuration, and maintenance of a secure system by implementing various guidelines and mechanisms. The native system functionalities should be combined with other external mechanisms to form a multilayered security strategy to address aspects including physical security, operational security, procedural security, risk management, security policies, backup policies, high availability and contingency planning.

The native system functionalities include system access controls such as, password encryption, password login, password masking, authorized user list, password recovery, password reset, two factor authentication, password complexity rules, password expiration rules, automatic logoff, account Lockout Policy, allow/prevent multiple sessions.

3.1.3 Operational system toolkit

A subgroup of features related to running the system internally at the customer site.

3.1.3.1 System administration and configuration

This feature supports the system administrator to administer and configure the system. Allows including, editing, excluding, and consulting medical records items, to configure rules for attributes displayed on the screen, maintain the rules to restrict access to the parameters of the functions and to configure the display of templates inside the items in the “EPC” function.

This feature manages which users can receive permissions from another user (permission copy). Allows consulting and validating invalid base objects, allow consulting and deleting patient’s files stored on hospital repositories. Based on the user configuration, this feature is used to block the application login for a user during a certain period, to change the user’s configuration, link profiles to any user and link departments to users, link the database tables by user profile, and link the functions and reports to the user profiles.

The system is very flexible; it is possible to fine-tune the system to achieve a highly customized experience via the configuration of parameters and settings. The function “System Administration” and the utility “Core Tables Settings” are the main tools for configuring the system.

For more detailed information refer to the System Administration Guide available on the Customer Portal.



WARNING

HIS is a highly configurable system that incorporates large amounts of data from many different areas in healthcare. There must be multidisciplinary involvement when configuring the system to ensure compliance with all laws, regulations, standards, guidelines, and best practices.

It is required for implementation to have a pre-production (or test environment) environment with test cases that accurately reflect the practice of the healthcare institution to ensure safe and effective operation in the final production environment.

Philips provides no warranty and accepts no responsibility or liability for the accuracy of the information, configuration and settings defined by the user. If they are not done properly, it may result in the inability to use the system.

**WARNING**

User access privileges must be configured to grant them the minimum necessary level of access to perform their due duties. Granting users to access more information than necessary may lead to unauthorized access to sensitive data and may lead to a breach in data privacy and security policies.

The “Core Tables Settings” are stored in separate tables, each for a specific context. These core tables are the system tables that contain data used throughout the system and do not belong to one specific function or functionality. The utility “Core Tables Settings” contains the main records and rules that affect system behavior on a system-wide level. Changing one of these settings impacts all parts of the system that have a dependency on the core table in question.

The table below describes the main differences between “Core Tables Settings” and “Function Parameters”.

Core Tables Settings	Function Parameters
Not mapped to a specific function	Restricted to a specific function
Each type of setting requires a unique data model and is stored in a separate table	Parameters require only a key-value pair and are stored in a single table
Access can be controlled by profile	Access control follows the same rules set for access to system functions
Settings apply for the entire system	Parameters can be applied by: Establishment, Profile or User

Typically, only the system administrator and specific key users have access to “Core Tables Settings”, and even those key users see only a small subset of settings related to their area of expertise. The system administrator can configure access control for “Core Tables Settings” via the function “System Administration” in “Profiles” > “Record” > “Table”. From there the system administrator can configure which core tables can be accessed by profile.

3.1.3.2 User preferences configuration

This feature allows the definition and management of end-user preferences.

System administrators can use the “System Administration” function to define preferences for users. Alternatively, non-admin users can access their own personal settings by selecting “My Settings”. The “My Settings” option is found in the “User Menu” icon, located on the top-right corner, in the Menu Bar. Using this resource, it is possible to configure standard texts, calendar, signatures, languages, system opening preferences and default values.

Users can export or import the parameters that are currently being used in a function by opening the utility “Function Information”. First open the function for which the parameters will be exported or imported, then click on the “Main Menu” icon, in the top-left corner of the “Menu Bar” and select the “Utility” tab. Finally, select the utility “Function Information”. This feature allows the user to consult the information about the function, and export or import function parameters.

3.1.3.3 Reporting management

This feature is a set of configuration rules used to generate the results view of a particular activity, project, action, research, note, or another event that is finished or in progress. The generated view allows printing a report on paper or as a digital document.

In the “Report Manager” function, the user can create and manage standard or customized reports, support its generation and printing configurations. On the “Dynamic Report” tab, the user can create a report by adding items on report sections and using the drag and drop functionality for data disposition throughout the report. It is possible to generate standard reports or customized ones throughout the system, for example in the “EPC” and “PEPC” functions.

The “Automatic Printing” feature is in the “Core Table Settings” function. This feature allows defining which documents can be printed automatically, their periodicity, which printer must be used, and where it must be stored in the databank.

3.1.3.4 Excel data importing and exporting processes

This feature supports the user to import and export data into Excel spreadsheet files. In addition, the system allows the user to import a table by configuration using the XLS extension file.

The export to the excel file can be done in all the functions where the information can be presented in the grid view, then the user can use the shortcut in the keyboard “Control + E” (Ctrl + “E”), the system will then generate the information to the excel file.

In the functions such as “SUS APAC”, “SUS BPA”, there is a special functionality to export data when the information needs to be imported to another system, following the standard file as, the dBase database file (.dbf file), or this feature can be used in the function “Insurance Protocol” to export the patient accounts to an XML file that is sent to the insurance company.

The import can be done through the function “Loads”. This feature allows importing information, such as Addresses Catalogue, Materials and Medicine list, Price Table, Postal Code, and Service Table, that can be done from different sources like excel file, the dBase database file (.dbf file), or text file.

3.1.3.5 Internal and external communication system

This feature provides the possibility of the system to communicate an alert or a specific message to the user, allows communication amongst the users, and also enables the user to send a message to an external contact.

The automatic generation of a message can be configured. The tab menu “Alerts” of “Quality Management” function allows defining the conditions for generation of the message using the SQL command and how this message can be sent, if by internal communication, SMS, or email. In the menu tab “Events and Rules” of the function “Alerts and Events Management”, the user can define the characteristics of the message that can be sent by internal communication, SMS, email, or can be presented on the screen. And in the “Core Tables Settings” function > “Main Application” > “Core Tables Settings” > “Rule for sending alerts and events”, the system administrator can define the action that generates the message by choosing the option in the field “Action that launches”.

The user can read the internal communication using the function “Internal Communication”. It is also, possible to use the same function to write a message for a user, profile, department, user group, group of profiles, or a combination of these options. In the purchase process, through the functions “Purchase Quotation” or “Purchase Order” the user can send an email to the supplier describing the items that are being quoted or authorizing the supplier to send the items to the entity.

3.1.4 Interoperability

A subgroup of features related to the exchange of information with other systems via standard communication methods.

3.1.4.1 Interoperability tools

This feature provides interoperability capability to interface with third-party devices or software in a healthcare organization for an overall integrated information management flow and can also be configured to be accessed through a web portal.

It is responsible for handling the extraction and access of data, its mapping, and its transformation to other formats, based on standard that can be recognized by other systems.

Through the interoperability process, the system can send and receive information, add and maintain an integration record with other system through web services with transmission of XML files, allow medical consultation between doctor and patient by audio and video call, receive information from other electronic health records systems. Beyond that, allows the user to:

- Access electronic documents available in online repositories or intranet, by hyperlink
- Add, edit, delete, and consult rules for automatic print of reports
- Add and maintain interface points with external systems, interfaces that allows the export and import of data
- View the logs of all the transmissions performed during an interfacing
- Add and maintain rules for filtering the interface points and, records for the conversion of defined data between different systems for interface.

During the interoperability process, the system allows the retrieval and search of clinical bed locations; clinical room locations; clinical unit encounters, locations, and organizations; health system encounters and organizations; institution encounters, locations, and organizations; patient data and related people, all of these from an Application Programming Interface (API).

API is a set of functions that allows applications to access data and interact with external software components, operating systems, or microservices. API delivers a user response to the system and sends the system's response back to the user. In case of a failed request, the API shall return an HTTP 40x error message when an invalid FHIR request is received.

Communication is handled in an asynchronous fashion using a message bus, the interface has built-in retry logic to prevent loss of data when a message is not successfully processed on the first attempt.

Other integrations can be done from an API, such as, retrieval and search of observation data; remuneration model based on diagnosis; device; practitioner, practitioner role, patient's allergy; case episode of care; pregnancy episode of care; procedure episode of care; vital signs; clinical observations; laboratory exams; patient's condition; clinical scores including indexes; clinical documents; capability statements; and service request.

When the system receives and sends messages by interface, the standard used is Health Level 7 (HL7). HL7 is a standard used by the healthcare industry to allow the exchange of health information through messages, between applications such as Laboratory Information System (LIS) for Electronic Health Record (EHR), Health Informatics System for Radiological Information System (RIS) and medical equipment, for example.

One example of the interface happens during patient's appointment registration, where the user can check the eligibility in the insurance portal or third-party company. This process ensures that the patient's health plan can be accepted by the clinic.

The configuration of the interfaces can be done in the "Management for Integration" function.

3.1.5 Standards & regulations

A subgroup of features to support use of the system globally.

3.1.5.1 Localization and internationalization

Localization refers to the configuration of specific information to accommodate the norms of specific countries and markets, while internationalization refers to the product being capable of supporting different localizations and therefore prepared to be used internationally once localized. The system allows configuration of aspects such as: languages, currencies, measurements, time zones, postal addresses, date and time format, to match the geographical location of its users.

3.1.5.2 Ontologies

This feature supports the process of mapping ontology encoding to system data fields. An ontology is a set of concepts and categories in a subject area or domain that shows its properties, and the interrelationships between those properties. These standard concepts are essential in medicine, particularly for data exchange (interoperability) and research purposes. The “Ontologies” function is designed to host different ontology sources, such as SNOMED-CT.

In the “Ontologies” function, there is read-only access to reference mappings between SNOMED and the standard data fields and data values in the system. The standard clinical data is centralized in the “EPC”, “eMAR” and “CPOE” functions. Also, there is access to define mappings between SNOMED and the custom data values created by the healthcare institution. The data specific to each healthcare institution are defined in the “Core Tables Setting” utility function. These core tables include Allergens, Anesthesia warnings, Categories of surgery models in the Perioperative Electronic Patient Chart, Internal exams and procedures, International Classification of Diseases - ICD, Lab test material, Laboratory examination, Material registration, Medicine datasheet, Oral diets composition, Pain condition, Part of the body, Prescription interval, Recommendations, Register of problems, Types of fasting, and Unit of Measurement.

After the mapping between the system and SNOMED is defined, patient data exported via HL7 messages will contain the associated SNOMED information making it possible to integrate with other systems that use the HL7 protocol and SNOMED standards. Finally, define which data to export in the “HL7 Interfaces” utility function.

3.1.5.3 Regulatory requirements

This feature supports the implementation of regulatory requirements such as mandatory labeling content to support deployment in a market/country where the product shall comply with the set of requirements defined by local Regulatory Agencies.

Local Regulatory Agencies, in each country, are responsible to determine the concept and scope of a medical device product and the set of requirements such a product must comply with to be marketed in the country.

3.2 Clinical Features

A group of features that help to manage data related to the clinical activities of healthcare professionals.

3.2.1 Clinical orders composition and view

A subgroup of features related to ordering of drugs, exams, procedures, nutrition products and recommendations.



WARNING

Philips does not provide order sets content by default. It must be configured and maintained by a multidisciplinary team of the healthcare organization. Integration with external content providers may also be available.

3.2.1.1 Collective orders

This feature supports requesting the same exams and procedures for a group of patients instead of doing one by one. For example, surveillance culture (nasal swab) in all patients admitted to the ICU.

Using the “CPOE” function, the clinical user can access the “Collective Orders” function via an external call. Then, applying the filter, the user selects the patients or the department and the specific exams protocol.

The request can be directly submitted to all selected patients or can still be pending individual submission.

3.2.1.2 Medical gases ordering

This feature supports gas therapy ordering in the context of the patient’s therapeutic plan.

Using the “CPOE” function, the clinical user selects the “gas therapy” group. Then, it is possible to define the respiration type, such as bubbling non-invasive mechanical ventilation, non-invasive mechanical ventilation, invasive mechanical ventilation, invasive mechanical ventilation with barrier filters, or spontaneous.

It is also possible to select the type of gas (oxygen or nitrous oxide), the flow rate, and the frequency (continuous or intermittent). When spontaneous breathing is selected, the physician can inform the device (e.g., nasal catheter) and the FiO₂ (%).

For mechanical ventilation, the ventilation parameters suitable for the patient can be informed, such as programmed frequency (cycles/min), scheduled current volume (mL), FiO₂ (%), PIP (cmH₂O), IPAP (cmH₂O), EPAP (cmH₂O), PEEP (cmH₂O), CPAP (cmH₂O), support pressure (cmH₂O), PEEP low (cmH₂O), PEEP high (cmH₂O), MAP (cmH₂O), inspiratory flow (L/min), inspiratory time (%), inspiratory time (s), inspiratory time/expiratory time, time low (s), time high (s), high-frequency respiratory rate (Hz), amplitude (%), amplitude (cmH₂O), sensitivity (cmH₂O), sensitivity (L/min), and type of wave.

3.2.1.3 Laboratory, anatomic pathology, image and procedures request

This feature supports the clinicians in ordering laboratory and image exams, procedures, and anatomic pathology exams in the context of the patient’s therapeutic plan.

Using the “CPOE” function, images (x-ray and tomography), laboratory exams (blood count, urinalysis and feces) and procedures (such as nebulization, glycemic control and dressing) can be requested through autocomplete in the Exams and Procedures group, and depending on the type of exam and procedure, the fields “topography”, “side”, “clinical indication” and “interval” needs to be specified. The physician may still order the medication required to perform the exam/procedure (for example, a contrast in tomography or a laxative in a colonoscopy).

In the “CPOE” function, for anatomic pathology purposes, there is a specific group for this request, called “anatomic pathology exams”, which also allows search using autocomplete. This particular group has fields such as removal/collection date, the quantity of samples, main sample, location of injury and the quantity of specimen containers.

Depending on the anatomic pathology exams requested, the system presents specific questions/fields related to the process. To allow the system to identify that it refers to the particular type of exam anatomy, it is necessary to preconfigure it in the “Internal Exams and Procedures” function. If the exam is configured as Cervical Cytopathological, the clinician can fill in information as follows:

- Has previous preventive exam (Pap smear)?
- On what date was the last exam?
- Do you use IUD?

- Is she pregnant?
- Do you use birth control pills?
- Take hormones or medicines to menopause?
- Have you ever undergone radiotherapy?
- Knows the date of last menstrual period?
- On what date was the last menstrual period?

3.2.1.4 Blood, blood products and related therapies ordering

This feature supports the ordering of blood, blood products, blood therapy procedures, and specific blood tests in the context of the patient’s therapeutic plan. For example, concentrated red blood cells, platelets, plasma, platelet-rich plasma, therapeutic phlebotomy, and apheresis.

The physician can request the blood, blood products or only reserve them, indicating that they can be used if the patient needs it during or after the procedure.

To execute this activity, the physician needs to access the “CPOE” function and select the “Blood and Blood Products” group to choose the desired blood, blood products, blood therapy procedures, or specific blood tests. At this time, the user can inform the frequency of repetition of the request, justify the clinical indication, enter the results of related laboratory tests, request some drug that must be infused during the process of hemotherapy (e.g., antihistamine or steroids).

3.2.1.5 Dialysis request and calculation

This feature supports physician ordering of hemodialysis or peritoneal dialysis for the patient and processes data input using rules and algorithms.

The configuration of the types of solutions for each type of dialysis (hemodialysis or peritoneal) is performed in the “Dialysis” option of the “Patient Chart Settings” function. The necessary fields for both types are the component, volume, unit of measurement, infusion time (h/min), temperature, infusion device, and infusion speed. In addition, for hemodialysis solutions, it is possible to configure a rule for the dose field using the “calculate dose per Kg” field and the formula: dose (informed in the “dose” field) x patient weight. According to the patient’s clinical condition, this suggested value can be edited by the physician in the “CPOE” function.

For peritoneal dialysis, solutions protocols for each type can be configured in the function “Patient Chart Settings,” option “Dialysis,” sub-option “Peritoneal Dialysis” with the respective fields for each solution: solution, infusion time, stay time, drainage time, and start and end times. In addition, the sodium and bicarbonate profiles are configured in the “Core Table Settings” function, with the respective values for each informed period (0-1 h/1-2 h/2-3 h/3-4 h/4-5 h/ 5-6 h), that the physician can later edit in “CPOE” function.

In the “CPOE” function, hemodialysis or peritoneal dialysis is requested in the “Dialysis” group. Depending on the dialysis’ type, different field options are displayed.

Hemodialysis

To order a hemodialysis session, the physician needs to open the “CPOE” function in the dialysis group. The user can request more than one solution simultaneously and can define the weekdays the patient will undergo the procedure. In addition, the user informs whether it is a routine or an emergency condition, continuous or intermittent, and its specific type, such as Continuous Venovenous Hemodiafiltration (CVVHDF), Continuous Venovenous Hemodialysis (CVVHD), Intermittent Hemodialysis (IHD), Sustained Low-efficiency Dialysis (SLED), Daily Hemodiafiltration (HDF), Slow Continuous Ultrafiltration (SCUF), and Therapeutic Plasma Exchange (TPE).

After selecting the hemodialysis type, the physician must inform the following fields: Number of sessions – only for “intermittent” type hemodialysis, duration of the procedure (h/min), blood flow (mL/min) of dialysis, dialyzer model, blood flow (mL/L/min), type of access, post hemodialysis weight, current and dry/ideal of the patient, ultrafiltration, maximum ultrafiltration, ultrafiltration profile, sodium profile, bicarbonate profile, sodium (mEq/L), and bicarbonate (mEq/L). In addition, for each type of infusion (dialysate, anticoagulation, post or pre-capillary replacement), it is necessary to complete the following fields: type of hemodialysis solution, hemodialysis solution, components, dose, unit of measurement, solution flow, unit of measurement, and appropriate temperature (°C) for infusing the solution. The system calculates the “total volume” field for each type of solution according to the following formula: dialysis duration x infusion rate (flow).

Peritoneal

To order a peritoneal dialysis session, the physician needs to open the “CPOE” function in the dialysis group. The user can request more than one solution simultaneously and can define the weekdays the patient should undergo the procedure. In addition, the user needs to specify the type (outpatient continuous, automated, or intermittent). Depending on the selected option, the system presents only the context-related fields. The mandatory fields for requesting peritoneal dialysis are cycle volume (mL) and duration of dialysis (h/min). The system performs the calculation of the respective fields according to the following formulas:

- Cycle per stage = solution volume (mL) / cycle volume (mL)
- Cycle (h/min) = infusion time + stay time + drain time
- Total of cycle = dialysis duration (h/min) / cycle (h/min)
- Stage (steps) = total cycles / cycles by steps
- Total volume = cycle volume (mL) X total cycles

For peritoneal solutions, there is an option called “Protocol”, where, after the physician selects each solution, the system fills in the respective fields, such as dialysis solution, infusion devices, volume (mL), temperature (°C), infusion time (h/min), stay time (h/min), draining time (h/min), item, dose, and unit of measurement. The physician can still edit the information.

3.2.1.6 Recommendations and complementary medical orders

This feature supports requesting recommendations encompassing general care and other prescribed guidelines to ensure complete care for the patient. For example, change of body position, bath frequency, request for walks, check vital signs or other patient information.

Using the “CPOE” function, the clinical user selects the “Interventions and Recommendations” group to find, using autocomplete, the desired recommendation and the activity repetition frequency. Some recommendations can be configured as routines to be easily searched.

3.2.1.7 Nutrition ordering and calculations

This feature supports the ordering of fasting, oral diets, enteral diets, supplements, infant milk and formulas, TPN into the patient’s care plan.

Nutrition orders are a group of patient diet-and-nutrition-related orders, including oral diet, enteral or parenteral formula requirements. In addition, there are options for parenteral nutrition (adult, pediatric, and neonatal), which is the intravenous administration of nutrients such as amino acids, carbohydrate, lipid, added vitamins, and minerals delivered via central or peripheral route.

In the “CPOE” function, the mentioned options are requested in the Nutrition group. Depending on the type of nutrition (fasting, oral diets, enteral diets, supplements, infant milk and formulas, adult and pediatric/neonatal TPN), the system presents different field options to the user.

To request fasting, the clinician selects the type of fasting (such as absolute fasting, fasting with permission for oral medication, or fasting with water permission), the reason for fasting (such as due to laboratory test collection and due to procedure surgery), the start and finish dates.

To order an oral diet, the clinician selects the desired one via autocompleting (such as light, low-sodium, and low-fat). When the diet needs to be tailored for one patient due to specific needs, the clinician can select the diet by composition and consistency, which requires a previous configuration. To order oral supplements, the clinician needs to use the autocomplete, select the desired material or commercial brand, and define the information like route, dose, unit of measurement, interval, and type of administration (as start time, per doctor’s order or when necessary).

To order enteral diet and supplements, the clinician selects the desired material or commercial brand via autocompleting and defines additional information such as dose, administration mode – continuous or intermittent infusion, frequency, unit of measurement, and stage infusion duration. For example, suppose the clinician defines that the patient needs to continuously receive 1500 mL of the enteral diet for 24 h. In that case, the system calculates and presents the result of the infusion rate (62.5 mL/h or 20.83 drops/min). This result depends on the selected unit of measurement. Conversely, if the clinician chooses the intermittent infusion, it is necessary to input the duration stage, and the system calculates the infusion rate. For example, if the patient needs to receive 1500 mL in four stages of four hours in 24 h. The system calculates and presents the result of the infusion rate (375 mL in four hours of each one of the four stages).

To order infant milk/formula, the clinician selects the desired option via autocompleting such as infant formula, breast milk, and human milk. The clinician can choose the infant formula’s solubility, suction device, and temperature. If the clinician chooses breast milk, it is possible to order “breast milk on demand.” Solubility record is a pre-condition that the clinician needs to configure before ordering the milk formula. For example, to prepare 100 mL of milk formula, it is necessary to have 15 g of powder over 90 mL of water, having a solubility of 15%. This is the quantity of powder that will be diluted in the water. Suppose the clinician is ordering 120 mL in the same solubility. In that case, the quantity of powder and water change (18 g of powder and 108 mL of water).

“CPOE” function allows the clinician to place orders for parenteral nutrition according to the calorie requirements and clinical needs of the patient. It is possible to order products for nutrition and specify the quantity of a product that needs to be prepared according to the nutrients requested for the patient.

To order adult TPN, the clinician selects a pre-configured protocol with products and elements and edits these items as needed by the patient. For example, the user can choose the percentage of protein, lipid, and carbohydrate in that nutrition and the number of bags, duration of infusion, infusion device, and other information that the user deems relevant.

To order pediatric or neonatal TPN, a prior setting is necessary considering the age and weight of the patients to adapt the workflow process with the appropriate fields related to a pediatric or neonatal order. The clinician can adjust the products and elements shown on the screen and select the number of bags, water requirement (mL/Kg/day), calories requirement (Kcal/Kg/day), infusion duration, and infusion device other information that the user deems relevant.

After selecting oral, enteral, parenteral nutrition, supplement, milk/formula, breast milk or human milk, interval, or stages, and the first administration time, the system generates the schedule of the administration

times. For example, if the user enters two times a day, starting today at 08 a.m., the system generates 08 a.m. and 08 p.m. as administration times.

Description of the formulas used in the process described above (not necessarily in the presentation sequence):

- Harris Benedict Basal Metabolic Rate (Kcal/day):
- BMR Men = $66.5 + 13.75 \times \text{weight (Kg)} + 5.003 \times \text{height (cm)} - 6.775 \times \text{age (years)}$
- BMR Women = $655.1 + 9.563 \times \text{weight (Kg)} + 1.850 \times \text{height (cm)} - 4.676 \times \text{age (years)}$
- Total Caloric Value (Kcal/day): $\text{TCV} = \text{BMR} \times \text{activity factor} \times \text{stress factor}$
- Kcal per weight kilogram per day (Kcal/Kg/day) = $\text{TCV} / \text{weight}$
- Kcal carbohydrate = $\text{TCV} \times \% \text{ carbohydrate} / 100$
- Kcal protein = $\text{TCV} \times \% \text{ protein} / 100$
- Kcal lipid = $\text{TCV} \times \% \text{ lipid} / 100$
 - Nonprotein calorie to nitrogen gram – NPC:N
 - $\text{Protein (g)} / 6.25 = X$
 - $\text{NPC:N} = \text{TCV} / X$
- % per kilocalorie per carbohydrate gram = $\% \text{ Protein/Kcal/g} - \% \text{ Lipids/Kcal/g}$
- Glucose Infusion Rate (mg/kg/min): $\text{GIR} = \text{grams of glucose} / (\text{Weight} \times 1.44)$
- Osmolarity (mOm/L):
 - $(\text{qty Protein} \times 10) + (\text{qty Lipid} \times 0.27) + (\text{qty Glucose} \times 5) + [(\text{qty Sodium} + \text{qty Potassium} + \text{qty Magnesium} + \text{qty Calcium}) \times 2] / (\text{total volume} \times 1000)$
 - $[(\text{qty Protein} \times 11) + (\text{qty Glucose} \times 5.5) + (\text{qty Lipid} \times 0.3) + (\text{qty Sodium} + \text{qty Potassium} + \text{qty Magnesium} + \text{qty Calcium} + \text{qty Phosphorus})] \times 1000$
 - $[(\text{qty AddProtein} \times 11) + (\text{qty AddGlucose} \times 5.5) + (\text{qty Lipid} \times 0.3) + (\text{qty Sodium} + \text{qty Potassium} + \text{qty Magnesium} + \text{qty Calcium}) \times 2] / (\text{total volume} \times 1000)$
 - $[(\text{qty AddProtein} \times 11) + (\text{qty AddGlucose} \times 5.5) + (\text{qty Lipid} \times 0.3) + (\text{qty Sodium} + \text{qty Potassium} + \text{qty Magnesium} + \text{qty Calcium}) \times 2] / (\text{total volume} + 30 \times 1000)$
 - *The parameter # 1080 of CPOE function is used to define the osmolarity formula to be used in adult TPN calculation.*
- Concentration:
 - $\% \text{ protein} = \Sigma \text{ Kcal ptn} / (\Sigma \text{ ptn} + \Sigma \text{ cho} + \Sigma \text{ lip})$
 - $\% \text{ carbohydrate} = \Sigma \text{ Kcal cho} / (\Sigma \text{ cho} + \Sigma \text{ ptn} + \Sigma \text{ lip})$
 - $\% \text{ lipid} = \Sigma \text{ Kcal lip} / (\Sigma \text{ lip} + \Sigma \text{ ptn} + \Sigma \text{ cho})$
- Infusion rate:
 - $\text{Milliliters per hour} = \text{Total volume (mL)} / \text{duration (h)}$
 - $\text{Drops per minute} = \text{Total volume (mL)} / \text{duration (min)} / 3$

NOTE Rules and calculations that support the nutrition ordering process are configured in “Patient Chart Settings”, “Nutrition Record”, “Material Record”, and “Core Table Settings” functions.

3.2.1.8 Medication and medical fluids ordering, calculation, and decision support

This feature supports clinicians in ordering medicines and infusions for the patient and processes data using rules and algorithms.

In the “CPOE” function, in the Infusions and Medicines group, it is possible to order all infusions or medicines in different routes and infusion modes (continuous or intermittent). In this group, the information is context-

sensitive according to physician choices. Some tools support the order process, for example, therapeutic calculators, dose calculations considering a correction factor or the glucose infusion rate, and more, mentioned below.

A medicine can be ordered as a new one using autocomplete or other options, such as routine, protocols (order sets), favorites, and previous orders. When the medicine is added via routine or protocol options, the institution can configure the medicine in the specific protocol with the dose per kilogram, and the system considers the patient's weight and displays the final dose to the user. When a physician orders a new medicine via autocomplete, they need to inform the administration route, dose, unit of measurement, and frequency. Institutions can configure the system to automatically populate these fields with default values; the user can edit the content if needed. In addition, depending to the item selected by the user, the system only presents the appropriate fields (context-sensitive information). For example, for an oral medication tablet, no diluent option is available.

NOTE The rules and calculations are configured in the Material Records, Medicine, Core Table Settings, Patient Chart Settings, Protocol Records, Nutrition Records, CPOE parameters functions to support the medication and medical fluids ordering process.

When applicable, the user can select the body's side to apply the drug. A previous configuration of each drug is necessary for having the suitable options displayed on the screen (for example, left, right, or bilateral for cases such as eye drops).

When the patient brings their home-taking medication to the institution and keeps using it during the admission, the physician can flag the option that refers to this situation, avoiding unnecessary pharmacy supply.

Based on previously configured rules, the user can receive feedback on medication inconsistencies, maximum and minimum dose limits, therapeutic duplication, non-standardized medication, medication allergy after generating an order, and drug interactions. Some consistencies, such as the maximum and minimum dose limits and drug interactions, can also be a result of an interface with external content providers.

In the "CPOE" function, when the physician orders antimicrobials, the system presents specific fields related to the number of days, source of infection, sample material, topography, and microorganism. This information can be managed and approved by the nosocomial infection surveillance team for authorization and infection control.

Ordering, preparation, and administration guide of intravenous medicines

Intravenous drugs can be ordered as an **infusion** (ongoing administration) or **medicine** (discrete administration). When flagged as an infusion in the "e-MAR" function, there is an infusion control by the nursing team, which means that the nurse records the start, the pause, the change of infusion rate, and the end of the infusion. When flagged as a medicine, the nursing team only records the moment the drug was administered, without the time checking mentioned above.

The system considers the current order information to create preparation and administration instructions to support the nursing team. One example using the drug's dose and diluent, the total volume, interval/stages, infusion rate and infusion set volume, for example *Separate 2.4 mL from Fentanyl 50 mcg/mL Injection with 2 mL over 117.6 mL from Sodium Chloride 0.9 % flask 100 mL. Administer 100 mL (one-stage) up to 4.16 mL/h (total volume = 100 ml). Considered 20 mL of infusion device during preparation.*

For intravenous drugs (discrete administration) that may require reconstitution, dilution, and re-diluent (e.g., neonatal), the physician can add them during the ordering process, or the institution can preconfigure them. The options commonly used are displayed when selecting the main drug in the autocomplete. Some adjustments can be made if necessary. The system considers the total volume (medicine and diluent) or the volume to apply and the duration of administration to generate the infusion rate.

For intravenous infusions (ongoing administration), the physician must inform its mode, whether continuous, intermittent, variable infusion rate, or PCA. The main differences are described below:

Continuous: infusions administered without planned interruptions, such as for long periods (for example, 24 hours). There are no time intervals when the bottles are changed.

Intermittent: infusions that are administered with a time slot between the stages, such as every eight hours for 30 minutes. The infusion time is shorter than the interval between the doses.

Variable infusion rate: infusions that normally vary their infusion rate according to patient clinical response. They are widely used in intensive care units for vasoactive medicines, as per physician discretion.

PCA: infusions that are controlled by the patient for analgesic purposes.

For continuous and intermittent infusions, the system considers the bag volume (medicines and diluents) and the infusion duration to generate the infusion rate. When the user types the desired infusion rate, the system does not process any calculation, only considers the typed infusion rate. *Example: Continuous Infusion with “infusion rate” as reference for calculation or Variable Infusion Rate infusion.*

The system also calculates the total volume of the infusion, considering the bag volume and the interval or stages selected in continuous and intermittent infusions with interval and stages as a reference for calculation. For continuous infusions with infusion rate as a reference for calculation, the system only considers the typed rate to generate the total volume. *Examples: if the bag volume has 100 mL and the physician types twice a day, then the total volume is 200 mL. If the physician enters 50 mL/h of infusion rate and the administration time of two hours, then the total volume is 100 mL.*

Therapeutic dose calculators

During the process of ordering intravenous medicines, the physician can open the therapeutic calculator, clicking the icon on the dose field to assist in calculating the final dose.

The physician may also use a therapeutic calculator to assist in the final dose and infusion rate calculation when ordering an infusion. As a pre-requisite, the “CPOE” function parameter #29 must be set to NO, with this setting the diluent will be visible on the user’s screen. In addition, “CPOE” function parameter #1151 allows two view options of the infusion calculator for adult and neonatal/pediatric patients.

The adult calculator generates the infusion rate, considering the weight, height, body surface area, body mass index, therapeutic proposition, and measurement unit. *Example: If the infusion has 100 mcg of fentanyl (2 mL) and 98 mL of saline (100 mL in total) and the physician types 10 mcg/h in the dose therapeutic proposition, then the system generates an infusion rate of 10 mL/h and an administration time of 10 h.*

The neonatal/pediatric calculator aims to generate the necessary dose of medication and diluent to prepare the infusion, considering the weight, height, body surface area, body mass index, infusion rate, infusion duration, therapeutic proposition, and measurement unit. *Example: If the infusion has 100 mcg of fentanyl (2 mL) and 98 mL of saline (100 mL in total) and the physician types 10 mcg/h in the dose therapeutic proposition, 10 mL/h in the infusion rate and 24 h in the duration, then the system generates 4.8 mL of fentanyl and 235.2 mL of saline (240 mL in total) to cover 24 h of administration time.*

Intravenous Rehydration Therapy

The Intravenous Rehydration Therapy aims to maintain or restore the normal volume and composition of body fluids.

In the “CPOE” function, there is this feature that allows the prescription of Intravenous Rehydration Therapy, helping the medical user in the selection of products and elements that will compose this solution, as well as in the various calculations that are performed. It is available in CPOE, through an icon that may be visible on the prescription screen of Solutions and Medicines, if parameter #767 of CPOE “Allows prescribing Intravenous Rehydration Therapy” is enabled.

By clicking on the “Intravenous Rehydration Therapy” icon, the system will open a prescription screen of the elements and products that will compose this solution. To generate them, it is necessary that in the Nutrition Registration function all the configurations are properly done.

For the system to calculate the dose of elements and products, the user must necessarily inform the patient's weight, since the doses will be unique for each individual. By informing the weight, the system can calculate the Water Intake, which will inform the total amount of liquid needed to compose the solution, and the need for kcalories per day. The system will also calculate the glucose infusion rate (GIR).

With these results and information, the system will bring up the elements and products. Depending on the patient's weight, the system will calculate the daily amount of electrolytes. For glucose, the system will consider the GIR value (mg/kg/min), completing the volume of the solution with water, in order to complete the value of the patient's water supply.

Glucose infusion rate

When ordering a medicine diluted in glucose, the system displays the Glucose Infusion Rate (GIR) field for the user. In this field it is possible to enter the GIR value in mg/Kg/min to generate the dose of the glucose diluent. When only a glucose product is ordered, the user can access the GIR field via the icon on the glucose dose field, and the system generates the glucose dose according to the GIR value in mg/Kg/min.

There are two prerequisites for the adequate working of this feature. The glucose products must be identified correctly in the “Order” tab of the “Material Record” function, and the parameter #29 of the “CPOE” function must be set as YES.

Ordering nutrients

In the “CPOE” function, when the physician orders medicines or infusions that provide macronutrients and micronutrients to the patient, the system displays the quantity of nutrients provided in the ordered dose. A previous configuration is necessary for the “Nutrition Record” function (the same used for parenteral nutrition ordering) for each product, identifying the equivalent quantity of the nutritional element.

Correction factor

The physician can select the loading, additional, and differentiated doses and flag the option of the correction factor to consider the volume disregarded in the device line (infusion set) by the formula: *correction factor = total infusion volume + volume of the infusion set / total infusion volume*. The correction factor is multiplied by each dose (volume of medicine, volume of diluent) to define the final volume to be dispensed. Considering the final volume, the system generates the preparation instructions and calculates the dispensing materials.

Schedule generation

Finally, when selecting the interval or stages of drugs and infusions and the first time of the administration, the system generates the schedule of the administration times. *Example: if the user enters two times a day, starting today at 08 a.m., then the system generates 08 a.m. and 08 p.m. as administration times.*



WARNING

The precise configuration of the ordering time interval options and their properties is critical for the correct behavior of the system, and every orderable item, such as drugs, procedures and exams must be linked to the proper applicable intervals.

Beyond that, using the “CPOE” function, the physician can select the loading, additional, and differentiated doses, define different administration intervals (every day, just a few days a week, once a month, at a specific time or after a specific meal).

If physicians are ordering a continuous drug that does not have a time for discontinuation (e.g., thyroxine), they must flag the option “Kept until further notice”. If there is a duration use limit (such as antimicrobials and anti-inflammatory drugs), they must flag the ‘Scheduled’ option and define the end date of the treatment. There are additional options for single-dose, PRN, and as per doctor’s discretion.

3.2.1.9 Chemotherapy and radiotherapy ordering

This feature supports physicians in ordering chemotherapy and radiotherapy treatments and the physicist to plan the radiotherapy application.

The user opens the “EPC” function in the “Cancer Treatment/Chemotherapy” item to order chemotherapy. The user defines the protocol according to the diagnosis and staging of the tumor. The user can modify the items in the protocol, changing or adding the information, for example, sequence of items, medication, dose, route of administration, interval, day and cycle of application, category (pre or post medication), and the administration facility (hospital or home). The user can generate the order in the same function after filling in the required information. If necessary, the user can change any patient information, such as weight, height, creatinine, or AUC.

It is still possible after the protocol generation to adjust and modify information for each medication. Nevertheless, changes in three fields will require dose recalculation: the dose directly, the unit of measurement (mg/m² or mg/Kg), and type of weight (current, optimal, or adjusted optimal weight). For adjusted optimal weight, it is necessary to inform the medication correction factor. For outpatient treatment, the order is sent to the pharmacy to be delivered to the patient.

Based on previously configured rules, the user can receive feedback on medication inconsistencies, such as dose above the limit, non-standardized medication, and medication allergy after generating an order.

The physician can order radiotherapy on the “EPC” function in the item Cancer Treatment/Radiotherapy. To execute the ordering, the user needs to fulfill information such as type of treatment (conventional radiotherapy or brachytherapy), responsible physician and physicist, locoregional or ICD-10 and ICD-O, side, and purpose. Once the physician records the necessary information, the physicist can plan the treatment in the “Radiotherapy Management” function.

In the same “Radiotherapy Management” function, the physicist adds information in the physician’s previously defined radiotherapy protocol in the “EPC”. The information includes treatment start date, total dose and dose per fraction (cGy), amount of check film, days of application, applicator, insertion number, total dose for insertions (cGy), interval, and the volume of the treatment. The process of determining the volume of the treatment has several steps. Two volumes need to be defined before the planning begins.

These volumes are GTV (Gross Tumor Volume) and CTV (Clinical Target Volume). Then, two more volumes are defined during the planning process: PTV (Planning Target Volume) and Organ at Risk.

3.2.2 Management and administration of specific and general orders

A subgroup of features related to documenting the execution of the patient's clinical orders, such as administration of medications, nutrition products, infusion of medical fluids, collecting exams or following recommendations.

3.2.2.1 General plan and medications administration

This feature supports the nursing team to record and manage administration and checking of several ordered items, such as drugs, nutrition, and procedures. A timeline displays all ordered items and administration times and their status, such as pending administration, suspended, or administered.

The highly configurable “e-MAR” function is used to support this feature. For example, in the “System Administration” function, the user can configure several properties, such as defining user privileges, right-click button options, linking the closed-loop administration process, and integrating the information with other system functions such as chemotherapy and hemotherapy, and lab exams management.

Using the “e-MAR” function, the user can record the administration, cancellation, and patient’s refusal of medicines, oral diets, infant milk, and formulas, as well as the checking fasting periods, lab and non-lab exams, services and procedures, nurse interventions, recommendations, and complementary orders. It is also possible to reschedule, save the scheduled time as a default, and perform new dispensing requests. Through the configuration of the function’s parameters, “Material Records” and “Core Table Settings” functions, it is possible for the system to inform the user whenever there is a new order that is pending for the nurse's acknowledgement, as well as identify which of the medicines require double-check from the nursing staff.

Then, in the “e-MAR” function, the nursing team records the administration or checking according to the scheduled time, or in the case of PRN or per doctor’s discretion, the user can schedule them when receiving the physician order. All information can be double-checked in the “CPOE” function, such as dose and route for medications.

When administering an oral diet, the user can record its amount and the patient’s satiety. According to a previous configuration, it is possible to display the nutrition as oral diets or simply as breakfast, lunch, and dinner. When administering infant milk and formulas, the user can record the gastric residue and the administered and residual volumes and their characteristics. When checking non-lab exams, services, and procedures, it is also possible to record associated items, such as medicines or infusions.

Nurse interventions from “CPOE” function and recommendations from the care plan of the “EPC” function can be checked according to the scheduled time. If there is no time scheduled, the user can schedule or suspend them.

Every action performed regarding the administration process is recorded in the system, and the user has access to the logs via a screen option or a right-click button option “view item events.”



WARNING

To avoid safety issues related to the patient therapeutic plan and its details displayed on the e-MAR function, in cases of discrepancies or doubt, the user must double-check the primary source of the ordering process, on the CPOE function.



WARNING

The precise configuration of the ordering time interval options and their properties is critical for the correct behavior of the system, and every orderable item, such as drugs, procedure and exams must be linked to the proper applicable intervals.

3.2.2.2 Bedside checking process

This feature supports the bedside checking process using devices such as laptops and barcode readers.

There are two system possibilities, the simple record checking of the item (such as drugs, nutrition, and milk) in the “e-MAR” function or triggering the “CLMAP” function.

According to a previous configuration, the “CLMAP” function is accessed via “e-MAR” function, by double-clicking the scheduled time or item, and by the right-click button option. Using barcode readers, the “CLMAP” allows the user to check medicines, infusions, nutrition and milk, blood products, bladder irrigation, and materials and items associated with procedures. The user can also record the cancellation, the patient’s refusal, and the first and second checks of high-risk medications. In addition, according to a previous configuration, it is possible to record the separation, sanitization, preparation, and administration steps.

All actions performed regarding the administration process are recorded in the system. The user has access to all logs by the screen or right-click button option: “View item events”.

3.2.2.3 Medical fluids infusion process

This feature helps the nursing team to manage the infusion administration process.

In the “CPOE” function, the physician can order continuous, intermittent, and variable dripping rate infusions, PCA infusion, and intravenous rehydration therapy filling in all information needed for the correct administration by the nursing team. For greater precision regarding infusion rate, it is possible to activate a parameter to apply two decimal places in the data.

In the “e-MAR” function, the nursing team records the infusion’s start according to the scheduled time. In the case of PRN or infusions per doctor’s discretion, the user can schedule when receiving an order by the physician.

When starting a continuous, intermittent, or intravenous rehydration therapy infusion, the user can define the patient an existing device (or add a new one in the “Devices used by the patient” function) and double-check the information coming from the “CPOE” function, such as infusion components, infusion rate, and volume to be administered. If it is necessary to pause the infusion, the user informs the reason, the partial infused volume, and the discarded volume, when applicable. When there is a physician’s request that the required volume is larger than the existing bottle’s presentation in the pharmacy, the “e-MAR” function user needs to record the change of the bottle before resuming the infusion and complete the requested volume.

When starting an infusion with a variable dripping rate, the ICU nursing team records the time and the initial infusion rate that will be changed according to the patient’s clinical parameters, decreasing or increasing it.

When starting a PCA infusion, the user can define the patient an existing device (or add a new one in the “Devices used by the patient” function) and double-check the information coming from the “CPOE” function, such as infusion components, lockout interval (min), type of analgesia, mode, final concentration, bag volume (mL), initial dose, flow, bolus, four hours limit and one hour limit.

According to a previous configuration and the information filled in the “CPOE” function, it is possible to view the infusion titles in the “e-MAR” function, usually used when physicians want to condense the infusion components. There are different icons for each infusion status: started, interrupted, resumed, and finished.

Other actions available in the “e-MAR” function, according to user privileges, are to define infusion pump, assign an infusion pump to a patient, compare between drug information received from the infusion pump and prescribed order, inform which channel of the infusion pump is being used, change the infusion, reschedule, and suspend the infusions. All actions performed regarding the infusion process are recorded in the system, and the user has access to all logs via the screen or right-click option “View item events”.

3.2.2.4 Medical gases administration

This feature supports the user in recording the administration of medical gases for the patient.

Via the “e-MAR” function, the nurse records the start of the medical gases administration, and according to the breathing type, different fields are necessary to be filled in. For example, if the breathing is spontaneous, the nurse checks the amount of gas, the device, and the FiO₂%. If mechanical, the nurse checks the ventilatory parameters, the amount of gas, and the equipment.

The nurse can also schedule, reschedule, interrupt the administration process (by informing the reason), finalize or suspend the medical gases administration based on user privileges. In addition, if the gas therapy has been ordered as PRN or Per Doctor’s order, the nurse can schedule it when the physician defines the right moment to start it. For mechanical ventilation, it is possible at any time to view the ventilation parameters ordered in the “CPOE” function by pressing the right mouse button option on the “e-MAR” function screen.

3.2.2.5 Blood, blood products and related therapies execution

This feature supports the administration processes of blood and blood products.

In the “e-MAR” function, the clinical user can use the filter to search for a patient. After selecting a specific patient, the clinical user needs to choose the “Blood Management” tab to access the patient’s blood bag information. It presents the requested blood product and detailed information such as blood product, dose, interval, and infusion device.

NOTE The patient's blood bag is listed in the "Blood Management" tab of the "e-MAR" function only after the request is submitted via the “Blood Management” function.

Using the “e-MAR” function, the clinical user can choose one of the already submitted blood products to record the infusion’s start, pause, and end. The user can also record transfusion reactions and events using a right-button mouse option in the same function.

It is also possible to perform a bedside checking of the blood products using devices homologated by Philips. First, the user accesses the platform’s link in the browser and selects the “e-MAR” icon on the screen. Then, at the bedside, the user checks the patient’s wristband to see the requested blood products. After the clinical user chooses one of the blood products, it is necessary to confirm the reservation and blood product number to start or stop the infusion. As a result, the blood product status changes to completed in the “Blood Management” tab of the “e-MAR” function.

3.2.2.6 Chemotherapy administration

This feature supports checking chemotherapy medication information (for example, medication, dose, unit of measurement, route of administration, interval, infusion device, day, and the cycle of application) before administering them.

Using the “e-MAR” function, the clinical user accesses the patient medication information. Filters can be applied for searching in the patient worklist. After choosing a specific patient, the user selects the item “Oncology” and check the detailed data in the filter (for example, day, chemotherapy cycle, period of hours). The system brings the medication the patient needs to receive according to the time, day, and cycle of application.

Before choosing one of the medications presented, the clinical user can verify if the medication was dispensed and is ready to be administered. It is possible to view the process status of each medication (in preparation, prepared, and dispensed).

The clinical user can choose one of the medications, confirm the production order and the order number in the “Oncology Check” function. The medication status changes to “Administered” in the “Oncology Check” and in the “eMAR” functions.

3.2.2.7 Dialysis execution

This feature aims to assist the caregivers during the dialysis session.

The user accesses the "Kidney Failure Management" function in the "Reception" sub-tab and selects the patient. Register the patient's arrival or absence, confirm the presence, inform the pre-dialysis weight, and generate the hemodialysis.

Before starting the dialysis session, the user accesses the sub-tab "Kidney Failure Management", in the same function, and selects the patient. It is possible to view the prescription, generated in the "CPOE" function, with the defined treatment, type of dialysis prescribed, and other information inserted in the dialysis prescription (medication, solutions, recommendation).

In the same sub-tab "Kidney Failure Management", the user defines the dialyzer and dialysis point, generates the dialysis, and registers the control during the dialysis session. In the dialysis control the blood flow, transmembrane pressure, arterial and venous line pressure, temperature, heart rate, capillary glycemia among others are recorded.

3.2.2.8 Bladder irrigation

This feature supports the user in managing the bladder irrigation procedure, which is the washing method of the mucosa that lines the bladder, removing sediments, clots, urine decomposition, or therapeutic purposes.

By the “CPOE” function, the physician orders the procedure bladder irrigation, adding the required washing solutions.

In the “e-MAR” function, after selecting a patient, the nurse records the start of the procedure, inputs the amount of infusing solution. It is possible to record the washing process several times, informing the infusing volume and drained volumes with their appearance until the end of the procedure. A bladder irrigation device can be added right after starting the procedure. This device is included in the patient device list in the item “Devices used by the patient”, accessed through the “EPC” function. In addition, according to user privileges, it is possible to schedule, reschedule, and suspend the irrigation process.

3.2.2.9 Glycemic control

This feature supports the user in managing the patients' blood glucose (BG) level checks, processing data using rules and algorithms, displaying the correspondent corresponding therapeutic instructions, aiming for tight blood glucose control. The rules and algorithms are based on scientific literature or configured by the customers.

The processes and workflows related to this feature are separated into two procedures in the system: Conventional Glucose Control (CGC) and Intensive Glucose Control (IGC). CGC is based on fewer periodic BG

checks and does not require continuous insulin intravenous administration. IGC, also known as Intensive Insulin Therapy, is generally applied for patients in critical care units, requiring more frequent BG checking (commonly every one or two hours) with continuous intravenous insulin administration to achieve and maintain an adequate glycemic control with a low risk of hypoglycemia.

NOTE The Conventional and Intensive glucose protocols defined by the institution are configured in the “Patient Chart Settings” function in the option Glycemia Protocols.

In the “CPOE” function, the physician can order one of the two procedures mentioned above. Previously, a mandatory configuration is needed in the "Internal Exams and Procedures" function, where the "Glycemia" field is flagged with the option CGC or IGC.

NOTE When ordering a procedure in the “CPOE” function, which is linked to a glucose control protocol, the items associated with the order will be classified as either CGC or IGC based on the procedure selected. When using the function “eMAR”, the items are then grouped by CGC and IGC, in different lists to be managed separately.

For the CGC procedure, the user can select one of several different schemes, then review and modify the ranges and instructions in the “CPOE” function before submission. There are three possible options regarding IGC: Goldberg, Modified, and Institution-defined protocols. The definition of the option available to the end-user is based on previous settings in the "e-MAR parameters" function. For the intensive control schemes, the physician cannot edit the glycemic ranges and instructions.

The conventional and intensive glucose protocols defined by the institution are configured in the “Patient Chart Settings” function in the option Glycemia Protocols. For conventional protocols, based on if-then rules, it is necessary to define ranges with initial and final levels of BG, the equivalent insulin or glucose default dose, medication administration instructions, miscellaneous instructions / guidelines, the schedule, and rules for additional measurements. For intensive protocols, as mentioned before, there are two hard-coded protocols and one configurable by the institution. For the latter, it is necessary to define the initial and final levels of BG to start the protocol and the suggested dose of intravenous insulin. In the same function, the user configures the maintenance phase with the suggested doses of insulin or glucose equivalent to the BG increase, decrease, and percent of variation.

For the hard-coded IGC protocols, the system’s default option is the Goldberg Protocol (parameter #400 of “e-MAR parameters” function). See below the Goldberg algorithm, according to the publication *Goldberg, P. A., Roussel, M. G., & Inzucchi, S. E. (2005). Clinical Results of an Updated Insulin Infusion Protocol in Critically Ill Patients. Diabetes Spectrum, 18(3), 188–191. Doi:10.2337/diaspect.18.3.188.*

Target blood glucose (BG) levels: 90-119 mg/dL

Bolus & initial insulin infusion rate: If initial BG \geq 150 mg/dL, divide by 70, then round to nearest 0.5 units for bolus AND initial drip rate. If initial BG < 150 mg/dL, divide by 70 for initial drip rate only (i.e., NO bolus). Examples: Initial BG = 335 mg/dL: $335 \div 70 = 4.78$, round \uparrow to 5: 5 units IV bolus + start infusion @ 5 units/h; initial BG = 148 mg/dL: $148 \div 70 = 2.11$, round \downarrow to 2: start drip @ 2 units/h (NO bolus).

Changing the insulin infusion rate:

If BG < 50 mg/dL: Discontinue the insulin infusion and give 1 ampoule (25 g) of Dextrose 50 IV and recheck BG every 15 min. When BG ≥ 90 mg/dL, wait 1 hour and recheck BG. If still ≥ 90 mg/dL, restart insulin infusion at 50% of most recent rate.

If BG 50-69 mg/dL: Discontinue the insulin infusion and, if symptomatic (or unable to assess), give 1 ampoule of (25 g) Dextrose 50 IV and recheck BG every 15 min; If asymptomatic, give 1/2 ampoule (12.5 g) of Dextrose 50 IV or 8 ounces (240 mL) juice and recheck BG every 15-30 minutes; when BG ≥ 90 mg/dL, wait 1 hour and recheck BG. If still ≥ 90 mg/dL, restart infusion at 75% of most recent rate.

If BG ≥ 70 mg/dL:

Step 1 - determine the current BG level and identifies a column in the table below.

Step 2 - determine the rate of change from the prior BG level, identifies a cell in the table, then move right for instructions.

NOTE If the last BG was measured 2-4 hours before the current BG, calculate the hourly rate of change.
Example: If the BG at 2 p.m. was 150 mg/dL and the BG at 4 p.m. is now 120 mg/dL, the total change over 2 h is 30 mg/dL. however, the hourly change is $-30 \text{ mg/dL} \div 2 \text{ h} = -15 \text{ mg/dL/h}$.

Current BG level				Instructions*
BG 70-89 mg/dL	BG 90-119 mg/dL	BG 120-179 mg/dL	BG ≥ 180 mg/dL	
		BG ↑ by > 40 mg/dL/h	BG ↑	↑ infusion by "2Δ"
	BG ↑ by > 20 mg/dL/h	BG ↑ by 1-40 mg/dL/h or BG unchanged	BG unchanged or BG ↓ by 1-40 mg/dL/h	↑ infusion by "Δ"
BG ↑	BG ↑ by 1-20 mg/dL/h, BG unchanged or BG ↓ by 1-20 mg/dL/h	BG ↓ by 1-40 mg/dL/h	BG ↓ by 41-80 mg/dL/h	No infusion change
BG unchanged or BG ↓ by 1-20 mg/dL/h	BG ↓ by 21-40 mg/dL/h	BG ↓ by 41-80 mg/dL/h	BG ↓ by 81-120 mg/dL/h	↓ infusion by "Δ"
BG ↓ by > 20 mg/dL/h see below†	BG ↓ by > 40 mg/dL/h	BG ↓ by > 80 mg/dL/h	BG ↓ by > 120 mg/dL/h	Hold x 30 min, then ↓ infusion by "2Δ"

† Discontinue insulin infusion and check BG every 30 min. When BG ≥ 90 mg/dL, restart infusion at 75% of most recent rate.

*Changes in infusion rate ("Δ") are determined by the current rate:

Current Rate (units/h)	Δ = Rate Change (unit/h)	2Δ = 2x Rate Change (unit/h)
< 3	0.5	1

3 - 6	1	2
6.5 – 9.5	1.5	3
10 – 14.5	2	4
15 – 19.5	3	6
20 – 24.5	4	8
≥ 25	≥ 5	10 (consult medical doctor)

The second hard-coded IGC protocol is a modified version of the Goldberg Protocol (parameter #426 of “e-MAR parameters” function), according to the publication of the Handbook of Practical Critical Care Medicine of the Brazilian Society of the Intensive Care – Segmento Farma Editores, 2009.

In the “e-MAR” function, the nurse can schedule, reschedule, start, pause, cancel, and finish the glucose procedure. After each BG measurement, the nurse records the BG level and receives the corresponding instruction based on the pre-defined rules. Finally, the nurse records the action taken.

3.2.3 Clinical records charting and view

A subgroup of features related to patient history as documented by healthcare professionals. This section includes general record supported by the system for different levels of complexity of patient care.

3.2.3.1 Health history

This feature supports the clinical user in managing the social and health information patient history.

In the “Health History” item of the “EPC” function, the user can record and check the patient’s health history information. This structured information is separated into several categories, such as medications in use, comorbidities, allergies, social history, previous surgeries and transfusions, orthosis and prothesis, and vaccines. In addition, based on previous configuration and the aim to expedite the recording process, it is possible to call the Routine Health History using the right-click option. Thus, the user can fulfill concise information from different health history tabs on a single screen.

The information recorded in the “Health History” item of the EPC may be used in other clinical workflows, such as data about allergies is used during the medication ordering in the “CPOE” function. In addition, based on the same configuration rules, information from health history can be presented in the “Safety Alert” function, which can be shown in different moments of the clinical workflow. The allergy information is also presented in the allergy icon of the patient bar.

3.2.3.2 Patient education

This feature supports HCP in preparing, managing and providing patient educational interventions, plans, and materials related to the care process (diseases, conditions, and treatment).

The “Nursing Records” function is used to configure the educational interventions and guidelines for the patient or family members. Each nurse intervention can be linked with nursing diagnosis to support the structured care plan process via the Care Plan and SNPC functions. Using the “Standardized Nursing Care Plan (SNCP)” or “Health Professional Assistance Systematization (HPAS)” item in the “Electronic Patient Chart (EPC)” function, the HCP can define and manage the patient interventions and educational plans. The interventions can be checked and managed in the “Electronic Medication Administration Record (e-MAR)” function. After confirming the intervention, the user can record the information content provided to the patient, the family member, the teaching method, the patient’s or companion’s level of understanding, and if it was successfully captured. All the information can also be viewed in the “EPC” and “PEPC” functions.

In the “Patient Chart Settings” function, the institution can configure the care plan models, assign professional roles, and link the patient problems to the educational goals. In the “Care Plan” function, the

user can record the patient assessment according to the specific problem identified, select, and define the educational goals. Finally, the user can define the accomplishment of each educational goal supporting the management of the patient educational care plan.

In the “Patient Chart Settings” function, the institution can configure standard texts as orientation or guidance materials at a user or institutional level. Accessing the “Discharge instruction” item of the “EPC” function, the user can record guidelines, when, if properly configured, is supported by standard texts and text input prompting.

3.2.3.3 Clinical attachment archives

This feature consolidates patient documentation into the medical chart by attaching documents from multiple sources such as computer files, scanners, and digital cameras.

In the “EPC” function, documents and images can be attached in different chart items for better clinical reasoning. The user can consult, add, and remove files in clinical functionalities like Wounds and Dressings, Assessments, Discharge Summary, Lab tests, and Imaging/diagnostic services.

Files can also be attached to administrative functions that impact patient care. For example, the “Surgical schedule management” and “Master person index” functions where the users can add and query documentation related to pre-admission, health insurance, and surgical scheduling.

3.2.3.4 Clinical incidents and events

This feature allows the institution to configure, record, and manage clinical incidents and events related to patient care, such as patient falls, aggression, drug use and transfusion reactions.

Each institution needs to configure the events using the “Core Table Settings” function. According to the event type, additional information is required, such as event form, event name, classification, and type of analysis.

The user can record events and clinical incidents occurring at any time during the care process. The main functions associated with the recording of events are the “EPC”, “EOC”, “PEPC”, “Ophthalmology”, “Patient Anesthetic Form”, and “Blood management”.

After selecting the patient, the user can access the “Events” item to record the incident. When adding a new record and selecting an event, the user can inform the classification, severity, describe event details, the immediate actions, and add notes. According to the previous configuration related to each type of event, the user can fill in additional information in structured forms.

Events, incidents, and their information may be used for further analysis performed in the “Quality Management” function. For example, the user can search for types of events by period and department to analyze each type of event and define the appropriate actions.

3.2.3.5 Clinical notes

This feature supports clinical users in creating and checking patient clinical records in a free-text format or structured forms. Admission and progress notes, assessments, and medical opinions are examples of these documents.

NOTE For structured forms, refer to the item "Templates" and "Notes and Forms".

In the “Patient Chart Setting” function, the user can configure sentences and standard texts and define macros to expedite the fulfillment of the information. According to user privileges, access, and use can be defined at an institutional, departmental, specialty, or user level.

In the item “Clinical note” of the “EPC” function, the user can enter a new clinical note and check all the existing ones sorted by period, type of notes, or healthcare professional category. In addition, using the mouse’s right-click button, it is possible to “enter a clinical note with consultation” to support users in inputting information viewing other sources of information simultaneously (split-screen mode).

3.2.3.6 Vital signs and clinical parameters

This feature supports the HCP to input and view data derived from vital signs and clinical parameters and also processes the data using rules and algorithms.

To access this feature, open the “EPC” function and select the "Vital Signs and Monitoring" patient tree option. The user can view different tabs, such as vital signs and general monitoring, respiratory and hemodynamic monitoring, analgesic, portable biochemical analyzer, portable urinalysis, bioimpedance, and lung function. Beyond the grid view, a graphical visualization option is available in the vital signs and general monitoring, respiratory, and hemodynamic monitoring sections.

NOTE In the context of this feature, the word "monitoring" means only the tab's label. This feature is not intended for real-time patient monitoring. It is intended to record data from the monitoring processes (bedside monitors and devices) for documentation purposes.

Integration with bedside monitors and devices is possible. When configured properly, data can be transmitted directly from bedside monitors and other devices to the appropriate fields and can be reviewed by an HCP (parameters #1493 and 1494 of EPC function).

Retroactively importing vital signs data is possible by clicking in the notification icon, located above the patient’s name, in patient bar of the “Electronic Patient Chart” function. Within the “Retrospective data” option, it is possible to select which data will be imported from the retrospective data and stored in the patient chart.

Most of the data are derived from clinical examination or at the bedside. The data input is manual or via an interface, charted from the original system function or by “Multiparameter Flowsheet” function. Data charted by “Multiparameter Flowsheet” function will maintain predefined rules and calculations from the original system function. Sometimes available data can be used to generate new data via calculations, such as the mean arterial pressure, using the systolic and diastolic values or via rules application such as comparing data with standard thresholds. In the latter case, information that is out of range may be highlighted on the screen according to the configuration. In essence, new values can be calculated by the bedside monitor device, the user, or the system. The clinical information derived from calculations executed is listed in the section below.

NOTE The rules related to the comparison with the clinical data with standard thresholds are configured in the "System Administration" function.

"Vital Signs and Monitoring" group

This tab, located in the user interface of the host system, supports the HCP in recording information related to the main and general patient's vital signs and clinical parameters. Description of the formulas displayed in this group (not necessarily in the presentation sequence):

- Mean Arterial Pressure (mmHg): $MAP = [SBP + (DBP \times 2)] / 3$
 - Delta weight (Kg) = Last weight - current weight
 - Arm Muscle Circumference (cm): $AMC = (3.14 \times \text{triceps skinfold (mm)}) / 10$
 - Body Mass Index (Kg/m²): $BMI = \text{weight (Kg)} / [\text{height (m)}]^2$
 - *Regarding BMI, different result classifications and descriptions are possible (World Health Association 2000, Pan American Health Organization 2002, Brazilian SISVAN 2004, Brazilian MoH 2004). The user needs to define the default options in the "Core Tables Settings" function (Patient management -> Electronic patient chart -> Default BMI rule).*
 - Body Surface Area (BSA):
 - Mosteller: square root of (weight x height / 3600)
 - Du Bois & Du Bois: $0.007184 \times \text{height}^{0.725} \times \text{weight}^{0.425}$
 - Haycock: $0.024265 \times \text{weight}^{0.5378} \times \text{height}^{0.3964}$
 - Gehan & George: $0.0235 \times \text{weight}^{0.51456} \times \text{height}^{0.42246}$
 - Boyd: $0.03330 \times \text{weight} (0.6157 - 0.0188^{\log_{10}\text{weight}}) \times \text{height}^{0.3}$
- Regarding BSA, the user needs to define the default option in the Core Tables Settings function (Main Application -> Physician -> Electronic patient chart parameters -> BSA formula (m²)).*

Pain Assessment

Part of the "Vital Signs and Monitoring" group, this feature supports HCP in recording patient pain information. The use of a proper and validated pain assessment scale is key to evaluate pain level. The system has several pain scales available. Some scales are a simple choice of a number or a similar option without any calculation or data processing. Other scales combine different parameters to define the level of pain.

NOTE Check if the Scale, Score or Index is available in your region. Copyrights, official bibliography for translation and cross-cultural Adaptation may impact their availability. Contact your Philips representative for further information.

- **Behavioral Pain Assessment:** The Behavioral Pain Assessment is used to assess the pain of patients unable to provide a pain report themselves. It consists of assessing five aspects: face, anxiety, muscle tone, vocalization, and consolability. The pain is rated in four levels: no pain evidence = 0, mild pain = 1-3, moderate pain = 4-6, and severe pain ≥ 6 . *The John Hopkins Hospital PACU Behavioral Pain Rating Scale cited in Mateo, OM., & Krenzischek, DA (1992).*
- **Behavioral Pain Scale (BPS):** BPS is used to assess pain in sedated and unconscious patients on mechanical ventilation. It consists of assessing three aspects: facial expression, body movements, and tolerance to mechanical ventilation. Pain intensity can be defined between 3 (no pain) and 12 (the highest pain intensity) scores. *Payen JF, Bru O, Bosson JL, et al. Assessing pain in critically ill sedated patients by using a behavioral pain scale. Crit Care Med. 2001 Dec;29(12):2258-63.*
- **Critical Care Pain Observation Tool (CPOT):** CPOT evaluates the pain of adult patients in intensive care units with or without intubation. The scale is applied through answers to five questions. For items such as "Adequacy to the Respirator" and "Vocalization of extubated patients", it is possible to select only one of them (intubated or extubated). The minimum pain score is 0, and the maximum score is 8 points. *Gels C, Fortier M, Viens C, Fillion L, Puntillo KA. Pain assessment and management in critically ill intubated patients: a retrospective study. Am J Crit Care. 2004; 13: 126-135.*
- **Face, Legs, Activity, Cry, Consolability (FLACC) scale:** This behavioral pain scale was developed in 1997 to facilitate the assessment of pain in children ages 0-19. The scale presents indicators of facial expression, movement of the legs, activity, crying, and consolation. Each one is measured from 0-2 points with a possible total score ranging from zero to ten points. The higher the value, the more severe the pain. *Merkel SJ, Voepel-Lewis T, Shayevitz JR, Malviya S. The FLACC: a behavioral scale for scoring postoperative pain in young children. Pediatr Nurs. 1997;23:293-297.*

- **Modified Behavioral Pain:** The Modified Pain Behavior Scale is indicated for use in young children. It can be used to monitor the effectiveness of interventions to reduce pain. It comprises three groups, divided into Facial Expression, Crying, and Transactions. The score ranges from 0-8 points. The higher the value, the more severe the pain. Facial expression (Positive 0, Neutral 1, Negative 2), Crying (Smiling 0, Not crying 1, Moaning 2, Crying a lot or sobbing 3), Transactions (Usual 0, Neutral without movement 1, Removal attempted 2, Complex agitation involving head or limbs 3). *Koren G. Use of the eutectic mixture of local anesthetics in young children for procedure-related pain. J Pediatr. 1993; 122: S30-S35.*
- **Modified Objective Pain Score (MOPS):** MOPS is a modified version of the Objective Pain Score (OPS) to assess pain in children. The scale is designed to assess postoperative pain for preschool and school children aged 2 to 11 years. Through 5 parameters, the scale assesses the level of crying, movement, agitation, posture, and verbal communication, scoring from 0 to 10. The higher the value, the more severe the pain. *Wilson GAM Doyle E. Validation of three paediatric pain scores for use by parents. Anaesthesia. 1996; 51: 1005-1007.*
- **Neonatal Facial Coding System (NFCS):** NFCS is used to assess pain responses by analyzing the newborn's facial activity up to 18 months. It consists of eight parameters (brow bulge, stretched mouth (horizontal/vertical), eyelids squeezed shut, taut tongue, deepening of naso-labial fold, tongue protrusion, open lips and chin quiver) allowing a score ranging from 0 to 8 points. The higher the value, the more severe the pain. *Grunau RV, Craig KD. Pain expression in neonates: facial action and cry. Pain. 1987;28(3):395-410. Pinheiro I, Lima F, Magalhães F, Farias L, Sherlock M. Pain evaluation in newborns using the Neonatal Facial Activity Coding scale during blood gases analysis Rev Dor. São Paulo, 2015 jul-sep;16(3):176-80.*
- **Neonatal Infant Pain Score (NIPS):** NIPS is used in the pain evaluation of the non-intubated newborns. It is composed of six indicators of pain, by the evaluation of the facial expression, crying, breathing movements, movements of the legs and arms, and the waking state. The total score ranges from zero to seven points. The higher the value, the more severe the pain. *Lawrence J, Alcock D, McGrath P et al. — The development of a tool to assess neonatal pain. Neonatal Netw, 1993;12:59-66.*
- **Pain Assessment In Advanced Dementia Scale (PAINAD):** PAINAD was developed to provide a universal method of analyzing the pain experienced by patients in the advanced stage of dementia. It contains five criteria for evaluation (breathing independent of vocalization, negative vocalization, facial expression, body language, and consolability); the score ranges from 0 to 10. The score interpretation is mild pain (1-3), moderate pain (4-6), and severe pain (7-10). *Warden V, Hurley AC, Volicer L. Development and psychometric evaluation of the Pain Assessment in Advanced Dementia (PAINAD) scale. J Am Med Dir Assoc. 2003;4(1):9-15.*
- **Post-Operative Neonatal Pain Scale (CRIES):** The CRIES (Crying Requires increased oxygen administration Increased vital signs Expression Sleeplessness) scale was developed for pain assessment in infants, aged six months or less, and is widely used in the context of neonatal intensive care for postoperative neonatal pain. This scale comprises five categories (cry, oxygenation, vital signs, facial expression, and sleep) with an individual variation of 0 to 2 points per category, totaling 0 to 10 points. The higher the value, the more severe the pain. *Krechel SW, Bildner J. CRIES: a new neonatal postoperative pain measurement score. Initial testing of validity and reliability. Paediatric Anaesthesia, Oxford, vol. 5, p. 53-61, 1995.*
- **Faces (Claro):** This scale was developed and validated by Claro in 1993 and aims to facilitate the assessment of pain of school-age children. The scale follows the same principle of facial expression transformation, using characters familiar to Brazilian children's culture. Five facial expressions are presented: no pain, mild pain, moderate pain, severe pain, and unbearable pain. *CLARO. M.T. Escala de faces para avaliação da dor em crianças: etapa preliminar. Ribeirão Preto. 1993, 60 p. Dissertação (Mestrado) - Escola de Enfermagem de Ribeirão Preto. Universidade de São Paulo.*
- **Numeric Pain Rating Scale - NPRS (categorical):** The NPRS is indicated for assessing pain in adult patients using a numerical value that varies according to the intensity, generally used from (0 to 10). Grade 0 corresponds to the absence of pain, while grade 10 is the highest possible intensity. The patient is asked to rank the severity of pain perception using numbers. *Childs JD, Piva SR, Fritz JM. Responsiveness of the numeric pain rating scale in patients with low back pain. Spine 2005;30:1331-4. Jensen*

MP, McFarland CA. Increasing the reliability and validity of pain intensity measurement in chronic pain patients. *Pain* 1993;55: 195–203. Rodriguez CS. Pain measurement in the elderly: a review. *Pain Manag Nurs* 2001;2:38–46

- **Visual Analogue Scale (VAS):** The VAS is an instrument that measures a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. For example, the amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain. From the patient's perspective this spectrum appears continuous without taking discrete jumps, as a categorization of none, mild, moderate and severe would suggest. It was to capture this idea of an underlying continuum that the VAS was devised. VAS can be presented in several ways, including scales with a middle point, graduations or numbers (numerical rating scales), meter-shaped scales (curvilinear analogue scales), "box-scales" consisting of circles equidistant from each other (one of which the subject has to mark), and scales with descriptive terms at intervals along a line (graphic rating scales or Likert scales). The choice of terms to define the anchors of a scale has also been described as important. https://www.physio-pedia.com/Visual_Analogue_Scale. Huskisson EC. Measurement of pain. *Lancet* 1974;2:1127–31. Downie WW, Leatham PA, Rhind VM, Wright V, Branco JA, Anderson JA. Studies with pain rating scales. *Ann Rheum Dis* 1978;37:378–81.
- **Visual Numeric Pain Scale (VNS):** The VNS aims to inform a numerical value of pain, which may vary according to the intensity, generally used from (0 to 10). Grade 0 corresponds to the absence of pain, while grade 10 is the highest imaginable intensity. The VNS combines the features of a NPRS with solid visual clues, including size and shading. These include the height and shading of bars associated with each numeral and can thus be considered a combination scale with visual and numeric components. *Measurement of pain using the visual numeric scale*. Philip L Ritter, Virginia M González, Diana D Laurent, Kate R Lorig. *The Journal of Rheumatology* Mar 2006, 33 (3) 574-580;
- Regarding the numeric pain rating scales (categorical and numerical), the user needs to define the default option in the "Core Tables Settings" function (Patient management > Electronic patient chart > Rule for pain scale)

"Respiratory" group

This tab, located in the user interface of the host system, supports the HCP in recording information derived from respiratory monitoring, mainly related to mechanical ventilation. The formulas displayed in this group are described below (not necessarily in the presentation sequence):

- Static pulmonary compliance (mL/cmH₂O): $C_{st} = \text{current volume}/\text{plateau pressure} - \text{PEEP}$
- Dynamic compliance (mL/cmH₂O): $C_{dyn} = \text{current volume} / \text{peak pressure} - \text{PEEP}$
- PaO₂/FiO₂ ratio (mmHg/%): $P/F = \text{PaO}_2/\text{FiO}_2$
- Pulmonary resistance (cmH₂O/L/s): $R_{sr}/R_{aw} = (\text{peak} - \text{plateau pressure})/\text{O}_2 \text{ flow}$

"Hemodynamics" Group

This tab supports HCP to record information derived from hemodynamic monitoring. Description of the formulas displayed in this group (not necessarily in the presentation sequence):

- Mean pulmonary artery pressure (mmHg): $\text{MPAP} = (\text{SPAP} + [2 \times \text{DPAP}])/3$
- Mean femoral arterial pressure (mmHg): $\text{MFAP} = (\text{SFAP} + [2 \times \text{DFAP}])/3$
- Cardiac index (L/min/m²): $\text{CI} = \text{CO}/\text{BSA}$
- Systolic volume (mL/heartbeat): $\text{SV} = (\text{CO}/\text{HR}) \times 1000$
- Systolic index (mL/beat/m²): $\text{SI} = (\text{CI}/\text{HR}) \times 1000$
- Systemic Vascular Resistance (dynes.sec.cm⁻⁵): $\text{SVR} = 80 \times (\text{MAP} - \text{CVP}) / \text{CO}$
- Systemic Vascular Resistance Index (dynes.sec.cm⁻⁵/m²): $\text{SVRI} = 80 \times (\text{MAP} - \text{CVP})/\text{CI}$
- Pulmonary Vascular Resistance (dynes.sec.cm⁻⁵): $\text{PVR} = 80 \times (\text{MPAP} - \text{PAOP})/\text{CO}$
- Pulmonary Vascular Resistance Index (dynes.sec.cm⁻⁵/m²): $\text{PVRI} = 80 \times (\text{MPAP} - \text{PAOP})/\text{CI}$

- Left ventricle systolic work (g.min): $LVS\text{W} = SV \times (\text{MAP} - \text{PAOP}) \times 0.0136$
- Left ventricle systolic work index (g/m/m²): $LVS\text{WI} = SI \times (\text{MAP} - \text{PAOP}) \times 0.0136$
- Right ventricle systolic work (g/m/m²): $RVS\text{W} = SV \times (\text{MPAP} - \text{CVP}) \times 0.0136$
- Right ventricle systolic work index (g/m/m²): $RVS\text{WI} = SI \times (\text{MPAP} - \text{CVP}) \times 0.0136$

“Extracorporeal Membrane Oxygenation” group

This tab supports HCP in recording information derived from extracorporeal membrane oxygenation. There is a single formula displayed in this group:

- Trans-membrane pressure (mmHg): Pre-membrane pressure – post-membrane pressure

“Analgesia” group

This tab supports HCP in recording information derived from analgesia control. Using a proper and validated analgesic assessment scale is key to evaluate the patient’s depth of analgesia:

- Comfort Behavior Scale (COMFORT-B): Refer to the feature “Scales, indexes, and scores” of this document.
- Glasgow Coma Scale (GCS) modified by Cook and Palma: This scale was described in 1987 and provides a score of the patient’s reactivity under mechanical ventilation according to response to external stimuli, considering five pieces of information: eye-opening, motricity, cough, ventilation, and spontaneous communication. The score of the scale, ranging between 4 and 18, is based on the best reactivity response and assesses a numerical score that corresponds to deep sedation when less than 8, to mild sedation when in the range between 8 and 13, and to awake status when > 13 score. *Cook S, Palma O: Propofol as a sole agent for prolonged infusion in intensive care. J Drug Dev 1989, (Suppl 2):65–67*
- Neonatal Pain, Agitation and Sedation Scale (N-PASS): Refer to the feature “Scales, indexes, and scores”.
- Pasero Opioid-Induced Sedation Scale (POSS): The POSS scale was developed to assess the level of sedation in patients after opiates administered for pain management. The scale is recommended to adult patients in care settings non-critical, as well as for opioid management, also for sedation assessment in the Post Anesthetic Recovery Room. The scale has five levels of sedation criteria to select such as S = Sleep, easy to arouse, 1 = Awake and alert, 2 = Slightly drowsy, easily aroused, 3 = Frequently drowsy, arousable, drifts off to sleep during conversation and, 4 = Somnolent, minimal or no response to verbal and physical stimulation. *Chris Pasero, M.S, RN – BC, FAAN. Assessment of sedation during Opioid administration for Pain Management. Journal of Ped. Anesthesia, Vol 24, No 3 (June) 2009: pp 186 – 190*

“Bioimpedance” group

This tab supports HCP in recording information derived from bioimpedance evaluation, such as body density, mass, and water. There is a single formula displayed in this group:

- Waist-hip ratio (cm) = Abdomen circumference (cm) / hip circumference (cm)

3.2.3.7 Diagnosis and problem lists

This feature allows the user to chart, manage and visualize the patient diagnosis and problems in the patient chart.

The concept diagnosis here means using specific catalogs, such as International Classification of Diseases (ICD-10) from WHO, to assign a diagnosis for a patient. Whereas problem list refers to the patient’s health problems, and each problem may be associated or not with a diagnosis code.

The clinician can manage the patient’s diagnosis by accessing the item “Diagnoses” and managing the patient problems by accessing the Problem List, both in the “EPC” function.

In the “Diagnoses” item of the “EPC” function, record information related to the diagnosis, such as ICD-10 code, classification of primary or secondary diagnosis, acute or chronic, date of the diagnosis, last manifestation and duration.

In the “Problem List” item of the “EPC” function, it is possible to utilize standardized lists or catalogs (e.g., International Classification of Primary Care (ICPC) , ICD-10). These catalogs must first be loaded in the system using the “Loads” function. Users can link a problem with a catalog code or create a free-text description of the problem. They can define categories, status, start date, and duration of the problems. In addition, it is possible to change the status of a problem during the patient’s hospitalization and create other secondary problems connected to a primary one.

3.2.3.8 Laboratory results charting and view

This feature provides the user a consolidated view of patient laboratory results, such as, serum glucose, serum or urine creatinine and microbiology cultures.

Laboratory results may be manually charted by an HCP or acquired via an interface with an external source. The user selects the item “Lab tests” in the “EPC” function to access this feature. The system displays all patient laboratory results from this encounter or even the previous ones in a list view. The list displays exam status and corresponding status icon, acknowledgment, and if the exam results are out of the normal reference range. In the filter options, the user can set a period, specific exam, or group, select a hospital unit, or only the out-of-reference range values. In the grid mode tab, it is possible to generate a graphical view of laboratory results for better analysis and management.

It is possible to visualize the laboratory results in text typed in the system and to visualize the laboratory results in pdf files that were generated through an external system and imported through integration. In this same item, the user can register an acknowledgement, marking that they are aware of the exam results.

It is possible to manually chart laboratory results by clicking the “Add” option in “Lab Tests”, opening the “External Lab Result Entry” function. After defining the result date, requesting a physician, and the exam protocol (set of exams, if applicable), the user selects the exams and charts their results. These results will be available on the “EPC” function.

3.2.3.9 Non-lab results (images and others)

This feature allows HCPs to view the reports of imaging exams after the radiology physician’s release.

The main functions where the professional has access to the examination reports of each patient are “EPC”, “EOC” and “PEPC” functions.

When selecting the patient through the “EPC” function by accessing the “Imaging/diagnostic services” item, the user can view the requested exams and the reports. For an exam to be presented in this item, it depends on the process of ordering, performing, and releasing the report using the “EPC”, “Exam Management”, and “Medical Report Processing” functions.

The user can use the “External Imaging/Diagnostic Service Results Entry” function to transcribe the reports of exams that the patient performed externally. These reports can be viewed in the “Imaging/diagnostic services” item. In this same item, the HCP can mark an exam as aware, view the report and view the report images through an integration with a Picture Archiving and Communication System (PACS). Integration with an external image storage system is optional, exam images can also be manually uploaded as attachments.

The professional requesting the exam can view the orders of exams performed and their reports on the physician's portal.

In the patient's portal functionality, the patients can view their exams and reports.

3.2.3.10 Intakes & outputs

This feature supports HCPs in recording, following up, and managing liquid intakes and outputs.

The "Patient Chart Settings" function is used to configure the groups, types, and properties of the intakes and outputs, such as the unit of measurement (mL or g) or the number of times (without a unit of measurement), conversion, if they count or not in the fluid balance, and if they need additional information. It is possible to link intakes and outputs to specific devices bringing more consistency and accuracy during the recording process. Rules can be configured to notify HCPs if there is no data input for a defined time. In the "Core Tables Settings" function, the user can define the day shifts with the hour that each one starts and finishes, which impacts the fluid balance's data analysis. The user can also define the rules of automatic input, such as for infusions, diets, and blood collection.

The follow-up and management of intakes and outputs can be performed in the item "Intakes and Outputs" of the "EPC", "PEPC" and "Patient Anesthetic Form" functions. The analysis of the fluid balance is performed by different groups based on a day, shift, or admission view. The user can also check the intakes and outputs in the "Electronic Patient Summary" and "Multiparameter Flowsheet" functions. In the latter, a graphical view is available. For recording, when the user is on the "Intakes and Outputs" tab, a new function, called the "Intakes and Outputs" function, is opened. During the data input, the user selects an intake or output option from a predefined list, informing the hour, the value with the proper unit of measurement (volume, weight, or occurrence), and the patient device.

The anesthesiologist can record intakes and outputs directly from the "Surgery Graph" function in the anesthesia graph during the surgery. The information recorded in the anesthesia graph is also available in the "Intakes and Outputs" tab of PEPC.

Some information recorded in the "eMAR" function can automatically feed certain information to the patient intakes and outputs process. For example, when the nurse records an infused volume, liquid diet, blood loss, or collection, it can automatically generate a new input. The same case applies to the bladder irrigation procedure and some nursing interventions ordered in the "Care Plan" function, where some fluid outputs can be recorded, such as the ones related to drains and tubes.

3.2.3.11 Discharge summary

This feature provides mechanisms to summarize clinical data to improve HCP communication and care continuity.

To compose a discharge summary, the clinician needs to access the "Discharge/Transfer Summary" item in the "EPC" function, selecting the type of summary, reason for discharge, return period, assigned physician, current and destination unit in transfer cases, and cause of death, if applicable. On the "Summary" tab, to compose the final text, the user can select multiple data charted in several tabs, such as "clinical notes", "diagnoses, and problem lists", "orders", "exams", "procedures", and "surgeries".

It is possible to configure in the "Core Tables Settings" function which type of clinical note, material, medication, procedure, and specialty will be displayed as options on the "Discharge/Transfer Summary" item of the "EPC" and "EOC" function.

3.2.3.12 Multiparameter charting and graphs

This feature displays the patient’s clinical data recorded in different system applications and sections on a single flowsheet, such as vital signs, clinical parameters, intakes and outputs, medication dripping rates, score and indexes, blood glucose levels and other lab results.

There are two system alternatives of the multiparameter charting and graphs feature, the read-only flowsheet and the chartable flowsheet, both are located in the “Multiparameter Flowsheet” function. The read-only and the chartable options can be found in the “Multiparameter Flowsheet” and “Flowsheet” tabs respectively. The “Multiparameter Flowsheet” function can be accessed as a separate function (via external call) or preferably by its item in the patient tree of the “Electronic Patient Chart” function.

NOTE Health care institutions should define only one of the options for use within the entire institution. This restriction can be implemented with usage configurations in the “System Administration” function.

Read-only Multiparameter Flowsheet

This option consolidates different types of patient’s clinical data, acquired from several system functions, and organizes it into different sections where the information is in a read-only mode.

Configuration:

The user must open the “Records” tab of the “Multiparameter Flowsheet” function to configure the flowsheet model. The flowsheet model is like a template for how the data will be displayed on screen. On this tab, it will define a group and group title to display a subset of the clinical information listed above. Then, for each group, select the specific variables and items with the respective attributes, such as display minimum, maximum, average, and total values. Each model can be defined for use base on establishment, department, profile, and professional role. The model can be shown in a cumulative 24h period or by nurse shifts (configured in the “Core Tables Settings” function). If there is more than one model, it is possible to define the default model for a department in the “Organizational Structure” function.

Operation:

The user must access the “Multiparameter Flowsheet” tab to view alphanumeric clinical data from the last twenty-four hours displayed in either a grid or graph view. The y-axis of the flowsheet shows the groups and variables, the unit of measurement, minimum, maximum, average values, totals, and shifts defined by the institution. The x-axis shows time in full hours. According to the information in the legend, some symbols are used to highlight different conditions, for example, when there is more than one value of a variable in the full hour period.

Chartable Multiparameter Flowsheet

This option consolidates different types of patient’s clinical data that can be directly charted in the flowsheet (or indirectly via an external call of another system function), keeping the integrity with the respective system functions and sections that contain the same information.

This option consolidates different types of patient’s clinical data, acquired from several system functions, and organizes it into different sections. The user can chart and store values into the original data tables of the system directly from the chartable flowsheet, such as vital signs and scores and indexes, or access directly from it into a function as an external call, for example “CPOE”, “eMAR” and “Intakes and Outputs”.

Configuration:

The user must open the “Models” tab on the “Multiparameter Flowsheet” function to configure the model. It can register the model title and description, as well as maximum number of columns that will be rendered in the screen (16 or 24 columns) and the standard time scale (Exact; 5, 15 and 30 minutes; 1, 2, 3, 4, 8, 12 and 24 hours). By double clicking in the model, it is possible to configure the groups of the model, such as type of display, actions of “Add new” button and scales, also the rows in each group and composed item (tree view of secondary rows grouped in a primary row) in each added row. On the row’s configuration, the user can configure the graphical presentation of the value such as style, symbol, and color. Each model can have access rules defined by unit, profile, and user. It is important to set that the loading time of the function is directly influenced by the total number of rows visible in the model.

To configure option colors that can be used to manually highlight a value, the user must define in the “Cell highlights register (Multiparameter Flowsheet)”, in the Core Table Settings.

Operation:

The user must access the “Chartable Flowsheet” tab and select a model to view a patient clinical data, displayed according to model configuration. The y-axis of the flowsheet shows the groups and rows, the unit of measurement, minimum, maximum, average values, and totals. The x-axis shows the timeline, divided according to defined time scale and number of columns, with the option to change time range interval.

The chartable flowsheet allows vital signs, scales, indexes, and scores to be charted directly through the tabular view, whereas other data are charted by opening the specific function as an external call for that data input, keeping the patient’s context, such as “EPC” function to register a clinical note, “CPOE” function for prescription orders, “e-MAR” function for medicine administration. Data charted by end-users or coming from an interface can be approved by using the “pending items” option to be approved or rejected. Values charted from the flowsheet into the original table or by external call function maintain all business rules applied in the original system data tables, regarding calculations, highlight a value outside reference range or in blue for new data, and clinical decision support through Mentor function.

By the right-click button, the user can edit, highlight or describe a comment in a value, and also view the history of all values inside a cell.

In the “Actions” button, the user will find usability tools, such as expand or collapse groups and rows, disable the automatic update or highlight the timeline. In “Settings” button, it is possible to set which group or row will be visible in the model, visualize legends, and toggle between light and dark mode.

NOTE In the chartable multiparameter flowsheet alternative, all input information related to vital signs and scales, indexes, and scores are processed in the vital signs and scales, indexes, and scores original system tables.

NOTE In the chartable multiparameter flowsheet alternative, the rules related to the comparison with the clinical data with standard thresholds are configured in the "System Administration" function.

NOTE In the chartable multiparameter flowsheet alternative, all input information related to vital signs and scales, indexes, and scores are processed in the original vital signs and scales, indexes, and scores original system tables. Therefore, it will follow standard system behavior, all applicable rules and calculations configured in the "Clinical Decision Support – Mentor" function to support the Clinical Pathways configuration and implementation processes.

3.2.3.13 Nursing assessment, diagnosis, and intervention system

This feature presents structured and standardized information to clinical users (nurses, physiotherapists, psychologists, phonoaudiologist, and others) when composing a care plan for a patient.

A care plan workflow consists of the following workflow steps: perform the clinical assessment and define diagnosis or problems, goals, and interventions.

The clinician can access the “EPC” function, select the item related to care plan processes, add a new record and follow the workflow steps of the supporting tools.

The primary system functions associated with this feature for configuration purposes are the “Nursing Records” and “Patient Chart Settings”. They support the user to configure the clinical content or to import it from external libraries.

The interventions are sent to the “e-MAR” function to be appropriately managed and checked. The professional can review and manage the patient care plan whenever necessary, reassessing each of the steps.

3.2.3.14 Wound, dressing and healing process

This feature allows the nursing staff to configure, record, and manage patient’s wounds and dressings recording processes.

The institution needs to configure the wound recording processes in the “Core Tables Settings” function. According to each one, additional information is required, such as type of wound, classification, format, location, and human body drawing. In addition, each dressing assessment contains items with possible results, such as length, depth, width, exudate, and tissue with its characteristics.

The user can record information about wounds and dressings occurring at any time during the care process. The main functions associated with recording wounds are the “EPC”, “Electronic Outpatient Chart”, “PEPC”, “Care Plan”, and “Patient Anesthetic Form”. After selecting the patient, the user can access the “Wounds and dressings” item to record and manage the wound’s care. The clinical user has several options to record wound information, such as selecting characteristics, performing an assessment or structured form, recording the materials used, defining nursing interventions according to the wound condition and progress, suggesting types of dressings for each wound, and uploading photos or drawing images. In the “wounds and dressings” tab, the user can add a new record informing the start date, wound location, type, classification format, presence of pain and pain location, if admitted with wound, previous and social history, comorbidities, tissue type, type of secretion, and discharge information.

For each wound recorded, the user can add new dressing records at any time, selecting preconfigured characteristics to each item, informing the current status or stage of the lesion. In addition, for each dressing record, it is possible to inform the materials used. The “Assessment” tab is used when the institution configures specific forms to assess wounds. Guidelines can be created to provide some instructions about the wound dressing. The user can add photos, capture an image, or select a file for each wound recorded. Human body images may be recorded via the “Images” tab, where the user can add a new record selecting a preconfigured image and defining areas with lesions.

In the “Care Plan” function, during the anamnesis and physical examination processes, the nurse can select the wound type and proceed with the wound record, use the human body drawing, and select the human area to record the main wound’s characteristics. After submitting the record, the information can be viewed and managed in the “Wounds and dressings” item of the “EPC” function.

3.2.3.15 Tubes, lines and devices management

This feature supports the management of patient’s medical devices, tubes, catheters, and lines. Their use can be temporary or permanent and needs to be carefully followed up by the care team.

The function “Devices Record” supports the user configuring information related to insertion, placement, replacement, or removal of devices. In this function, the user can configure for each device details such as gauge, anatomical topography, duration, specific instructions, and the reason for removal. In addition, the user can link devices to dressings, events, procedures, assessments, clinical protocols, alerts, and clinical notes.

During the clinical workflows, the “Devices Used by the Patient” function interacts, as an external call, with several other clinical functions, such as “EPC”, “PEPC”, “Patient Anesthetic Form”, “Clinical panorama” and “e-MAR”.

For example, in the “EPC” and the “PEPC” functions, the user can update and check the details of all patient devices and print reports. In addition, based on the previous configuration, the care team may receive updates in the “e-MAR” function regarding the status of the devices installed and can set programmed interventions related to it.

3.2.3.16 Targets of care

This feature allows the user to record and manage the main targets related to patient care.

In the “Patient Chart Settings” function, the user can configure the targets and define rules for each one, such as if it is recurrent and if the goals achievements are manually or automatically checked based on specific conditions.

The “Care Goals” item from the “EPC” function is used to record and manage the patient’s care targets. The user can select a target from a pre-configured list, record the measurement and the status, such as achieved, partially achieved, not achieved, or pending. On the “Monitoring” tab, it is possible to follow up the last seven-day records related to the care goals targets.

NOTE In the context of this feature, the word "monitoring" means only the tab's label. This feature is not intended for real-time patient monitoring. It is intended to record data from the monitoring processes (bedside monitors and devices) for documentation purposes.

3.2.3.17 Orders and care plans management

This feature supports the nursing review of the therapeutic plan, mainly regarding the scheduling and additional material related to drugs and procedures.

In the function “Therapeutic Plan Management”, the nurses can review the medical orders (scheduling times, materials) before submitting them to the pharmacy, guaranteeing that the electronic dispensation times occur according to the necessity for administration of medicine by the nursing department.

The nurses have access to diets, supplements, nutritional support, parenteral nutrition, medication, exams and procedures, hemotherapy, and more.

3.2.3.18 Detailed view of prescribed orders

This feature aims to support the users with additional and granular information about the ordered medications.

During the use of “CPOE” and “e-MAR” functions, when the user is focusing on a specific medication, the “Integrated Item View” function can be reached using an external call (right-click mouse button).

The feature brings additional information such as the amount of the drug that was already given to the patient, number of treatment days, number of pending administration times, actives ingredients, reconstitution, dilution standard, and other content from the “Material Record” function (drug settings).

3.2.3.19 Phrase builder

Phrase Builder is a feature used to support the clinical data input. It facilitates the completion and the correctness of the words and sentences standardization.

Select the “Utilities” tab on the home screen, and then select the system utility “Phrase Builder”. The user can create and save reusable text segments or “phrases”, allowing them to be reutilized during the composition of larger texts that follow a standard format. The text segments can be organized into a hierarchy, where the texts available on each level depend on the text selected on the previous level. Structuring the text segments in a hierarchy allows for greater control over how the text segments can be combined, limiting the set of all possible combinations to a set of pre-defined combinations.

The text segments and phrases are available in items of the “EPC” function, such as “Clinical Notes” and “Health History”.

3.2.3.20 Scales, indexes, and scores

This feature supports HCP in applying structured assessments to classify patients in different categories, commonly related to diagnosis, severity, and risk.

Two types of scales, indexes, and scores are offered, the hard-coded (native) and the ones that can be configured by the user. Native scores are hard-coded developed based on relevant clinical publications after the copyright assessment and agreement. Score flex and score flex II is the framework for customers to configure their own scores.

In the "groups of scores and indexes" tab of the "Core Table Settings" function, the institution has access to the system catalog of native scales. It is possible to create different clinical groups and assign different scores and indexes according to specialty, department, users, and also indicate the permissions such as edit, read-only. The link between specific groups with the user profiles is performed in the “System Administration” function.

In the “Core Table Settings” function, it is also possible to configure clinical conducts or procedures to be displayed to HCP after submitting the final scale result. It comprises natives scores, score flex, and score flex II. The institution can configure the content and the display rules.

Considering the native scales, there are some scales which are a simple choice of a number or an option without any calculation or data processing. On the other hand, other scales combine different parameters to define its result.

For the scales customizable by the user, there are two possibilities for the configuration (score flex and score flex II), which shall be performed in the “Score Flex” tab of the “Core Table Settings” function.

Score flex supports the configuration of basic customizable scores. It allows configuring statements to be answered by the clinician. Each answer has only two possible results, yes or no. Each "yes" result has a value to be summed in the final score. Some result ranges can be created (maximum and minimum values). The tab "documentation" shows relevant information such as inclusion and revision dates, score concepts, and bibliographic references. It is possible to define the user profiles that have access to the Score flex scale.

Score flex II supports the configuration of more complex customizable scores. It is associated with a calculation result of an assessment configured in the "Structured Assessments Settings" function. The

institution can create different format types of results for the assessment, such as edit, check box, look-up, and create formulas linked to the calculation field to be considered by the score flex II. A SQL language knowledge is required for the correct formula's definition. Some result ranges can be created (maximum and minimum values). The tab "documentation" shows relevant information such as inclusion and revision dates, score concepts, and bibliographic references. It is possible to define the user profiles that have access to the Score flex II scale.

In the "Electronic Patient Chart (EPC)" function, the clinician needs to access the "scores and indexes" item to verify the groups available according to the user profile. In each group, each native score is displayed as a single tab. The "score flex" and "score flex II" are also shown as single tabs, where the user can access the configured scales for each profile.

Another alternative to view the scales is using the Scale Integrated View (SIV). After the previous configuration is performed in the "Patient Chart Settings" function, the user can select this option (SIV scale) and see a panel with different scores and indexes in a chronological view, filtered by month, with descriptive results or numeric values.

Pain scores are available in the Electronic Patient Chart function, in the "Vital sign and monitoring" item. Anesthesia scores are available in the "PACU Scores" item of the "Perioperative Electronic Patient Chart" function, and in the "risk" tab in of the "Electronic Pre-Anesthetic Assessment" function.

In all use cases, after completing the required information by HCPs, the system processes the calculation based on native rules and SQL formulas or the ones defined in "Core Table Settings" function. After the calculation, the system displays the final score result and its description to be submitted and stored in the system and available for authorized users. After the submission, according to the previous configuration, the clinical conduct or procedure message linked to the result is promptly shown, or it can be accessed by right-click mouse "conducts" option.

NOTE All native hard-coded scales, scores, and indexes available in the system are supported by published bibliography and compliant with copyrights.

NOTE Additional information about each scale is available via the right-click option menu.

3.2.3.20.1 Abbreviated Mental Test Score (AMTS)

Description: The Abbreviated Mental Test Score (AMTS) is used to quickly assess elderly patients for the possibility of dementia. The test has utility across a range of acute and outpatient settings. Questions are asked to the patient such as: how old are you?; what is the time to the nearest hour?; what year are we in?; what is the name of the hospital?; what is your home address number?; can you recognize two persons (the doctor, nurse, home help, etc.)?; what is your date of birth? (day and month sufficient); what year did first World War start?; what is the name of the current monarch/prime minister/president?; And request the patient to count backwards from 20 down to 1; give the patient an address and ask them to repeat it at the end of the test. For each correct answer, 1 point is added to the final score. Maximum score is 10 and a score of less than 7 or 8 suggests cognitive impairment. The test can differentiate normal from cognitively impaired but is not reliable in identifying delirium.

System functions: Electronic Patient Chart -> Scores and Indexes

Source:

- *Hodkinson, HM. Evaluation of a mental test score for assessment of mental impairment in the elderly. Age and Ageing. 1972 Nov; 1(4):233-8*

3.2.3.20.2 ABCD2 Score

Description: The ABCD2 Score helps clinicians stratify stroke risk in patients with Transient Ischemic Attack (TIA). The management of patients with TIA varies between institutions, with some advocating hospitalization and others outpatient evaluation. Consequently, there is a great interest in identifying clinical prognostic indicators that can be used to estimate stroke risk after a TIA. The ABCD2 it is a scoring system based on five parameters: age, blood pressure, clinical features, TIA duration and presence of diabetes. Each parameter corresponds to one point, except for clinical features and TIA duration, which are 2 points. Stroke risk classification score: low risk 0-3, moderate risk 4-5 and high risk 6-7.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Johnston, SC, Rothwell PM, Nguyen-Huynh MN, Giles MF, Elkins J S, Bernstein AL, Sidney S. Validation and refinement of scores to predict very early stroke risk after transient ischemic attack. Lancet. 2007*
- *Josephson SA, Sidney S, Pham TN, Bernstein AL, Johnston SC. Higher ABCD2 score predicts patients most likely to have true transient ischemic attack. Stroke. 2008*
- *Wardlaw J, Brazzelli M, Miranda H, Chappell F, McNamee P, Scotland G. et al. An assessment of the cost-effectiveness of magnetic resonance, including diffusion-weighted imaging, in patients with transient ischaemic attack and minor stroke: a systematic review, meta-analysis and economic evaluation. Health Technol Assess. 2014*

3.2.3.20.3 ACC/AHA 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery

Description: ACC/AHA 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery is a Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). It includes the framework, reflected in the evaluation, for determining which patients are candidates for cardiac testing before a noncardiac surgery. If the patient has one or two clinical risk factors, then it is reasonable to either proceed with the planned surgery, with heart rate control with beta blockade or consider testing if it will change management. In patients with three or more clinical risk factors, the surgery-specific cardiac risk is important. The surgery-specific cardiac risk of noncardiac surgery is related to two important factors. First, the type of surgery itself may identify a patient with a greater likelihood of underlying heart disease and higher perioperative morbidity and mortality. If the patient is undergoing vascular surgery, testing should only be considered if it will change management. Other types of surgery may be associated with similar risk to vascular surgery but have not been studied extensively. For nonvascular surgery, the degree of hemodynamic cardiac stress dictates the surgery-specific risk. The perioperative morbidity related to the procedures ranges from 1% to 5%. In these patients who are considered ready to undergo intermediate-risk surgery, there are insufficient data to determine the best strategy (proceeding with the planned surgery with tight heart rate control with beta blockade or further cardiovascular testing if it will change management).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Fleisher L A, Beckman J A, Brown K A, Calkins H, Chaikof E L, Fleischmann K E, Freeman W K, Froehlich J B, Kasper E K, Kersten J R, Riegel B, John F. Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery) ACC/AHA 2007 Robb Circulation. 2007;116: e418-e500; originally published online September 27, 2007*
- <http://circ.ahajournals.org/content/116/17/e418>

3.2.3.20.4 ACEF Score

Description: The ACEF score is an operative mortality risk score for elective cardiac surgery patients based on a very limited number of factors. It considers only three independent predictors: Age, Creatinine and Ejection Fraction (ACEF). The ACEF score was computed as follows: [age(years) / left ventricular ejection fraction(%)] +1 (if creatinine >2.0 mg/dL). There is a univariate association (logistic regression) between ACEF score and mortality risk. The higher the score result, the higher the predicted mortality rate (%).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Ranucci M, Castelvechio S, Minicanti L, Frigiola A, Pelissero G. Risk of Assessing Mortality Risk in Elective Cardiac Operations: age, creatinine, ejection fraction, and the law of parsimony. 2009 Jun 23;119(24):3053-61*

3.2.3.20.5 Acute Kidney Injury Network (AKIN) Scale

Description: The Kidney Disease Improving Global Outcomes (KDIGO) international guideline uses Acute Kidney Injury Network (AKIN) scale for kidney injury determination. The AKIN scale is based on changes to serum creatinine and/or urinary output and divides the acute kidney failure into three categories according to severity, and into two categories reflecting the persistence of the renal function loss. An increase in serum creatinine greater than or equal to 0.3 mg/dL, or an increase of more than 50% of the basic value (an interval of at least 48 h) characterizes AKI.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Mehta RL, Kellum JA, Shah SV, Molitoris BA, Ronco C, Warnock DG, et al. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. Crit Care 2007; 11: R31*
- *Machado MM, et al. Lesão renal Aguda após revascularização do miocárdio com Circulação Extracorpórea. Arq Bras Cardiol 2009; 93(3): 247-252*
- *Romano TG, Guimarães PF, Tierno MM. Injúria Renal Aguda no paciente politraumatizado. J Bras Nefrol 2013;35(1):48-56*

3.2.3.20.6 Acute Respiratory Distress Syndrome (ARDS) Score

Description: The Acute Respiratory Distress Syndrome (ARDS) Score is a set of signs and symptoms based on increased capillary permeability, hypoxia, presence of bilateral pulmonary infiltration (pulmonary edema) on chest radiography and no clinical evidence of left heart failure. The evaluation criteria are performed by means of chest radiography, hypoxemia, compliance of the respiratory system when ventilated (cmH₂O/mL) and positive end-expiratory pressure when ventilated (cmH₂O). Each one the 6 evaluated criteria has scores of 0, 1 and 2, so the final score can range from 0 to 12. A score of 0 represents no lung injury, whereas a score between 0.1 and 2.5, and higher than 2.5 defined mild to moderate and severe lung injury, respectively.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Antoniazzi P. *Síndrome da Angústia Respiratória Aguda (SARA)*. *Medicina, Ribeirão Preto*, 31: 493-506, out/dez 1998
- Ashbaugh DG et al, *Acute respiratory distress in adults*. *Lancet* 2: 319-323, 1967
- Oliveira RHR, Basille Filho A. *Incidência de lesão pulmonar aguda e síndrome da angústia respiratória aguda no centro de tratamento intensivo de um hospital universitário: um estudo prospectivo*. *J Bras Pneumol*. 2006;32(1):35-42

3.2.3.20.7 Alcohol Use Disorder Identification Test (AUDIT) Score

Description: The Alcohol Use Disorder Identification Test (AUDIT) Score is used to identify possible alcoholic disorders. It was developed to measure the frequency and intensity of alcohol dependence. There are 10 questions and the possible responses to each question are scored 0, 1, 2, 3 or 4, except for questions 9 and 10 which have possible responses of 0, 2 and 4. The questions refer to the last 12-month period. The first three questions measure the quantity and frequency of regular or occasional use of alcohol, the next three investigate symptoms of addiction and the final four are about problems in life related to alcohol consumption. The score ranges from 0 to 40. According to WHO guidelines, a score of 0 indicates an abstainer who has never had any problems from alcohol while a score of 1 to 7 suggests low-risk consumption. Scores from 8 to 15 suggest hazardous or harmful alcohol consumption and a score of 16 or more indicates the likelihood of alcohol dependence (moderate-severe alcohol use disorder).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Babor TF, Fuente JR, Saunders J, Grant M. *AUDIT. The alcohol use disorders identification test: guidelines for use in primary health care*. WHO (World Health Organization)/PAHO. 4:1-29, 1992

3.2.3.20.8 Alcohol Withdrawal Score (AWS)

Description: Patients admitted to hospitals or the emergency department should undergo screening at admission to identify those at risk of alcohol withdrawal. In hospitalized patients, early detection and treatment to prevent the development of withdrawal is the optimal approach. The Alcohol Withdrawal Score (AWS) provides a systematic measure of uncomplicated withdrawal severity by recording changes of clinical features over time. AWS does not diagnose withdrawal, but stratifies the severity of an already diagnosed withdrawal syndrome. The AWS is divided into 7 groups and the maximum possible score is 27: perspiration (0–4), tremor (0–3), anxiety (0–4), agitation (0–4), axilla temperature (0–4), hallucinations (0–4), and orientation (0–4). Withdrawal severity: < 4 mild, 5–14 moderate and > 15 severe.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources :

- https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/GL2008_011.pdf
- *Mental Health and Drug and Alcohol Office. NSW Drug and Alcohol Withdrawal Clinical Practice Guidelines. Publication date 04 July 2008, Review date 18 April 2018*

3.2.3.20.9 Aldrete Modified Score

Description: The Aldrete Modified Score evaluates the progress of patients in the post-anesthetic period in accordance with their state of consciousness and vital signs. It has five variables: activity (ability to move four,

two or no extremities), respiration (ability to inhale deeply, cough, dyspnea or superficial breathing and apnea), systemic blood pressure (change in blood pressure of just 20% in relation to pre-anesthetic values, change between 20-49% or greater than 50% in relation to pre-operative), consciousness (fully awake, arousable by calling or no response) and coloring/oximetry (normal, pale or cyanotic). Each variable is classified as 0, 1 or 2 and the patient is discharged when the score ≥ 9 .

System functions: Electronic Patient Chart -> Scores and Indexes

Sources :

- Aldrete JA, Kroulik D. A postanesthetic recovery score. *Anesth Analg*, 1970;49:924-934
- Castro FSF, et al. Temperatura corporal, índice Aldrete e Kroulik e alta do paciente da Unidade de Recuperação Pós-Anestésica. *Rev. esc. enferm. USP* vol.46 no.4 São Paulo Aug. 2012

3.2.3.20.10 American Society of Anesthesiology (ASA) Classification

Description: The American Society of Anesthesiology (ASA) Classification is used for over 60 years. The purpose of the classification is to assess a patient's pre-anesthetic medical comorbidities. The ASA alone does not predict perioperative risks, but used with other factors (type of surgery, frailty, level of deconditioning), it can be useful in predicting perioperative risks. Assigning a physical status rating level is a clinical decision based on several factors. Although the physical status classification can be initially determined at various times during the patient's preoperative classification, the final assignment of the physical status classification is made on the day of anesthesia care by the anesthesiologist after patient evaluation. The ASA ranges from I to VI. ASA I: normal healthy patient; ASA II: patient with mild systemic disease; ASA III: patient with severe systemic disease; ASA IV: patient with severe systemic disease that is a constant threat to life; ASA V: moribund patient who is not expected to survive without the operation; ASA VI: declared brain-dead patient whose organs are being removed for donation purposes.

System functions: Electronic Pre-Anesthetic Assessment -> Risk

Sources:

- Moreno R P, Pearse R, Rhodes A (2015) American Society of Anesthesiologists Score: still useful after 60 years? *Results of the EuSOS Study. Rev Bras Ter Intensiva* (2015); 27(2):105-112

3.2.3.20.11 American Spinal Injury Association (ASIA) Impairment Scale

Description: The American Spinal Injury Association (ASIA) Impairment Scale derived from the International Standards for Neurological Classification of Spinal Cord Injury and is used in the neurologic evaluation of spinal cord injuries. The sensory examination evaluates 28 specific dermatomes bilaterally for light touch and pinprick sensation. Each examination component is recorded for each dermatome and laterality. A grade of 0 denotes absent sensation, 1 denotes impaired or altered sensation, and 2 denotes normal sensation. Total bilateral sensory score ranges from 0 (inability to distinguish pinprick sensation from light touch) to 224 (fully normal). The motor examination consists of grading five specific muscle groups in the upper extremities and in the lower extremities. Motor strength is graded using a universal six-point scale (from 0 to 5) for each muscle group bilaterally. The maximum bilateral motor score in a healthy individual is 100. The additional anorectal examination evaluates for the presence of spinal shock. It is examined for voluntary motor contraction and the ability to sense deep anal pressure. Both are graded in a binary fashion, 0 for absent and 1 for present.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *American Spinal Injury Association (1982) Standard for Neurological Classification of Spinal Injured Patients. ASIA, Chicago.*
- *Cohen, M., Jr, J., Donovan, W. et al. A test of the 1992 International Standards for Neurological and Functional Classification of Spinal Cord Injury. Spinal Cord 36, 554–560 (1998). <https://doi.org/10.1038/sj.sc.3100602>*
- *BARROS FILHO TEP. Avaliação padronizada nos traumatismos raquimedulares. Rev Bras Ortop. 1994;29(3):.*

3.2.3.20.12 Ann Arbor Classification for Non-Hodgkin Lymphoma

Description: The Ann Arbor Classification for Non-Hodgkin Lymphoma is the staging system for lymphomas, both in Hodgkin's lymphoma (formerly designated Hodgkin's disease) and non-Hodgkin lymphoma (NHL). It was initially developed for Hodgkin's but has some use in NHL. It has roughly the same function as TNM staging in solid tumors. The stage depends on both the place where the malignant tissue is located (as located with biopsy, CT scanning, gallium scan and increasingly positron emission tomography) and on systemic symptoms due to the lymphoma ("B symptoms": night sweats, weight loss of > 10% or fevers). The stage is defined for designations applicable to any stage, according to symptoms (A - no symptoms) or (B - fever for temperature > 38 °C, drenching night sweats, unexplained loss of > 10% of body weight within the preceding 6 months), bulky disease (E-Involvement of a single extra nodal site that is contiguous or proximal to the known nodal site) or (S-Splenic involvement). After selecting to the options of symptoms and bulky disease, the stage can be defined according to: I-Involvement of a single lymphatic site (i.e., nodal region, Waldeyer's ring, thymus, or spleen) (I); or localized involvement of a single extra lymphatic organ or site in the absence of any lymph node involvement (IE). II-Involvement of two or more lymph node regions on the same side of the diaphragm (II); or localized involvement of a single extra lymphatic organ or site in association with regional lymph node involvement with or without involvement of other lymph node regions on the same side of the diaphragm (IIE). III-Involvement of lymph node regions on both sides of the diaphragm (III), which also may be accompanied by extra lymphatic extension in association with adjacent lymph node involvement (IIIE) or by involvement of the spleen (IIIS) or both (IIIE, S). IV-Diffuse or disseminated involvement of one or more extra lymphatic organs, with or without associated lymph node involvement; or isolated extra lymphatic organ involvement in the absence of adjacent regional lymph node involvement, but in conjunction with disease in distant site(s). Stage IV includes any involvement of the liver or bone marrow, lungs (other than by direct extension from another site), or cerebrospinal fluid.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Carbone PP, Kaplan HS, Musshoff K, et al: Report of the Committee on Hodgkins Disease Staging Classification. Cancer Res 31:1860-1861, 1971*
- *Lister TA, Crowther D, Sutcliffe SB, et al: Report of a committee convened to discuss the evaluation and staging of patients with Hodgkin's disease: Cotswolds Meeting. J Clin Oncol 7:1630-1636, 1989*
- *Bruce D, Cheson, Richard I, Fisher, Sally F, Barrington, et al: Recommendations for Initial Evaluation, Staging, and Response Assessment of Hodgkin and Non-Hodgkin Lymphoma: The Lugano Classification. J Clin Oncol 32:3059-3067, 2014*

3.2.3.20.13 APACHE II Score

Description: The Acute Physiology and Chronic Health Evaluation (APACHE) II Score aims to classify the severity of the critical patient's alterations. The main objective is to quantify the degree of organ dysfunction using a numerical value from the existing clinical and laboratory changes or the type/number of procedures

used. It is applied in the first 24 h of a patient's admission to an ICU. The score is calculated using 12 routine physiological measurements: blood pressure, body temperature, heart rate, breathing rate, arterial pH, sodium, potassium, creatinine, hematocrit, white blood cells, gradient A-aO₂ or PaO₂ and Glasgow Coma Scale (GCS). The minimum score is 0 with a maximum of 100, and a cutoff point of greater severity at 35 points. The predicted mortality rate according to APACHE II scores is: 4% for 0-4 points, 8% for 5-9 points, 15% for 10-14 points, 25% for 15-19 points, 40% for 20-24 points, 55% for 25-29 points, 75% for 30-34 points and 85% for > 34.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *William AK, Elizabeth AD, Douglas PW, Zimmerman JE, Jack. APACHE II: A severity of disease classification system. October – 1985 – Volume 13.*
- *Headley J, Theriault R, Smith TL. Independent validation of APACHE II severity of illness score for predicting mortality in patients with breast cancer admitted to the intensive care unit. Cancer. 1992 Jul 15;70(2):497-503. DOI: 10.1002/1097-0142(19920715)70.*
- *Capuzzo M, Valpondi V, Sgarbi A, Bortolazzi S, Pavoni V, Gilli G, Candini G, Gritti G, Alvisi R. Validation of severity scoring systems SAPS II and APACHE II in a single-center population. Intensive Care Med. 2000, Dec;26(12):1779-85. Doi: 10.1007/s001340000715.*

3.2.3.20.14 APACHE IV Score

Description: The APACHE IV Score is an improved tool based on APACHE III containing new variables and different statistical modelling to evaluate the severity of the illness and the prognosis in the ICU. This version of the APACHE IV is calculated based on 129 clinical variables derived in the first 24 hours of admission to the ICU. Some studies have suggested the superior advantage of APACHE IV compared to other risk scoring systems. The score is calculated using the following routine physiological measurements: age, temperature (°C), MAP (mmHg), HR (beats/min), RR (breaths/min), mechanical ventilation, FiO₂ (%), PO₂ (mmHg), pCO₂ (mmHg), arterial pH, sodium (mEq/L), urine output (mL/24 h), creatinine (mg/dL), Blood Sugar Level (mg/dL), albumin (g/L), bilirubin (mg/dL), hematocrit (%), WBC (x1000/mm³), GCS, chronic health conditions, Pre-ICU LOS (days), origin, readmission, emergency surgery and admission diagnosis (non-surgical or post-surgical). The APACHE IV score sums APS points (Acute Physiology Score, with scores of 0, +1, +2, +3, +4) depending on the range of each vital sign evaluated + Age (less than 44 years:0, 45 to 54:2, 55 to 64:3, 66 to 74:5, 75 or greater:6 points) + Chronic Health (if the patient has a history of severe organ system insufficiency or is immuno-compromised). APACHE IV score ranges from 0 to 286 points, 0 being the best prognosis and lowest mortality and 286 being the worst prognosis and the highest mortality rate.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Zimmerman JE, Kramerr AA, McNair ES, Malila FM. Acute Physiology and Chronic Health Evaluation (APACHE) IV: hospital mortality assessment for today's critically ill patients. Crit Care Med. 2006 May;34(5):1297-310*
- *Mihye K, Miyoung S, Sang-Min L, Yujin K, Soyoun Y. Performance of APACHE IV in Medical Intensive Care Unit Patients: Comparisons with APACHE II, SAPS 3, and MPMO III. Acute Crit Care. 2018 Nov; 33(4): 216–221. Doi:10.4266/acc.2018.00178*

3.2.3.20.15 Apfel Score to Predict Postoperative Nausea and Vomiting

Description: The Apfel score to predict Postoperative Nausea and Vomiting is a score for evaluating and monitoring the intensity of post-operative nausea and vomiting. Four risk factors are evaluated: female gender, non-smoker, history of kinetosis or post-operative nausea and vomiting, and plan for post-operative use of opioids. The probability of post-operative nausea and vomiting corresponds to 10% with no risk factor, 21% with one, 39% with two, 61% with three and 78% with four.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Apfel CC, Laara E, Koivuranta M, Greim CA, Roewer N. A simplified risk score for predicting postoperative nausea and vomiting: conclusions from cross-validations between two centers. *Anesthesiology*. 1999;91:693-700
- Weilbach C, et al. Náuseas e vômitos (NVPO): utilidade do Apfel-score para a identificação de pacientes de alto risco para NVPO. *Acta Anaesthesiol Belg*. 2006;57(4):361-3
- Lages N, Fonseca C, Neves A, Landeiro N, Abelha FJ. Náuseas e Vômitos no Pós-Operatório: Uma Revisão do “Pequeno-Grande” Problema. *Revista Brasileira de Anestesiologia*. Vol. 55, Nº 5, Setembro – Outubro, 2005

3.2.3.20.16 Apgar Score

Description: The Apgar Score is a quick way to evaluate the health of newborns. It consists of five signs of the newborn in the first, fifth, and tenth minute after birth. A score of 0 to 2 is used to assess the newborn's condition per each one of the five components: heart rate, breathing, muscle tone, reflex irritability and skin color. The final score can vary from 0 to 10. An Apgar Score of 0 to 2 indicates severe asphyxia, 3 to 4 moderate asphyxia, 5 to 7 mild asphyxia and 8 to 10 indicates a newborn without asphyxia.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Apgar V. *The Newborn (Apgar) Scoring System*. *V Apgar – Pediatr Clin North Am*, 1966 – 130.14.81.9
- Apgar V. A proposal for a new method of evaluation of the newborn infant. *Curr. Res. Anesth. Analg*. 1953;32(4): 260-7. DOI:10.1213/00000539-195301000-00041. PMID 13083014

3.2.3.20.17 Assessment of Alcohol Abstinence Syndrome – revised (CIWA-Ar)

Description: The Assessment of Alcohol Abstinence Syndrome - revised (CIWA-Ar) assesses the severity of the patient's alcohol abstinence syndrome and the need for medicine administration. It was created from the CIWA-A (1981) and uses 10 of the 15 items which are: nausea/vomiting (0, 1, 4 and 7), tremor (0, 1, 4 and 7), paroxysmal sweats (0, 4 and 7), anxiety – ask “Do you feel nervous?” (0, 1, 4 and 7), agitation (0, 1, 4 and 7), tactile disturbances (0, 1, 2, 3, 4, 5, 6 and 7), auditory disturbances (0, 1, 2, 3, 4, 5, 6 and 7), visual disturbances (0, 1, 2, 3, 4, 5, 6 and 7), headache/fullness in head (0, 1, 2, 3, 4, 5, 6 and 7), orientation/clouding of sensorium (0, 1, 2, 3 and 4). Classification: minimal to mild withdrawal 0-20, moderate withdrawal 20-24, severe withdrawal > 24 points.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Sullivan J, Sykora M, Schneiderman J, et al. Assessment of alcohol withdrawal: the revised Clinical Institute Withdrawal for Alcohol Scale (CIWA-Ar). *Br J Addict* 1989; 84: 1353-7

- *Laranjeira R, Nicastri S, Jeronimo C, Marques AC, et al. Consenso sobre a Síndrome de Abstinência do Álcool (SAA) e o seu tratamento. Rev Bras Psiquiatr 2000;22(2):62-71*

3.2.3.20.18 Assistance Complexity Classification System

Description: The Assistance Complexity Classification System categorizes the healthcare complexity of payments in accordance with the quantity and quality of care.

The estimation of the staff number is a process that requires knowledge of the existing workload at inpatient units and this work depends, in turn, on the patients' healthcare needs, and on the expected standard of care. The use of objective patient classification systems allows the HCP to distribute work more evenly among subordinate professionals. These point totals sort patients into distinct categories. The institution can use one or more bibliographical sources and even adapt them to their own local needs.

The 13 critical indicators considered to compose the instrument are: mental state and level of consciousness; oxygenation; vital signs; nutrition and hydration; motility; locomotion; body care; eliminations; therapy; health education; behavior; communication and cutaneous-mucosal integrity. Each of the indicators is scored from 1 to 5. The value 1 corresponds to the lowest level of nursing care and the value 5 to the maximum level of care complexity. The patient is classified in all indicators to one of the five levels that best describes their situation in relation to nursing care. The individual values are then added and the total is classified to a category of care as follows: minimal care (13 to 26 points), intermediate care (27 to 39 points), semi-intensive care (40 to 52 points) and intensive care (53 to 65 points).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources :

- *De Groot, H.A-J. Nurs.Adm. v.19, n.7, p.24-30, 1989*

3.2.3.20.19 Average Severity of Illness Index (ASIS Index)

Description: Average Severity Index Score (ASIS) is a method used to assess the patient's clinical conditions and the occurrence of infections related to healthcare. It can range from A to E, in proportion to the observed severity. To characterize the clinical severity of patients, the clinical severity index was adopted at patient admission according to the ASIS criteria, divided into five categories: A (Patients in the postoperative period not requiring intensive medical or nursing care; discharge from the unit within 48 hours); B (Physiologically stable patients, requiring prophylactic observation, not requiring intensive medical or nursing care); C (Physiologically stable patients requiring intensive nursing care and monitoring); D (Physiologically unstable patients requiring medical and nursing care intensive with the frequent need for reassessment and therapy adjustment); E (Physiologically unstable patients, in coma or shock, or requiring cardio-pulmonary resuscitation or medical care and intensive nursing and with frequent need for reassessment).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Starling, C.E.F., Pinheiro S.M.C. Couto, B.R.G.B. (1993) "Vigilância Epidemiológica das Infecções hospitalares na prática diária (ensaios)". Edições Cuatiara, 488*
- *CDC, 1994. NNIS Manual National Nosocomial Infections Surveillance System. Atlanta: U.S. Department of Health & Human Services*

3.2.3.20.20 Bariatric Analysis and Reporting Outcome System (BAROS)

Description: The Bariatric Analysis and Reporting Outcome System (BAROS) evaluates the quality of life of patients in the late postoperative period after bariatric surgery. The BAROS combines quality of life

questionnaire responses with self-esteem (-1; -0.5; 0; +0.5; +1), willingness to exercise (-0.5; -0.25; 0; +0.25; +0.50), ability to relate socially (-0.5; -0.25; 0; +0.25; +0.50), interest in sex (-0.5; -0.25; 0; +0.25; +0.50), willingness to work (-0.5; -0.25; 0; +0.25; +0.50), clinical conditions (-1; 0; +1; +2, +3), percentage of weight loss (-1; 0; +1; +2, +3), surgical complications (+0.2; +1), surgical intervention (+1). The final score can vary from -3 to 9, with -3 being the worst result and 9 being the best in quality of life. Classification: quality of life greatly decreased (-3 to -2.1), decreased (-2 to -1.1), unchanged (-1 to 1), improved (1.1 to 2) and increased significantly (2.1 to 9).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Oria HE, Moorehead MK. Bariatric analysis and reporting outcome system (BAROS). 1998 Oct;8(5):487-99*
- *Barros LV, Moreira RAN, Frota NM, Caetano JA. Mudanças na qualidade de vida após a cirurgia bariátrica. Rev enferm UFPE online, Recife, 7(5):1365-75, maio, 2013*

3.2.3.20.21 Barthel Index (BI)

Description: The Barthel Index (BI) assesses the patient's independence to perform basic life activities, such as: 1- feeding (0, 1, 2 points); 2- bathroom (0, 1 point); 3- personal care (0, 1 point); 4- ability to get dressed (0, 1, 2 points); 5- intestinal rhythm (0, 1, 2 points); 6- urinary rhythm (0, 1, 2 points); 7- use of toilet (0, 1, 2 points); 8- transportation (0, 1, 2, 3 points); 9- mobility (0, 1, 2, 3 points); 10- climb stair (0, 1, 2 points). Each item is rated in terms of whether the patient can perform the task independently, with some assistance, or is dependent based on observation (0 = unable, 1 = needs help, 2 = independent). The final score is multiplied by 5 to get a number on a 100-point score. Proposed guidelines for interpreting Barthel Index are that scores of 0-20: total dependency, 21-60: severe dependency, 61-90: moderate dependency, and 91-99: slight dependency.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Mahoney FI, Barthel D. "Functional evaluation: The Barthel Index." Maryland State Medical Journal 1965; 14:56-61*
- *Araújo F, Ribeiro JLP, Oliveira A, Pinto C. Validação do Índice de Barthel numa amostra de idosos não institucionalizados. Vol. 25, Nº 2, Julho/Dezembro, 2007*

3.2.3.20.22 Baylor Rating Scale

Description: The Baylor Rating Scale allows the clinician to assess the presence and level of muscle spasm and movement. The scale ranges from 0 to 4, where zero corresponds to normal, 1 to discrete spasm without functional deficit, 2 to moderate spasm with minimal functional deficit, 3 to moderate spasm with moderate functional deficit and 4 to intense spasm with severe functional impairment.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Lucci LMD. Blefaroespasma essencial benigno. Arq Bras Oftalmol. 2002;65(5):585-9*
- *Molho E, Jankovic J, Lew Mark. Role of botulinum toxin in the treatment of cervical dystonia. Neurol Clin 2008;26(Suppl 1):43-53*

- *Joseph Jankovic, Kenneth Schwartz, Donald T Donovan. Botulinum toxin treatment of cranial-cervical dystonia, spasmodic dysphonia, other focal dystonias and hemifacial spasm. Journal of Neurology, Neurosurgery, and Psychiatry 1990;53:633-639*

3.2.3.20.23 Behavioral Pain Assessment Scale

Description: Refer to the feature “Vital signs and clinical parameters calculation” of this document.

3.2.3.20.24 Behavioral Pain Scale – BPS

Description: Refer to the feature “Vital signs and clinical parameters calculation” of this document.

3.2.3.20.25 Berg Balance Scale

Description: The Berg Scale is a validated instrument for the functional assessment of balance composed by 14 tasks with five items each and a score from zero to 4 for each task (zero for unable to perform the task and 4 for task performed independently). This scale serves mainly to determine risk factors for loss of independence and for falls by the elderly, serving several purposes: quantitative decision of the ability of functional balance, monitoring of patients' progress and evaluation of the effectiveness of interventions in clinical practice and in research.

The total score ranges from zero to 56 points. The lower the score, the greater the risk for falls; the higher the score, the better the performance. The scale was adapted for application in Brazil by Miyamoto et al. presenting scores from zero to 4 for each item and a determined time for each task. Scores below 45 points are considered a risk of falling.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources :

- *Berg KO; Norman, KE. Functional assessment of balance and gait. Clinics in Geriatrics Medicine, v. 12, n. 4, p. 705-723, 1996*
- *Miyamoto ST, Lombardi Junior L, Berg KO, Ramos LR, Natourn J. Brazilian version of the Berg balance scale. Braz. Med. Biol. Res., Ribeirão Preto, v. 37, n. 9, p. 1411-1421, abr. 2004*
- *Lusardi MM,(2004). Functional Performance in Community Living Older Adults. Journal of Geriatric Physical Therapy, 26(3), p.14-22.*

3.2.3.20.26 Bishop Score

Description: The Bishop Score was originally developed to predict the likelihood of a woman going into labor naturally. The items evaluated as part of the score are dilation (cm), effacement (%), station, consistency and position. The score ranges from 0 to 13. If a woman has a score ≤ 1 , it is not expected she will go into labor within 3 weeks. If the score ≤ 6 , the chances of having a vaginal birth are low and the cervix is considered unfavorable or “not mature” for induction. If the score ≥ 8 , the chances of having a vaginal birth are good and the cervix is considered favorable or “ripe” for induction. A score ≥ 10 indicates that the patient could go into labor naturally within a few days. Although the Bishop’s score was originally used to assess the likelihood of vaginal birth in women who gave birth before (multipara), it is now also used for women who have never given birth (nullipara) and are being considered for induction of labor.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Bishop EH. Pelvic scoring for elective induction. Obstet Gynecol. 1964;24: 266-8. PMID 14199536*

- *Newman RB, Goldenberg RL, Iams JD et al.* Preterm Prediction Study: Comparison of the Cervical Score and Bishop Score for Prediction of Spontaneous Preterm Delivery. *Obstet Gynecol.* 2008;112(3): 508-15. DOI:10.1097/AOG.0b013e3181842087. PMID 18757646
- *Laughon SK, Zhang J, Troendle J, Sun L, Reddy UM.* Using a Simplified Bishop Score to Predict Vaginal Delivery. *Obstetrics and Gynecology* 2011;117(4):805-11. DOI:10.1097

3.2.3.20.27 Braden Q Scale

Description: The Braden Q scale is a tool for evaluation of the risk of pressure ulcers in pediatric patients. The scale consists of seven subscales, which are: mobility, activity, sensory perception, humidity, friction/shearing, nutrition and perfusion/oxygenation of tissue. Each subscale is classified from 1 to 4 where the lower the number the greater the risk. The total Braden Q scale score ranges from 7 (highest risk) to 28 (lowest risk), with a score of 16 or less identified as a patient at risk for pressure ulcers.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Acarin, M, et al.* Tradução para a língua portuguesa e validação da escala de Braden Q para avaliar o risco de úlcera por pressão em crianças. *Rev Paul Pediatr* 2011;29(3):406-14
- *Curley, M.A.Q., Razmus, I.S., Roberts, K.E., Wypij, D.* Predicting Pressure Ulcer Risk in Pediatric Patients: The Braden Q Scale. *Nursing Research.* 52(1):22-33, January/February 2003

3.2.3.20.28 Braden Scale

Description: The Braden Scale is used to determine the risk of developing pressure ulcers in patients who spend a long time in bed. It consists of six subscales: sensory perception, moisture, physical activity, mobility, nutrition and, friction and shear. The total score can vary between 6 and 23 points, with patients classified as follows considering the development of pressure ulcers: very high risk (scores less than or equal to 9), high risk (scores from 10 to 12 points), moderate risk (scores from 13 to 14 points), low risk (score from 15 to 18 points) and no risk (score from 19 to 23 points).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Ayello EA, Braden B.* How and why to do pressure ulcer risk assessment. *Adv Skin & Wound Care.* 2002;15(3):125-33
- *Paranhos WY, Santos VLCG.* Avaliação de risco para úlceras de pressão por meio da Escala de Braden, na língua portuguesa. *Rev Esc Enferm USP.* 1999; 33:191-206

3.2.3.20.29 Bristol Stool Form Scale (BSFS)

Description: The Bristol Stool Form Scale (BSFS) allows the assessment of changes in intestinal transit based on the identification of stool forms. Through observation, the user selects from 7 options: Type 1 - separate hard lumps such as walnuts (difficult to pass), Type 2 - Sausage-shaped but irregular, Type 3 - Like a sausage but with cracks on the surface, Type 4 - Like a sausage or snake, smooth and smooth, Type 5 - Soft blisters with sharp edges, Type 6 - Fluffy chunks with jagged edges, a doughy stool, and Type 7 - Watery, in solid pieces, totally liquid. It is a useful diagnostic tool for physicians working with patients with gastrointestinal disorders, including an Irritable Bowel Syndrome (IBS).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Heaton, K. W.; Lewis, S. J. *Stool form scale as a useful guide to intestinal transit time. Scandinavian Journal of Gastroenterology, 1997*

3.2.3.20.30 Candida Score

Description: The Candida Score is intended to help physicians to differentiate patients that could benefit from early antifungal treatment from those in whom invasive candidiasis is highly improbable. The characteristics evaluated for the score are: 1-Multifocal colonization by Candida sp (0, 1 point); 2- Surgery or admission to ICU (0, 1 point); 3- total parenteral nutrition (0, 1 point); 4- severe sepsis (0, 1, 2 points). The score ranges from 0 to 5 points. The Candida score is used to differentiate between ICU patients who have severe hospital acquired sepsis or septic shock and would benefit from early antifungal treatment (score > 3) from those for whom invasive candidiasis is highly improbable (score ≤ 3).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- León C, Ruiz-Santana S, Saavedra P, Almirante B, Nolla-Salas J, Álvarez-Lerma, F, Garnacho-Montero J, Ángeles León M, EPCAN Study Group, *Crit Care Med* 2006 Vol. 34, No. 3 731
- Leroy G, et al. *Evaluation of "Candida score" in critically ill patients: a prospective, multicenter, observational, cohort study. Intensive Care. 2011; 1:50*

3.2.3.20.31 Caprini Risk Assessment

Description: The Caprini Risk Assessment for venous thromboembolism (VTE) was developed by Dr. Joseph A. Caprini in 1991, followed by newly updated and validated versions. The 2010 published version has 40 risk factors, and the weight of each risk factor varies from 1, 2, 3, and 5 points each. The total sum score is presented in four categories (low, moderate, high, and highest risk), each one with a recommended prophylactic regimen. The total score ranges from 1 to 40 points, where the higher the score, the higher the risk.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- J Caprini JA, Arcelus JI, Hasty JH, Tamhane AC, Fabrega F. Clinical assessment of venous thromboembolic risk in surgical patients. *Semin Thromb Hemost.* 1991;17 Suppl 3:304-12 Joseph A. Caprini, M.D. Risk assessment as a guide for the prevention of the many faces of venous thromboembolism 2010 –The American Journal of Surgery
- Caprini JA. *Risk assessment as a guide for the prevention of the many faces of venous thromboembolism. Am J Surg* 2010; 199(1Suppl):3-10

3.2.3.20.32 Capurro Somatic Method

Description: The Capurro Somatic Method is a simplified method for diagnosis of gestational age in the neurologically depressed newborn. It uses 5 somatic criteria: nipple formation, skin texture, ear shape, mammary gland size, and plantar creases. The total score ranges from 0 to 94. The gestational age in weeks is obtained by adding 204 to the total score and dividing by 7 and it is classified as preterm (under 37 weeks), term (37 to 41 weeks) and post term (above 42 weeks).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Capurro H, Konichezky S, Fonseca D, Caldeyro-Barcia R. A simplified method for diagnosis of gestational age in newborn infant. Journal of Pediatrics. 1978. 93:120-122*

3.2.3.20.33 Capurro Somatic and Neurologic Method

Description: The Capurro Somatic and Neurologic Method is a simplified method for diagnosis of gestational age in the newborn infant. It uses 5 somatic criteria (nipple formation, skin texture, ear shape, mammary gland size, and plantar creases) and 2 neurological (scarf sign and head). The total score ranges from 0 to 94. The gestational age in weeks is obtained by adding 204 to the total score and dividing by 7 and it is classified as preterm (under 37 weeks), term (37 to 41 weeks) and post term (above 42 weeks).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Capurro H, Konichezky S, Fonseca D, Caldeyro-Barcia R. A simplified method for diagnosis of gestational age in newborn infant. Journal of Pediatrics. 1978. 93:120-12*

3.2.3.20.34 CHADS2 Score

Description: The CHADS2 Score is a method of cardiovascular risk assessment, based on the prediction of cerebrovascular events through a set of individualized risk factors. The CHADS2 score allocates a point for congestive heart failure, arterial hypertension, age ≥ 75 years, or diabetes mellitus and two points for previous stroke or TIA. The greater the number of points assigned to a patient, the greater the probability of having a thromboembolic complication. A score 0: Low risk (1.9% per annum), score 1: Intermediate risk (2.8% per year) and score ≥ 2 : High risk (12.5% per year). The history of stroke has its own value of 2 points, in consensus to move these patients directly to the high-risk group ($>8.5\%$ per year), because the predicted stroke is a history of severity for new strokes.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Singer DE, Albers GW, Dalen JE, Fang MC, Go AS, Halperin JL, Lip GY, Manning WJ. Antithrombotic therapy in atrial fibrillation: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). American College of Chest Physicians. Chest. 2008 Jun;133(6 Suppl):546S-592S*
- *Santos C, Pereira T, Conde J. O Escore de CHADS2 na Predição de Eventos Cerebrovasculares – Uma Metanálise. Arq Bras Cardiol. 2013;100(3):294-301*

3.2.3.20.35 CHA2DS2 – VASc Score

Description: The CHA2DS2-VASc Score are clinical prediction rules for estimating the risk of stroke in patients with non-rheumatic atrial fibrillation (AF), a common and serious heart arrhythmia associated with thromboembolic stroke. The score is used to determine whether or not treatment is required with anticoagulation therapy or antiplatelet therapy, since AF is a known risk factor for stroke. The CHA2DS2-VASc Score is a refinement of CHADS2 Score and extends the latter by including additional common stroke risk factors, that is, age 65–74, female gender, and vascular disease. In the CHA2DS2-VASc Score, age greater than or equal 75 contributes 2 points. Major guidelines have used the fixed annual stroke risk as a guideline for starting anticoagulant treatment; ischemic stroke risk $> 1\%$ is considered an indication to start an anticoagulant therapy.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Gregory YHL, Nieuwlaat R, Pisters R, Deirdre A L, Harry JG.* Refining Clinical Risk Stratification for Predicting Stroke and Thromboembolism in Atrial Fibrillation Using a Novel Risk Factor-Based approach. *The Euro Heart Survey on Atrial Fibrillation. CHEST* 2010; 137(2):263-272
- *Olesen JB, Lip GY, Hansen ML, Hansen PR, Tolstrup JS, Lindhardsen J, Selmer C, Ahlehoff O, Olsen AM, Gislason GH, Torp-Pedersen C.* Validation of risk stratification schemes for predicting stroke and thromboembolism in patients with atrial fibrillation: nationwide cohort study. *BMJ.* 2011 Jan 31;342
- *Coppens M, et al.* The CHA2DS2-VASc score identifies those patients with atrial fibrillation and a CHADS2 score of 1 who are unlikely to benefit from oral anticoagulant therapy. *European Heart Journal.* Volume 34, Issue 3, Ap 170-6

3.2.3.20.36 Charlson Comorbidity Index

Description: The Charlson score considers the severity of each patient, in each institution's database, important information to adjust performance indicators by risk among service providers. Institutional performance indicators can use this score to assist in the assessment between service providers (for example, nursing) using the individual score of each patient considering their comorbidities. The evaluation criteria are the following diseases: myocardial infarction; peripheral vascular disease; Cerebrovascular disease; insanity; chronic lung disease; connective tissue disease; ulcer; chronic liver disease and cirrhosis; uncomplicated diabetes; hemiplegia or paraplegia; severe or moderate kidney disease; complicated diabetes; tumor; leukemia; lymphoma; severe or moderate liver disease; malignant tumor, metastasis and AIDS. The index assigns weights of 1, 2, 3 and 6 diseases to obtain a total value ranging from 0 to 37 points, where 0 is the best survival and 37 the worst survival. Scores greater than 4 points are those that have a greater indication of comorbidities, so that the higher the index presented in the Charlson Comorbidity Index at admission, the greater the chances of presenting death as an outcome.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources :

- *Charlson ME, Pompei P, Ales KL, MacKenzie CR.* A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis* 1987; 40:373-83
- *Charlson ME, et al.* The Charlson comorbidity index is adapted to predict costs of chronic disease in primary care patients. 2008 Dec;61(12):1234-40
- *Martins M, Blais R, Miranda NN.* Avaliação do índice de comorbidade de Charlson em internações da região de Ribeirão Preto, São Paulo, Brasil. *Cad. Saúde Pública, Rio de Janeiro*, 24(3):643-652, mar, 2008

3.2.3.20.37 Child Pugh Score

Description: The Child Pugh Score is used to assess the prognosis of patients with chronic liver disease, particularly cirrhosis. Originally developed to predict mortality during surgery, it is currently used to determine the prognosis, as well as the intensity of treatment and the need for a liver transplant. There are 5 clinical criteria for scoring the liver disease: (1) total bilirubin (mg/dL): points at +1, +2, +3; (2) serum albumin (g/dL): points at +1, +2, +3; (3) prothrombin time (INR): points at +1, +2, +3; (4) ascites: points at +1, +2, +3; (5) hepatic encephalopathy: points at +1, +2, +3. For the final score, the scores for each criterion evaluated are added. The score is divided into 3 severity classes: Child class A for 100% survival in 1 year (5-6 points), Child class B for 80% survival in 1 year (7-9 points) and Child class C for 45% survival in 1 year (10 - 15 points).

System functions: Perioperative Electronic Patient Chart -> PACU Scores and Electronic Pre-Anesthetic Assessment -> Risk

Sources:

- *Kollia Z, Patelarou E, Vivilaki V, Kefou F, Elefsiniotis I, Dourakis SP, Brokalaki H. Translation and validation of the Greek chronic liver disease questionnaire. 2010 Dec 14;16(46):5838-44*
- *Durand F, Valla D. Assessment of the prognosis of cirrhosis: Child-Pugh versus MELD. J Hepatol. 2005;42(suppl 1):100-7.*

3.2.3.20.38 Chung Score

Description: The Chung Score is used to assess the post-surgical patient's recovery in the anesthetic recovery room who will be released to complete their recovery at their home. The purpose of this score is to ensure clinical stability for its release, according to medical discharge. The Score is composed of the items: vital signs, activity level, nausea and/or vomiting; pain assessment, as well as the level of post-surgical bleeding. Chung has a total score of 10 points, with the patient being safe for home discharge only if the score is >9 points.

System functions: Perioperative Electronic Patient Chart -> PACU Scores

Sources:

- *Gignoux B, Gosgnach M, Lanz T, Vulliez A et.al. Short-term outcomes of Ambulatory Colectomy for 157 Consecutives Patients. Annals of Surgery, Volume 270, Number 02, 2019. PMID: 29727328 DOI: 10.1097/SLA.0000000000002800.*

3.2.3.20.39 Cincinnati Prehospital Stroke Scale (CPSS)

Description: The Cincinnati Prehospital Stroke Scale (CPSS) is used for pre-hospital evaluation of potential strokes where three physical changes are observed and applied in a time of less than one minute. The criteria are established in the facial droop, arm drift and abnormal speech where the presence of one of the three findings indicates a 72% probability of a stroke and the presence of all three findings indicates an 85% probability of a stroke.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Kothari RU, Pancioli A, Liu T, Brott T, Broderick J. Cincinnati Prehospital Stroke Scale: reproducibility and validity. Ann Emerg Med 1999 Apr;33(4):373-8*
- *AHA American Heart Association/ ACLS Emergências em Cardiologia. Suporte avançado de vida em cardiologia. Barbara Aehlert. Tradução da 3ª edição. Edição/reimpressão: 2009*

3.2.3.20.40 Clavien Score

Description: The Clavien Score is used to classify surgical complications. It includes 7 assessment levels (I, II, IIIa, IIIb, IVa, IVb, V). Through observation and description of the grades, the user selects the appropriate grade from Grade I to Grade V. Grade I corresponds to any deviation from the normal postoperative course without the need of pharmacological treatment or surgical, endoscopic or radiologic interventions. Grade II corresponds to pharmacological treatment with other drugs allowed for grade I complications, blood transfusions and total parenteral nutrition. Grade III has two subgroups corresponding to the presence or absence of general anesthesia (grade IIIa and grade IIIb) and grade IV has two subgroups corresponding to single organ dysfunction or multiple organ dysfunction (grade IVa and grade IVb). The suffix "d" is added to the respective degree of complications when the patient experiences a complication, indicating the need for follow-up to fully assess complications.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Dindo D, Demartines N, Clavien Pierre-Alain. Classification of surgical complications. Annals of Surgery, volume 240, Number 2, August 2004*
- *R. Kazan, D. Bracco and T. M. Hemmerling. Reduced cerebral oxygen saturation measured by absolute cerebral oximetry during thoracic surgery correlates with postoperative complications. British Journal of Anaesthesia 103 (6): 811-16 (2009)*

3.2.3.20.41 Clinical Global Impression – Schizophrenia Scale Severity of Illness (CGI-SCH SI)

Description: The Clinical Global Impression – Schizophrenia Scale Severity of Illness (CGI-SCH SI) is used to assess the severity of symptoms, the response to treatment, and the effectiveness of therapeutic interventions for schizophrenia. The severity of illness measures the patient’s clinical situation throughout the week prior to the evaluation and is sub-divided into five categories that reflect the dimensions of the schizophrenia: positive symptoms, negative symptoms, depressive symptoms, cognitive symptoms and overall symptoms. The scores for each of the evaluated criteria are scored from 1 to 7 points and the higher the score, the greater the severity of the schizophrenia. This scale does not generate a total score at the end, only assigns severity to each of the evaluated symptoms.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Guy W. Clinical global impression (CGI). In: ECDEU Assessment Manual for Psychopharmacology. US Department of Health and Human Services, Public Health Service, Alcohol Drug Abuse and Mental Health Administration, NIMH Psychopharmacology Research branch. Rockville, MD: National Institute of Mental Health; 1976. P.218-22-1*
- *Haro JM, et al. The Clinical Global Impression-Schizophrenia scale: a simple instrument to measure the diversity of symptoms present in schizophrenia. Acta Psychiatr Scand Suppl. 2003;(416):16-23*

3.2.3.20.42 Clinical Pulmonary Infection Score (CPIS)

Description: The Clinical Pulmonary Infection Score (CPIS) was developed to increase the accuracy of the clinical diagnosis of pneumonia in relation to mechanical ventilation in patients with respiratory distress syndrome and chronic obstructive disease. The evaluated criteria used in this score are tracheal secretions, chest X Ray, temperature in Celsius, leukocytosis, PaO₂/FiO₂, criteria for progression of pulmonary infiltrates, microbiology. The final score is the sum of the individual values and ranges from 0 to 12 points, where 0 to 6 is a low probability of pneumonia related to mechanical ventilation and 7 to 12 is a high probability of pneumonia related to mechanical ventilation.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Pugin J, Auckenthaler R, Mili N, Janssens JP, Lew PD, Suter PM. Diagnosis of ventilator-associated pneumonia by bacteriologic analysis of bronchoscopic and nonbronchoscopic “blind” bronchoalveolar lavage fluid. Am Rev Respir Dis 1991;143(5 Pt 1):1121-9*

3.2.3.20.43 Clinical Pulmonary Infection Score (CPIS) Modified

Description: The Clinical Pulmonary Infection Score (CPIS) Modified was developed to increase the accuracy of the clinical diagnosis of pneumonia in relation to mechanical ventilation in patients with respiratory distress syndrome and chronic obstructive disease. The evaluated criteria used in this score are temperature

in Celsius, leukocytosis, type, and quality of tracheal secretions, PaO₂/FiO₂ and chest X Ray. The difference for CPSI is the culture of tracheal secretion, for the CPSI Modified do not need to wait until the laboratory result to know the type of germ and quantity to perform the evaluation. The final score is the sum of all result values, that goes from 0 to 10. If the final score is 0 to 5 points, the patient is less likely to have pneumonia, if it is from 6 to 10, the patient is most likely to have pneumonia.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Luna CM, Aruj P, Niederman MS, Garzon J, Violi D, Prignoni A, Rios F, Baquero S, Gando S. *Appropriateness and delay to initiate therapy in ventilator-associated pneumonia. For the Grupo Argentino de Estudio de la Neumonia Asociada al Respirador (GANAR) group. Eur Respir J 2006; 27: 158-164*

3.2.3.20.44 Clinical-Functional Vulnerability Index (IVCF-20)

Description: The Clinical-Functional Vulnerability Index (IVCF-20) is a multidimensional index that assesses eight dimensions considered predictive of functional decline and/or death in the elderly: 1- age; 2- health self-perception; 3- functional disabilities; 4-cognition; 5-mood/behavior; 6- mobility (grasp, hold and clamp; aerobic capacity/ muscle; gait and sphincter function); 7- communication (vision and hearing); 8- presence of multiple comorbidities, represented by poly pathology, polypharmacy and/ or recent hospitalization. The score varies between 0 and 40 points. Score from 0 to 6 points: elderly at low risk of functional clinical vulnerability; Score from 7 to 14 points: elderly at moderate risk of functional clinical vulnerability; Score ≥ 15 points: elderly at high risk of functional clinical vulnerability.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Carmo AS. *Proposta de um índice de vulnerabilidade clínico-funcional para Atenção Básica: um estudo comparativo com a avaliação multidimensional do idoso. Belo Horizonte; 2014. Orientador: Edgar Nunes de Moraes. Dissertação (mestrado): Universidade Federal de Minas Gerais, Faculdade de Medicina*
- <https://www.ivcf-20.com.br>

3.2.3.20.45 Comfort-Behavior Scale

Description: The Comfort-Behavior Scale (Comfort-B) is derived from the Comfort scale. In 2005, this scale was validated in critically ill pediatric patients without mechanical ventilation, in order to assess the suffering of children in the ICU. Containing only behavioral variables, the scale has seven evaluation items which are: readiness, calm/agitation, respiratory response, crying, physical movement, muscle tonus and facial tension. Each item receives a value between 1 and 5 points. The scale ranges from 7 to 35 points, where a value of ≤ 10 corresponds to super sedation and ≥ 23 to little sedation. Intermediate values (11-22) may not predict the degree of sedation, requiring more careful observation.

System functions: Electronic Patient Chart -> Scores and Indexes and Vital Signs and General Monitoring.

Sources:

- Ambuel B, Hamlett KW, Marx CM, Blumer JL. *Assessing distress in pediatric intensive care environments: The COMFORT scale. Journal of Pediatric Psychology, 1992: 17(1), 95-109*

- *Amoretti CF, Rodrigues GO, Carvalho PRA, Trotta EA. Validação de escalas de sedação em crianças submetidas à ventilação mecânica internadas em uma unidade de terapia intensiva pediátrica terciária. Rev Bras Ter Intensiva. 2008;20(4):325-330*

3.2.3.20.46 Confusion Assessment Method (CAM)

Description: The Confusion Assessment Method (CAM) is a standardized evidence-based assessment that enables non-psychiatrically trained clinicians to identify and recognize delirium quickly and accurately in both clinical and research settings. Therefore, patients should be assessed frequently using the CAM to facilitate identification and management of delirium and underlying etiology. It is composed of four items: (1) acute onset or fluctuating course; (2) lack of attention; (3) disorganized thoughts, (4) altered level of consciousness. Each question has a yes/no answer. The patient is considered in delirium state (CAM positive) when characteristics 1 and 2 plus characteristics 3 or 4 are present.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Mori S, Kashiba KI, Silva DV, Zanei SSV, Whitaker IY. Confusion assessment method para analisar delirium em unidade de terapia intensiva. Revisão de literatura. Revista Brasileira de Terapia Intensiva. 2009; 21(1): 58-6*

3.2.3.20.47 Confusion Assessment Method for the Intensive Care Unit (CAM-ICU)

Description: The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) was adapted in 2001 for the assessment of critically ill patients intubated under mechanical ventilation (MV) in intensive care environments. This is composed of four items present in CAM: 1 - acute onset, 2 - attention disorder, 3 - disorganized thinking, and 4 - change in the level of consciousness. The proposed evaluation comprises the observation of the patient's non-verbal response pattern through the response to simple commands, the recognition of figures by applying the Attention Screening Examination (ASE), surveillance and logical answers with yes or no to simple questions. The patient is considered in delirium state (CAM positive) when characteristics 1 and 2 plus characteristics 3 or 4 are present. For example: if features 1, 2 and 3 are present, there is no need to evaluate feature 4. If features 1 or 2 are absent, there is no need to continue because the patient cannot be CAM-ICU positive without them. Do not apply the CAM-ICU in comatose/unconscious patients (RASS -4/-5).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources :

- *Ely EW. Vanderbilt University. Confusion Assessment Method for the ICU (CAM-ICU). Revised Edition: October 2010*
- *Faria RSB, Moreno RP. Delirium na unidade de cuidados intensivos: uma realidade sub diagnosticada. Rev Bras Ter Intensiva, 2013*

3.2.3.20.48 Confusion Assessment Method for the Intensive Care Unit modified (CAM – ICU)

Description: Confusion Assessment Method for the Intensive Care Unit modified (CAM – ICU) was developed in 2001 to evaluate intubated patients on mechanical ventilation in ICUs. This assessment allows a quick and accurate measurement in critically ill patients, just assessing the level of consciousness. The difference between CAM-ICU and CAM-ICU Modified is that the second are there validated expressions for Brazil. It has four items for assessing level of consciousness: 1-Acute onset or fluctuating course; 2-Lack of attention; 3-Disorganized thoughts; 4-Altered level of consciousness. The evaluation corresponds to the patient's non-

verbal response via response to simple commands, recognition of figures, surveillance and logical responses. The result is simply criteria for delirium depending on the answers and observation of the patient. Criteria for delirium diagnosis is considered present when the answer is yes for items 1 and 2 and when the answer is yes for either trait 3 or 4.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Ely EW, Margolin R, Francis J, et al* – Evaluation of delirium in critically ill patients: validation of the Confusion Assessment method for the Intensive Care Unit (CAM-ICU). *Crit Care med*, 2001;29:1370-1379
- *Mori S, Khachiba KI, Silva DV, Zanei SSV, Whitaker IY.* Confusion assessment method para analisar delirium em unidade de terapia intensiva. Revisão de literatura. *Rev Bras Ter Intensiva*. 2009; 21(1):58-64
- *Ely EW and Vanderbilt University.* Confusion Assessment Method for the ICU (CAM-ICU). Revised Edition: October 2010

3.2.3.20.49 Contrast Induced Nephropathy (CIN) Risk Score

Description: The Contrast Induced Nephropathy (CIN) Risk Score is used for patients undergoing percutaneous coronary intervention and predicts the risk of contrast-induced nephropathy. The score includes patient-related characteristics [age > 75 years (4 points), diabetes mellitus (3 points), chronic congestive heart failure or admission with acute pulmonary edema (5 points), hypotension (5 points), anemia (3 points), and chronic kidney disease] and procedure-related characteristics [use of IABP (5 points) or increasing volumes of contrast (1 point for each 100 mL of contrast)]. The final score predicts the risk of CIN and the risk of dialysis. To score the chronic kidney disease, the HCP can consider the serum creatinine (4 points if > 1.5 mg/dL) or the estimated glomerular filtration rate (eGFR) in mL/min/1.73 m² (0 points for eGFR ≥ 60, 2 points for 40 ≤ eGFR < 60, 4 points for 20 ≤ eGFR < 40, and 6 points for eGFR < 20).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Mehran R, et al.* A simple risk score for prediction of contrast-induced nephropathy after percutaneous coronary intervention: Development and initial validation. *Journal of the American College of Cardiology*. V. 44, Issue 7, 6 October 2004, pg. 1393-1399

3.2.3.20.50 COPD Assessment Test (CAT)

Description: The COPD Assessment Test (CAT) is a patient-completed questionnaire that can assess the impact of Chronic Obstructive Pulmonary Disease (COPD) on a patient's health status. The content of the CAT questionnaire comprises simple questions that most patients should be able to understand and easily answer. CAT is used to assess current status and for long-term follow-up of COPD-related health status. It is not a diagnostic tool, it supplements information obtained from lung function measurement and exacerbation risk assessment. The questionnaire consists of eight items with a total score varying from 0 to 40. Higher scores denote a more severe impact of COPD on a patient's life.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Jones PW, Harding G, Berry P, Wiklund I, Chen W-H, Kline N.* Development and first validation of the COPD Assessment Test. *Eur Respir J*, 2009

3.2.3.20.51 Cormack-Lehane (CL) Classification

Description: The Cormack-Lehane (CL) classification is a tool used to describe laryngeal view during direct laryngoscopy and correlates with measures of difficulty with intubation. This tool aims to classify patients according to the one of the four categories described and exemplified by images, which are grade 1 (most of the glottis is visible), grade 2 (at best almost half of the glottis is seen, at worst only the posterior tip of the arytenoids is seen), grade 3 (only the epiglottis is visible) and grade 4 (no laryngeal structures are visible). The higher the classification, the more difficult can be the intubation.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Cormack RS, Lehane J. Difficult tracheal intubation in obstetrics. Anaesthesia 1984; 39: 1105-11*
- *Khol LK, Kong CE, IP-Yam PC. The modified Cormack-Lehane score for the grading of direct laryngoscopy: evaluation in the Asian population. 2002 Feb;30(1):48-51*
- *R. Krage, et al. Cormack-Lehane classification revisited. British Journal of Anaesthesia 105 (2): 220-7 (2010)*

3.2.3.20.52 CRB-65 Score

Description: The CRB-65 Score is a tool used to stratify patients with community acquired pneumonia (CAP) into three risk groups. It is based only on clinical observations, in cases when laboratory exams are not available (refer to CURB-65 when serum urea is available). Each of the following risk factor scores one point: confusion of new onset, RR \geq 30/min, low blood pressure (SBP < 90 mmHg or DBP \leq 60 mmHg), and age \geq 65 years. The maximum score is 4. Patients with scores 0 are at low risk of mortality (1.2%) and might be suitable for home treatment. Patients with a score of 1 or 2 are at intermediate risk of mortality (8.15%), likely need hospital referral and assessment and should be considered for hospital supervised treatment. Patients with a score of 3 or 4 are at high risk of mortality (31%) and need urgent hospital admission.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Lim WS, Van der Eerden MM, Laing R, et al. Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. Thorax 2003; 58:377-382*
- *Dwyer R, Hedlund J, Henriques-Normark B, et al. Improvement of CRB-65 as a prognostic tool in adult patients with community acquired pneumonia. BMJ Open Res 2014;1: e000038. DOI:10.1136/bmjresp-2014-000038*
- *Lim W S, Baudouin S V, George R C, et al. British Thoracic Society guidelines for the management of community acquired pneumonia in adults: update 2009. Thorax 2009; 64(Suppl III) -55. DOI:10.1136/thx.2009.121434*

3.2.3.20.53 Creatinine Clearance Rate Equations

Description: The Creatinine Clearance Rate Equation is used to estimate the glomerular filtration (GF) based on the serum creatinine value (mg/dL) and other patient's attributes, such as weight (Kg), height (cm), age (years), African descentance, and premature newborn. The formulas available in the system are described below.

For adult patients:

Cockcroft-Gault Equation

GF (mL/min) = (140 – age) x weight x (0.85 if woman) / (72 x serum creatinine)

Simplified Modification of Diet in Renal Disease (MDRD) equation

GF (mL/min/1.73 m²) = 186 x serum creatinine^{-1.154} x age^{-0.203} x (0.742 if female) x (1.210 if African descentance)

Jelliffe Modified

GF (mL/min) = {98 – [0.8 x (age – 20)]} / serum creatinine x [0.007184 x (height)]^{0.725} x (weight)^{0.425} / 1.73 m² x (0.9 if woman)

For pediatric patients up to 18 years old:

Counahan-Barratt Equation

GF (mL/min/1.73 m²) = 0.43 x height / serum creatinine

Schwartz Formula

GF (mL/min) = k x height x serum creatinine

k = 0.33 premature

ii. k = 0.45 term to 2 years

iii. k = 0.55 female 2-16 years

iv. k = 0.70 male 2-16 years

System functions: Electronic Patient Chart -> Scores and Indexes and Oncology Treatment, Electronic Pre-Anesthetic Assessment -> Risks

Sources:

- *Cockcroft DW, Gault MH. Prediction of creatinine clearance from serum creatinine. Nephron. 1976; 16:31-41*
- *Levey AS, Bosch JP, Lewis JB, Greene T, Rogers N, Roth D: A more accurate method to estimate glomerular filtration rate from serum creatinine: a new prediction equation. Modification of Diet in Renal Disease Study Group. Ann Intern Med 130:461-470, 1999*
- *Jelliffe R. Estimation of creatinine clearance in patients with unstable renal function, without a urine specimen. Am J Nephrol. 2002; 22(4):320-4*
- *Counahan R, Chantler C, Ghazali S, Kirkwood B, Rose F, Barratt TM: Estimation of glomerular filtration rate from plasma creatinine concentration in children. Arch Dis Child 51:875-878, 1976*
- *Schwartz GJ, Feld LG, Langford DJ: A simple estimate of glomerular filtration rate in full-term infants during the first year of life. J Pediatr 104:849-854, 1984*

3.2.3.20.54 Clinical Risk Index for Babies (CRIB)

Description: The Clinical Risk Index for Babies (CRIB) was designed by the International Neonatal Network in the United Kingdom in 1993 and is used to predict mortality for infants born at less than 32 weeks gestation. The clinical severity in preterm infants was based on six variables such as birthweight, gestational age (weeks), maximum and minimum fraction of inspired oxygen and maximum base excess during the first 12 h, and presence of congenital malformations. The final score is based on a weighted sum of these six factors,

and the maximum score obtained in the assessment is 23 points. A higher score indicates an increased risk of mortality.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *The CRIB (clinical risk index for babies) score: a tool for assessing initial neonatal risk and comparing performance of neonatal intensive care units. Lancet 1993; 342:193-8*

3.2.3.20.55 Clinical Risk Index for Babies (CRIB II)

Description: The Clinical Risk Index for Babies (CRIB II) is an update of the first CRIB version. It is a tool developed to predict initial mortality risk amongst low-birth-weight babies (newborn at 32 weeks' gestation) after 1 h of admission to the ICU. The index contains 5 variables such as gender, gestational age, birth weight (g), temperature at admission and base excess (mmol/L). The CRIB II score ranges from 0 to 27. Lower scores indicate a better prognosis.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Parry G, et al. CRIB II: an update of the clinical risk index for babies score. 2003 May 24;361(9371):1789-91*
- *Mohkam M, et al. A comparison of CRIB, CRIB II, SNAP, SNAPII and SNAP-PE scores for prediction of mortality in critically ill neonates. Vol. 24, No.4, February 2011, pp. 193-9*
- *Zahraa Mohamed Ezz-Eldin, Tamer A. Abdel Hamid, Meray Rene Labib Youssef, and Hossam El-Din Nabil Clinical Risk Index for Babies (CRIB II) Scoring System in Prediction of Mortality in Premature Babies. 2015 Jun; 9(6): SC08–SC11.*

3.2.3.20.56 Critical Care Pain Observation Tool (CPOT)

Description: Refer to the feature "Vital signs and clinical parameters calculation" of this document.

3.2.3.20.57 CRUSADE Score

Description: The CRUSADE score is used to estimate the patient's baseline risk of major bleeding during the in-hospital phase of a myocardial infarction treatment without ST-T segment elevation. The bundles observed are: basal hematocrit (%), creatinine clearance (mL / min), HR (bpm), SBP (mmHg), severe vascular disease, diabetes mellitus and signs of HF on admission. The score was created by assigning weighted integers corresponding to the coefficient of each variable. It ranges from 1 to 100 points. Major bleeding rate increased by bleeding risk score quintiles: 3.1% for those at very low risk (score ≤ 20); 5.5% for those at low risk (score 21-30); 8.6% for those at moderate risk (score 31-40); 11.9% for those at high risk (score 41-50); and 19.5% for those at very high risk (score >50).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Abu-Assi E, et al. Evaluating the Performance of the Can Rapid Risk Stratification of Unstable Angina Patients Suppress Adverse Outcomes with Early Implementation of the ACC/AHA Guidelines (CRUSADE) bleeding score in a contemporary Spanish cohort of patients with non-ST-segment elevation acute myocardial infarction. 2010 Jun 8;121(22):2419-26*

- *Subherwal S, et al. The CRUSADE (Can Rapid risk stratification of Unstable angina patients Suppress Adverse outcomes with Early implementation of the ACC/AHA guidelines) Bleeding Score. Circulation, 2009; 119:1873-82*

3.2.3.20.58 CURB-65 Score

Description: The CURB-65 Score is a tool used in the emergency department to stratify patients with community acquired pneumonia (CAP) into three management groups. Each of the following risk factor scores one point: confusion of new onset, serum urea > 7 mmol/L, RR ≥ 30 breaths/min, low blood pressure (SBP < 90 mmHg or DBP ≤ 60 mmHg), and age ≥ 65 years. The maximum score is 5. Patients with scores 0 and 1 are at low risk of mortality (< 2%) and might be suitable for management as hospital outpatients or by their general practitioner. Patients with a score of 2 are at intermediate risk of mortality (9%) and should be considered for hospital supervised treatment. Patients with a score of > 2 are at high risk of mortality (> 19%), corresponding to those patients who meet the criteria for severe CAP and should be treated in hospital.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Lim WS, Van der Eerden MM, Laing R, Boersma WG, Karalus N, Town GI, Lewis SA, Macfarlane JT. Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. Thorax, 2003*

3.2.3.20.59 Delirium Risk Assessment in Post-Operative Period of Non-Cardiac Elective Surgery

Description: The Delirium Risk Assessment in Post-Operative Period of Non-Cardiac Elective Surgery uses data available in the preoperative period to stratify patients into risk groups for developing delirium. Several clinical findings are evaluated, such as over 70 years of age, alcohol abuse, previous cognitive dysfunction, severe illness, preoperative metabolic disorder, aortic aneurysm surgery and thoracic surgery. The risk of delirium is evidenced by the scoring: 0 represents a risk of delirium of 2%, between 1-2 represents a risk of 11%, and 3 or more represents 50% of postoperative delirium risk.

System functions: Perioperative Electronic Patient Chart -> PACU Scores and Electronic Pre-Anesthetic Assessment -> Risk

Sources:

- *Marcantonio ER, Goldman L, Mangione CM et al. A Clinical Prediction Rule for Delirium After Elective Noncardiac Surgery. JAMA. 1994;271(2):134-9*

3.2.3.20.60 Detsky Modified Preoperative Cardiac Risk Index

Description: The Detsky Modified Preoperative Cardiac Risk Index is well publicized in clinical practice by the American College of Physicians (ACP) based on the Modified Detsky Index. This method consists of scoring age, clinical cardiac and laboratory variables present for the patient. The index results presented are classified as: Class I for 0-15 points (5% cardiac risk). Class II for 20-30 points (27% cardiac risk). Class III for > 30 points (60% cardiac risk).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Palda AV, Detsky AS. Guidelines for Assessing and Managing the Perioperative Risk from Coronary Artery Disease Associates with Major Noncardiac Surgery. Report of the American College of Physicians. Ann Intern Med 1997; 127: 309-12*

3.2.3.20.61 Dialysis Malnutrition Score (DMS)

Description: The Dialysis Malnutrition Score (DMS) was developed by Kalantar-Zadeh and coworkers (1999) with the aim to assess the level of malnutrition for patients undergoing dialysis treatment. The score is an accumulative test with 7 variables divided between two groups: clinical history - 5 variables (weight loss, change in food intake, gastrointestinal symptoms, functional capacity, and associated comorbidity) and clinical exam - 2 variables (subcutaneous fat loss and muscle mass loss). Each variable has a value of 1 (normal) to 5 (very severe) points. The sum of all scores determines the patient's degree of nutrition, which can range from 7 points (normal) to 35 points (severely malnourished).

System functions: Electronic Patient Chart ->Scores and Indexes

Sources:

- *Kalantar-Zadeh K, et al. A modified quantitative subjective global assessment of nutrition for dialysis patients. Nephrol Dialysis Transplant. 1999; 14:1732-8*
- *Huarte-Loza E, et al. Grupo de Consenso de la Sociedad Española de Diálisis y Trasplante- SEDYT. Nutrición en pacientes en diálisis. Consenso SEDYT. Revista Diálisis y Trasplantes. 2006;27(4):138-61*
- *Yaffé M, Barozzi C. Desnutrición en la enfermedad renal crónica. Tendencias en Medicina. Junio; Año XXVI N° 50: 163-170*

3.2.3.20.62 Dimensions of Anger Reactions (DAR-5)

Description: The Dimensions of Anger Reactions (DAR-5) is a brief and psychometrically sound measure of anger. It is a five-point Likert scale ranging from 1 to 5 that assesses anger frequency, intensity, duration, aggression and impact on a person's social functioning over the preceding 4-week period. Items are summed to provide a total severity score (range 5 to 25). Higher scores indicate worse symptomatology, and a score ≥ 12 indicates an anger problem.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Goulart AC et al. Dimensions of Anger Reactions (DAR-5) and its validity associated with anxiety and depression in Brazilian adults. 2016 -"The Spanish Journal of Psychology"*
- *Forbes D, Alkemade N, Mitchell D, Lewis V. Utility of the Dimensions of Anger Reactions-5 (DAR-5) scale as a brief anger measure. Depress Anxiety. 2014 Feb;31(2):166-73. Epub 2013 Jun 25*

3.2.3.20.63 DINI Scale

Description: The DINI scale allows for the classification of pediatric patients in degrees of dependence on nursing. It makes it possible to improve the decision-making process of nurses in managerial and care practice. Obtained after four phases of the Delphi technique, it is composed of 11 indicators: activity, control measurement interval, drug therapy, oxygenation, mucosal skin integrity, mobility and ambulation, body hygiene, nutrition and hydration, elimination, companion participation and support. Scale results ranging from 13 to 26 points indicate minimal care; 27 to 39 points intermediate care; 40 to 52 points semi-intensive care and > 53 indicate intensive care.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Akins RB, Tolson H, Cole BR. Stability of response characteristics of a Delphi panel: application of bootstrap data expansion. 2005 Dec 1; 5:37*

- *Dini, AP, Fugulin FMT, Veríssimo MDLOR et al. Sistema de Classificação de Pacientes Pediátricos: construção e validação de categorias de cuidados. Rev Esc Enferm USP 2011; 45(3): p. 575-80*

3.2.3.20.64 Distress Thermometer

Description: The Distress Thermometer is used to identify distress levels and possible causes for oncologic patients. It takes in consideration personal, family, emotional and physical problems. It ranges from 0 (no distress) to 10 (extreme distress), for which patients indicate their level of distress over the course of the week prior to assessment.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Bergerot CD, et al. Termômetro de Distress: validação de um instrumento breve para avaliação diagnóstica de pacientes oncológicos. Universidade de Brasília, Brasília. Brasil. Psico-USf, v. 14, n. 3, p. 253-260, Set/Dez 2009*

3.2.3.20.65 Douleur Neuropathique 4 (DN4) Questionnaire

Description: The Douleur Neuropathique 4 (DN4) questionnaire was developed by the French Neuropathic Pain Group and is a simple and objective tool, with the ability to distinguish nociceptive from neuropathic pain (NPP). It was derived from a list of signs and symptoms associated with NPP and includes a series of 4 groups of questions consisting of 7 sensory descriptors and 3 signs related to a sensorial exam. If the score is 4 or higher, then the pain is likely to be NPP; if the score is less than 4 then the pain is unlikely to be NPP.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Bouhassira D, Attal N, Alchaar H, Boureau F, Brochet B, Bruxelle J, Cunin G, Fermanian J, Ginies P, Grun-Overdyking A, Jafari-Schluep H, Lante´ri-Minet M, Laurent B, Mick G, Serrie A, Valade D, Vicaut E: Comparison of pain syndromes associated with nervous or somatic lesions and development of a new neuropathic pain diagnostic questionnaire (DN4). Pain 114:29-36, 2005*
- *Jamile G. Santos, Jacilene O. Brito, Daniel C. de Andrade, Viviane M. Kaziyama, Karine A. Ferreira, Israel Souza, Manoel J. Teixeira, Didier Bouhassira and Abrahao F. Baptista: Translation to Portuguese and Validation of the Douleur Neuropathique 4 Questionnaire. The Journal of Pain, Vol 11, No 5 (May), 2010: 484-490*

3.2.3.20.66 Downton Index

Description: The Downton Index was created in 1993 and aims to assess the risk of falls in patients. It is used for inpatients of all ages at risk of falling. The variables evaluated are previous falls (score of 0 and 1); administration of medicines (scores between 0, 1, 2, 3, 4 and 5); walking (score of 0 and 1) and mental status (score of 0 and 1). The Index ranges from 0 to 9. The results for the Downton Index are: no risk (score 0); low risk (score 1); medium risk (score 2) and high risk (score 3 or more).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Downton JH. Falls in the elderly. London: Editor British Library Cataloguing in Publication Data, 1993. 158 p*
- *Rosendahl E, Lundin-Olsson L, Kallin K, Jensen J, Gustafson Y, Nyberg L. Prediction of falls among older people in residential care facilities by the Downton index. Aging 15: 142-147, 2003*

3.2.3.20.67 Downton Modified Index

Description: Downton Modified Index aims to assess the risk of falls in patients. It is used for inpatients of all ages at risk of falling. Downton Modified Index uses a different method of scoring the use of multiple drugs: 1 point if using 1 or more drugs (the Downton Index score can be from 0 to 4 points, depending on the number of drugs used and for what purpose). The classification of the index corresponds to the evaluation of previous falls (score of 0 or 1); administration of medicines (scores of 0 or 1); visual deficit (score of 0 or 1), hearing deficit (score of 0 or 1); extremity deficit (score of 0 or 1); walking (score of 0 or 1) and mental status (score of 0 or 1). The index ranges from 0 to 7. The results for the Downton Modified Index are: no risk (score 0); low risk (score 1); medium risk (score 2) and high risk (score ≥ 3).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Downton JH. Falls in the elderly. London: Editor British Library Cataloguing in Publication Data, 1993. 158 p*
- *Machado TR, Oliveira CJ, Costa FBC, Araujo TL. Avaliação da presença de risco para queda em idosos. As. Eletr. Enf. [Internet]. 2009;11(1):32-8*
- [Http://www.fen.ufg.br/revista/v11/n1/v11n1a04.htm](http://www.fen.ufg.br/revista/v11/n1/v11n1a04.htm)
- *Pinho T, et al. Avaliação do risco de quedas em idosos atendidos em Unidade Básica de Saúde. As Esc Enferm USP 2012; 46(2):320-7*

3.2.3.20.68 Durie e Salmon Scale

Description: The Durie e Salmon Scale is based on the combination of factors such as hemoglobin (low hemoglobin levels mean that the person is anemic and may indicate that the myeloma cells occupy a large part of the bone marrow), serum calcium (the bone normally contains a large amount of calcium and the destruction of the bone triggers the submission of calcium into the blood), concentration of the monoclonal component (a large quantity of monoclonal immunoglobulin indicates that many malignant plasma cells are present and that they are producing abnormal protein) and bone involvement (the advanced multiple myeloma stage in bone area is seen on x-rays). There are three phases established in accordance with the tumoral mass: stage I which equates to low cellular mass, stage II which equates to intermediate cellular mass, and stage III which equates to high cellular mass.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Durie BG, Salmon SE. A clinical staging system for multiple myeloma. Correlation of measured myeloma cell mass with presenting clinical features, response to treatment, and survival. Cancer 1975; 36:842-54*
- *Martinez GA. Fatores prognósticos no Mieloma Múltiplo. Rev. bras. hematol. hemoter. 2007;29(1):27-30*

3.2.3.20.69 Eastern Cooperative Oncology Group (ECOG) Performance Status

Description: The Eastern Cooperative Oncology Group (ECOG) Performance Status is a tool for the clinician to assess cancer patients for self-care, daily activities, and physical ability. The scale ranges from 0 (no restrictions) to 5 (dead).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Machado L, Saad IAB, Honma HN, Morcillo AM, Zambon L. Evolução do status de performance, índice de massa corpórea e distância percorrida no teste de caminhada de seis minutos em pacientes com câncer de pulmão avançado submetidos à quimioterapia. J Bras Pneumol. 2010;36(5):588-594*
- *Shvarts O, Lam JS, Han KR, Figlin R, Beldegrun A. Eastern Cooperative Oncology Group performance status predicts bone metastasis in patients presenting with renal cell carcinoma: implication for preoperative bone scans. 2004 Sep;172(3):867-70*

3.2.3.20.70 Eating Assessment Tool (EAT-10)

Description: The Eating Assessment Tool (EAT-10) is a symptom-specific outcome instrument for dysphagia. It consists of ten statements that a patient rates on a scale of 0 (no problem) to 4 (severe problem). If the score is ≥ 3 , the patient may have swallowing and safety issues.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Belafsky PC, Mouadeb DA, Rees CJ, Pryor JC, Postma GN, Allen J, Leonard RJ. The validity and reliability of EAT-10 has been determined. Validity and Reliability of the Eating Assessment Tool (EAT-10). Annals of Otology, Rhinology & Laryngology 2008;117(12): 919-924*
- <https://www.nestlenutrition-institute.org/resources/nutrition-tools/details/swallowing-assessment-tool>

3.2.3.20.71 Edmonton Symptom Assessment System – Brazilian Version (ESAS-Br)

Description: The Edmonton Symptom Assessment System (ESAS-Br) is a simple method for the assessment of symptoms in patients admitted to a palliative care unit. It is a translation and the cross-cultural adaptation to Brazilian Portuguese, of a revised version of the instrument Edmonton Symptom Assessment System (ESAS-r) for use in palliative care. The ESAS-Br It is a combination of physical and psychological symptoms and addresses ten symptoms frequently found in patients with cancer such as pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, well-being, shortness of breath and sleep. The severity at the time of assessment of each symptom is rated from 0 to 10 on a numerical scale, with 0 meaning that the symptom is absent and 10 that it is the worst possible severity. The assessment can be completed by the patient, by the family or by the healthcare team. It allows the frequency and intensity of the symptoms presented by the patients to be known, allowing healthcare teams to make suitable decisions for offering the necessary care.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Watanabe SM, Nekolaichuk C, Beaumont C, Johnson L, Myers J, Strasser F. A multicenter study comparing two numerical versions of the Edmonton Symptom Assessment System in palliative care patients. J Pain Symptom Manage. 2011; 41:456–468.*
- *Bruera E, Kuehn N, Miller MJ, Selmsler P, Macmillan K. J Palliat Care. The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients. 1991 Summer; 7 (2):6-9*

- Paiva CE, Manfredini LL, Paiva BSR, Hui D, Bruera E. The Brazilian version of the Edmonton Symptom Assessment System (ESAS) is a feasible, valid and reliable instrument for the measurement of symptoms in advanced cancer patients. PLoS ONE. 2015;10(7):e0132073. Doi: 10.1371/journal.pone.0132073

3.2.3.20.72 Edmonton Symptom Assessment System (ESAS)

Description: The Edmonton Symptom Assessment System (ESAS) is a simple method for the assessment of symptoms in patients admitted to a palliative care unit. It is a combination of physical and psychological symptoms and addresses nine symptoms frequently found in patients with cancer such as pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, well-being, and shortness of breath. The severity at the time of each symptom assessment is rated from 0 to 10 on a numerical scale, with 0 meaning that the symptom is absent and 10 that it is the worst possible severity. The assessment can be completed by the patient, by the family or by the healthcare team. It allows the frequency and intensity of the symptoms presented by the patients to be known, allowing healthcare teams to make suitable decisions for offering the necessary care.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Bruera E, Kuehn N, Miller MJ, Selmsler P, Macmillan K. *J Palliat Care. The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients.* 1991 Summer; 7 (2):6-9

3.2.3.20.73 Epworth Sleepiness Scale (ESS)

Description: Epworth Sleepiness Scale (ESS) is a method used to measure the level of daytime sleepiness. Patients are asked to rate the likelihood (0-3) of falling asleep during eight daily activities. The higher the score the patient assigns to an activity the more likely they are to fall asleep. The final score is a sum of all answer values, and ranges from 0 to 24. The higher the ESS score, the higher that person's average sleep propensity in daily life and the more likely a sleep disorder is present.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Johns MW. *A new method for measuring daytime sleepiness: the Epworth Sleepiness Scale.* Sleep. 1991; 14:540-5
- Johns MW. *Sleepiness in different situations measured by the Epworth Sleepiness Scale.* Sleep. 1994; 17:703-10
- Bertolazi AS. *Validação da escala de sonolência de Epworth em português para uso no Brasil.* J. bras. Pneumol. Vol.35 no.9 São Paulo Sept. 2009

3.2.3.20.74 Estimated Body Fat Percentage (BFP) Assessment

Description: The Estimated Body Fat Percentage (BFP) Assessment is a generic tool that allows the institution to configure different protocols to estimate the patient's BFP based on skinfolds, additional anthropometric measurements, gender, and age. The institution can configure an internal or a published protocol (such as Faulkner equation) in the "Body fat protocol" item on the "Core Table Settings" function. The references below are related to this assessment's applicability and a comparison between different formulas and methods.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Rezende FAC, Lima Rosado LEFP, Priore SE, Franceschini SCC. Aplicabilidade de equações na avaliação da composição corporal da população brasileira. As. Nutr., Campinas, 19(3):357-367, maio/jun., 2006*
- *Buscariolo FF, Catalani MC, Domingues Dias LCG, Navarro AM. Comparação entre os métodos de bioimpedância e antropometria para a avaliação da gordura corporal em atletas do time de futebol feminino de Botucatu/SP. Rev. Simbio-Logias. V.1, n.1, mai/2008*

3.2.3.20.75 European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core-30 (EORTC QLQ-C30)

Description: European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core-30 was developed to assess the quality of life of patients with cancer. It has 30 questions related to five functional scales (physical, functional, emotional, social and cognitive), a scale on the overall state of health, three symptom scales (fatigue, pain, nausea/vomiting) and six additional symptom items (dyspnea, insomnia, loss of appetite, constipation, diarrhea, financial difficulties). Each question has 4 possible answers, from 0 (no) to 4 (a lot). All EORTC QLQ-C30 scale scores range from 0 to 100. A high score for a functional scale represents a high level of functioning.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Arraras J, Arias F, Tejedor M, Pruja E, Marcos M, Martínez E, Valerdi J. The EORTC QLQ-C30 (version 3.0) QoL questionnaire: Validation study for Spain with head and neck cancer patients. Psycho-Oncology, 11, 249-256*
- *Franceschini J, et al. Reprodutibilidade da versão em português do Brasil do European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire em conjunto com seu módulo específico para câncer de pulmão. J. bras. Pneumol. Vol.36 no.5 São Paulo Sept./Oct. 2010*

3.2.3.20.76 European System for Cardiac Operative Risk Evaluation (EuroSCORE)

Description: The European System for Cardiac Operative Risk Evaluation (EuroSCORE) is designed to predict 30-day mortality in patients undergoing cardiac surgery. It is also used to predict other useful parameters, including long-term mortality, length of stay in ICU, and complications. The criteria for evaluation are age (1 point for patients over 60 years old and add 1 more point for every additional 5 years), gender (1 point for female), chronic lung disease (1 point), extracardiac arteriopathy (2 points), neurological dysfunction (2 points), previous cardiac surgery (3 points), preoperative creatinine > 2.3 mg/dL (2 points), active endocarditis (3 points), critical preoperative status (3 points), factors related to cardiovascular status such as unstable angina (2 points), previous acute myocardial infarction (2 points), left ventricle ejection fraction (1 or 3 points) and pulmonary artery systolic pressure > 60mmHg (2 points), surgery-related factors such as emergency surgery (2 points), aortic surgery (3 points), post-infarction septal rupture (4 points), operation other than isolated CABG (2 points). The EuroSCORE results are: low risk (0-2); medium risk (3-5); high risk (> 6).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Samer AMN, Francois R, Bradley GH, et al. Validation of European System for Cardiac Operative Risk Evaluation (EuroSCORE) in North American cardiac surgery. European Journal of Cardio-thoracic Surgery 22 (2002) 101-105*

3.2.3.20.77 Extended Barthel Index (EBI)

Description: The Extended Barthel Index (EBI), consisting of the original Barthel Index plus cognitive items, provides a tool to monitor patients' outcomes in rehabilitation regarding need for help with activities of daily living. The original BI evaluates 10 motor activities of daily living items. The BI extension consists of 6 additional cognitive items. Although originally intended for multiple sclerosis patients, the EBI was validated and is often applied to other neurological patients, including stroke, traumatic brain injury or Parkinson's disease. Similar to the Barthel Index, not all items represent all categories from 0–4, such as item 1-Feeding that can be scored 0, 2, 3 or 4 (category 1 is missing) or item 13-Social interaction with categories 0, 2, 4 (categories 1 and 3 are missing). The total score of cognitive items is 24 and the total score of the EBI ranges of 0-64.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Maritz R, Tennant A, Fellinghauer CS, Stucki G, Prodinge B (2019). The Extended Barthel Index (EBI) can Be Reported as a Unidimensional Interval-Scaled Metric – A Psychometric Study. Phys Med Rehab Kuror 2019; 29: 224–232*
- *Janša J, Pogačnik T, Gompertz P. An Evaluation of the Extended Barthel Index with Acute Ischemic Stroke Patients. Neurorehabilitation and Neural Repair. 2004;18(1):37-41*

3.2.3.20.78 Face, Legs, Activity, Cry, Consolability Scale (FLACC)

Description: Refer to the feature "Vital signs and clinical parameters calculation" of this document.

3.2.3.20.79 Faces (Claro)

Refer to the feature "Vital signs and clinical parameters" in the IFU of HIS document.

3.2.3.20.80 Fagerström Score

Description: The Fagerström Score estimates the level of nicotine dependence in tobacco smoking and aids in treatment decisions for tobacco dependence. The score consists of six simple choice questions regarding cigarette consumption profile. Two questions vary from 0 to 3 points and four questions from 0 to 1 point, the total score ranges from 0 to 10. Scores 1 and 2 mean low dependence on nicotine, scores 3 and 4 mean low to moderate dependence, scores 5 to 7 mean moderate dependence and more than 8 means high dependence. The treatment is recommended by the author based on the dependence level.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Fagerström KO. Measuring degree of physical dependence to tobacco smoking with reference to individualization of treatment. Addict Behav. 1978;3(3-4):235-41*
- *Fagerstrom KO, Schneider NG. Measuring nicotine dependence: a review of the Fagerstrom Tolerance Questionnaire. J Behav Med. 1989;12(2):159-82*

3.2.3.20.81 Fat percentage estimation based on the body density

Description: The Fat percentage estimation based on the body density allows the institution to set the parameters to be added to generate the estimated body fat percentage, in accordance with the referential chart adopted.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Petroski EL, Pires-Neto CS. Validação de equações antropométricas para a estimativa da densidade corporal em mulheres. *Revista Brasileira de Atividade Física e Saúde*. V.1, Nº2, pág. 65-73, 1995
- Petroski EL. *Antropometris: Técnicas e Padronizações*. Porto Alegre: Palotti, pág. 144, 1999

3.2.3.20.82 Fibromyalgia Impact Questionnaire (FIQ)

Description: The Fibromyalgia Impact Questionnaire (FIQ) is an assessment designed to measure the status, evolution and outcomes of patients with fibromyalgia (FM). It is designed to measure the health status components believed to be most affected by FM. It has 19 questions that are related to functional capacity, professional status, psychological disorders and physical symptoms. Each answer has a value, and the final score is the sum of all values on the questionnaire. The score ranges from 0 to 100, and the higher the score, the higher the impact of fibromyalgia on patient's quality of life.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Burckardt CS, Clark SR, Bennett RM. The Fibromyalgia Impact Questionnaire: Development and Validation. *J Rheumatol* 18:728-33, 1991
- Marques AP, et al. Validação da versão brasileira do Fibromyalgia Impact Questionnaire (FIQ). *Rev Bras Reumatol*, v. 46, n. 1, p. 24-31, jan/fev, 2006

3.2.3.20.83 Forrest classification

Description:

Forrest classification is a classification of upper gastrointestinal hemorrhage used for purposes of comparison and in selecting patients for endoscopic treatment. It provides prognostic information on the need for endoscopic therapeutic intervention. This scale classified peptic ulcers according to features that were associated with risk of rebleeding, which are 1–3 groups, with lesions in higher groups showing a decrease in risk of recurrence, such as group 1 (actively bleeding ulcers): (1a) vessels that are either spurting or (1b) (oozing); group 2 (non-actively bleeding ulcers): (2a) non-bleeding but visible vessel, (2b) ulcer with surface clot, or (2c) ulcer with pigmented spots and group 3 includes ulcers with a clean base.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Block, Berthold; Schachschal, Guido; Schmidt, Hartmut H. (2004-01-01). *Endoscopy of the Upper GI Tract: A Training Manual*. Thieme. ISBN 9783131367310
- T. Deist, A. Freytag. "Stomach: Forrest classification in Atlas of Gastroenterological Endoscopy by A. Freytag, T. Deist". www.endoskopischer-atlas.de
- Hadzibulic, Edvin; Svjetlana Govedarica. "Significance of Forrest Classification, Rockall's and Blatchford's Risk Scoring System in Prediction of Rebleeding in Peptic Ulcer Disease". Archived from the original (PDF) on June 3, 2013. Retrieved 2008-08-11
- Heldwein W; Schreiner J; Pedrazzoli J; Lehnert P (Nov 21, 1989). "Is the Forrest classification a useful tool for planning endoscopic therapy of bleeding peptic ulcers?". *Endoscopy*. 21 (6): 258-62. PMID 2693077. DOI:10.1055/s-2007-1010729
- Forrest, JA, Finlayson, ND, Shearman, DJ (Aug 1974). "Endoscopy in gastrointestinal bleeding." *Lancet* 2 (7877): 3947. PMID 4136718

3.2.3.20.84 Framingham Risk Score (FRS)

Description: The Framingham Risk Score (FRS) was derived from the Framingham Heart Study as a prediction model to estimate 10-year and lifetime risks for atherosclerotic cardiovascular disease. The information required to calculate the risk includes age, gender, race, total cholesterol, HDL cholesterol, SBP, hypertension medication, diabetes, and smoking. The final result represents the 10-year risk for cardiovascular disease, defined as coronary death or nonfatal myocardial infarction, or fatal or nonfatal stroke.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Wilson PW, D'Agostino RB, Levy D, Belanger AM, Silbershatz H, Kannel WB.* Prediction of coronary heart disease using risk factor categories. *Circulation.* 1998; 97: 1837-47
- <https://framinghamheartstudy.org/fhs-risk-functions/cardiovascular-disease-10-year-risk/>

3.2.3.20.85 Framingham - ATP III Score

Description: The Framingham - ATP III score is used to estimate 10-year risk for myocardial infarction and death due to atherosclerotic cardiovascular disease in adults without cardiopathy and without diabetes. This version of the Framingham Risk Score was published by the Adult Treatment Panel III (ATP III), an expert panel of the National Heart, Lung, and Blood Institute, which is part of the USA National Institutes of Health (NIH). The first Framingham Risk Score included age, gender, LDL cholesterol, HDL cholesterol, BP (and also whether the patient is treated or not for hypertension), diabetes, and smoking. The updated version was modified to include dyslipidemia, age range, hypertension treatment, smoking, and total cholesterol, and it excluded diabetes, because Type 2 diabetes meanwhile was considered to be a coronary heart disease (CHD) Risk Equivalent, having the same 10-year risk as individuals with prior CHD. Patients with Type 1 diabetes were considered separately with slightly less aggressive goals. While at increased risk, no study had shown them to be at equivalent risk for CHD as those with previously diagnosed coronary disease or Type 2 diabetes. The information required to calculate the risk includes age, gender, race, total cholesterol, HDL cholesterol, SBP, hypertension medication use, and smoking status. The final result represents the 10-year risk for cardiovascular disease, defined as coronary death or nonfatal myocardial infarction, or fatal or nonfatal stroke.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III).* *JAMA.* 2001; 285 (19): 2486-2497
- *Sposito AC, Caramelli B, Fonseca FAH, Bertolami MC, Souza, Aguinaldo D, Chacra AP, Faludi AA, IV Diretriz Brasileira Sobre Dislipidemias e Prevenção da Aterosclerose (2007).* *Departamento de Aterosclerose da Sociedade Brasileira de Cardiologia. Arq. Bras. Cardiol.* 2007; 88 (Supl. I):1-19

3.2.3.20.86 Framingham AF Risk Score

Description: The Framingham AF risk score predicts the 5-year risk of stroke or death in individuals with new-onset atrial fibrillation (AF) in the community. The information required to calculate the risk includes age, SBP, diabetes, smoking, prior myocardial infarction or congestive heart failure, significant murmur, and electrocardiographic left ventricular hypertrophy. The final result represents the 5-year risk for stroke or death (the higher the score, the higher the risk of atrial fibrillation).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Wang TJ, Massaro JM, Levy D, et al. A risk score for predicting stroke or death in individuals with new-onset atrial fibrillation in the community. JAMA. 2003; 290:1049-1056
- <https://framinghamheartstudy.org/fhs-risk-functions/stroke-or-death-after-atrial-fibrillation/>
- Schnabel, Renate & Sullivan, Lisa & Levy, Daniel & Pencina, Michael & Massaro, Joseph & D'Agostino, Ralph & Newton-Cheh, Christopher & Yamamoto, Jennifer & Magnani, Jared & Tadros, Thomas & Kannel, William & Wang, Thomas & Ellinor, Patrick & Wolf, Prof & Vasan, Ramachandran & Benjamin, Emelia. (2009). Development of a risk score for atrial fibrillation (Framingham Heart Study): A community-based cohort study. Lancet. 373. 739-45. 10.1016/S0140-6736(09)60443-8.

3.2.3.20.87 Fujinaga Scale

Description: The Fujinaga Scale also called Preterm Oral Feeding Readiness Assessment Scale assists HCP to initiate preterm feeding in view of promoting safe and objective breastfeeding. It consists of five categories, with a total of 18 items: corrected gestational age (≤ 32 weeks; 32-34 weeks and ≥ 34 weeks), behavioral organization state (state of consciousness, posture and global tone), oral posture (lips and tongue posture), oral reflexes (seeking reflex, suction, biting and vomiting) and non-nutritive sucking (tongue movement, tongue canopy, jaw movement, suction force, paused suction, maintenance of paused suction rhythm, maintenance of alertness and signs of stress). The performance of preterm infants in each item varies from 0 to 2. The maximum final scoring is 36 points, and a higher score indicates the preterm readiness to start oral feeding.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Fijunaga CI, et al. *Prontidão do prematuro para início da alimentação oral: proposta de um instrumento de avaliação.* Universidade de São Paulo: Escola de enfermagem de Ribeirão Preto. 2002
- Fujinaga et al. *Confiabilidade do instrumento de avaliação da prontidão do prematuro para alimentação oral.* Pró-Fono Revista de Atualização Científica, v. 19, n. 2, abr.-jun. 2007

3.2.3.20.88 Functional Independence Measure (FIM)

Description: The Functional Independence Measure (FIM) is a tool for assessing the incapacity of patients with a variety of functional restrictions. Its main objective is to assess quantitatively the load of care demanded by one person for the completion of a series of daily motor and cognitive tasks. The tool is comprised of 18 items, grouped into 2 subscales - motor and cognition. The motor subscale includes items such as eating, grooming, bathing, dressing, (upper body), dressing, (lower body), toileting, bladder management, bowel management, transfers - bed/chair/wheelchair, transfers - toilet, transfers - bath/shower, walk/wheelchair, and stairs. The cognition subscale includes comprehension, expression, social interaction, problem solving, and memory. Each item is scored on a 7-point ordinal scale, ranging from a score of 1 to a score of 7. The higher the score, the more independent the patient is in performing the task associated with that item. The total FIM (the sum of the motor and cognition subscale scores) ranges from 18 to 126.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Linacre JM, Heinemann AW, Wright BF, Granger CV, Hamilton BB. *The structure and stability of the Functional Independence Measure.* Arch Phys Med Rehabil 1994;75: 127-32

- Granger CV, Hamilton BB, Keith RA, Zielezny M, Sherwin FS. *Advances in functional assessment for rehabilitation. In Topics in geriatric rehabilitation. Rockville, MD: Aspen; 1986*

3.2.3.20.89 Glasgow Coma Scale (GCS)

Description: The Glasgow Coma Scale (GCS) is used to evaluate the level of consciousness in the acutely ill trauma and non-trauma patient and assists with predictions of neurological outcomes and mortality. Three criteria are evaluated: best eye response (score ranges from 1 to 4), best verbal response (score ranges from 1 to 5), and best motor response (score ranges from 1 to 6). The total score varies from 3 points (severe encephalic injury) to 15 points (normality). Mild head injuries are generally defined as those associated with a GCS score of 13-15, and moderate head injuries are those associated with a GCS score of 9-12. A GCS score of 8 or less defines a severe head injury.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Jennett B. *Assessment of the Severity of Head Injury. Lancet, V.13, n7, p.81-3, 1974*

3.2.3.20.90 Glasgow Coma Scale (GCS) 2018

Description: The Glasgow Coma Scale (GCS) 2018 is a scale used to evaluate the level of consciousness in the acutely ill trauma and non-trauma patient and assists with predictions of neurological outcomes and mortality. The criteria evaluated are best eye response (score ranges from 1 to 4), best verbal response (score ranges from 1 to 5), and best motor response (score ranges from 1 to 6). In the 2018 version, if any criteria cannot be tested, then "Non testable (NT)" shall be marked. Furthermore, there is possibility for assessment of pupil reaction, called GCS Pupils Score or GCS-P. It summarizes information about loss of pupil reactivity to light and decreases from total score: 0 points if both pupils are normal (reactive to light), -1 point if one pupil is unreactive to light, and -2 points if both pupils are unreactive to light. The total score varies from 1 to 15 points, and the lower the score, the higher the mortality and unfavorable outcome.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- <https://www.glasgowcomascale.org/downloads/GCS-Assessment-Aid-Brazilian.pdf>
- <http://www.glasgowcomascale.org>
- American College of Surgeons Committee on Trauma. *Advanced Trauma Life Support; ATLS. 10 ed., 2018*
- Brennan PM, Murray GD, Teasdale GM: *Simplificando o uso de informações prognósticas em lesão cerebral traumática. Parte 1: A pontuação GCS-Pupils: um índice estendido de gravidade clínica. J Neurosurg : 2018*

3.2.3.20.91 Global Assessment of Functioning Scale (GAF)

Description: The Global Assessment of Functioning (GAF) scale is used to rate how serious a mental illness may be. It's designed to help mental health providers understand how well the person can do everyday activities. The score can help figure out what level of care someone may need and how well certain treatments might work. It measures how much a person's symptoms affect their day-to-day life on a scale of 0 to 100. It's broken into 10 sections. These are known as anchor points. The higher your score, the better the score, the better the patient is able to handle daily activities.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Sá Junior, AR, Souza MC. Avaliação do comprometimento funcional na esquizofrenia. Rev. Psiquiatr. Clín. Vol.34 suppl.2 São Paulo 2007*
- *American Psychiatric Association; Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Washington, DC, American Psychiatric Association, 1994*

3.2.3.20.92 Global Initiative for Chronic Obstructive Lung Disease (GOLD) Group Classification

Description: The Global Initiative for Chronic Obstructive Lung Disease (GOLD) is a program that produces recommendations for management of Chronic Obstructive Pulmonary Disease (COPD) based on the available scientific information. The assessment includes four variables: 1) GOLD classification regarding the airflow limitation in spirometry based on post-bronchodilator FEV₁, 2) exacerbation history, 3) dyspnea status, and 4) COPD assessment test (CAT). The result classifies the patient in one of four groups (A, B, C, D) with specific different therapies based on the GOLD report.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Global Strategy for the Diagnosis, Management, and Prevention of COPD (2017 Report) from www.goldcopd.org. The tables and figures in this Pocket Guide follow the numbering of the 2017 Global Strategy Report for reference consistency*

3.2.3.20.93 Global Risk Classification (GRC)

Description: The Global Risk Classification (GRC) is a combination of the EuroSCORE and SYNTAX scores. It can be used to predict two-year cardiac mortality in de-novo left main coronary artery (LMCA) disease patients undergoing percutaneous coronary intervention (PCI).

The GRC combines the results of the EuroSCORE and SYNTAX scores to classify patients into three risk groups. The low-risk group is composed of patients with low/intermediate EuroSCORE and low/intermediate SYNTAX score. The intermediate risk group is composed of patients with an intermediate/high EuroSCORE or intermediate/high SYNTAX score. The high-risk group is composed of patients with a high EuroSCORE and a high SYNTAX score.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Global Risk Score and Clinical SYNTAX Score as Predictors of Clinical Outcomes of Patients Undergoing Unprotected Left Main Percutaneous Catheter Intervention, *Cardiol. Res.*2017;8(6): 312-318*
- *Global risk classification and clinical SYNTAX (synergy between percutaneous coronary intervention with TAXUS and cardiac surgery) score in patients undergoing percutaneous or surgical left main revascularization, *JACC. Cardiovasc. Interv. März 2011, 4(3): 287-297. DOI: 10.1016/j.jcin.2010.10.013**

3.2.3.20.94 Goldman Index

Description: The Goldman Index was developed in 1977 by Goldman and associates. It is used to establish the risk of cardiovascular morbidity and mortality in patients who would undergo non-cardiac surgery. High age, history of heart or valve diseases, changes in ventilatory parameters or biochemical markers, as well as surgical history contribute to the increased risk of complications. Risk points allow perioperative estimation of cardiac risk and determine the likelihood of complications such as acute myocardial infarction, acute lung edema, ventricular tachycardia, and cardiac death. The estimated risk of death is classified according to the

following values: class I for 0.2% (0-5 points), class II for 2.0% (6-12 points), class III for 2.0% (13-25 points) and class IV for 56%. (> 25 points).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Goldman L, Calderal DL, Nussbaum SR et al – Multifactorial index risk in noncardiac surgical procedures. *N Engl J Med*, 1977;20:297:845-850
- Ramos G, Assis CH, et al. Avaliação Pré-Operatória do Pneumopata. *As Bras Anesthesiol*, 2003; 53: 1: 114 – 126

3.2.3.20.95 GRACE Score

Description: The GRACE Score is a prospectively studied scoring system to stratify patients with at-risk Acute Coronary Syndrome (ACS). The score was derived from the Global Registry of Acute Coronary Events study, a massive international database of ACS from 94 hospitals in 14 countries and aims to estimate in-hospital mortality from 6 months to 3 years and is composed of eight variables. Five of the variables are computed semi quantitatively, that is, different weight for each age stratum, SBP, HR, plasma creatinine and class of Killip (Killip I - no dyspnea, third sound or lung rales; Killip II - dyspnea and lung rales in the lower thirds of the chest; Killip III - acute lung edema; Killip IV - cardiogenic shock). In addition, three variables are computed dichotomously related to ST-segment depression, a marker of myocardial necrosis, and cardiac arrest on admission. The final score ranges from 0 to 372 points and determines the percentage of mortality risk. The higher the score, the higher the mortality risk.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Fox KAA, Goodman SG, Klein W, Brieger D, Steg PhG, Dabbous O, Avezum A, for the GRACE Investigators. Management of acute coronary syndromes. Variations in practice and outcome. Findings from the Global Registry of Acute Coronary Events (GRACE). *Eur Heart J* 2002; 23:1177-89
- Granger CB, Goldberg RJ, Dabbous O, Pieper KS, Eagle KA, Cannon CP, et al; Global Registry of Acute Coronary Events Investigators. Predictors of hospital mortality in the Global Registry of Acute Coronary Events. *Arch Intern Med*. 2003;163(19):2345-53. doi: 10.1001/archinte.163.19.2345.

3.2.3.20.96 GRACE 2.0 Score

Description: As the previous GRACE Score version, the GRACE 2.0 Score is used to help clinicians assess the risk of death or myocardial infarction (MI) and serves as a guide to treatment options for patients with ACS. Although accurate, a major limitation to the widespread use of the GRACE Risk Score is the inclusion of several variables, including Killip class and creatinine values at the time of the patient's hospital presentation. GRACE Risk Score 2.0 was developed to address these limitations and to evaluate the short- and long-term risk for dying after an ACS, including up to 3 years after discharge. GRACE 2.0 is an improved and refined list of outcomes from GRACE, and instead of using score ranges to calculate outcomes like in-hospital mortality, it is possible to calculate a mortality for every score. The higher the score, the higher the probability of death from admission to 6 months.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Fox KA, Dabbous OH, Goldberg RJ, Pieper KS, Eagle KA, Van de Werf F, Avezum A, Goodman SG, Flather MD, Anderson FA, Jr., Granger CB. Prediction of risk of death and myocardial infarction in the

six months after presentation with acute coronary syndrome: prospective multinational observational study (GRACE). *BMJ*. 2006;333:1091

- *Granger CB, Goldberg RJ, Dabbous O, Pieper KS, Eagle KA, Cannon CP, Van De Werf F, Avezum A, Goodman SG, Flather MD, Fox KA*. Predictors of hospital mortality in the global registry of acute coronary events. *Arch Intern Med*. 2003;163:2345–2353
- *Eagle KA, Lim MJ, Dabbous OH, Pieper KS, Goldberg RJ, Van de Werf F, Goodman SG, Granger CB, Steg PG, Gore JM, Budaj A, Avezum A, Flather MD, Fox KA*. A validated prediction model for all forms of acute coronary syndrome: estimating the risk of 6-month postdischarge death in an international registry. *JAMA*. 2004;291:2727–2733
- *Fox KA, Fitzgerald G, Puymirat E, Huang W, Carruthers K, Simon T, Coste P, Monsegu J, Gabriel Steg P, Danchin N, Anderson F*. Should patients with acute coronary disease be stratified for management according to their risk? Derivation, external validation and outcomes using the updated GRACE risk score. *BMJ Open*. 2014;4:e004425

3.2.3.20.97 Gross Motor Function Measurement (GMFM)

Description: The Gross Motor Function Measurement (GMFM) is an instrument that quantitatively assesses broad motor skills, aimed at children with cerebral palsy and assists in the treatment plan aimed at improving function and quality of life. In 1990, the GMFM was modified, including 3 new items from the original 85 items, totaling 88. These 88 items are measured by observation of children and rated on an original scale from 0 to 4 points for each item evaluated. They are grouped into 5 dimensions which are classified as: “A” for lying and rolling, “B” to sit, “C” to crawl and kneel, “D” standing, and “E” walking, running and jumping. The purpose of the assessment is to generate a percentage of functional motor skills in a patient with neuromuscular disease.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Lane, M. Apostila do curso de Medição da Função Motora Grossa – GMFM*. Reabilitação Especializada. São Paulo: GMFM; 2000
- *Pina LV, Loureiro APC. O GMFM e sua aplicação na avaliação motora de crianças com paralisia cerebral*. *Fisioterapia em Movimento*, Curitiba, v.19, n.2, p. 91-100, abr./jun., 2006

3.2.3.20.98 Hamilton Depression Rating Scale (HDRS)

Description: The Hamilton Depression Rating Scale (HDRS), also known as the Ham-D, is a widely used depression assessment scale that aims to measure the frequency and intensity of depressive symptoms in individuals with major depressive disorder. The scale contains 17 variables: depressed mood, feelings of guilt, suicide, early night insomnia, middle of the night insomnia, early morning insomnia, work and activities, slowness of thought and speech, impaired ability to concentrate, decreased motor activity, agitation, psychic anxiety, somatic anxiety (physiological concomitants of anxiety such as: dry mouth, somatic gastro-intestinal symptoms, general somatic symptoms), genital symptoms (symptoms such as loss of libido, menstrual disturbances), hypochondriasis, loss of weight, and insight. The variables are measured either on five-point or three-point scales, the latter being used where quantification of the variable is either difficult or impossible. No distinction is made between intensity and frequency of symptoms, the rater having to give due weight to both in making his judgment. The scale result is the simple sum of all answers given: normal (0 to 7), mild depression (8 to 13), moderate depression (14 to 18), severe depression (19 to 22), and very severe depression (> 23).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Hamilton M. A rating scale for depression. J Neurol Neurosurg Psychiatry 1960*

3.2.3.20.99 HAS-BLED Score

Description: The HAS-BLED Score is recommended to be used in association with CHA2DS2-VASc to support the anticoagulation indication for a specific patient. The score takes in consideration 9 items, which are hypertension, renal disease, liver disease, stroke history, prior major bleeding or predisposition, labile INR, age above 65 years old, medication usage predisposing to bleeding and alcohol usage. Each attended item is graded as 1, and the final score is the sum of all items, with a total of 9. Results ≥ 3 suggests to the clinician to take into consideration alternatives to anticoagulation being used.

System functions: Electronic Patient Chart->Scores and Indexes

Sources:

- *Pisters R, Lane DA Nieuwlaat R, de Vos CB, Crijns HJ, Lip GY. A novel user-friendly score (HAS-BLED) to assess 1-year risk of major bleeding in patients with atrial fibrillation: the Euro Heart Survey. Chest. 2010 Nov;138(5):1093-100. Epub 2010 Mar 18*
- *Lip GY, Frison L, Halperin JL, Lane DA. Comparative validation of a novel risk score for predicting bleeding risk in anticoagulated patients with atrial fibrillation: the HAS-BLED (Hypertension, Abnormal Renal/Liver Function, Stroke, Bleeding History or Predisposition, Labile INR, Elderly, Drugs/Alcohol Concomitantly) score. J Am Coll Cardiol. 2011 Jan 11;57(2):173-80. Epub 2010 Nov 24*
- [Http://www.mdcalc.com/has-bleed-score-for-major-bleeding-risk](http://www.mdcalc.com/has-bleed-score-for-major-bleeding-risk)

3.2.3.20.100 Helios Kliniken Preoperative Assessment of Cardiopulmonary Risk

Description: The Helios Kliniken Preoperative Assessment of Cardiopulmonary Risk is a preoperative assessment form to stratify cardiovascular surgical risk. It was developed by the Helios Kliniken medical team and consists of two classifications, one by the anesthesiologist and one by the surgeon. The anesthesiologist's assessment consists of four different scores (0 – no increased risk, 1 – low risk, 3 – medium risk or 5 – high risk) depending on the patient's previous health conditions, and the surgeon's assessment consists of 3 scores (2 – low risk, 3 – medium risk or 5 – high risk) depending on the type of surgery. The two assessments are summed to obtain the result: from 2 to 5 points, the patient is considered approved for the surgery, 6 points the patient is approved for the surgery only if the exercise capacity is higher than climbing two or more flights of stairs, from and 7 to 10 points the patient is considered at risk for the procedure in question.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Sebastian K, Arkadiusz K, Paweł R, Maciej Ż. Preoperative evaluation; new attempt, Polski Przegląd Chirurgiczny 2015, 87, 12, 644–654*
- [Https://issuu.com/mwv-berlin/docs/20_jahr_helios_burgard/5](https://issuu.com/mwv-berlin/docs/20_jahr_helios_burgard/5)

3.2.3.20.101 Hospital Anxiety and Depression Scale

Description: The Hospital Anxiety and Depression Scale is a self-assessment scale developed and found to be a reliable instrument for detecting states of depression and anxiety in the setting of an hospital medical outpatient clinic. The anxiety and depressive subscales are also valid measures of severity of the emotional disorder. The questionnaire consists of 14 items (7 depression and 7 anxiety questions) . For each question

there are 4 answer options with a score of 0, 1, 2 or 3. For both Anxiety and Depression subscales the results represent: normal from 0 to 7 points, borderline (doubtful) cases from 8 to 10 points, and definite cases (abnormal) from 11 to 21.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Zigmond, AS; Snaith, RP. "The hospital anxiety and depression scale". Acta Psychiatrica Scandinavica. 1963. 67 (6): 361-370*

3.2.3.20.102 House-Brackmann Scale

Description: The House-Brackmann Scale is a tool to grade the degree of nerve damage in a facial nerve palsy. The measurement is determined by measuring the upwards movement of the mid-portion of the top of the eyebrow, and the outwards movement of the angle of the mouth. The result is the simple assessment level from six possibilities, ranging from normal facial function in all areas (grade I) to total facial paralysis, that means no movement (grade VI).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *House JW, Brackmann DE. Facial nerve grading system. Otolaryngol Head Neck Surg. 1985.15:146-147*
- *Tessitore A, Magna LA, Paschoal JR. Medida angular para aferição do tônus muscular na paralisia facial. Pró-Fono R. Atual. Cient. vol.22 no.2 Barueri Apr/June 2010*
- *Ferreira MAA. Paralisia facial periférica e gestação: abordagem e tratamento. Rev Bras Ginecol Obstet. 2013; 35(8):368-72*

3.2.3.20.103 Humpty Dumpty Scale

Description: The Humpty Dumpty Scale is used for risk assessment and prevention of falls in infant patients. It has 7 parameters with specific criteria for scoring related to age, gender, diagnosis, cognitive disabilities, environmental factors, response to surgery/sedation/anesthesia and use of medicines. The minimum score is 7, and the maximum is 23. A scale result ≥ 12 indicates a risk of fall.

System functions: Electronic Patient Chart->Scores and Indexes

Sources:

- [Pauley BJ](#), [L Houston S](#), [Cheng D](#), [Johnston DM](#). Clinical relevance of the Humpty Dumpty Falls Scale in a pediatric specialty hospital. *Pediatr Nurs*, May-Jun 2014;40(3):137-42
- *The Humpty Dumpty Falls Prevention Program™*

3.2.3.20.104 Hunt and Hess Scale

Description: The Hunt and Hess Scale is a graded scale used to classify and establish the severity of non-traumatic subarachnoid hemorrhage (SAH), predict the mortality rate based on clinical characteristics observed in a patient, and is also used to determine the surgical risk of patients undergoing surgery for SAH. The scale consists of five grades ranging from minimally symptomatic to coma. Each grade corresponds to a specific set of clinical examination findings from 3 areas (level of arousal, reflexes, and meningeal irritation), such as grade I (asymptomatic or minimal headache and slight nuchal rigidity), with a 70% survival; grade II

(moderate to severe headache, no nuchal rigidity other than cranial nerve palsy), with 60% survival; grade III (drowsiness, confusion, or mild focal deficit), with 50% survival; grade IV (stupor, moderate to severe hemiparesis, possible early decerebrate rigidity and vegetative disturbances), with 20% survival; and grade V (deep coma, decerebrate rigidity, moribund appearance), with 10% survival.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Hunt WE, Hess RM. Surgical risk as related to time of intervention in the repair of intracranial aneurysms. Journal of Neurosurgery 1968 Jan;28(1):14-20*
- *Hunt WE, Meagher JN, Hess RM. Intracranial aneurysm. A nine-year study. Ohio State Medical Journal 1966 Nov;62(11):1168-71*
- *Lantigua H, Ortega-Gutierrez S, Schmidt JM, Lee K, Badjatia N, Agarwal S, Claassen J, Connolly ES, Mayer SA. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4556224/> Crit Care. 2015 Aug 31;19(1):309.*

3.2.3.20.105 Insomnia Severity Index (ISI)

Description: The Insomnia Severity Index (ISI) is a 7-item self-report questionnaire assessing the nature, severity, and impact of insomnia. The usual recall period is the “last month” and the dimensions evaluated are severity of sleep onset, sleep maintenance, early morning awakening problems, sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress caused by the sleep difficulties. A 5-point Likert scale is used to rate each item (e.g., 0 = no problem; 4 = very severe problem), yielding a total score ranging from 0 to 28. The total score is interpreted as follows: no clinically significant insomnia (0-7); subthreshold insomnia (8-14); moderate insomnia (15-21); and severe insomnia (22-28).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Morin CM, Belleville G, Bélanger L, Ivers H. The Insomnia Severity Index: Psychometric Indicators to Detect Insomnia Cases and Evaluate Treatment Response. Sleep. 2011 May 1; 34(5): 601–608*
- *Bastien CH, Vallières A, Morin CM. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. Sleep Med. 2001 Jul;2(4):297-307. doi: 10.1016/s1389-9457(00)00065-4. PMID: 11438246.*

3.2.3.20.106 Intensive Care Delirium Triage Checklist (ICDSC)

Description: The Intensive Care Delirium Triage Checklist (ICDSC) was created in 2001 and can be applied by a clinician or a nurse in a busy critical care setting to screen all patients even when communication is compromised. The tool can be utilized quickly and helps to identify delirious patients. It includes the evaluation of eight items such as altered level of consciousness, inattention, disorientation, hallucination or delusion, psychomotor agitation or retardation, inappropriate mood or speech, sleep/wake cycle disturbance, and symptom fluctuation. For each item, obvious manifestation of an item = 1 point, no manifestation of an item or no assessment possible = 0 point. The score ranges from 0 to 8 and the higher final score indicates greater severity.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources :

- *Bergero N, et al. Intensive Care Delirium Screening Checklist: evaluation of a new screening tool. Intensive Care Me. 2001 May;27(5):859-64*
- *Gusmao-Flores D, Salluh JI, Dal-Pizzol F, Ritter C, Tomasi CD, Lima MA, et al. The validity and reliability of the Portuguese versions of three tools used to diagnose delirium in critically ill patients. Clinics (As Paulo). 2011;66(11):1917-22*
- *Carvalho JPLM, Almeida ARP, Flores DG. Escalas de avaliação de delirium em pacientes graves: revisão sistemática da literatura. Rev Bras Ter Intensiva. 2013 ;25(2) :148-154*

3.2.3.20.107 International Prostate Symptom Score (IPSS)

Description: International Prostate Symptom Score (IPSS) assists in the diagnose and evaluation of symptoms of benign prostatic hyperplasia (BPH). The score consists of 4 questions related to obstructive symptoms and 3 related to irritative symptoms. IPPS values range from 0 to 7, 8 to 19 and 20 to 35 represent mild, moderate and severe symptoms, respectively.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Junior PNL, et al. Correlation between urinary flow rate, quality of life and international prostate symptom score (I-PSS) in patients with benign prostatic hyperplasia (BPH). Braz J Urol, 27: 353-357, 2001*

3.2.3.20.108 International Staging System (ISS)

Description: International Staging System (ISS) is a tool used to assess the prognosis of patient with multiple myeloma. Based exclusively on the $\beta 2$ microglobulin and albumin levels at diagnosis, the ISS relies on simple and available lab parameters, and thus may be more objective than previous staging systems, including the Salmon-Durie system based on clinical variables. Multiple Myeloma ISS interpretation: stage I (Serum $\beta 2$ microglobulin <3.5 mg/L AND serum albumin ≥ 3.5 g/dL), stage II (either serum $\beta 2$ microglobulin <3.5 mg/L, but serum albumin <3.5 g/dL or serum $\beta 2$ microglobulin 3.5 – 5.4 mg/L irrespective of the serum albumin), and stage III (serum $\beta 2$ microglobulin ≥ 5.5 mg/L). his model classified patients in 3 risk groups: stage I (median overall survival 62 months), stage II (45 months), and stage III (29 months).

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Greipp PR, San MJ, Durie BG et al. International staging system for multiple myeloma. J Clin Oncol. 2005;23(15):3412-20*
- *Maiolino A et al. Avaliação de risco em mieloma múltiplo: resultados preliminares do grupo brasileiro de estudos de mieloma. Rev. Bras. Hematol. Hemoter. Vol.30 suppl.2 São Paulo June 2008*

3.2.3.20.109 International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI)

Description: The International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI) was developed and is maintained by the American Spinal Injury Association (ASIA). The ISNCSCI is the most well-established assessment to characterize the neurological impairment after a spinal cord injury. It describes a person's functional impairment as a result of a spinal cord injury (SCI). The ISNCSCI consists of two major parts; neurological evaluation and a subsequent classification. The classification is performed based on the sensory examination of light touch appreciation and pin prick discrimination along 28 dermatomes per body side, as well as the manual muscle test for 10 key muscles per body side and an anorectal examination for

deep anal pressure sensation and voluntary anal contraction. For the sensory group the total score is 112 and for the motor group the score is 100.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *American Spinal Injury Association. Worksheet International standards for neurological classification of spinal cord injury (ISNCSCI); Revised version November 2015*

3.2.3.20.110 Interstroke Stress Scale

Description: Interstroke Stress Scale is used for psychologic stress evaluation. Self-perceived psychological stress as a risk factor for coronary arterial disease (CAD) was evaluated in men without previous myocardial infarction. For this scale, stress was defined as a feeling of tension, irritability or anxiety, or having sleeping difficulties as a result of conditions at work or at home. The scale presents the following options to be selected: (1) never experienced stress, (2) >= 1 period of stress, (3) some period of stress during the last 5 years, (4) several periods of stress during the last 5 years, (5) permanent stress during the last year or (6) permanent stress during the last 5 years.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Rosengren, Annika. et al. Self-Perceived Psychological Stress and Incidence of Coronary Artery Disease in Middle-Aged Men. Am J. Cardio 1991; 98: 1171-1175*

3.2.3.20.111 Japan Coma Scale (JCS)

Description: The Japan Coma Scale (JCS) is a grading system to evaluate disturbed consciousness. It was first published in 1974 and is certified as a standard field tool assessing the level of consciousness by the Japan Fire and Disaster Management Agency. The scale is composed of four main categories: 0 and one-, two-, and three-digit codes corresponding with alert, awake without stimuli, arousable with some stimuli (but reverts to previous status if stimulus stops), and unarousable by any forceful stimuli, respectively. Each code is further divided into three subcategories: 1, 2 and 3 in the one-digit code, 10, 20, and 30 in the two-digit code, and 100, 200, and 300 in the three-digit code. Hence, there are 10 grades in total. As note, the user can select also if there is restlessness (R), incontinence (I) and apallic state or akinetic mutism (A). The result is shown as 30R or 20I, for example.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Yumoto, T., Naito, H., Yorifuji, T. et al. Association of Japan Coma Scale score on hospital arrival with in-hospital mortality among trauma patients. BMC Emerg Med 19, 65 (2019). <https://doi.org/10.1186/s12873-019-0282-x>*

3.2.3.20.112 Johns Hopkins Fall Risk Assessment Tool (JHFRAT)

Description: The Johns Hopkins Fall Risk Assessment Tool (JHFRAT) was developed by the Johns Hopkins University in 2005 and revised in 2007. The risk assessment areas consist of: category of the fall risk factor (high or low) and, if an option is completed, enables the rest of the scale; age (1 or 2 or 3 points); history of fall in the 6 months prior to admission (5 points); intestinal and vesical eliminations (2 or 4 points); medications: including PCA pump/opioids, anticonvulsants, anti-hypertensives, diuretics, hypnotics, laxatives, sedatives and psychotropics (3 or 5 or 7 points); patient care equipment: any equipment that compromises the patient's mobility such as infusion IV, chest tube, catheters, pneumatic compressors (1 or 2 or 3 points); mobility (2 points for each option, allows multiple choices) and cognition (1 – 2 – 4 points for

each option, allows multiple choices). The final score defines risk: low risk (0-5 points), moderate risk (6 – 13 points) and high risk (>13 points). The criteria for application of the scale are during the first eight hours following the patient’s admission, once a day thereafter and as per changes to the patient’s clinical condition or risk condition.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Poe SS, et al. An Evidence-based Approach to Fall Risk Assessment, Prevention, and Management. Journal of Nursing Care Quality/April-June 2005*
- *Poe SS, et al. The Johns Hopkins Fall Risk Assessment Tool. Journal of Nursing Care Quality/October-December 2007*

3.2.3.20.113 Karnofsky Performance Scale Index

Description: The Karnofsky Performance Scale Index is used in oncology, hematology and related areas in order to attempt to qualify the overall wellbeing of patients and determine the possibility of receiving chemotherapy, the need of adjusting the doses of these medications. The tool classifies patients on a scale of 0 to 100 where the lower the Karnofsky score, the worse the survival for most serious illnesses, the patient is unable to care for self; requires equivalent of institutional or hospital care; disease may be progressing rapidly. The rating 100% corresponds to perfect health, the patient can carry on normal activity and to work, no special care needed.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Karnofsky DA, Burchenal JH. (1949). “The Clinical Evaluation of Chemotherapeutic Agents in Cancer.” In: MacLeod CM (Ed), Evaluation of Chemotherapeutic Agents. Columbia Univ Press. Page 196*
- *Schag CC, Heinrich RL, Ganz PA. Karnofsky performance status revisited: Reliability, validity, and guidelines. J Clin Oncology. 1984; 2:187-193*
- *O’Toole DM, Golden AM. Evaluating cancer patients for rehabilitation potential. West J Med. 1991; 155:384-387*

3.2.3.20.114 Katz Index of Independence in Activities of Daily Living

Description: The Katz Index of Independence in Activities of Daily Living, commonly referred to as the Katz ADL, is an instrument used to assess functional status as a measurement of the patient's ability to perform activities of daily living independently. It has been used gerontological literature to assess the functionality of the elderly in basic daily living activities. The presentation of the result in this index was modified by The Hartford Institute for Geriatric Nursing in 1998. The Index ranks adequacy of performance in the six functions of bathing, dressing, toileting, transferring, continence, and feeding. Patients are scored yes/no for independence in each of the six functions. A score of 6 indicates full function (patient independent), 4 indicates moderate impairment, and ≤ 2 indicates severe functional impairment.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of illness in the aged. The index of ADL: a standardized measure of biological and psychosocial function. JAMA. 1963; 185 (12):914-9*

- *The Hartford Institute for Geriatric Nursing. Katz Index of Independence in Activities of Daily Living (ADL) [1998]. [text on the Internet]. New York; 2005*

3.2.3.20.115 Kendall Scale

Description: The Kendall Scale is used to evaluate muscle strength. It is a numerical scale graduated in: 0 – null (absence of contraction), 1 – trace (there is a slight contraction, but incapable of produce movement), 2 – weak (there is movement only in the absence of gravity), 3 – regular (can move by overcoming gravity), 4 – good (can move by overcoming gravity and also an external resistance) and 5 – normal (can perform movement overcoming a resistance greater than the good muscle).

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Kendall FP, McCreary EK, Provance PG. Músculos: prova e funções com postura e dor. 4. Ed. São Paulo: Manole, 1995*
- *Silva MB, et al. Análise dos instrumentos de avaliação na miopatia. Revista de neurociências. V14 N2 – ABR/JUN, 2006 (029-043)*

3.2.3.20.116 Kidney Failure Classification (RIFLE)

Description: Acute Kidney Injury (AKI) is a common medical condition in critically ill patients and is well recognized for its impact in the intensive care unit setting. To establish a uniform AKI definition and scoring, the Acute Dialysis Quality Initiative (ADQI) formulated the RIFLE (Risk, Injury, Failure, Loss and End-stage kidney disease) classification. The RIFLE classification is based on creatinine values or glomerular filtration rate and urinary output determinants, and considers three severity classes of AKI (Risk, Injury and Failure), according to the variations in the determinants, and two outcome classes (Loss of kidney function and End-stage kidney disease). The patient shall be classified according to the worst classification (maximum RIFLE).

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Santos ER. Associação do RIFLE com letalidade e tempo de internação em pacientes críticos com lesão renal aguda. Rev Bras Ter Intensiva. 2009; 21(4):359-368*
- *Uchino, S, Bellomo, R, Goldsmith, D, et al. An assessment of the RIFLE-criteria for acute renal failure in hospitalized patients. Crit Care Med 2006; 34:1913*

3.2.3.20.117 Killip Classification

Description: The Killip classification is a system used in individuals with an acute myocardial infarction (heart attack), taking into account physical examination and the development of heart failure in order to predict and stratify their risk of mortality. Killip class I includes individuals with no clinical signs of heart failure, Killip class II includes individuals with rales or crackles in the lungs, an S3 gallop, and elevated jugular venous pressure, Killip class III describes individuals with frank acute pulmonary edema, and Killip class IV describes individuals in cardiogenic shock or hypotension (measured as systolic blood pressure <90 mmHg), and evidence of low cardiac output (oliguria, cyanosis, or impaired mental status). The expected mortality rate of class I is 6%, class II of 17%, class III of 38%, and class IV of 81%.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- Killip T, Kimball JT. *Treatment of myocardial infarction in a coronary care unit: a two year experience of 20 patients. Am J Cardiol. 1967*
- Pesaro AEP, et al. *Infarto Agudo do Miocárdio – Síndrome Coronariana Aguda com Supradesnível do Segmento ST. Rev Assoc Med Bras 2004; 50(2): 214-20*
- Torres MA. *Estratificação de Risco Pós-Infarto Agudo do Miocárdio. Revista da Sociedade de Cardiologia do Rio Grande do Sul. Ano XVI nº 13 Jan/Fev/Mar/Abr 2008*

3.2.3.20.118 LATCH Score

Description: The LATCH score is an assessment tool to evaluate the effectiveness of early breast-feeding. A numerical value of 0, 1, or 2 is assigned to the five evaluated items: latching of infant onto the breast, amount of audible swallowing, type of nipple, comfort of mother, help needed by mother to hold baby to breast. The final score is the sum of the five evaluated items, ranged from 0 to 10. Scores between 9-10 means breastfeeding is successful thereby indicating minimum or no support, scores between 6-8 means breastfeeding can display problems and requires assistance, and scores ≤ 5 mean breastfeeding displays problems and strongly requires assistance.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Jensen D, Wallace S, Kelsay P. *Latch: a breastfeeding charting system and documentation tool. J. Obstet. Gynecol. Neonatal Nurs., 1994*
- Riordan J, Bibb DD, Miller M, Rawlins T. *Predicting breastfeeding duration using the LATCH breastfeeding assessment tool. J Hum Lact 2001; 17:20-3*

3.2.3.20.119 LEE Cardiac Risk Index

Description: The LEE Cardiac Risk Index is used to estimate the risk of peri-operative cardiac complications in patients. The index evaluates six variable (high intrinsic risk operation, coronary artery disease, congestive heart failure, cerebrovascular disease, diabetes and, preoperative creatinine $> 2,0\text{mg/dl}$), which are identified as an increased risk of cardiac complications. Based on the final index, it informs the clinician about risk class classification and percentage of complications. The risk of peri-operative cardiac complications is given according to the score: score 0 corresponds to classification I – 0.5%; score 1 corresponds to classification II – 1,3%; score 3 corresponds to classification III with 4% and \geq score 3 corresponds to classification IV – 9%. The final classification (presented in %) is a risk of the patient having perioperative cardiac complications.

System functions: Electronic Pre-Anesthetic Assessment -> Risk; Electronic Patient Chart -> Scores and Indexes

Sources:

- Lee TH, Marcantonio ER, Mangione CM, Thomas EJ, Polanczyk CA, Cook EF, Sugarbaker DJ, Donaldson MC, Poss R, Hoo KK, Ludwig LE, Pedan A, Goldman L. *Derivation and prospective validation of a simple index for prediction of cardiac risk of major noncardiac surgery. 1999 Sep 7;100(10):1043-9*
- Goldman L, Caldera DL, Nussbaum SR, et al. *Multifactorial index of cardiac risk in noncardiac surgical procedures. N Engl J Med.1977; 297(16):845-50*

- *Buitrago FJ, Santana AS, Guimarães LF, Henriques MD, Júnior WMA. Avaliação cardiovascular perioperatória para cirurgia não cardíaca. As Med Minas Gerais 2011; 21(2 Supl 3): S9-S27*

3.2.3.20.120 Maddrey's Discriminant Function (MDF) Score

Description: The Maddrey's Discriminant Function (MDF) Score is a model for evaluating the severity and prognosis in patients with alcoholic hepatitis. It takes into consideration the Prothrombin time (PT), PT control and serum bilirubin to generate the final score. The score is calculated by the formula: $[4.6 \times (PT - PT \text{ control})] + \text{serum bilirubin in mg/dL}$, and a score ≥ 32 means the patient likely has severe alcoholic hepatitis.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- <https://www.mdcalc.com/maddreys-discriminant-function-alcoholic-hepatitis>
- https://en.wikipedia.org/wiki/Modified_Maddrey%27s_discriminant_function
- https://www.oneta.ch/images/pdf/Child_und_andere_Scores.pdf
- <http://gihep.com/calculators/hepatology/maddrey-discriminant-score/>

3.2.3.20.121 Malnutrition Screening Tool (MST)

Description: The Malnutrition Screening Tool (MST) was developed to allow quick and easy performance of nutritional screenings in adult patients upon hospital admission. The MST is a questionnaire comprising two main issues considered to have high specificity and sensitivity for detecting early nutritional risk when compared to the considered gold standard Subjective Global Assessment. These two issues include reducing food intake due to loss of appetite and unwanted weight loss. The tool is made up of 3 questions, each with a different score, for example: Have you had any recent unintentional weight loss? (If yes = 2 points); How many kg? (1-5 Kg = 1 point; 6-10 Kg = 2 points; 11-15 Kg = 3 points; > 15 Kg = 4 points); Are you eating less due to loss of appetite? (If yes = 1 point). After applying the MST questionnaire, results with scores > 2 mean that the patient is at nutritional risk.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Henderson S, Moore N, Lee E, Witham MD. Do the malnutrition universal screening tool (MUST) and Birmingham nutrition risk (BNR) score predict mortality in older hospitalised patients. BMC Geriatrics 2008, 8:26*
- *Stratton RJ. `Malnutrition Universal Screening Tool¿ predicts mortality and length of hospital stay in acutely ill elderly. British Journal of Nutrition (2006), 95, 325-330*

3.2.3.20.122 Malnutrition Universal Screening Tool (MUST)

Description: The Malnutrition Universal Screening Tool (MUST) is a triage tool with five steps for identifying adults with risk of malnutrition or obesity. The tool evaluates the BMI, the involuntary weight loss percentage in the last 6 months and the effect of an acute illness.

The tool consists of the assessment of 3 criteria: BMI, weight loss and reduced food intake. If BMI > 20 (0 points) 18.5-20 (1 point), < 18.5 (2 points). If the percentage of weight loss in the last 3 to 6 months is < 5% (0 points), 5-10 (1 point), and > 10 (2 points). If the patient had a drastic reduction in food intake (2 points). The total sum indicates the risk of malnutrition or obesity: low risk = 0, medium risk = 1, high risk ≥ 2 .

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Kondrup J, Allison SP, Elia M, et al. ESPEN Guidelines for Nutrition Screening 2002; Clinical Nutrition 2003, 23 (4) p.415-421*

3.2.3.20.123 Manchester Risk Classification System

Description: The Manchester Risk Classification System was developed by nurses and physicians in the United Kingdom as a strategy to establish, based on clinical criteria, the priority of care among patients in emergency departments. The methodology starts with the patient's main complaint, which drives the nurse to different flowcharts. Each flowchart contains discriminators that support the triage process, and, finally, a classification of severity or clinical risk is presented.

These are the Patient classification flowcharts available: aggression, allergy, behavior change, asthma, self-aggression, crying baby, headache, seizures, sexually transmitted diseases, adult abdominal pain, abdominal pain in child, neck pain, sore throat, backache, testicular pain, chest pain, apparent drunkenness, rash, exposure to chemical agents, wounds, pregnancy, digestive hemorrhage, local infections and abscesses, adult malaise, malaise in neonates (up to 28 days), baby malaise (from 29 days to 12 months), malaise in children (from 12 months to 14 years old), bites and stings, overdose and poisoning, concerned parents, palpitations, extremity problems, problems on the face, eye problems, ear problems, dental problems, urinary problems, burns, falls, vaginal bleeding, traumatic brain injury, major trauma, thoracoabdominal trauma, multiple victims situation – primary assessment and multiple victims situation – secondary assessment.

The classification is described by colors, which indicate the maximum time until the first medical examination. Red indicates an emergency condition, suggesting immediate care. Orange indicates very urgent conditions with suggested time ≤ 10 minutes. Yellow is for urgent condition with time ≤ 60 minutes. The conditions classified as green are low urgency with suggested time ≤ 120 minutes. Blue is considered non-urgent and the suggested time is ≤ 240 minutes.

System functions: Manchester Risk Score (available for German and Brazilian localization)

Sources:

- *Risk Classification in Urgency and Emergency, 2nd Brazilian edition (2017), being the translation of the book: Emergency Triage/Manchester Triage Group; edited by Kevin Mackway-Jones, Janet Marsden, Jill Windle, 3rd edition (2014) and validated by the technical team of GBCR – Brazilian Risk Rating Group (<http://gbc.org.br>)*
- *Emergency Triage: Manchester Triage Group 3.7 ed, Wiley Verlag, 2013 and for the German edition First assessment in the emergency room: the Manchester Triage System 5th edition, Hogrefe Verlag 2020*

3.2.3.20.124 Maximum Response to Botulinum Toxin Rating Scale (Jankovic)

Description: The Maximum Response to Botulinum Toxin Rating Scale (Jankovic) was created by Jankovic assessing the degree of clinical response (at the maximum action moment after the application - peak effect) of the botulinum toxin in a study of the treatment of cranial-cervical dystonia, spasmodic dysphonia, other focal dystonia and hemifacial spasm. The "peak effect" was rated on a 0 to 4 scale (0= no effect; 1 = mild improvement; 2 = moderate improvement, but no change in functions; 3 = moderate improvement in severity and functions; 4 = marked improvement in severity and function).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Botulinum toxin treatment of cranial-cervical dystonia, spasmodic dysphonia, other focal dystonias and hemifacial spasm.* Joseph Jankovic, Kenneth Schwartz, Donald T Donovan. *Journal of Neurology, Neurosurgery, and Psychiatry* 1990;53:633-639
- *Jankovic J, Brin MF. Therapeutic uses of botulinum toxin. New Engl J Med 1991, 324:1186-1194*

3.2.3.20.125 Medical Outcomes Study (MOS) 36-Item Short-Form Health Survey (SF-36)

Description: The Medical Outcomes Study (MOS) 36-Item Short-Form Health Survey (SF-36) was constructed to survey health status in clinical practice and research. It includes one multi-item scale that assesses eight health concepts with 36 items, such as limitations in physical activities because of health problems, limitations in social activities because of physical or emotional problems, limitations in usual activities because of physical health problems, bodily pain, general mental health (psychological distress and well-being), limitations in usual activities because of emotional problems, vitality (energy and fatigue), and general health perceptions. The scoring established is 0 to 100 where zero corresponds to the worse state of general health and 100 to the best state of health.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *WARE, J. E. Sherbourne CD: The MOS 36 Item Short-Form Health Survey (SF-36). I. Conceptual framework and item selection. Med Care, n. 30, p. 473-483, 1992.*
- *Ciconelli RM, Ferraz MB, Santos W. Meinão I, Quesada MR. Tradução para língua portuguesa e validação do questionário genérico de avaliação de qualidade de vida SF-36 (Brasil SF-36). Rev Bra. Reumatol – Vol.39 – Nº3 – Mai/Jun, 1999.*
- *VILAGUT Gemma et al. El Cuestionario de Salud SF-36 español: una década de experiencia y nuevos desarrollos. Gac Sanit vol.19 no.2 Barcelona Mar./abr. 2005.*

3.2.3.20.126 Mini Mental Health Exam Score

Description: The Mini Mental Health Exam Score assesses the presence of cognitive impairment, and it is commonly used for screening for dementia, estimating the severity of cognitive impairment at a given time and to monitor the course of an individual's cognitive changes over time. The exam measures orientation in terms of time and place (knowing where you are, and the season or day of the week), short-term memory (remembering), attention and problem solving (how to spell a simple word backwards), language (identify common objects by name) and comprehension and motor skills (draw a somewhat complicated shape like two pentagons crossing each other). The score has a maximum of 30 points and ranks normal cognition or no dementia if the score ≥ 24 points, mild dementia between 19 - 23 points, moderate dementia between 10 - 18 points, and severe dementia with a result ≤ 9 .

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. Journal of Psychiatric Research 12 (3): 189-1998*
- <https://www.dementiacarecentral.com/mini-mental-state-exam>

3.2.3.20.127 Mini Nutritional Assessment (MNA®) Long form

Description: The Mini Nutritional Assessment (MNA®) Long form is a nutritional assessment tool that can identify patients aged ≥ 65 years who are malnourished or at risk of malnutrition. This assessment includes

screening (MNA® Short form) and global assessment. It is necessary to answer the screening prior to the global assessment. It is divided into four parts: anthropometric assessment (BMI, arm circumference, calf circumference, and weight loss); global assessment (questions related to lifestyle, medication, mobility and psychological problems); dietary assessment (questions related to the number of meals, food and liquid intake and autonomy in eating); and self-assessment (the self-perception of health and nutritional status).

If the screening result is between 8-11, it is suggested to perform the global assessment (MNA® Long form). The final assessment is the sum of the screening and global assessment and is interpreted as: malnourished (< 17), at risk of malnutrition (17-23.5) and normal nutritional status (24-30).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Guigoz Y, Vellas B, Garry PJ. Mini Nutritional Assessment: A practical assessment tool for grading the nutritional state of elderly patients. Facts and Research in Gerontology, 1997, pp 15-60*
- *Rubenstein LZ, Harker J, Guigoz Y and Vellas B. Comprehensive Geriatric Assessment (CGA) and the MNA: An Overview of CGA, Nutritional Assessment, and Development of a Shortened Version of the MNA. In: "Mini Nutritional Assessment (MNA): Research and Practice in the Elderly". Nestle Nutr Workshop Ser Clin Perform Programme 1999; 1:101-15; 115-6. DOI: 10.1159/000062958*

3.2.3.20.128 Mini Nutritional Assessment (MNA®) Short form

Description: The Mini Nutritional Assessment MNA® Short form can identify patients aged ≥ 65 years that are malnourished or at risk of malnutrition. It is a nutritional screening tool consisting of questions concerning changes in food intake (due to loss of appetite, digestive problems or difficulty in chewing or swallowing), weight loss, mobility, occurrence of psychological stress or acute illness, neuropsychological problems and BMI. If the BMI cannot be recorded, it is necessary to record the calf circumference. The final assessment is interpreted as: malnourished (0-7), at risk of malnutrition (8-11) and normal nutritional status (12-14).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Guigoz Y, Vellas B, Garry PJ. 1994. Mini Nutritional Assessment: A practical assessment tool for grading the nutritional state of elderly patients. Facts and Research in Gerontology. Supplement 2:15-59*
- *Vellas B. Comprehensive Geriatric Assessment (CGA) and the MNA: An Overview of CGA, Nutritional Assessment, and Development of a Shortened Version of the MNA. In: "Mini Nutritional Assessment (MNA): Research and Practice in the Elderly". Nestle Nutr Workshop Ser Clin Perform Programme 1999; 1:101-15; 115-6. DOI: 10.1159/000062958*

3.2.3.20.129 Mirels Score

Description: Mirels Score is useful in the management of bone tumors, by identifying patients who could benefit from prophylactic fixation if they have a high enough risk of pathological fracture. It analyzes and combines four clinical and radiographical risk factors in one single score in accordance with the location (upper limbs, lower limbs and peritrochanteric), level of pain caused by the injury (light, moderate, and intense) type of injury (lytic, blastic, mixed) and the extent of the lesion – size (< 1/3, 1/3-2/3, > 2/3). The final score is a sum of the values. If the score is greater than 8, it suggests prophylactic internal fixation prior to irradiation is beneficial.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Mirels H. Metastatic Disease in long bones. A proposed Scoring System for diagnosing impending pathologic fracture. Clin Orthop Rel Res 1989; 249; 256-264*

3.2.3.20.130 Model for End-Stage Liver Disease (MELD)

Description: The Model for End-stage Liver Disease (MELD) is a tool used to assess patient’s liver conditions (the seriousness of liver disease), and consequently, the urgency for liver transplant. The calculation is performed using a formula based on laboratory results for bilirubin, creatinine and International Normalized Ratio (INR), and dialysis at least twice in the past week. The final score ranges from 6 to 40. The higher the score, the more serious is the disease, and the more urgent becomes patient’s need for a liver transplant.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *SH, Christein J, Donohue J, Que F, Kendrick M, Farnell M, et al. Hepatic resection of hepatocellular carcinoma in patients with cirrhosis: Model of end-stage liver disease (MELD) score predicts perioperative mortality. J Gastrointest Surg. 2005; 9: 1207-1215*
- *Biggins SW, Bambha K. MELD-based liver allocation: Who is underserved? Semin Liver Dis. 2006; 26: 211-220*
- *Cholongitas E, Senzolo M, Patch D, Kwong K, Nikolopoulou V, Leandro G, et al. Risk factors, sequential organ failure assessment and model for end-stage liver disease scores for predicting short-term mortality in cirrhotic patients admitted to intensive care unit. Aliment Pharmacol Ther. 2006; 23: 883-893*
- *Kamath, Patrick S. MELD Score (Model for End-Stage Liver Disease) (12 and older). MD+CALC. 2021. Available at: <https://www.mdcalc.com/meld-score-model-end-stage-liver-disease-12-older#pearls-pitfalls>*

3.2.3.20.131 Modified Ashworth Scale

Description: The Modified Ashworth Scale aims to assess the grade of muscle spasticity (tonus abnormality) in patients with neurological conditions, applicable to both the upper and lower body limbs. The rater should extend the patient’s limb from a position of maximal flexion to maximal extension until the first soft resistance is felt. The Modified Ashworth Scale is used in pre and post treatment condition. The score ranges from 0 to 4 for each analyzed muscle, where lower score represents normal muscle tone, and higher score represent affected rigid part in bending or extension. Refer to “spasticity management” feature in this document for more details related to the workflow that includes this scale use (neuromuscular block).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Ashworth B. Preliminary trial of carisoprodol in multiple sclerosis. Practitioner 1964; 192: 540-2*
- *Bohannon RW, Smith MB. Inter rater reliability on modified Ashworth scale of muscle spasticity. Phys Ther; 1967: 659-61*
- *Espasticidade. Protocolo Clínico e Diretrizes Terapêuticas. Portaria SAS/MS no 377, de 10 de novembro de 2009*

3.2.3.20.132 Modified Behavioral Pain

Description: Refer to the feature “Vital signs and clinical parameters calculation” of this document.

3.2.3.20.133 Modified Early Warning Score (MEWS)

Description: The Modified Early Warning Score (MEWS) is a versatile tool based on physiological parameters such as HR, RR, body temperature, SBP and level of consciousness. All these variables are capable of alerting physicians and other members of the healthcare team about patients at risk of clinical deterioration. This score can be used in the wards to guide the continued follow-up of patients, identifying those with altered scores and progressive increase, who need more attention from the responsible team. Values above 3 mean the need for team intervention and above 5 are considered critical.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Morgan RJM; Williams F, Wright MM. An early warning scoring system for detecting developing critical illness. Clinical Intensive Care, 1997*
- *Subbe CP, Kruger M, Rutherford P, et al. Validation of a modified early warning score in medical admissions. QJM, 2001;94:521-526*
- *Burch VC, Tarr G, Morroni C. Modified early warning score predicts the need for hospital admission and in hospital mortality. Emerg Med J 2008; 25:674-678*

3.2.3.20.134 Modified Objective Pain Score (MOPS)

Description: Refer to the feature “Vital signs and clinical parameters calculation” of this document.

3.2.3.20.135 Modified Rankin Scale (MRS)

Description: The Modified Rankin Scale (MRS) is used to categorize level of incapacity or functional independence in the daily activities of people who suffer a stroke or other causes of neurological disability and is compared over time to check for recovery and degree of continued disability. The scale consists of 6 categories from 0 to 6: 0) no symptoms, 1) no significant disability, 2) slight disability, 3) moderate disability, 4) moderately severe disability, 5) Severe disability, and 6) dead. The categories are intuitive and easily grasped by both clinician and patient, it has concurrent validity and is demonstrated by strong correlation with measures of stroke pathology (e.g., infarct volumes) and agreement with other stroke scales.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Rankin J. “Cerebral vascular accidents in patients over the age of 60.” Scott Med J 1957;2:200-15*
- *Bonita R, Beaglehole R. “Modification of Rankin Scale: Recovery of motor function after stroke.” Stroke 1988 Dec;19(12):1497-1500*
- *Saver JL, Filip B, Hamilton S, et al. “Improving the reliability of stroke disability grading in clinical trials and clinical practice: the Rankin Focused Assessment (RFA).” Stroke 2010; 41 (5): 992-95*

3.2.3.20.136 Morse Fall Scale (MFS)

Description: The Morse Fall Scale (MFS) is a rapid and simple method of assessing a patient’s likelihood of falling and helps prevent falls and their consequences. The MFS is used widely in acute care settings, both in the hospital and long-term care inpatient settings. The tool consists of 6 fall risk items such as history of falling (immediate or previous), if the patient has a secondary diagnosis (meaning 2 or more diagnoses in the patient chart), ambulatory aid, intravenous therapy/ heparin lock, gait, and mental status. The sum of the items gives a score ranging from 0 to 125 points. Three types of fall risk are presented such as low (< 25 point), moderate (25 – 45 points) and high (> 45 points) and each of these has a different recommendation for intervention.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Morse, JM. Predicting Patient Falls. CA: Sage Publications, 1997*
- *Morse, JM. Morse Fall Scale. University Park, PA: The Pennsylvania State University School of Nursing, 1985*
- *Urbanetto JS, et al. Morse Fall Scale: tradução e adaptação transcultural para a língua portuguesa. Rev Esc Enferm USP. 2013; 47(3):569-75*

3.2.3.20.137 Mucositis Scale

Description: The Mucositis Scale was proposed by the WHO and it is a simple classification system for patient's oral toxicity related chemotherapy. The assessment considers objective signs (redness or erythema, and development of ulcers) and the subjective signs (ability to swallow, and mucosal sensitivity). After the evaluation, the user selects among four classes: level 0 (none) - no signs and symptoms, level 1 (mild) - oral pain and erythema, level 2 (moderate) - oral erythema, ulcers, tolerated solid diet, level 3 (severe) - oral ulcers, liquid diet only and level 4 (life-threatening) - oral feeding impossible.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Kowanko, I.H., Brent; Long, Lesley; Evans, David, Prevention And Treatment Of Oral Mucositis In Cancer Patients. Best Practice, 1998. 2(3)*
- *Miller, A. B ; Hoogstraten, B ; Staquet, M. et al. Reporting results of cancer. Cancer. N. 47, 207 – 214, 1981*
- *Peterson, D., New Strategies for Management of Oral Mucositis in Cancer Patients. Supportive Oncology, 2006. 4: pg 9, 14*
- *Hajisalem, Telka & Ghaffary, Saba & Nejati, Babak & Mashayekhi, Simin & Fathiazad, Fatemeh & Shokri, Javad & Bateni, Amin. (2019). Effect of Achillea millefolium Mouthwash on Oral Mucositis Induced by Chemotherapy in AML Patients. Jundishapur Journal of Natural Pharmaceutical Products. In Press. 10.5812/jjnpp.14077.*

3.2.3.20.138 Multinational Association for Supportive Care in Cancer (MASCC) Risk Index

Description: The Multinational Association for Supportive Care in Cancer (MASCC) risk index is used to assess for risk of serious complications of febrile neutropenia in patients with cancer. The variables are symptoms severity, age, hypotension (systolic blood pressure < 90 mmHg), chronic obstructive pulmonary disease, solid tumor (or hematologic malignancy without prior fungal infections), rehydration requiring parenteral fluids, and the status at onset of neutropenic fever. The maximum score is 26, and a score greater than or equal to 21 indicates low-risk patients and less than 21 high-risk patients for poor outcomes.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Klastersky J, et al. The Multinational Association for Supportive Care in Cancer Risk Index: A Multinational Scoring System for Identifying Low-Risk Febrile Neutropenic Cancer Patients. Journal of Clinical Oncology, Vol 18, No 16 (August), 2000: pp 3038-3051*

- *Klastersky J, Paesmans M. The Multinational Association for Supportive Care in Cancer (MASCC) risk index score: 10 years of use for identifying low-risk febrile neutropenic cancer patients. 2013 May;21(5):1487-95. Doi: 10.1007/s00520-013-1758-y. Epub 2013 Feb 27*
- *Almarie Uys, Bernardo L. Rapoport & Ronald Anderson. Febrile neutropenia: a prospective study to validate the Multinational Association of Supportive Care of Cancer (MASCC) risk-index score. Supportive Care in Cancer. Vol 12, 2004: pp 555–560*
- *Klastersky, Jean. MASCC Risk Index for Febrile Neutropenia. 2021. Available at: <https://www.mdcalc.com/mascc-risk-index-febrile-neutropenia>*

3.2.3.20.139 Multiple Organ Dysfunction Score (MODS)

Description: The Multiple Organ Dysfunction Score (MODS) uses physiological measurements of dysfunction in six organ systems and is related to the hospital mortality risk. Used on patients in the intensive care unit (ICU) during admission, calculated every 48 h until discharge. It comprises the following variables: PaO₂/FiO₂; platelet count, serum bilirubin, blood pressure (min/max/mean), heart rate, central venous pressure, Glasgow Coma Scale, and serum creatinine. Each value generates a score (from 0 to 4) for each system (respiratory, cardiovascular, renal, hepatic, hematologic and central nervous system), therefore the maximum score is 24 points. Higher scores are associated with higher hospital mortality and ICU mortality rates, and longer ICU length of stay.

- *Marschall JC et coll. Multiple Organ Dysfunction Score: A reliable descriptor of a complex clinical outcome. Crit Care med.1995; 23:1638-1652*
- *Peres Bota D, Melot C, Lopes Ferreira F, Nguyen Ba V, Vincent JL. The Multiple Organ Dysfunction Score (MODS) versus the Sequential Organ Failure Assessment (SOFA) score in outcome prediction. 2002 Nov;28(11):1619-24. Epub 2002 Sep 6*

3.2.3.20.140 National Early Warning Score (NEWS)

Description: The National Early Warning Score (NEWS) is used in hospitalized patients to allow early detection of clinical deterioration and the potential need for a higher level of care. The NEWS is based on a simple aggregate scoring system in which a score is allocated to physiological measurements that are routinely recorded in clinical practice. Six simple physiological parameters form the basis of the scoring system such as RR, oxygen saturation, supplemental oxygen, pulse rate, temperature, level of consciousness. The score ranges from 0 to 20. A score of 0-4 indicates: low clinical risk, 5-6: medium clinical risk, and > or equal to 7: high clinical risk. A red score is assigned when extreme variation in a single physiological parameter is present (a score of 3 in any physiological parameter).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Royal College of Physicians. National early warning score (NEWS): Standardising the assessment of acute illness severity in the NHS. Report of a working party. London: RCP, 2012*

3.2.3.20.141 National Early Warning Score 2 (NEWS 2)

Description: The National Early Warning Score 2 (NEWS 2) is used in hospitalized patients to allow early detection of clinical deterioration and the potential need for a higher level of care. NEWS 2 is the latest version of the National Early Warning Score (NEWS), first produced in 2012 and updated in December 2017, which advocates a system to standardize the assessment and response to acute illness. The NEWS is based on a simple aggregate scoring system in which a score is allocated to physiological measurements, that are routinely recorded in clinical practice. Six simple physiological parameters form the basis of the scoring

system such as respiratory rate (RR), oxygen saturation, supplemental oxygen, pulse rate, level of consciousness or new confusion and temperature. Differently from NEWS, NEWS 2 scores has different parameters and provides clinical recommendations for each result. The score ranges from 0 to 24. A score of 0 to 4 indicates low risk; 5-6: medium risk and, > or equal to 7 high risk. The red score continues to be assigned when extreme variation in a single physiological parameter is present (i.e., a score of 3 in any physiological parameter).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Royal College of Physicians. National Early Warning Score (NEWS 2): Standardising the assessment of acute illness severity in the NHS. Updated report of a working party. London: RCP; 2017*
- *Echavarría PAE, Bush OAP, Ambriz JB. Implementación de las escala de gravedad para la activación del equipo de respuesta rápida: NEWS 2. Med Crit 2019;33(2):98-103*

3.2.3.20.142 National Health Service Falls Risk Assessment Scale

Description: The National Health Service Falls Risk Assessment Scale aims to identify risk related to fall for elderly patients. It evaluates a patient's age, gender, gaiting style, mobility, history of falls, sensory deficits, medications in use, health history and memory. The higher the score, the higher the fall risk of the patient, with a total maximum score of 40.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Falls prevention and management program guidelines for elderly people within the community – Redditch and Bromsgrove Primary Care Trust – NHS*

3.2.3.20.143 National Institute of Health Stroke Scale (NIHSS)

Description: The National Institute of Health Stroke Scale (NIHSS) is a tool for systematic use that allow a quantitative assessment of neurological deficits related to stroke. This scale measures the initial neurological state in the acute phase of stroke. The scale is composed of 15 neurological exam items assessing the level of consciousness (questions and commands), extraocular movements, visual fields, facial palsy, motor strength (right, left leg and arm), limb ataxia, sensory, language/aphasia, dysarthria, and neglect. The total score ranges from 0 to 42, where zero means no stroke symptoms, 1–4 minor stroke, 5–15 moderate stroke, 16–20 moderate to severe stroke, and 21–42 severe stroke.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources :

- *Goldstein LB, Bertels C, Davis JN. Interrater reliability of the NIH stroke scale. Arch Neurol. 1989, 46 :660-662*
- *Lyden P, Brott T, Tilley B, et al. Improved reliability of the NIH Stroke Scale using video training. Stroke 1994; 25:2220-26*
- *Brott T, Adams HP Jr, Olinger CP, Marler JR, Barsan WG, Biller J, Spilker J, Holleran R, Eberle R, Hertzberg V, et al. Measurements of acute cerebral infarction: a clinical examination scale. Stroke. 1989 Jul; 20(7) :864-70*

3.2.3.20.144 Neonatal Facial Coding System for pain evaluation (NFCS)

Description: Refer to the feature “Vital signs and clinical parameters calculation” of this document.

3.2.3.20.145 Neonatal infant pain score (NIPS)

Description: Refer to the feature “Vital signs and clinical parameters calculation” of this document.

3.2.3.20.146 Neonatal Therapeutic Intervention Scoring System (NTISS)

Description: The Neonatal Therapeutic Intervention Scoring System (NTISS) measures severity of illness by quantifying the intensity and complexity of care received and has proven valuable in assessing clinical outcomes and resource consumption in neonatal intensive care. The National Therapeutic Intervention Scoring System (NTISS) was created by modifying the Therapeutic Intervention Scoring System (TISS), where 42 items were deleted from the 76 original items of the TISS and 28 new items were added. Each item assigns scores from 0 to 4 for various intensive care therapies (some of which are grouped). NTISS scores compute the most intense level for each therapy (respiratory, monitoring, cardiovascular, medication, metabolic/nutritional, procedures, transfusions and vascular access) during a 24h period. The first scoring period usually begins on admission. It is also important to delineate during subsequent administrations of the score whether scores are based on initiation of therapy or continuation. NTISS is a valid measure of therapeutic intensity that is independent of birth weight and can be used as an indicator of neonatal illness severity and resource utilization (the higher the score, the more illness severity and resource utilization).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Gray JE, Richardson DK et al. Neonatal Therapeutic Intervention Scoring System: a therapy-based severity-of-illness index. *Pediatrics*. 1992; 90:561-7

3.2.3.20.147 New Ballard Score (NBS)

Description: New Ballard Score (NBS) is used to determine gestational age (GA) via a neuromuscular and physical assessment of the newborn, where 6 neurological parameters are considered (posture, square window/wrist, arm recoil, popliteal angle, scarf sign, heel to ear) and 6 physical parameters (skin, lanugo, plantar surface, breast, eye/ear, male genital, female genital). To each parameter a score is assigned which in the sum determine the estimated gestational age (-10 is the minimum score and the maximum is 50). The total score allows an estimation of ages between 26 and 44 weeks of gestation and can be applied in up to 96 h of the newborn’s life.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Ballard, J. L., Novak, K. K., & Driver, M. (1979). A simplified score for assessment of fetal maturation of newly born infants. *The Journal of Pediatrics*, 95(5), 769–774.
- Ballard, J. L., Khoury, J. C., Wedig, K., Wang, L., Eilers-Walsman, B. L., & Lipp, R. (1991). New Ballard Score, expanded to include extremely premature infants. *The Journal of Pediatrics*, 119(3), 417–423.
- Donovan, E. F., Tyson, J. E., Ehrenkranz, R. A., Verter, J., Wright, L. L., Korones, S. B., ... Papile, L.-A. (1999). Inaccuracy of Ballard scores before 28 weeks’ gestation. *The Journal of Pediatrics*, 135(2), 147–152.

3.2.3.20.148 New York Heart Association (NYHA) Functional Classification

Description: The NYHA functional classification is a tool that provide a simple way of classifying the extent of heart failure. It classifies patients in one of four categories based on their limitations during physical activity.

The limitations and symptoms evaluated are related to normal breathing and varying degrees in shortness of breath and or angina pain, which are (Class 1) no limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea (shortness of breath); (Class 2) Slight limitation of physical activity. Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea (shortness of breath); (Class 3) Marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, or dyspnea and (Class 4) Unable to carry on any physical activity without discomfort. Symptoms of heart failure at rest. If any physical activity is undertaken, discomfort increases.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *The Criteria Committee of the New York Heart Association. Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels. 9th ed. Boston, Mass: Little, Brown & Co; 1994:253-256*

3.2.3.20.149 Nitrogen Balance (NB) Equation

Description: Nitrogen Balance (NB) Equation is the calculation of the difference between the ingested nitrogen (IN) and the excreted nitrogen (EN) of proteins, allowing identification of a patient's catabolic or anabolic state. A negative nitrogen balance indicates an unfavorable clinical condition.

$$NB = IN - EN$$

$$IN = (\text{ingested protein} + \text{infused protein})/6.25$$

$$EN = \text{urinary urea nitrogen (UUN) 24 h} + \text{non-urea urinary nitrogen (NUN)} + \text{fecal nitrogen (FN)} + \text{skin nitrogen} + \text{nasogastric probe nitrogen} + \text{fistula nitrogen}$$

$$NUN = \text{urinary urea nitrogen (UUN)} \times 0.2$$

$$UUN = \text{urinary urea 24 h} \times 0.47$$

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Maicá AO Schweigert ID. Avaliação nutricional em pacientes graves. As Bras Ter Intensiva. 2008; 20(3):286-295*
- *Acosta Escribano J, Gomez-Tello V, Ruiz Santana S. Nutritional assessment of the severely ill patient. Nutr Hosp. 2005;20 Suppl 2:5-8. Spanish*

3.2.3.20.150 Numeric Categorical Pain Scale

Description: Refer to the feature "Vital signs and clinical parameters calculation" of this document.

3.2.3.20.151 Numeric Pain Rating Scale (categorical)

Refer to the feature "Vital signs and clinical parameters".

3.2.3.20.152 Nursing Activities Score (NAS)

Description: The Nursing Activities Score (NAS) is a tool developed by Miranda and colleagues and aimed to measure nursing workload based on the consumption of nursing time at the patient level in the ICU. The tool consists of 7 categories and 23 items. The total score results from the sum of each item scored that corresponds to the patients' direct and indirect care needs. This score represents how much time the patient required from a nursing professional in the last 24 h. If the score is 100, it is interpreted that the patient required 100% of the time of a nursing professional in their care in the last 24 h.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Miranda DR, Nap R, Rijk A, Schaufeli W, Iapichino G. Nursing activities score. Crit Care Med. 2003;31(2):374-82*
- *Padilha KG, Sousa RMC, Queijoa AF, Mendesa AM, Mirandab DR. Nursing Activities Score in the intensive care unit: Analysis of the related factors. Intensive and Critical Care Nursing (2008) 24, 197-204*
- *Padilha KG, Sousa RMC, Garciab PC, Bento ST, Finardi EM Hatarashi RHK. Nursing workload and staff allocation in an intensive care unit: A pilot study according to Nursing Activities Score (NAS). Intensive and Critical Care Nursing (2010) 26, 108-113*

3.2.3.20.153 Nutrition Care Level Classification

Description: The Nutrition Care Level Classification is used to define the patient nutrition care level. It is performed after the assessment of the patient's situation, regarding the main disease, the need for dietary therapy and the potential presence of associated nutritional risk factors. The classification is made selecting the presence of two conditions, the dietary therapy need and risk factors, defining the care level of nutrition (primary, secondary and tertiary).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Cardoso, Isosaki, Nazima et al. Manual de Dietoterapia e Avaliação Nutricional. Ed Atheneu capítulo 1: 4-8, 1997*
- *Cardoso E, Isosaki M, Nazima M.K.N, Nakasato M. Anamnese e diagnóstico na assistência nutricional ao cardiopata. As Soc Cardiol Estado de São Paulo. V. 7, n.5. p. 63-8, 1997*
- <https://www.asbran.org.br/storage/arquivos/PRONUTRI-SICNUT-VD.pdf>

3.2.3.20.154 Nutrition Risk Screening (NRS-2002)

Description: The Nutritional Risk Screening 2002 (NRS-2002) is used to perform nutritional risk screening of hospitalized patients. It is considered by the European Society for Clinical Nutrition and Metabolism (ESPEN) to be the gold standard method for identifying malnutrition or the risk of developing it and classifies patients according to the deterioration of nutritional status and disease severity.

The screening tool considers five criteria: BMI, unintentional weight loss over a period of one to three months, reduction in appetite and food intake, metabolic changes, disease severity and age < 70 years old. The last two criteria being considered as the ones that most influence the worsening of the nutritional status and the increased risk of malnutrition.

The NRS-2002 is divided into three parts. The first part or initial screening consists of four questions that can indicate the possibility of nutritional risk, without indicating whether the patient is at risk or not. If the answer is “no” to any question, the patient is classified as “No risk”, and must be re-screened in 7 days; however, if the answer is “yes” to any of the questions, the screening should move on to the second part.

In the second stage of the screening or final screening, the patient’s nutritional status and disease severity are assessed, being scored from 0-3 for each category and an additional point for age. Nutritional status is assessed using three variables: BMI, percentage of weight loss and change in food intake, with the variable with the greatest impairment being used to categorize the patient. To classify the severity of the disease, the

tool considers the underlying pathology, complications developed, the functional capacity and the demand for nutritional therapy, in addition to the APACHE II > 10.

At the end of the screening, one point is added to the score obtained if the patient age is ≥ 70 years old.

If the score ≥ 3 , the patient is nutritionally at-risk, and a nutritional care plan is initiated. For a score < 3, weekly rescreening of the patient is needed. If the patient is scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk status.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Kondrup J, Alisson SP, Elia M, Vellas B, Plauth M. ESPEN Guidelines for Nutrition Screening 2002. Clinical Nutrition (2003) 22(4): 415-421*

3.2.3.20.155 Ontario Modified Stratify Falls Risk Screen (Sydney Scoring)

Description: The Ontario Modified Stratify Falls Risk Screen (Sydney Scoring) is used for forecasting fall in hospitalized elderly patients. It evaluates history of falls, mental status, vision, urination urgency and frequency, movement from bed to chair and mobility. The total score ranges from 0 to 30, with values ≥ 9 indicating a high risk of fall.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Papaioannou A, et al. Previsão de quedas usando uma ferramenta de avaliação de riscos no ambiente de cuidados intensivos. BMC Med. 2004; 2:1*
- [Http://www.ncbi.nlm.nih.gov/pmc/articles/pmc333435](http://www.ncbi.nlm.nih.gov/pmc/articles/pmc333435)

3.2.3.20.156 Oswestry Disability Index (ODI)

Description: Oswestry Disability Index (ODI) is a tool used for assessing disorders of the spinal column, common in patients with low back pain. It is a self-administered questionnaire divided into ten sections designed to assess limitations of various activities of daily living. Each section is scored on a 0–5 scale, 5 representing the greatest disability. The index is calculated by dividing the summed score by the total possible score, which is then multiplied by 100 and expressed as a percentage. Higher scores represent higher disturbance of activities of daily living due to chronic back pain.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Cook C, et al. Cross-Cultural Adaptation and Validation of the Brazilian Portuguese Version of the Neck Disability Index and Neck Pain and Disability Scale. SPINE Volume 31, Number 14, 2006, pp 1621-7*
- *Mehra A, et al. Oswestry Disability Index Scoring Made Easy. 2008 September; 90(6): 497-9*
- *Vigatto R, Alexandre NMC, Filho HRC. Development of a Brazilian Portuguese Version of the Oswestry Disability Index. SPINE Volume 32, Number 4, 2007, pp 481-6*

3.2.3.20.157 Pain assessment scale in advanced dementia (PAINAD)

Description: Refer to the feature "Vital signs and clinical parameters calculation" of this document.

3.2.3.20.158 Palliative Performance Scale (PPS)

Description: The Palliative Performance Scale is a modification of the Karnofsky Performance Scale. It is used for measurement of performance status in palliative care. The scale is observer-rated and includes five domains: ambulation, self-care, activity level and evidence of disease, intake, and level of consciousness. It is possible to select the patient's general condition in a scale of 0% (death) to 100% (normal), in increments of 10%.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Anderson F, Downing GM, Hill J. Palliative Performance Scale (PPS): a new tool. J Palliat Care. 1996 ; 12(1) : 5-11*
- *Morita T, Tsunoda J, Inoue S, et al. Validity of the Palliative Performance Scale from a survival perspective. J Pain Symp Manage. 1999; 18(1):2-3*
- *Ho F, Lau F, Downing MG, Lesperance M. A reliability and validity study of the Palliative Performance Scale. BMC Palliat Care. 2008; 7: 10*

3.2.3.20.159 Palliative Prognostic Index Modified (PPI)

Description: The Palliative Prognostic Index (PPI) is an extension of the Karnofsky Index and was validated as a prognostic tool for individuals with advanced oncologic disease. It is defined through oral ingestion and the presence or absence of dyspnea, edema and delirium. The scoring ranges between 0 and 14, whereby sick people are divided into three predictive groups: a PPI > 6 estimates a survival of less than 3 weeks, a PPI > 4 indicates less than 6 weeks of life and a PPI ≤ 4 suggests survival of more than 6 weeks.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Morita T, Tsunoda J, Inoue S, Chihara S. The palliative prognostic index: a scoring system for survival prediction of terminally ill cancer patients. Supportive Care in Cancer 1999; 7: 128-33*
- *Morita T, Tsunoda J, Inoue S, Chihara S. Survival prediction of terminally ill cancer patients by clinical symptoms: development of a simple indicator. Jap J Clin Oncol 1999; 29:156-59*
- *Chow E, et al. How Accurate are Physicians' Clinical Predictions of Survival and the Available Prognostic Tools in Estimating Survival Times in Terminally Ill Cancer Patients? A Systematic Review. Clinical Oncology 2001; 13: 209-18*

3.2.3.20.160 Pasero Opioid-Induced Sedation Scale (POSS)

Description: Refer to "Vital signs and clinical parameters" feature, "analgesia" group.

3.2.3.20.161 Patient Health Questionnaire (PHQ-9)

Description: The Patient Health Questionnaire (PHQ-9) is used for evaluating signs of depression. It consists of 9 questions with 4 options each. The final score ranges from 0 to 27, which 27 means the highest risk of depression.

System functions: Electronic Patient Chart -> Scores and Indexes.

Sources:

- *Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001 Sep;16(9):606-13*

- Santos IS (1), Tavares BF, Munhoz TN, Almeida LS, Silva NT, Tams BD, Patella AM, Matijasevich A.(Sensitivity and specificity of the Patient Health Questionnaire-9 (PHQ-9) among adults from the general population, Cad Saúde Pública, Rio de Janeiro, 29(8):1533-1543, ago, 2013

3.2.3.20.162 Pediatric Early Warning Score (PEWS)

Description: The Pediatric Early Warning Score (PEWS) was developed in 2001 to identify pediatric patients at risk for clinical deterioration. The scoring system covers three components of child assessment, which are related to behavior, cardiovascular state and respiratory state, adding two questions about quarter-hourly nebulizers (every 15 min) and persistent vomiting following surgery. The score value indicates the patient's reassessment interval: ≥ 7 indicate a reassessment need every 30 min, 6 every 1 h, 5 every 1-2 h, 0-4 every 4 h.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Monaghan A. *Detecting and managing deterioration in children.* Paediatr Nurs. 2005;17(1): 32:35
- Quist-Therson E and the Hertfordshire Partnership NHS Trust. *Acute Children's Services: Guidelines Services: Guidelines for using paediatric early warning scoring tool.* National Health System, Hertfordshire Partnership, England. August 2006
- Tucker KM, et al. *Prospective evaluation of a pediatric inpatient early warning scoring system.* J Spec Pediatr Nurs. 2009 Apr;14(2):79-85
- *Sensitivity of the Pediatric Early Warning Score to Identify Patient Deterioration (Mari Akre, Marsha Finkelstein, Mary Erickson, Meixia Liu, Laurel Vanderbilt and Glenn Billman)* Pediatrics 2010;125; e763; originally published online March 22, 2010

3.2.3.20.163 Pediatric Index of Mortality (PIM 2)

Description: The Pediatric Index of Mortality (PIM 2) estimates the mortality risk of a pediatric patient, collecting data since patient ICU admission. It evaluates if the admission was elective, surgery or procedure recovery, heart surgery (bypass), select high or low risk diagnosis, mechanical ventilation, PaO₂, FiO₂, SBP and base excess. Based on the results and evaluations it generates a mortality percentage for the patient.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Slater et al. *PIM 2: a revised version of the Paediatric Index of Mortality.* Intensive Care Med 2003; 29:278-85

3.2.3.20.164 Pediatric Index of Mortality (PIM 3)

Description: The Pediatric Index of Mortality (PIM 3) was developed using PIM 2 through records of pediatric admissions in ICU, which estimates the mortality risk of a pediatric patient. It evaluates if the admission was elective, surgery or procedure recovery, base excess, select high or low risk diagnosis, mechanical ventilation, PaO₂, FiO₂, SBP and heart surgery (bypass). The consideration of cardiac surgery with or without by-pass and the entry of very high-risk diagnoses are variables evaluated differently from PIM 2. Based on the results and evaluations mortality percentage is generated for the patient.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Straney L, Clements A, Parslow RC, Pearson G, Shann F, Alexander J, Slater A, for the ANZICS Pediatric Study Group and the pediatric intensive care audit network. Pediatric Index of Mortality 3: an updated model for predicting mortality in pediatric intensive care. September 2013, volume 14, number 7*

3.2.3.20.165 Pediatric Logistic Organ Dysfunction (PELOD) Score

Description: The Pediatric Logistic Organ Dysfunction (PELOD) Score is used to assess the severity of multiple organ dysfunction syndrome in pediatric Intensive Care Units (ICU). The score includes six key organ dysfunctions: cardiovascular, respiratory, hematological, neurological, renal, and hepatic. To calculate the score, each organ dysfunction receives points (0, 1, 10 or 20) for the variable associated with the highest points. PELOD score is the sum of points for each organ system. The maximum number of points for an organ is 20, and the maximum PELOD score is 71. Higher scores indicate higher likelihood of multiple organ dysfunction and increased hospital mortality rate.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Leteurtre S. et al. Development of a pediatric multiple organ dysfunction score: use of two strategies. Med Decis Making 1999; 19:399-410*
- *Leteurtre S. et al. Validation of the paediatric logistic organ dysfunction (PELOD) score: prospective, observational, multicentre study. Lancet. 2003 Jul 19;362 (9379):192-7*

3.2.3.20.166 Pediatric Logistic Organ Dysfunction (PELOD 2) Score

Description: Pediatric Logistic Organ Dysfunction (PELOD 2) score was adapted from PELOD and is a tool to assess the severity of multiple organ dysfunction syndrome in pediatric Intensive Care Units (ICU) using a continuous scale. The PELOD 2 score includes mean arterial pressure and lactatemia in the cardiovascular dysfunction and does not include hepatic dysfunction. To calculate the score, 10 variables involving five organ dysfunctions are evaluated (cardiovascular, respiratory, hematological, neurological, and renal). For each variable, the severity level ranges from 0 (normal) to 6, and different from PELOD score, all variables of each system sum to the final score, with a maximum of 33 points. Higher scores indicate higher likelihood of multiple organ dysfunction and increased hospital mortality rate.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Leteurtre S, et al. PELOD-2: An Update of the Pediatric Logistic Organ Dysfunction Score. Pediatric Critical Care. July 2013, Volume 41, Number 7*
- *Hendra, Runtuuwu AL, Manoppo JIC. Pediatric Logistic Organ Dysfunction (PELOD) Score as prognosis of multiple organ failure in sepsis. Vol. 50, N° 4, July 2010*

3.2.3.20.167 Pediatric Patient Classification Tool (ICPP)

Description: Pediatric Patient Classification Tool (ICPP) is an instrument that allows the classification of pediatric patients in degrees of dependence on nursing. It favors better allocation of human resources for improvement of the quality of care. Consisting of 11 indicators, each with four situations of care dependence, graded from one to four points, increasing the demand for care and enabling the classification of patients into five categories of care. Results are categorized in the following manner: 11-17 points is minimum, 18- 23 points is intermediate, 24-30 points is high dependency, 31-36 points is semi-intensive and 37-44 points is intensive.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Dini AP, Guirardello EB. Pediatric Patient Classification System: Improvement of an instrument. Rev Esc Enferm USP 2014; 48(5):787-93*
- *Dini, AP, Fugulin FMT, Veríssimo MDLOR, et al. Sistema de classificação de pacientes pediátricos: construção e validação de instrumento. Rev Esc Enferm USP 2011; 45(3):575-80*
- *Dini AP, Guirardello EB. Construction and validation of an instrument for classification of pediatric patients. Acta Paul Enferm. 2013;26 (2):144-9*

3.2.3.20.168 Pediatric Risk of Mortality Score (PRISM)

Description: Pediatric Risk of Mortality Score (PRISM) is a tool used in the first 24 hours of patient’s pediatric intensive care admission, developed to reduce the number of physiologic variables required for pediatric ICU mortality risk assessment. It evaluates 14 variables, such as vital signs which includes heart rate and respiratory rate, laboratory results like potassium and glycemia, breastfeeding, pupillary reactions and Glasgow Coma Score. Each of the evaluated items generates a partial score, summed to the final score. The risk of death is calculated by a logistic regression equation using the value of the PRISM, patient age and need of surgery on admission to the PICU. Higher scores represent greater mortality rate. PRISM scores 5-10 (risk of mortality 11-23%), 15-20 (risk of mortality 40-61%), and 25-30 (risk of mortality 78-89%).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Pollack MM, Ruttimann UE, Getson PR. Pediatric risk of mortality (PRISM) score. 1988 Nov;16(11):1110-6*
- *Khajeh, Ali & Noori, MD & Reisi, Mohsen & Fayyazi, Afshin & Mohammadi, PhD & Miri-Aliabad, Ghasem. (2013). Mortality Risk Prediction by Application of Pediatric Risk of Mortality Scoring System in Pediatric Intensive Care Unit. Iran J Pediatr. 23.*

3.2.3.20.169 Pediatric Sepsis Early Detection Tool

Description: The Pediatric Sepsis Early Detection Tool supports clinicians in the early identification of pediatric inpatients with signs and symptoms of sepsis, which can influence clinical outcomes.

A previous configuration is required in the “Sepsis” item of the “Patient Chart Settings” function to activate the tool. On the “Sepsis triggering variables” tab, the user needs to filter for “Pediatric sepsis” to see all variables and the default configuration provided by Philips, five alerts for sepsis, and five signs of organic dysfunction. The variables are heart rate, respiratory rate, fever in the last 4 h, temperature, and white blood cell count. The types of organic dysfunction are hypotension, desaturation, oliguria, impaired perfusion, and acute change in the neurologic state. For each variable, the institution must configure the rules, the specific vital sign, event, laboratory test, intake, output, and the number of lookback hours that are valid. If the institution does not want to use all ten default variables, it is possible to configure in the tab “Sepsis Client” the desired variables, the threshold and, the patient’s age.

It is mandatory to configure rules using the “Clinical Decision Support – Mentor” function to activate the system alerts and notifications regarding pediatric sepsis. In the function, on the “Triggering events” tab, the user selects the option “Scores and indexes” to define the rules and actions, including professional roles and submission. Then, when an event is registered in the “Electronic Patient Chart” function, and it matches all

conditions defined in the “Clinical Decision Support – Mentor” function, a notification is triggered to inform the event, which will be validated by the clinician.

All data regarding the Pediatric Sepsis Early Detection Tool is recorded in the “Pediatric Sepsis” tab, on the “Scores and Indexes” item of the “Electronic Patient Chart” function. A new record can be manually created or automatically triggered according to the rules, followed by the user’s confirmation. Finally, the user can follow an ongoing investigation, record a medical assessment that automatically generates a new clinical note, and define the time the patient needs to be reassessed.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Dellinger R, et al. Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsis and Septic Shock: 2012. CritCareMed 2013 Vol 41, No. 2 2*
- *Brierley J, et al. Clinical practice parameters for hemodynamic support of pediatric and neonatal septic shock: 2007 update from the American College of Critical Care Medicine. Crit Care Med 2009 Vol. 37, No. 2 3*
- *Goldstein B, et al. International pediatric sepsis consensus conference: Definitions for sepsis and organ dysfunction in pediatric. PediatrCrit Care Med 2005 Vol. 6, No. 1*
- *Instituto Latino-Americano de Sepse; ILAS. Campanha de sobrevivência a Sepse Protocolo clínico pediátrico; 2016 (www.ilas.org.br)*

3.2.3.20.170 Phlebitis Rating Scale (Maddox)

Description: The Phlebitis Rating Scale (Maddox) is indicated for the assessment of peripheral venous access to monitor peripheral venipuncture and prevent phlebitis. The degree of severity of phlebitis allows classifying it as no reaction (0), sensitivity to touch on the access (1+), continuous pain without erythema (2+), continuous pain with erythema and edema, palpable hard vein less than 8 cm above the access site (3+), continuous pain, with erythema and edema, palpable hard vein more than 8 cm above the access site (4+), and apparent venous thrombosis (5+). The scale result is the single selected option, by the user, from 0 to 5.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Ray R. Maddox, David R. Rush, Robert P. Rapp, Thomas S. Foster, Vincent Mazella, Harley E. McKean, Double-blind study to investigate methods to prevent cephalothin-induced phlebitis, American Journal of Hospital Pharmacy, Volume 34, Issue 1, 1 January 1977, Pages 29-34*
- *PHILLIPS, L. D. Complicações da Terapia Intravenosa. In: PHILLIPS, L. D. Manual de Terapia Intravenosa. Porto Alegre: Artmed, 2001. P. 236-268*

3.2.3.20.171 Phlebitis Scale

Description: The Phlebitis Scale aims to indicate to clinicians the first stages of phlebitis in patients with intravenous access devices. This scale categorizes this clinical complication in five levels of progress, which are level zero (no symptoms), level 1 (erythema with or without local pain), level 2 (pain with erythema and or edema), level 3 (pain with erythema and or edema, with hardening and palpable fibrous cord), level 4 (pain with erythema and or edema, with hardening and palpable fibrous cord longer than 1 cm and purulent drainage). The scale result is the single selected option by the user.

System functions: Electronic Patient Chart>Scores and Indexes

Sources :

- *Intravenous Nurses Society*. Infusion nursing standards of practice. J Intraven Nurs. 2011. 34(1S): 47-565
- *Lucilene Reno Ferreira, Mavilde da Luz GonÁalves Pedreira, Solange Diccini*. Flebite no pré e pós-operatório de pacientes neurocirúrgicos. Acta Paul Enferm 2007;20(1):30-6

3.2.3.20.172 Pneumonia Severity Index (PSI)

Description: The Pneumonia Severity Index (PSI) is a prediction rule that stratifies patients with community-acquired pneumonia into five classes, with respect to the risk of death within 30 days following onset of symptoms. The prediction rule assigns points based on age, if the patient is a nursing home resident, presence of coexisting diseases (malignancy, liver disease, congestive heart failure, cerebrovascular disease, and renal disease), abnormal physical findings (mental status, heart rate, respiratory rate, temperature, blood pressure), and abnormal laboratory/image findings (arterial pH, urea level, serum sodium, glucose level, hematocrit, partial pressure of oxygen and pleural effusion on x-ray) at presentation. Each answer can add 10, 15, 20, or 30 points to the total score, which are summed and added to the patient age (minus 10 if woman). The mortality risk increases as the score increases.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Fine MJ, Auble TE, Yealy DM, Hanusa BH, Weissfeld LA, Singer DE, et al*. A prediction rule to identify low-risk patients with community-acquired pneumonia. N Engl J Med. 1997;336 (4):243-50

3.2.3.20.173 Portsmouth Physiological and Operative Severity Score (P-POSSUM)

Description: The Physiological and Operative Severity Score for the enumeration of Mortality and Morbidity (POSSUM) uses a physiological score and an operative severity score to calculate risks of mortality and morbidity when there is a need for an accurate comparison of surgical outcomes regardless of case mix. It is based on 12 physiological variables measured before surgery and on six operative and postoperative variables, with each variable being scored by a four-grade exponential scale as 1, 2, 4, and 8. Although POSSUM surgical scoring system is an evidence-based scoring system, it has been found that it may overpredict mortality by a factor of two in high-risk patients, a factor of six in low-risk patients (those with a death risk $\leq 10\%$), and a factor of seven in very low-risk patients (those with a death risk $\leq 5\%$). To correct the overprediction in mortality, Whiteley and coworkers (1996) used logistic regression and modified the equation accordingly. The revised scoring system, named Portsmouth Physiological and Operative Severity Score (P-POSSUM), when implemented prospectively, provided an expected mortality very close to the in-hospital observed or actual mortality. Default values are the lowest score for the category of a fit young patient having a minor operation. The higher the score result, the higher the percentage of morbidity and mortality risk. The more 'risky' the procedure, the more accurate the predicted risk.

System functions: Perioperative Electronic Patient Chart -> PACU Scores and Electronic Pre-Anesthetic Assessment -> Risk

Sources:

- *Copeland GP, Jones D, Walters M*. POSSUM: A scoring system for surgical audit. Br J Surg. 1991;78:355–60. [PubMed] [Google Scholar]
- *Whiteley MS, Prytherch DR, Higgins B, Weaver PC, Prout WG*. An evaluation of the POSSUM surgical scoring system. Br J Surg. 1996;83:812–5. [PubMed] [Google Scholar]

- *Prytherch DR, Whiteley MS, Higgins B, Weaver PC, Prout WG, Powell SJ. POSSUM and Portsmouth POSSUM for predicting mortality. Physiological and operative severity score for the enumeration of Mortality and morbidity. Br J Surg. 1998;85:1217–20. [PubMed] [Google Scholar] Neary WD, Heather BP, Earnshaw JJ. The Physiological and Operative Severity Score for the enumeration of Mortality and morbidity (POSSUM). 2003 Feb;90(2):157-65*
- *Fassoulaki A, Chondrogiannis K, Staikou C. Physiological and operative severity score for the enumeration of mortality and morbidity scoring systems for assessment of patient outcome and impact of surgeons' and anesthesiologists' performance in hepatopancreatic biliary surgery. Saudi J Anaesth. 2017;11(2):190-195. Doi:10.4103/1658-354X.203025*
- *Smith, Jason. P-Possum Scoring. Risk Prediction in Surgery. 2021. Available at: [Http://www.riskprediction.org.uk/index-pp.php](http://www.riskprediction.org.uk/index-pp.php)*

3.2.3.20.174 Post-Anesthetic Discharge Scoring System (PADSS)

Description: The Post-Anesthetic Discharge Scoring System (PADSS) was developed to assess patients after anesthesia in an outpatient surgery unit. Upon discharge from the outpatient surgery unit, the patient should be ready to return home, clinically stable, and able to rest at home under the care of a responsible adult. PADSS is based on five main criteria: vital signs (blood pressure, heart rate, respiratory rate, and temperature), activity and mental status, pain or nausea and/or vomiting, surgical bleeding, and intake/output. The PADS score consists of 5 items, each scored from 0 to 2, where the higher the score, the greater the degree of the patient's recovery and readiness to be discharged.

System functions: Perioperative Electronic Patient Chart -> PACU Scores

Sources:

- *Frances Chung, FRCPC, Vincent W.S. Ghan, FRCPC, Dennis O. (1995), A Post-Anesthetic Discharge Scoring System for Home Readiness after Ambulatory Surgery, Journal of Clinical Anesthesia, 1995, 7:500-506*

3.2.3.20.175 Postoperative Kidney Failure Risk

Description: The Postoperative Kidney Failure Risk tool was developed to assess the risk of acute kidney failure in the pre-operative phase. The risk prediction can be accurately quantified based on readily available preoperative data. The presence of serum creatinine > 2mg/dl or estimated creatinine clearance < 30 ml/min defines a high-risk patient. There is moderate risk when two or more minor predictors are present. Minor predictors are estimated clearance between 30 and 50 ml/min, heart failure, diabetes, jaundice, dehydration and serum urea/creatinine ratio > 40. The presence of one minor predictor defines a low-risk patient.

System functions: Electronic Patient Chart>Scores and Indexes and Electronic Pre-Anesthetic Assessment

Sources:

- *Chertow GM, Lazarus JM, Christiansen CL, Cook EF, Hammermeister KE, Grover F, et al. Preoperative renal risk stratification. Circulation. 1997;95(4):878-84*
- *Sachin Kheterpal, Kevin K. Tremper, Michael J. Englesbe, Michael O'Reilly, Amy M. Shanks, Douglas M. Fetterman, Andrew L. Rosenberg, Richard D. Swartz; Predictors of Postoperative Acute Renal Failure after Noncardiac Surgery in Patients with Previously Normal Renal Function. Anesthesiology 2007; 107:892–902*
- *Aronson S, Fontes ML, Miao Y, Mangano DT; Investigators of the Multicenter Study of Perioperative Ischemia Research Group; Ischemia Research and Education Foundation. Risk index for perioperative*

renal dysfunction/failure: critical dependence on pulse pressure hypertension. *Circulation*. 2007 Feb 13;115(6):733-42

3.2.3.20.176 Post-Operative Neonatal Pain Scale (CRIES)

Description: The CRIES (Crying Requires increased oxygen administration Increased vital signs Expression Sleeplessness) scale was developed for pain assessment in infants, aged six months or less, and is widely used in the context of neonatal intensive care for postoperative neonatal pain. This scale comprises five categories (cry, oxygenation, vital signs, facial expression, and sleep) with an individual variation of 0 to 2 points per category, totaling 0 to 10 points. The higher the value, the more severe the pain.

Sources:

- *Krechel SW, Bildner J. CRIES: a new neonatal postoperative pain measurement score. Initial testing of validity and reliability. Paediatric Anaesthesia, Oxford, vol. 5, p. 53-61, 1995*

3.2.3.20.177 Post-Ureteroscopic Lesion Scale (PULS)

Description: The Post-Ureteroscopic Lesion Scale (PULS) aims to offer a simple grading system for the description of ureteral lesions after ureteroscopy. In this scale, lesions are graded independently on their location and extent. In cases of multiple lesions, the most severe lesion defines the PULS grading. The clinician can classify the patient according to six grades, which are grade 0 (No lesion), grade 1 (Superficial mucosal lesion and/or significant mucosal edema/hematoma), grade 2 (Submucosal lesion), grade 3 (Perforation with less than 50 % partial transection), grade 4 (More than 50 % but less than 100 % partial transection) and grade 5 (Complete transection, open or laparoscopic reconstruction is mandatory).

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Schoenthaler, M., Buchholz, N., Farin, E. et al. The Post-Ureteroscopic Lesion Scale (PULS): a multicenter video-based evaluation of inter-rater reliability. World J Urol 32, 1033–1040 (2014).*

3.2.3.20.178 Pulmonary Embolism Rule-out Criteria (PERC)

Description: The Pulmonary Embolism Rule-out Criteria (PERC) is a tool that can identify patients who can safely be discharged from the emergency department without further investigation for pulmonary embolism (PE). It is composed of eight “yes or no” questions which evaluate age, heart rate, SaO₂, unilateral leg swelling, hemoptysis, recent surgery or trauma, prior PE or deep vein thrombosis (DVT), and hormone use. Pulmonary embolism workup can be avoided if (1) none of the above eight variables is positive and (2) there is a less than 15% (very low) pretest probability that the patient has a pulmonary embolism. A PERC evaluation is considered positive if any one of the eight criteria are met.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *KLINE, J. A.; MITCHELL, A. M.; KABRHEL, C.; RICHMAN, P. B.; COURTNEY, D. M. Clinical criteria to prevent unnecessary diagnostic testing in emergency department patients with suspected pulmonary embolism. J Thromb Haemost 2004*
- *Kline, J. A.; Courtney, D. M.; Kabrhel, C.; Moore, C. L.; Smithline, H. A.; Plewa, M. C.; Richman, P. B.; O’Neil, B. J.; Nordenholz, K. Prospective multicenter evaluation of the pulmonary embolism rule-out criteria. J Thromb Haemost. 2008*

3.2.3.20.179 Pulmonary Risk

Description: The Pulmonary Risk identifies the risk of pneumonia in non-cardiac surgical patients, helping to guide perioperative respiratory care. It considers age and type of surgery performed such as abdominal aortic aneurysm repair, thoracic surgery, upper abdominal surgery, neck surgery, vascular surgery and neurosurgery. It also evaluates if the patient has undergone general anesthesia, if the procedure was an emergency, if the patient was transfused more than 4 units of blood, the functional status between fully dependent or partially dependent, if there was a 10% weight reduction in the last 6 months, history of COPD, history of stroke, decreased consciousness, urea value (mg/dL), chronic use of corticosteroids (regular use for 1 month), smoking and alcohol use status (2 drinks/day in the last 2 weeks). Each assigned variable has a value, and the final score is generated by the sum of all values, indicating the classification between: class I (0-15 points) and II (16-25 points) = low pulmonary risk, class III (26-40 points) moderate pulmonary risk and class IV (41-55 points) and V (> 55 points) high pulmonary risk.

System functions: Electronic Pre-Anesthetic Assessment -> Risk; Electronic Patient Chart>Scores and Indexes

Sources:

- *Ahsan M. Arozullah, et al. Development and Validation of a Multifactorial Risk Index for Predicting Postoperative Pneumonia after Major Noncardiac Surgery. Intern Med. 20 November 2001;135(10):847-857*

3.2.3.20.180 Ramsay Sedation Scale

Description: The Ramsay Sedation Scale is used to measure the level of sedation and it is the most simplistic and it is an intuitively obvious scale and therefore lends itself to universal use, not only in the ICU, but wherever sedative drugs or narcotics are given. It divides a patient's level of sedation into six categories: 1) patient is anxious and agitated or restless, or both, 2) patient is co-operative, oriented, and tranquil, 3) patient responds to commands only, 4) patient exhibits brisk response to light glabellar tap or loud auditory stimulus, 5) patient exhibits a sluggish response to light glabellar tap or loud auditory stimulus, and 6) patient exhibits no response.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Mondello E, et al. Bispectral index in ICU: correlation with Ramsay score on assessment of sedation level. Journal of Clinical Monitoring and Computing. 2002. Vol 17, No 5*
- *Nascimento JS. Clonidina na cineangiocoronariografia: efeitos sedativos sobre a pressão arterial e frequência cardíaca. Arq Bras Cardiol 2006; 87 : 603-608*
- *Ramsay MA, Savage TM, Simpson BR, Goodwin R. Controlled sedation with alphaxone-alphadone. BrMed J 1974; 2: 656-659*

3.2.3.20.181 Ranson Criteria

Description: The Ranson Criteria are used to predict the severity and mortality of patients with acute pancreatitis, and are classified into 11 parameters. Five parameters are assessed on admission, and the other six are assessed at 48 h post-admission. One point is given for each positive parameter for a maximum score of 11, such as age (years), glycemia, leukocyte count, serum LDH and serum AST. At 48 h of admission, the remaining 6 parameters are: hematocrit fall, serum calcium, base deficit, increase in BUN, fluid sequestration and PAO₂. The mortality is evaluated using the percentage of 0 to 2 criteria for 2%; 3 to 4 criteria for 15%; 5 to 6 criteria for 40% and > 6 criteria for 100%.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Ranson JH, Rifkind KM, Roses DF, Fink SD, Eng K, Spencer FC (1974). “Prognostic signs and the role of operative management in acute pancreatitis”. Surgery, Gynecology & Obstetrics 139 (1): 69-81*
- *Abu-Ehy AS, Abolfotouh MA, Nawar E, Sabib AHA. Ranson’s Criteria for Acute Pancreatitis in High Altitude: Do they Need to be Modified? Saudi J Gastroenterol. 2008 January; 14(1): 20-23*

3.2.3.20.182 Revised Piper Fatigue Scale (PFS-R)

Description: The Revised Piper Fatigue Scale (PFS-R) scale is used to assess perceived fatigue of patients with chronic disease such as cancer. It is a 22-item scale that measures four subscales: behavior (6 items), affect (5 items), sensory (5 items) and cognition/mood (6 items). Each item has 11 response categories valued from 0 to 10, with verbal descriptors anchoring the endpoints. Each subscale is scored individually and then aggregated as a mean for the overall score, which ranges from 0 to 10. The higher the score is, the greater the patient’s fatigue.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Piper BF, Dibble SL, Dodd MJ, Weiss MC, Slaughter RE, Paul SM. The revised Piper Fatigue Scale: psychometric evaluation in women with breast cancer. Oncol Nurs Forum 1998; 25 (4): 677-84*
- *Mota DDCF, Pimenta CAM, Piper BF. Fatigue in Brazilian cancer patients, caregivers, and nursing students: a psychometric validation study of the Piper Fatigue Scale-Revised. Support Care Cancer 2009; 17(6): 645-5*
- *Mota DD, Pimenta CA, Piper BF. Fatigue in Brazilian cancer patients, caregivers, and nursing students: a psychometric validation study of the Piper Fatigue Scale-Revised. Support CareCancer. 2009 Jun;17(6):645-52*

3.2.3.20.183 Richmond Agitation-Sedation Scale (RASS)

Description: The Richmond Agitation and Sedation Scale (RASS) is a validated and reliable method to assess patients’ level of sedation in the intensive care unit. Developed by a multidisciplinary team from University of Richmond, Virginia, this scale is mostly used in mechanically ventilated patients in order to avoid over and under-sedation. The RASS is a 10-point scale ranging from -5 to +4. Levels -1 to -5 denote 5 levels of sedation, starting with “awakens to voice” and ending with “unarousable.” Levels +1 to +4 describe increasing levels of agitation. The lowest level of agitation starts with apprehension and anxiety, and peaks at combative and violent. RASS level 0 is “alert and calm.” RASS scoring and interpretation should be based on the sedation protocol being used.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Antonio Paulo Nassar Junior; Ruy Camargo Pires Neto; Walquiria Barcelos de Figueiredo; Marcelo Park Validity, reliability and applicability of Portuguese versions of sedation-agitation scales among critically ill patients:*
- http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1516-31802008000400003
<https://doi.org/10.1590/S1516-31802008000400003>

- *Sessler CN, Gosnell M, Grap MJ, Brophy GT, O’Neal PV, Keane KA et al. The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care patients. Am J Respir Crit Care Med 2002; 166:1338-1344*
- *Ely EW, Truman B, Shintani A, Thomason JWW, Wheeler AP, Gordon S et al. Monitoring sedation status over time in ICU patients: the reliability and validity of the Richmond Agitation Sedation Scale (RASS). JAMA 2003; 289:2983-2991*

3.2.3.20.184 Risk Assessment Scale for the Development of Injuries Resulting from Surgical Positioning (ELPO)

Description: Risk Assessment Scale for the Development of Injuries Resulting from Surgical Positioning (ELPO) was developed and validated according to the anatomical and physiological implications of the surgical positions. The purpose of using the ELPO associated with the professional’s skill is to provide support for decision making on the best care to be implemented for each patient, with implications for the prevention of complications and for improving the quality of care provided. The ELPO evaluates seven items as follows: type of surgical position, surgery time, anesthesia type, support surface, position of the limbs, comorbidities, and patient’s age. The scale ranges from 7 to 35 points, and the higher the score, the greater the risk of developing lesions caused by the surgical positioning of the patient. Classification of the results: 7 to 19 (lower risk of lesions development); 20 to 35 (greater risk of lesions development).

System functions: Electronic Patient Chart ->Scores and Indexes

Sources:

- *Lopes CMM, Hass VJ, Dantas Ras, Oliveira CG, Galvão CM. Scale for assessment of risk for development of lesions caused by surgical positioning. Rev Latino_Am Engermagem. Forthcoming 2016.*

3.2.3.20.185 Robson Classification

Description: The Robson classification, also known as the 10-groups classification or ten groups classification system (TGCS), is a system for classifying pregnant women who undergo childbirth. It was developed to allow more accurate comparison of caesarean section rates between different settings, whether they be individual hospitals or entire regions or countries. Endorsed by the World Health Organization in 2015, it differs from other classification systems in that it accounts for all women who undergo delivery, and not just those who proceed to cesarean section. The ten mutually-exclusive groups were first described by the obstetrician Michael Robson in 2001, and are defined based on the category of the pregnancy, the woman's previous obstetric record, the course of the labor and delivery, and the gestational age at delivery: 1) Nulliparous, single cephalic pregnancy, at least 37 weeks' gestation, spontaneous labour, 2) Nulliparous, single cephalic pregnancy, at least 37 weeks' gestation, with either induced labour or a cesarean section prior to the onset of spontaneous labour, 3) Multiparous, no previous caesarean section, single cephalic pregnancy, at least 37 weeks' gestation, spontaneous labour, 4) Multiparous, no previous caesarean section, single cephalic pregnancy, at least 37 weeks' gestation, with either induced labour or a cesarean section prior to the onset of spontaneous labour, 5) Previous caesarean section, single cephalic pregnancy, at least 37 weeks' gestation, 6) Nulliparous, single breech pregnancy, 7) Multiparous, single breech pregnancy, 8) Multiple pregnancy, 9) Single pregnancy with transverse or oblique lie, and 10) Single cephalic pregnancy, 36 weeks' gestation or less. The classification is increasingly used to monitor and compare rates of caesarean section in many countries, and some further subdivisions of the ten groups have been proposed.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Robson, Michael (2001). Classification of Caesarean Sections. Fetal and Maternal Medicine Review February 2001, pp 23 – 39*
- *Vogel JP, Betrán AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J, Tunçalp Ö, Mori R, Morisaki N, Ortiz-Panozo E, Hernandez B, Pérez-Cuevas R, Qureshi Z, Gülmezoglu AM, Temmerman M; WHO Multi-Country Survey on Maternal and Newborn Health Research Network. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. Lancet Glob Health. 2015 May;3(5):e260-70. doi: 10.1016/S2214-109X(15)70094-X. Epub 2015 Apr 9. PMID: 25866355.*

3.2.3.20.186 Rockall Risk Scoring System

Description: The Rockall Risk Scoring System attempts to identify patients at risk of adverse outcome following acute upper gastrointestinal bleeding. Rockall et al. identified independent risk factors in 1996 which were later shown to predict mortality accurately. The scoring system uses clinical criteria (increasing age, co-morbidity, shock) as well as endoscopic finding (diagnosis, stigmata of acute bleeding). A convenient mnemonic is ABCDE - i.e. Age, Blood pressure fall (shock), Co-morbidity, Diagnosis and Evidence of bleeding. Total score is calculated by simple addition. A score less than 3 carries good prognosis but total score more than 8 carries high risk of mortality.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Rockall TA, Logan RFA, Devlin HB, Northfield TC. Selection of patients for early discharge or outpatient care after acute upper gastrointestinal haemorrhage. National Audit of Acute Upper Gastrointestinal Haemorrhage. Lancet. 1996; 347(9009):1138-40*
- *British Society of Gastroenterology Endoscopy Committee (2002). "Non-variceal upper gastrointestinal haemorrhage: guidelines". Gut. 51 Suppl 4: iv1–6*
- *Vreeburg EM, Terwee CB, Snel P, et al. (1999). "Validation of the Rockall risk scoring system in upper gastrointestinal bleeding". Gut. 44 (3): 331–5*

3.2.3.20.187 Roland-Morris Disability Questionnaire

Description: The Roland Morris Questionnaire is designed to assess self-rated physical disability caused by low back pain. It has 24 “yes or no” questions, related to the impact of low back pain on the patient’s life, such as use of handrails in stairs, amount of time spent lying down, difficulty turning over in bed. The score is calculated by adding up the number of items checked, and ranges from 0 (no disability) to 24 (maximum disability).

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Roland MO, Morris RW. A study of the natural history of back pain. Part 1: Development of a reliable and sensitive measure of disability in low back pain. Spine 1983; 8: 141-144*
- *Roland Morris, L. Nusbaum, J. Natour, M.B. Ferraz and J. Goldenberg. Translation, adaptation and validation of the Roland-Morris questionnaire, Brazilian Journal of Medical and Biological Research, 2001*

3.2.3.20.188 Screening Tool for Risk of Nutritional Status and Growth (STRONG)

Description: The Screening Tool for Risk of Nutritional Status and Growth (STRONG) is a nutritional screening tool used in children from 1 month to 18 years old and consists of four questions: two questions to be answered by the HCP and two by the child’s caregiver. The questions to be answered by the HCP are: is there an underlying illness with a risk of malnutrition or expected major surgery? Is the patient in a poor status as judged by subjective clinical assessment? The questions to be answered by the caregiver are: is one of the following items present (excessive diarrhea >5 times/day and/or vomiting >3 times/day; reduced food intake during the last few days; pre-existing nutritional intervention; inadequate nutritional intake due to pain)? Is there weight loss or no weight gain (infants < 1 year) during the last weeks/months?

Each positive answer assigns one point; the sum of these points identifies the risk of malnutrition and provides guidance to the HCP on needed intervention and necessary follow-up. Risk assignment is as follows: high risk (4-5 points); medium risk (1-3 points); low risk (0 points).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Rebecca E. Ling; Victoria Hedges, Peter B. Sullivan. Nutritional risk in hospitalised children: An assessment of two instruments. ESPEN (European Society for Clinical Nutritional and Metabolism) 6 (2011) e153-e157*

3.2.3.20.189 Sepsis Early Detection Tool

Description: The Sepsis Early Detection Tool supports clinicians in the early identification of inpatients with signs and symptoms of sepsis, which can influence clinical outcomes.

A previous configuration is needed in the “Sepsis” item of the “Patient Chart Settings” function to activate the tool. On the “Sepsis triggering variables” tab, the user needs to filter for “Adult sepsis” to see all variables and default configuration provided by Philips, eight Systemic Inflammatory Response Syndrome (SIRS) criteria, and 15 signs of organic dysfunction. The variables of SIRS are bradycardia, hyperthermia, hypothermia, left shift in WBC count, leukopenia, leukocytosis, low PaCO₂, and bradypnea. The types of organic dysfunction are unexplained metabolic acidosis, consciousness level impairment, acute oliguria, dyspnea or supplemental O₂ necessity, abnormalities in PaO₂/FiO₂ ratio, serum creatinine level, MAP, SAP, aPTT, international normalized ratio (INR), O₂ Sat, white blood cell count, serum bilirubin level, and platelet levels. If the institution decides not to use all 28 default variables, it can configure in the tab “Sepsis Client” the desired ones, the thresholds and, the patient’s age.

It is mandatory to configure rules using the “Clinical Decision Support – Mentor” function to activate the system alerts and notifications regarding sepsis. In the function, on the “Triggering events” tab, the user selects the option “Scores and indexes” to define the rules and actions, including professional roles and submission. Then, when an event is registered in the “Electronic Patient Chart (EPC)” function and matches all conditions defined in “Clinical Decision Support – Mentor” function, a notification is triggered to inform the event, which is validated by the clinician.

All data regarding the Sepsis Early Detection Tool is recorded in the “Sepsis” tab, on the “Scores and Indexes” item of the “EPC” function. A new record can be manually created or automatically triggered according to the rules of the user’s confirmation. Finally, the user can follow an ongoing investigation and record a medical assessment that automatically generates a new clinical note.

System functions: Electronic Patient Chart > Scores and Indexes

Sources:

- *Surviving Sepsis Campaign. Educational Videos. Surviving Sepsis Campaign Responds to Sepsis-3*
- *Roteiro de implementação de protocolo assistencial gerenciado, ILAS. 4ª edição. Nova edição: 2018 revisada e atualizada*
- *Instituto Latino-Americano de Sepse ILAS; Implementação de protocolo gerenciado de sepse: protocolo clínico. Atendimento ao paciente adulto com sepse/choque séptico; 2018*

3.2.3.20.190 Sepsis Prompt

The sepsis prompt feature aims to support a sepsis management quality initiative to prospectively screen patients for clinical indicators of the potential presence of sepsis. It is aligned with the definition of the Third International Consensus Conference, which focused on adult patients, and defines sepsis as a life-threatening organ dysfunction caused by a dysregulated host response to infection.

Patient data such as vital signs, laboratory exams, and Glasgow scale will be continuously processed by an algorithm in the HIS CDS B product to identify patients who meet the criteria for suspected sepsis. The sepsis screening prompt is triggered when at least one of the following conditions is met: a positive quick Sequential Organ Failure Assessment (qSOFA) score (2 of 3), positive Systemic Inflammatory Response Syndrome (SIRS) criteria score (2 of 4), any new antibiotic started in the last 12 h, any new culture sent in the last 12 h. If one or more of these criteria are present the system evaluates for a Sequential Organ Failure Assessment (SOFA) score that has increased by at least 2 when compared to baseline. The baseline is assumed to be zero (0) unless there is a pre-existing condition. For known pre-existing conditions, the baseline value can be adjusted manually.

NOTE In the context of this feature, all rules and calculations are processed in HIS CDS B and applicable in the context of a specific patient. For details of the rules and calculations refer to the IFU of HIS CDS B.

System functions: Clinical Panorama; Electronic Patient Chart

Sources:

- *Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA. 2016;315(8):801–810. doi:10.1001/jama.2016.0287*

3.2.3.20.191 Sequential Organ Failure Assessment (SOFA) Score

Description: The Sequential Organ Failure Assessment (SOFA) Score is used to determine the level of organ dysfunction and mortality risk in intensive care unit (ICU) patients. It is based on six organ systems: respiratory, hepatic, cardiovascular, coagulation, renal, and neurological. Each evaluation criteria ranges between 0 and 4 points and are summed up to obtain the final score. The higher the score, the greater the severity of the patient’s dysfunction and the expected mortality rate.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA. 2016;315(8):801–810. doi:10.1001/jama.2016.0287*
- *Vincent JL, Moreno R, Takala J, Willatts S et al. The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure. On behalf of the Working Group on Sepsis-Related*

Problems of the European Society of Intensive Care Medicine. Intensive Care Med. 1996 Jul;22(7):707-10

- *Vincent JL, de Mendonca A, Cantraine F, et al. Use of SOFA score to assess the incidence of organ dysfunction/failure in intensive care units: results of a multicenter, prospective study. Critical Care Medicine 1998;26:1793-1800.*

3.2.3.20.192 Spontaneous Awakening Trial (SAT)

A spontaneous awakening trial (SAT) is a daily process aiming to discontinue sedatives and narcotics if the patient meets predetermined criteria. The goal of SATs is to minimize the sedation level patients receive while maintaining comfort to improve patient outcomes. The awakening trial is preceded by an assessment of patient readiness or appropriateness.

HIS CDS B product processes six metrics based on patient information received from HIS: sedation level, use of paralytic medicines, FiO₂, O₂ Sat, respiratory rate, PEEP, and hemodynamic stability. In the “Clinical Panorama” function on the “Ventilated Patient Census” tab, the result of the SAT algorithm is displayed in two ways, an overall SAT result or each individual metric. The result is binary and indicates that either the patient is ready (green) or not ready (yellow) for SAT. In the case of the overall SAT, the patient is only considered ready if all individual metrics have a result of ready (if any metric has a result of not ready the overall result is not ready).

System functions: Clinical Panorama; Electronic Patient Chart

NOTE In the context of this feature, all rules and calculations are processed in HIS CDS B and applicable in the context of a specific patient. For details of the rules and calculations refer to the IFU of HIS CDS B.

3.2.3.20.193 Spontaneous Breathing Trial (SBT)

A spontaneous breathing trial (SBT) aims to identify patients who are candidates to begin the process of weaning from mechanical ventilation. During the trial, the mechanical ventilation is held or decreased for a period of time to determine whether the patient requires ongoing mechanical ventilation or can possibly breathe successfully without the ventilator assistance.

HIS CDS B product processes six metrics based on patient information received from HIS: sedation level, use of paralytic medicines, FiO₂, O₂ Sat, RR, PEEP, and hemodynamic stability. In the “Clinical Panorama” function on the “Ventilated Patient Census” tab, the result of the algorithm is displayed two ways, an overall SBT readiness result, or each individual readiness metric. The result is binary and indicates that either the patient is ready (green) or not ready (yellow) for SBT. In the case of the overall SBT, the patient is only considered ready if all individual metrics have a result of ready (if any metric has a result of not ready, the overall result is not ready).

System functions: Clinical Panorama; Electronic Patient Chart

NOTE In the context of this feature, all rules and calculations are processed in HIS CDS B and applicable in the context of a specific patient. For details of the rules and calculations refer to the IFU of HIS CDS B.

3.2.3.20.194 Sexual Health Inventory for Men (SHIM)

Description: The Sexual Health Inventory for Men (SHIM) is a widely used tool which aids in the screening and diagnosis of Erectile Dysfunction (ED). It is a questionnaire with five questions that evaluate the symptoms of ED and each question has 5 possible answers that range from 1 to 5 points. The result is the sum of all questions and ranges from 5 to 25, representing severe ED from 1 to 7, moderate ED from 8 to 11, mild to moderate ED from 12 to 16, mild ED from 17 to 21, and no signs of ED from 22 to 25.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Rosen RC, Cappelleri JC, Smith MD, Lipsky J, Pena BM. Development and evaluation of an abridged, 5-item version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. International Journal of Impotence Research (1999) 11, 319-326*

3.2.3.20.195 Short Alcohol Dependence Data Questionnaire (SADD)

Description: The Short Alcohol Dependence Data Questionnaire (SADD) is used to evaluate the level of alcohol dependence. It is composed of 15 questions related to the consumption of alcohol. Each item is assigned a score of 0 (never), 1 (a few times), 2 (many times), or 3 (always). The 15 items are summed for a total score that can range from 0 to 45. Total scores are interpreted as follows: range 1 to 9 (slight dependence), 10 to 19 (moderate dependence) and 20 or higher (serious dependence).

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Raistrick, D., Dunbar, G., & Davidson, R. (1983). Development of a questionnaire to measure alcohol dependence. British Journal of the Addiction, 78, 89-95*
- *Edwards, G., Marshal, E. J. & Cook, C. H. O tratamento do alcoolismo: Um guia para profissionais da saúde. P.49, Porto Alegre, RS, Artes Médicas,1999*

3.2.3.20.196 Silverman Scoring System

Description: The Silverman Scoring System is used to evaluate the breathing performance of premature infants and to predict the need for escalation of respiratory support. It uses visual depictions to evaluate five parameters of work of breathing: (1) chest retraction as compared with abdominal retraction during inhalation; (2) retraction of the lower intercostal muscles; (3) xiphoid retraction; (4) flaring of the nares with inhalation; and (5) grunting on exhalation. Each category has three choices. The overall score determines the level of respiratory distress: a score of 0 indicates no respiratory distress; scores ≥ 7 indicate impending respiratory failure and a score of 10 indicates severe respiratory distress.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Silverman, W. A, Andersen D. H. A controlled clinical trial of effects of water mist on obstructive respiratory signs, death rate and necropsy findings among premature infants. Pediatrics, [S.l.], v. 17, p. 1-10, 1956*
- *Atenção à Saúde do Recém-Nascido. Guia dos Profissionais de Saúde: problemas respiratórios, cardiocirculatórios, metabólicos, neurológicos, ortopédicos e dermatológicos. Ministério da Saúde. Volume 3, Brasília – DF, 2011*

3.2.3.20.197 Simplified Acute Physiology Score (SAPS II)

Description: The Simplified Acute Physiology Score (SAPS II) determines the clinical severity of the patient on admission to the ICU and predicts mortality rates. The point score is calculated from 12 physiological variables and 3 disease-related variables during the first 24 hours, information about previous health status and other information obtained at admission. The parameters are age, type of admission, HR (bpm), SBP (mmHg), temperature (°C or °F), GCS, PaO₂ (mmHg)/ FiO₂ (%) if on mechanical ventilation or CPAP, diuresis (L/24h), serum urea (g/L) or BUN (mg/dL), sodium (mEq/L), potassium (mEq/L), bicarbonate (mEq/L), bilirubin (mg/dL), leukocytes (count/mm³), chronic diseases, HIV diagnosis. The final score is calculated by the sum of all result weights, and ranges from 0 to 163. The percent probability of death is then calculated based in the final scores.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Gall JR, Lemeshow S, Saulnier F. A new simplified acute physiology score (SAPS II) based on a European/North American multicenter study. Jama, December 22/29, 1993 – Vol 270, N° 24*

3.2.3.20.198 Simplified Acute Physiology Score (SAPS III-28 days)

Description: SAPS III-28 days aims to estimate the patient's survival during the first 28 days following admission to the Intensive Care Unit (ICU). The variables cover characteristics of the patient before admission to the ICU (age, previous state of health, co-morbidities, patient's location before admission to the ICU and the use of therapeutic options before admission to the ICU), the circumstances of the admission to the ICU (reasons for admission to the ICU, surgery location, planning for ICU admission, surgical state and infection in the ICU), and the presence and level of physiological perturbation upon admission to the ICU (within 1 hour before or after admission). The user responds to 29 questions grouped in three boxes and in the end, according to the weight of the responses, the system calculates the probability of death in percentage during the first 28 days following admission to the ICU.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Moreno RP, et al. Modeling in-hospital patient survival during the first 28 days after intensive care unit admission: a prognostic model for clinical trials in general critically ill patients. 2008 Sep;23(3):339-48*

3.2.3.20.199 Simplified Acute Physiology Score 3 PIRO Score (SAPS 3 PIRO)

Description: The SAPS 3 PIRO score is one of several modifications of the PIRO Score aiming to predict the mortality of patients with sepsis. In 2008, Moreno created SAPS 3 PIRO, covering the "P", "I" and "R" of the PIRO concept (Predisposition, Infection, Response, and Organ dysfunction). Although SAPS 3 PIRO shares some prognostic variables with the PIRO model, it is more of a mixture of physiological and therapeutic variables, rather than being based on the presence and degree of organ dysfunction/failure, as is the case in PIRO. The user responds to 18 questions grouped in three boxes (predisposition, infection and response) and in the end, according to the weight of the responses, the system calculates the probability of death in percentage.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Rubulotta F, Marshall JC, Ramsay G, Nelson D, Levy M, Williams M. Predisposition, insult/infection, response, and organ dysfunction: A new model for staging severe sepsis. Crit Care Med. 2009;37(4):1329-35*
- *Moreno RP, Metnitz B, Adler L, Hoechtel A, Bauer P, Metnitz and SAPS 3 Investigators. Sepsis mortality prediction based on predisposition, infection and response. Intensive Care Med 2008;34:496-504.*

3.2.3.20.200 Simplified Acute Physiology Score (SAPS III)

Description: The SAPS III (Simplified Acute Physiology Score III) prognostic system allows the prediction of mortality for patients admitted to intensive care units (ICU). Twenty variables are used: age, comorbidities, days of previous hospitalization, origin, vasoactive drugs, scheduled and/or unscheduled admission, emergencies, type of surgery, reason for admission, admission to the ICU, Glasgow Coma Score, systolic frequency, blood pressure, oxygenation, temperature, leukocytes, platelets, PH, creatinine and bilirubin. The final score is calculated by the sum of all result variables, and ranges from 0 to 194. As the score increases mortality rate goes from 0 to 100%.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Aplicabilidade dos Escore Fisiológico Agudo Simplificado (SAPS 3) em Hospitais Brasileiros. Revista Brasileira de Anestesiologia. Vol. 60, nº1, janeiro a fevereiro, 2010*
- *Moreno RP, et al. SAPS 3-From evaluation of the patient to evaluation of the intensive care unit. Part 2: Development of a prognostic model for hospital mortality at ICU admission. Intensive Care Med. 2005 October; 31(10): 1345-1355*
- *Soares M., Salluh JJ. Validation of the SAPS 3 admission prognostic model in patients with cancer in need of intensive care. 2006 Nov;32(11):1839-44. Epub 2006 Sep 15*

3.2.3.20.201 SNAP-II and SNAPPE-II scores

Description: The SNAP-II and SNAPPE-II (Score for Neonatal Acute Physiology and SNAP - Perinatal Extension - II) are empirically validated disease severity and mortality risk scores for the Neonatal Intensive Care Unit (NICU). They were developed to assess the severity of newborns within the first 12 hours of admission to the NICU. SNAP II scores show the variables for results of mean blood pressure, lowest temperature, PO₂ (mmHg)/FIO₂ (%), lowest serum pH, multiple seizures, urine output (mL/kg.h), Apgar score, birth weight (g) and if small for gestational age. The score ranges from 0 to 162 providing the predicted probability of patient mortality. The higher is the score result, greater is the estimated mortality.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Richardson DK, et al. SNAP-II and SNAPE-II. Simplified newborn illness severity and mortality risk scores. J Pediatr 2001; 138:92-100*
- *Richardson DK, Phibbs CS, Gray JE, McCormick MC, Workman-Daniels K, Goldmann DA. Birth weight and illness severity: independent predictors of neonatal mortality. Pediatrics 1993; 91:969-75.*
- *Silveira RC, Schlabendorff M, Procianoy RS. Predictive value of SNAP and SNAP-PE for neonatal mortality. J Pediatr (Rio J). 2001; 77 (6): 455-60.*
- *Muktan D, Singh RR, Bhatta NK & Shah D. Neonatal mortality risk assessment using SNAPPE- II score in a neonatal intensive care unit. BMC Pediatrics Vol 19, Article number: 279 (2019)19*

3.2.3.20.202 Steward Score

Description: Steward is a scoring system that allows recording of recovery stages from general anesthesia, indicating the significant return of protective functions such as awareness, airway, body movement. Values are assigned according to level of consciousness, airway, and movement, each variable ranging from 0 to 2. The total score ranges from 0 (unresponsive, immobile patient) to 6 (fully recovered).

System functions: Perioperative Electronic Patient Chart>PACU Scores

Sources:

- *Steward DJ. A simplified scoring system for the postoperative recovery room. Can Anaesth Soc J. 1975; 22(1):111-3*

3.2.3.20.203 Stroke Data Bank (SDB)

Description: The Stroke Data Bank (SDB) is a tool to assess the probability of brain hemorrhage among patients with acute stroke based upon clinical information. It uses some demographic characteristics and risk factors as well as clinical information. The differential diagnosis between ischemic stroke and hemorrhagic stroke is a key stage for treatment in the acute phase. The assessment is performed by selecting patient's symptoms presented, considering age and gender. With the sum of all scaling criteria, it ranges from -10 to +10. Results between (-10 a +2) indicate brain hemorrhage, and (> + 2 to + 10) indicate brain infarct.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Massaro AR, Sacco RL, Scaff M, et al. Clinical discriminators between acute brain hemorrhage and infarction: a practical score for early patient identification. Arq Neuropsiquiatr. 2002; 60:185-91*
- *Caneda MAG, Fernandes JG, Almeida AG, Mugnol FE. Confiabilidade de escalas de comprometimento neurológico em pacientes com acidente vascular cerebral. Arq Neuropsiquiatr 2006;64(3-A):690-697*

3.2.3.20.204 Subjective Global Nutritional Assessment (Detsky)

Description: The Subjective Global Assessment (Detsky) was developed in 1987 for Detsky and coworkers. It is a routine evaluation method based on clinical judgment. It is used in hospitals as a questionnaire, considered simple, low cost and widely accepted in clinical practice. It consists of data describing weight loss in the last six months and changes in the last two weeks, changes in food intake, presence of significant gastrointestinal symptoms, evaluation of the patient's functional capacity, metabolic demand according to diagnosis and physical exam. The assessment is composed of three categories: history, physical exam and result.

In history, the HCP evaluates the patient's weight loss in the last 6 months and changes in the two weeks, food intake, gastrointestinal symptoms, functional capacity, main diagnosis and associated diseases, and metabolic demand. In physical examination, subcutaneous fat loss, muscle loss, ankle and sacral edema, and ascites are evaluated. For each item evaluated, must be added 0 = normal, +1 = light, +2 = moderate or +3 = severe.

Based on the characteristics of the history and physical exam, it is possible to identify the degree of the subjective global assessment and classify into a category: (A) well nourished, (B) moderately (or suspected to be) malnourished, and (C) severely malnourished.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Detsky AS, McLaughlin JR, Baker JP, Johnston N, Whittaker S, Mendelson RA, et al. What is subjective Global Assessment of nutritional status? JPEN J Parenter Enteral Nutr 1987;11(1):8-13*
- *Barbosa-Silva MCG, Barros AJD. Avaliação nutricional subjetiva: Parte 1 – Revisão de sua validade após duas décadas de uso. Arq. Gastroenterol., São Paulo, v. 39, n. 3, p. 181-187, July 2002*

3.2.3.20.205 Subjective Global Nutritional Assessment (Ottery)

Description: The Subjective Global Nutritional Assessment (Ottery) is a clinical method for nutritional assessment that considers not only body composition but also changes in physiological function. It is used to identify malnutrition in oncological patients treated in outpatient clinics and radiotherapy. It differs from other methods of nutritional assessment used in clinical practice as it encompasses not only changes in body composition, but also functional changes in the patient. The Patient-Produced Subjective Global Assessment (PP-SGA) allows a quick assessment of nutritional status, identification of symptoms of nutritional impact, facilitating the implementation of adequate nutritional therapy.

The assessment is divided into two parts: one part produced by the patient and the other completed by nutritionist, physician or nurse. The initial part of the form, produced by the patient, contains questions about recent changes in body weight, performs daily activities, changes in food intake and symptoms that influence it. The second part of the assessment is answered by the researcher (nutritionist, physician or nurse) with information about the patient's diagnosis, metabolic stress and physical examination.

Each question is scored from 0-4, according to category. At the end of the evaluation, the researcher sums the scores and defines the category A (well nourished), B (moderately malnourished or suspected malnutrition) or C (severely malnourished).

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Baure J, Capra S, Ferguson M. Use of the scored Patient-Generated Subjective Global Assessment (PG-SGA) as a nutrition assessment tool in patients with cancer. 2002 Aug;56(8):779-85.*
- *Iserning E, Bauer J, Capra S. The scored Patient-generated Subjective Global Assessment (PG-SGA) and its association with quality of life in ambulatory patients receiving radiotherapy. Eur J Clin Nutri. 2003 Feb;57(2):305-9.*

3.2.3.20.206 Subjective Global Nutritional Assessment Modified (Detsky Modified)

Description: The Subjective Global Nutritional Assessment Modified (Detsky Modified) is a routine assessment method based on clinical judgment. It is used in hospitals as a questionnaire and is considered simple, low cost and widely accepted in clinical practice. It consists of data describing weight loss in the last six months and changes in the last two weeks, changes in food intake, presence of significant gastrointestinal symptoms, evaluation of the patient's functional capacity, metabolic demand according to diagnosis and physical exam. This assessment is a modified version because there are different items evaluated, such as fasting more than 5 days, changes persistent in the diet more than 30 days, dysphagia and/or odynophagia, anorexia, distention or abdominal pain. The assessment is composed of three categories: history, physical exam and results. In history, the HCP evaluates the patient's weight loss in the last six months and changes in two weeks, food intake, gastrointestinal symptoms, functional capacity, main diagnosis and associated diseases, and metabolic demand. In physical exam, subcutaneous fat loss, muscle loss, ankle and sacral edema, and ascites are evaluated. The following scoring is used per item 0 = normal; +1= light or +2= moderate. The assessment interpretation results are well nourished (< 17 points), moderately malnourished (17-22 points); severely malnourished (> 22 points).

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Detsky AS, et al. What is Subjective Global Assessment of Nutritional Status, Journal of Parenteral and Enteral Nutr. 11:8-13, 1987*
- *Yamauti AK, et al. Avaliação nutricional subjetiva global em Pacientes Cardiopatas. Arq Bras Cardiol 2006; 87(6): 772-777*

3.2.3.20.207 SYNTAX Score

Description: The SYNTAX score is a score that evaluates the complexity and prognosis of patients undergoing Percutaneous Coronary Intervention (PCI). The SYNTAX score is the sum of the points assigned to each individual lesion identified in the coronary tree with >50% diameter narrowing in vessels >1.5mm diameter. The coronary tree is divided into 16 segments according to the AHA classification. Each segment is given a score of 1 or 2 based on the presence of disease and this score is then weighted based on a chart, with values ranging from 3.5 for the proximal left anterior descending artery (LAD) to 5.0 for left main, and 0.5 for smaller branches. The collateral vessels before 3 months, a blunt stump, a side image of bridge in the arterial, the first segment visible beyond the total occlusion, and a side branch >1.5 diameter all receive one point. For trifurcations, one diseased segment gets three points, two diseased segments get four points, three diseased segments get five points, and four disease segments get six points. For bifurcation lesions, one point is given for types A, B, and C; two points are given for types D, E, F, and G; and one point is given for an angulation >70 degrees. Additionally, an aorto-ostial lesion is worth one point, severe tortuosity of vessel is worth two points, lesion length greater than 20 mm is worth one point, heavy calcification is worth 2 points, thrombus is worth 1 point, and diffuse disease or small vessel is at 1 point per segment involvement. For multiple lesions less than three reference vessel diameters apart, these are scored as a single lesion. However, at distances greater than three vessel diameters, these are considered separate lesions. Segments in which bifurcations are evaluated are those involving the proximal LAD and left main, the mid LAD, the proximal circumflex, mid circumflex, and crux of the right coronary artery. With regard to trifurcation lesions, these also are additive in number of segments involved. The SYNTAX score algorithm then sums each of these features for a total SYNTAX score. A computer algorithm is then queried and a summed value is produced. A higher SYNTAX score indicates a more complex condition as well as worse prognosis in patients undergoing contemporary revascularization especially with PCI. Among patients with complex Coronary Artery Disease (CAD), Coronary Artery Bypass Grafting (CABG) remains as the standard of care for patients with high (≥33) or intermediate (23–32) SYNTAX scores, whereas PCI is an acceptable alternative in patients with less complex disease (SYNTAX score ≤22).

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Sianos G, Morel MA, Kappetein AR, et al. The SYNTAX score: an angiographic tool grading the complexity of coronary artery disease. EuroInterv. 2005;1:219-227*
- *Mohr FW, Morice MC, Kappetein AP, et al. Coronary artery bypass graft surgery versus percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease: 5-year follow-up of the randomised, clinical SYNTAX trial. Lancet 2013;381:629–38*

3.2.3.20.208 Therapeutic Intervention Scoring System (TISS-10)

Description: The Therapeutic Intervention Scoring System (TISS-10) is a score that assesses nursing workload of ICU patients, partially allocated in the German system of Diagnosis Related Groups (DRG). Ten items are evaluated: mechanical ventilation, vasoactive medication, fluid intake, peripheral catheter, left

atrial/pulmonary catheter, dialysis/filtration, intracranial pressure measurement, acidosis/alkalosis treatment, ICU interventions, and outside ICU interventions. The total score is the sum of the weight of all items, from 0 to 47. The higher the score result, the greater the patient's nursing workload demand.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Guenther, U., Koegl, F., Theuerkauf, N. et al. Pflegeaufwandsindizes TISS-10, TISS-28 und NEMS. Med Klin Intensivmed Notfmed 111, 57–64 (2016)*

3.2.3.20.209 Therapeutic Intervention Scoring System-28 (TISS-28)

Description: The Therapeutic Intervention Scoring System-28 (TISS-28) is a score that allows measuring the nursing workload in Intensive Care Units (ICU) and estimating the severity of disease. The score consists of 7 categories: basic activities, cardiovascular support, ventilatory support, renal support, neurologic support, metabolic support, and specific interventions. Each category has specific scores according to its variables (1, 2, 3, 4, 5 or 8 points), and they are all summed up to obtain final score. Scores < 20 represent physiologically stable patients requiring prophylactic observation, scores from 20 to 35 represent physiologically stable patients, but requiring intensive nursing care and continuous monitoring, scores from 35 to 60 represent hemodynamically serious and unstable patients, and scores > 60 represent patients with compulsory indication as admission in ICU with continuous and specialized medical and nursing care.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Miranda DR et coll. Simplified Therapeutic Intervention Scoring System: The TISS-28 items. Results from a multicenter study. Crit Care Med. 1996; 24: 64-73*
- *Moreno R, Morais P. Validation of the simplified therapeutic intervention scoring system on an independent database. Intensive Care Med. 1997; 23: 640-644*

3.2.3.20.210 Timed Up and Go (TUG)

Description: The Timed Up and Go (TUG) test was proposed by Podsiadlo and Richardson in 1991 and aims to assess mobility, balance, walking ability, and fall risk in older adults. and the test times a patient as they progress from sitting to standing and walking, turning and returning to sit again. The assessment is determined by the time evaluated in seconds, where 10 seconds or less indicate normal mobility, 11 to 20 seconds are within normal limits for frail elderly and disabled patients, and greater than 20 seconds means the person needs assistance and indicates further examination and intervention may be needed.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Podsiadlo D, Richardson S. The Timde Up and Go: a test of basic functional mobility for frail elderly persons. Journal of American Geriatrics Society, v. 39, p. 142 – 148, 1991*
- *Cabral CLL. Tradução e validação do teste Time Up and Go e sua correlação com diferentes alturas da cadeira. Pró-Retirota de Pós Graduação e pesquisa Scrictosensu em gerontologia. Brasília – DF, 2011*

3.2.3.20.211 TIMI Risk Score

Description: The TIMI Risk score for non-ST segment elevation myocardial infarction is a prognostication scheme that categorizes a patient's risk of death and ischemic events and provides a basis for therapeutic decision making. Seven variables are assessed: age, risk factors for coronary arterial disease (CAD), use of

aspirin in prior 7 days, prior coronary stenosis of 50% or more, ST-segment deviation on electrocardiogram at presentation, at least 2 anginal events in prior 24 hours, and elevated serum cardiac markers. The result is obtained by the assignment of value of 1 when a factor was present and 0 when absent, and summing the number of factors present to categorize patients into risk strata. The score ranges from 0 to 7, higher scores represent higher rates of all-cause mortality, myocardial infarction and urgent revascularization.

The TIMI Risk score for ST-segment elevation myocardial infarction (STEMI) is an assessment tool for triage and management of fibrinolytic-eligible patients with STEMI, and for predicting 30-day mortality in these patients. Eight variables are assessed: age (2 points if age 65-74 years, 3 points if ≥ 75 years), history of diabetes or hypertension or angina (1 point), systolic blood pressure < 100 mmHg (3 points), heart rate > 100 bpm (2 points), Killip score between II-IV (2 points), weight < 67 kg (1 point), anterior ST segment elevation or left bundle branch block at presentation (1 point), and time to initiation of treatment > 4 hours (1 point). The result is the sum of all points, higher scores represent higher 30-day mortality rates.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *The TIMI Risk Score for Unstable Angina/Non-ST Elevation MI. A Method for Prognostication and Therapeutic Decision Making.* Elliott M. Antman, MD; Marc Cohen, MD; Peter J. L. M. Bernink, MD; Carolyn H. McCabe, BS; Thomas Horacek, MD; Gary Papuchis, MD; Branco Mautner, MD; Ramon Corbalan, MD; David Radley, MS; Eugene Braunwald, MD. JAMA. 2000;284(7):835-842
- *TIMI Risk Score for ST-Elevation Myocardial Infarction: A Convenient, Bedside, Clinical Score for Risk Assessment at Presentation.* An Intravenous nPA for Treatment of Infarcting Myocardium Early II Trial Substudy. David A. Morrow, MD; Elliott M. Antman, MD; Andrew Charlesworth, BSc; Richard Cairns, BSc; Sabina A. Murphy, MPH; James A. de Lemos, MD; Robert P. Giugliano, MD; Carolyn H. McCabe, BS; Eugene Braunwald, MD. Circulation 2000; 102: 2031-2037

3.2.3.20.212 Tinetti-test

Description: The Tinetti-test assesses gait and balance in older adults and assesses perception of balance and stability during activities of daily living and fear of falling. It is also called Performance-Oriented Mobility Assessment (POMA). It is a very good indicator of the fall risk of an individual. It has better test-retest, discriminative and predictive validities concerning fall risk than other tests including Timed Up and Go test (TUG), one-leg stand and functional reach test. It is used in various settings e.g. those diagnosed with Multiple Sclerosis, Parkinson's Disease, acquired brain injury, spinal cord injury, stroke and the elderly population. The Tinetti test has a gait score and a balance score. It uses a 3-point ordinal scale of 0, 1 and 2. Gait is scored over 12 and balance is scored over 16 totaling 28. The lower the score on the Tinetti test, the higher the risk of falling: ≤ 18 high risk of fall, 19-23, moderate and ≥ 24 low.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Tinetti ME, Williams TF, Mayewski R, Fall Risk Index for elderly patients based on number of chronic disabilities.* Am J Med 1986;80:429-434
- *Berg KO, Wood-Dauphinée SL, Williams JI, Maki B.* Measuring balance in the elderly: validation of an instrument. Can J Public Health.1992;83(suppl 2) :S7– S11.
- *Shumway-Cook A, Woollacott MH.* Motor control: translating research into clinical practice. Philadelphia : Wolters Kluwer, 2016.

3.2.3.20.213 Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS)

Description: The Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS), developed in the early 1990s, is a composite scale used to measure three aspects of cervical dystonia: severity, disability, and pain. The severity sub score is a maximum of 35 and consists of 11 items scored on scales ranging from either 0 to 1, 0 to 3, 0 to 4, or 0 to 5, also emphasizing the duration of the symptoms by weighting them with a factor of 2. The disability sub score has a maximum of 30 and consists of six items scored on scales from 0 to 5. Finally, the pain sub score has a maximum of 20 and consists of three patient-rated items, two of which are scored on a range from 0 to 5, while the third depends on patients' score of their usual pain (factored by 2), worst pain, and best pain, on a range of 0 to 10, all divided by 4 to reach a total ranging from 0 to 10. TWSTRS total score falls within the range of 0 to 85, where a higher score indicates a more severe condition.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Consky ES, Lang AE. Clinical assessments of patients with cervical dystonia. In: Jankovic J, Hallett M, eds. Therapy with Botulinum Toxin. New York, NY: Marcel Dekker, Inc.: 1994;211-237*
- *Tarsy D. Comparison of clinical rating scales in treatment of cervical dystonia with botulinum toxin. Mov Disord. 1997 Jan;12(1):100-2*
- *Sekeff-Sallem FA, Caramelli P, Barbosa ER. Cross-cultural adaptation of the Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS) to Brazilian Portuguese. Arq Neuropsiquiatr 2011;69(2-B):316-319*

3.2.3.20.214 Toxicity Scale

Description: The Toxicity Scale is used for assessing the toxicity of the treatment with antineoplastic treatment. The monitoring is performed at the beginning of the treatment and aims to ensure that the organism can withstand the toxic effects. The level of toxicity varies between 0 and 4, with level 0 for no changes and level 4 for maximum change in accordance with the sign, symptom, and laboratory result. Some adverse effects according to compromised systems can be related to toxicity, such as: hematological, cardiac, neurological, vesical, and renal, gastro-intestinal, dermatological, hepatic, in addition to reproductive and metabolic dysfunction.

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *INCA – Instituto Nacional de Câncer, Brazilian Ministry of Health, 2021 (<https://www.inca.gov.br>)*
- *Saad EV, et al. Critérios comuns de toxicidade do instituto nacional do câncer dos Estados Unidos. Revista Brasileira de Cancerologia, 2002. 48(1): 63-96*

Visual Analogue Scale

Refer to the feature “Vital signs and clinical parameters” in the IFU of HIS document.

3.2.3.20.215 Venous Thromboembolism(VTE) Risk Assessment Tool

Description: The Venous Thromboembolism (VTE) Risk Assessment Tool aims to stratify clinical and surgical patients with risk for VTE and adequacy of prophylaxis. The assessment includes age, weight, height, reduced mobility, and creatinine clearance. Then, after assessing and selecting the risk conditions, the user identifies chemo and mechanical prophylaxis counter-indications. According to the conditions selected, the system suggests the risk classification as high, intermediate, low or not applicable and suggests the proper

prophylaxis. Specifically for surgical patients the user must select surgery complexity as high, minor or other. The user can accept or not the risk classification and the suggested prophylaxis, adding justification and notes. The institution can also customize alternative responses to each therapeutic suggestion available in the system.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Guyatt GH, Akl EA, Crowther M, Gutterman DD, Schönemann HJ, for the American College of Chest Physicians. Executive Summary Antithrombotic Therapy and Prevention of Thrombosis Panel Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. CHEST/141/2/FEBRUARY, 2012 SUPPLEMENT*
- *Kahn SR, Lim W, Dunn AS, Cushman M, Dentali F, Akl EA, Cook DJ, Balekian AA, Klein RC, Le H, Schulman S, Murad MH. Prevention of VTE in Nonsurgical Patients Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. CHEST/141/2/FEBRUARY, 2012 SUPPLEMENT*
- *Gould MK, Garcia DA, Wren SM, Karanicolas PJ, Arcelus JJ, Heit JA, Samama CM. Prevention of VTE in Nonorthopedic Surgical Patients Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. CHEST/141/2/FEBRUARY, 2012 SUPPLEMENT*
- *Falck-Ytter Y, Francis CW, Johanson NA, Curley C, Dahl OE, Schulman S, Ortel TL, Pauker SG, Colwell Jr CW. Prevention of VTE in Orthopedic Surgery Patients Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Prevention of VTE in Orthopedic Surgery Patients*
- *Geerts WH, Bergqvist D, Pineo GF, et al. Prevention of venous thromboembolism. ACCP Evidence-Based Clinical Practice Guidelines (8th Edition). Chest 2008;133:381S-453S.*

3.2.3.20.216 Ventilatory Weaning Index (Ferrari-Tadini)

Description: The Ventilatory Weaning (Ferrari-Tadini) Index aims to analyze and guide the ventilatory weaning of critically ill patients admitted to the Intensive Care Unit (ICU) with Acute Respiratory Distress Syndrome (ARDS) who need tracheal intubation. Ventilatory weaning is the process of transition from artificial ventilation to spontaneous ventilation in patients who remain on invasive mechanical ventilation for more than 24 hours. The Ventilatory Weaning Index consists of 10 parameters: Glasgow scale, tidal volume (ml/kg), FiO₂ (%), PaO₂ (mmHg), PaCO₂ (mmHg), respiratory rate (cycles/min), O₂ Sat (%), inspiratory pressure (cmH₂O), support pressure (cmH₂O) and age. These parameters range from 1 to 3 and the sum may reach a score ranging between 0 and 30 classifying the Ventilatory Weaning index in categories: I (indicated - 27-30), II (favorable - 23-26), III (unfavorable - 20-22) and IV (contraindicated <19).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Nemer SN, Barbas CSV. Índices de desmame: o que devemos saber? Pulmão RJ 2011;20(3):24-28*
- *Ferrari D, Tadine R. Índice de desmame ventilatório: IDV Ferrari-Tadini [online]. [Http://www.sobрати.com.br/trabalho3-jan-2004.htm](http://www.sobрати.com.br/trabalho3-jan-2004.htm).*

- *Miranda JEO, et al. Eficácia do Índice de Desmame Ventilatório Ferrari-Tadini em uma Unidade de Terapia Intensiva de um Hospital de Fortaleza/CE. Fisioterapia Brasil - volume 12 - número 3 - maio/junho 2011*

3.2.3.20.217 Verbal category Pain Scale

Description: Refer to the feature “Vital signs and clinical parameters calculation” of this document.

3.2.3.20.218 Visual Numeric Pain Scale

Description: Refer to the feature “Vital signs and clinical parameters calculation” of this document.

3.2.3.20.219 Wagner-Meggitt classification

Description: Developed in 1970, the Wagner-Meggitt classification (also referred as Meggitt-Wagner or only Wagner) is used to assess the severity of injuries related to the diabetic foot with six grades of lesions. The first four grades (grades 0, 1, 2, and 3) are based on the physical depth of the lesion in and through the soft tissues of the foot. The last two grades (grades 4 and 5) are completely distinct because they are based on the extent of gangrene and lost perfusion in the foot (grade 4 refers to partial foot gangrene and grade 5 refers to a completely gangrenous foot).

System functions: Electronic Patient Chart>Scores and Indexes

Sources:

- *Armstrong DG, Lavery LA, Harkless LB. Validation of a diabetic wound classification system. The contribution of depth, infection, and ischemia to risk of amputation. Diabetes Care. 1998 May;21(5):855-9*
- *Levin ME. Classification of diabetic foot wounds. Diabetes Care 1998; 21:681-2*
- *Oyibo SO, Jude EB, Tarawneh I, Nguyen HC, Harkless LB, Boulton AJ. A comparison of two diabetic foot ulcer classification systems: the Wagner and the University of Texas wound classification systems. Diabetes Care. 2001 Jan; 24(1):84-8*

3.2.3.20.220 Waterlow Score

Description: Developed in 1985 and revised in 2005, the Waterlow Score predicts the risk of developing pressure ulcer or sores based on patient characteristics, medication or special risks. The score includes clinical categories (body mass index, skin condition, sex, age, nutritional status, continence condition, and mobility), and special risk factors (tissue malnutrition, medication, major surgeries or trauma, and neurological deficit). Each category has a set value of points, and the total score is represented by the sum of all categories. A score < 10 represents little to no risk, scores 10-14 represent patients at risk of developing pressure ulcer, scores 15-19 represent high risk, and scores > 19 represent patients at a very high risk.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- *Waterlow, J. Pressure sores: a risk assessment card. Nursing Times, 1985. 81(48): p. 49-55. Revised 2005.*

3.2.3.20.221 Wells Score for Pulmonary Thromboembolism

Description: Wells Score for Pulmonary Thromboembolism comprises a clinical prediction model that stratifies patients for risk of pulmonary embolism (PE) and provides estimated pre-test probability. The clinical variables are history and probability of thromboembolism, heart rate, immobilization, presence of hemoptysis and active malignant disease. The final result corresponds to three risk groups: low risk (0-1 points), moderate risk (2-6 points), and high risk (> 6 points).

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Wells PS, ET AL. *Excluding pulmonary embolism at the bedside without diagnostic imaging: management of patients with suspected pulmonary embolism presenting to the emergency department by using a simple clinical model and d-dimer.* Source Division of Hematology, The Ottawa Hospital, Civic Campus, Suite 452, 737 Parkdale Avenue, Ottawa, Ontario K1Y 1J8, Canada. *Ann Intern Med.* 2001 Jul 17;135(2):98-107
- Volschan A. *Diretriz de Embolia Pulmonar. Arquivos Brasileiros de Cardiologia – Volume 83, Suplemento I, agosto 2004*

3.2.3.20.222 Withdrawal Assessment Tool – Version 1 (WAT-1)

Description: Withdrawal Assessment Tool – Version 1 (WAT-1) is used to assess and monitor opioid and benzodiazepine withdrawal symptoms in pediatric patients due to prolonged exposure. The main objective of this tool is to improve the detection and treatment of withdrawal symptoms before they compromise the patient’s clinical condition. WAT-1 advises the HCP to continue the assessment twice a day for up to 72 h after the last dose of the opioid and/or benzodiazepine. The assessment includes four steps: patient information in the previous 12 h (stools aspect, vomiting/retching/gagging and temperature), 2 min pre-stimulus observation (state, tremor, sweating, movements, yawning/sneezing), 1 min stimulus observation (startle to touch and muscle tone), and post-stimulus recovery (time to gain calm state). The three first steps score 0 to 1 point, and the last step scores 0 to 2 points. The total score ranges from 0 to 12. Higher scores represent higher intensity of withdrawal symptoms.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Franck L S, Harris S K, Soetenga D J, et al. *The Withdrawal Assessment Tool – Version 1 (WAT-1): an assessment instrument for monitoring opioid and benzodiazepine withdrawal symptoms in pediatric patients.* *Pediatr Crit Care Med.* 2008 November; 9(6): 573-80. DOI:10.1097/PCC.0b013e31818c8328

3.2.3.20.223 Yesavage Geriatric Depression Scale – Short Version (GDS-15)

Description: Yesavage Geriatric Depression Scale – Short Version (GDS-15) is used for diagnosing depression in elderly patients. It consists of 15 “Yes” or “No” questions regarding depression symptoms, and each “Yes” response contributes with one point to the total scale. A final scale of 5 or more points indicates depression, and a scale equal to or greater than 11 characterizes severe depression.

System functions: Electronic Patient Chart -> Scores and Indexes

Sources:

- Almeida OP, Almeida AS. *Confiabilidade da versão brasileira da Escala de Depressão em Geriatria (GDS) versão reduzida.* *Arq Neuro-Psiquiatr.* 1999; 57:421-6
- Ferrari JF, Dalacorte RR. *Uso da Escala de Depressão Geriátrica de Yesavage para avaliar a prevalência de depressão em idosos hospitalizados.* *Scientia Medica, Porto Alegre, v. 17, n. 1, p. 3-8, jan./mar. 2007*
- Souza MCMR, Paulucc TD. *Análise da sintomatologia depressiva entre idosos institucionalizadas. R. Enferm. Cent. O. Min.* 2011 jan/mar; 1(1):40-46

3.2.3.21 Meaningful summaries

This feature aims to support the configuration and viewing of relevant patient information in a summarized way to be consumed by healthcare professionals during the diagnosis and treatment processes. They aim to show concise and updated descriptions of the patient's health, considering different clinical contexts, all at a glance on a single screen.

The "Electronic Patient Summary" function can be accessed through the "Electronic Patient Chart" or the "Clinical Panorama" functions.

Models may be configured for different specialties such as oncology, cardiology, emergency department, or even for specific diseases such as pneumonia, stroke and myocardial infarction. Different clinical stakeholders may use it, mainly nurses and physicians, in different moments of the workflow, including the shift handover, video evaluation (telehealth), patient transfer, or discharge.

It plays an important role enabling the patient care continuum, providing quick access to relevant patient information, and communication between stakeholders. Through the "Patient Chart Settings" function, it is possible to configure different models to be used by clinicians according to defined user access privileges. For each model, it is possible to configure its content, such as problem list, clinical notes, laboratory exams and image results, medicines, treatments, surgeries, recommendations, and other suitable information. For each content, it is possible to set out-of-bounds values, when applicable, and present them in numerical, graphical, and text format in a single view.

The "Electronic Patient Summary" presents also a specific decision support functionality related to early detection of sepsis (suspected sepsis) when HIS is integrated with HIS CDS B. A patient whose data triggers an alert for the potential presence of sepsis has a suspected sepsis icon in the header of the "Infectious diseases" tile on the screen. To access the current sepsis information, click on the ellipsis in the upper right corner of the tile for the options menu, and select the sepsis option.

NOTE The information for clinical decision support related to suspected sepsis in this feature is processed in HIS CDS B, based on data of a specific patient.

NOTE HIS solely sends the pertinent data (such as heart rate, respiratory rate and other measurements) and shows the calculation results to the user.

3.2.4 Surgical and anesthesia clinical records charting and view

A subgroup of features related to the patient before, during and after the surgical and anesthesia procedures.

3.2.4.1 General surgical charting

This feature supports the configuration, recording, and viewing of the information managed by healthcare professionals such as surgeons, anesthesiologists, and nurses related to surgical and anesthesia procedures.

Several pieces of information related to general surgical charting must be preconfigured in the "Perioperative Item Settings" function, such as patient positions, demarcations, time and motions, and vital signs. The sorting and availability of the items in the patient tree are defined in the "System Administration" function.

The "PEPC" is a function that supports healthcare professionals managing information during the preoperative, intraoperative, and postoperative phases. This function brings all surgery-related information such as surgical team, times and movements, surgical delays, clinical parameters, and medicines. In addition

to that, the ones coming from other functions, such as scheduling, pre-anesthetic assessment, and patient health history.

Firstly, the user can access the surgical schedule, the daily operation room census, and completed surgeries. Then, after selecting a patient, the user can record structured surgical-related information, such as site demarcation, asepsis, incision, dressings, positions, vital signs and clinical parameters, materials, equipment, medicines, anesthetic agents, fluid therapy, blood products, and cavity control. For more accuracy and agility, materials and medicines can be input using barcode readers. Finally, the item expenses summary consolidates all material and medicines used in the procedure, for billing purposes review.

To streamline the recording process, reduce the time and the effort for the documentation, and improve the quality, interfaces with monitors, equipment, and image systems are also available.

After completing the surgery process, a complete report can be generated according to the previous configuration in the Report Management function.

For anesthesia charting, anesthesia report, surgical report, time and motions, surgical and anesthesia materials, instruments, and equipment, please refer to the further dedicated instructions of use.

3.2.4.2 Pre-anesthesia assessment

This feature supports the pre-anesthesia process regarding the of the patient risk documentation such as medication in use, diseases and allergies.

Using the “EPAA” function, the anesthesiologist documents the information collected during the interview and the patient’s physical examination before the procedure.

Main elements of the Pre-Anesthesia assessment include patient’s health history, previous anesthesia and procedures, drug and allergies, airway and dental evaluation, scores and indexes, and anesthesia warnings, particularly those that may suggest potential complications or contraindications to the planned procedure (e.g., difficult airway or coagulopathy). It is possible to configure a personalized template of pre-anesthesia assessment and assign it to a surgery, instead of using the standard process.

The information generated in the “EPAA” function can be viewed in the “PEPC”.

3.2.4.3 Anesthesia charting

This feature allows the user to configure, record, chart, and view the information related to the anesthesia process in a single graphical screen.

The “PEPC” function allows the user to record specific anesthetic information such as vital signs, anesthesia parameters, input and outputs, anesthetic gases and fluids, drugs and dripping rates so it can be viewed in a consolidated screen.

Several surgery models can be configured in the “Perioperative Items Settings” function to be viewed in the “PEPC” function. Each model has a different set and sorting of variables, for example, vital signs and clinical parameters. In addition, the user can change the surgery models at any time during the procedure, record the necessary information and view the clinical data displayed in each section.

To access the anesthesia chart, open the “PEPC” function, select the patient, and click the right-mouse option “Graph”. Enable dark mode using function parameters. It is possible to select a pre-configured model, sorted by filter, and view the anesthetic information in the graphical screen. Vital signs data and clinical parameters can be obtained from an external source via an interface, or the user can manually input into the system. Using the anesthesia graph, the clinician can add or edit vital signs range scale, justify the administration of a drug with an inconsistency detected by the system, assign infusion pump for a drug and

analyze patient's data in a tabular and graphical single view. Other information related to equipment, infusion pump status, change of infusion rate, anesthetic technique, and patient devices can be accessed from the same "Graph" screen. The mentioned items are recorded and presented in the respective item of the "PEPC".

To maintain the continuum of care, the clinician can upload current ordered items in CPOE into the anesthesia graph such as medicines, infusions and blood products, as well as send to CPOE medications administered during the surgery. In addition, it is also possible to import patient's devices from ICU to be available into the anesthesia graph. The physician can access the "Surgery Review" function to review, record or update information related to the anesthetic procedure such as anesthetic technique, patient devices, vital signs, anesthetic agents, solutions, medicines, blood products, surgical events, intakes, and outputs. The user can access this function via "PEPC" or directly from the anesthesia chart.

To enable anesthesia care delivery and documentation outside the surgical theatre, for short-time procedures, and others, such as cardioversion, colonoscopy, and endoscopy, the use of an alternative function, called "Patient Anesthetic Form", is recommended. The physician can record information related to the anesthetic procedure in the same way, using the same configurations from "PEPC", such as materials, equipment, instruments, anesthetic agents, and time and motions.

3.2.4.4 Anesthesia report

This feature supports the configuration, recording, and viewing processes of anesthetic reports.

Different kinds of information used during the anesthesia process can be preconfigured in the "PEPC" settings. In addition, the user can configure standard texts for them or the institution and structured complications.

The "PEPC" function allows the user to record anesthetic information, such as the anesthetic technique, description, and complications. The user selects the anesthesia type(s) with proper description(s), defines as the main one, enters additional description, and can use the preconfigured standard texts. In addition, the anesthetist can document the patient's anesthetic complications related to the procedure. According to the information selected in the filter, it is possible to select one or more complications with proper comments.

3.2.4.5 Surgical report

This feature supports the configuration, recording, and viewing processes of surgical reports. The surgery report describes the surgical procedure, including the technique, surgical findings, observations, incidents, and complications.

Using the item "surgery report" in the "PEPC" function, the physician defines the surgical diagnosis and procedures codes. According to the previous configuration, the user can select and insert standard text for each procedure.

It is also possible to record structured related information in separated fields, such as complexity level, topography, blood loss control, operative findings, surgical complications, duration, and participants.

There is an option to record additional procedures to the same surgery report.

3.2.4.6 Surgical and anesthesia materials, instruments and equipment

This feature supports the users in configuring and using the surgical and anesthesia materials, instruments, and equipment, such as electric scalpel, hemostat, suction pumps, catheters, tubes, drains, and needles.

To configure the items above, the user needs to use the "Perioperative Items Settings" function. The user can define protocols, order sets according to procedures, and physician preferences such as equipment and

materials linked to the procedure. In addition, for billing purposes in the item “Equipment Fee”, the user can define equipment rules by area, group and specialty.

In the “Materials” tab, the user can also configure the information related to the surgical and anesthesia materials, for example, the description name, display sequence, define their color in the anesthesia graph, and the professional to whom the material can be provided.

In the “PEPC” function, the user can select the preconfigured equipment and materials during the procedure, entering additional information such as quantity, topography, side, start, and end of use. In addition, some information about the materials and equipment can be entered using barcode readers.

Beyond the use in the “PEPC” function, this feature configuration data is also used in the “Patient Anesthetic form”, “EPC”, “Surgeons Schedule”, and “Surgical Schedule Management” functions.

3.2.4.7 Surgical time and motion

This feature supports the configuration, recording, and hierarchy of the surgical and anesthetic workflow steps in a time and rule-based perspective.

A typical example of a steps sequence involving a surgical procedure includes patient enters into the operation room, the anesthetic procedure starts, the surgical procedure starts, the surgical procedure ends, the anesthetic procedure ends, the patient exits from the operation room, and the patient arrives in the recovery room.

Using the “Perioperative Items Settings” function, the user can define the event label description, chronological sequence, actions and steps involved, dependency event, number of repetitions, surgery status triggered by events, and the submission and release rules by profile. In addition, other information can be configured in the same function, such as surgery events related to the administration of anesthetic agents, patient department movement, room change, interface with equipment, and surgery protocols.

The times and motions are displayed in the “Electronic Perioperative Patient Chart” function, where they can be manually or automatically recorded. In addition, the user can edit or even retrospectively enter the data before the final submission. This time and motion information is also available in another function, the “Patient Anesthetic Form”, based on the same configuration settings. For more details about “Patient Anesthetic Form”, refer to the Anesthesia Charting feature.

3.2.5 Specific nursing processes

A subgroup of features related to processes handled by nursing staff.

3.2.5.1 Nursing assessment, diagnosis and intervention system

This feature presents structured and standardized information to clinical users (E.g. physicians) when composing a care plan record for a patient.

A care plan workflow consists of the following workflow steps: perform the clinical assessment and define diagnoses/problems, goals, and interventions.

The clinician can access the “EPC” function, select the item related to care plan processes, add a new record and follow the workflow steps of the supporting tools.

The primary system functions associated with this feature for configuration purposes are the “Nursing Records” and “Patient Chart Settings”. They support the user to configure the clinical content or to import it from external libraries.

The interventions are sent to the “e-MAR” function to be appropriately managed and checked. The professional can review and manage the patient care plan whenever necessary, reassessing each of the steps.

3.2.5.2 Wound, dressing and healing process

This feature allows the nursing staff to configure, record, and manage patient's wounds and dressings recording processes.

The institution needs to configure the wound recording processes in the "Core Tables Settings" function. According to each one, additional information is required such as type of wound, classification, format, location, and human body drawing. In addition, each dressing assessment contains items with possible results, such as length, depth, width, exudate, and tissue with its characteristics.

The user can record information about wounds and dressings occurring at any time during the care process. The main functions associated with recording wounds are the "EPC", "Electronic Outpatient Chart", "PEPC", "Care Plan", and "Patient Anesthetic Form". After selecting the patient, the user can access the "Wounds and dressings" item to record and manage the wound's care. The clinical user has several options to record wound information, such as selecting characteristics, performing an assessment or structured form, recording the materials used, defining nursing interventions according to the wound condition and progress, suggesting types of dressings for each wound, and uploading photos or drawing images. In the "wounds and dressings" tab, the user can add a new record informing the start date, wound location, type, classification format, presence of pain and pain location, if admitted with wound, previous and social history, comorbidities, tissue type, type of secretion, and discharge information.

For each wound recorded, the user can add new dressing records at any time, selecting preconfigured characteristics to each item, informing the current status or stage of the lesion. In addition, for each dressing record, it is possible to inform the materials used. The "Assessment" tab is used when the institution configures specific forms to assess wounds. Guidelines can be created to provide some instructions about the wound dressing. The user can add photos, capture an image, or select a file for each wound recorded. Human body images may be recorded via the "Images" tab, where the user can add a new record selecting a preconfigured image and defining areas with lesions.

In the "Care Plan" function, during the anamnesis and physical examination processes, the nurse can select the wound type and proceed with the wound record, use the human body drawing, and select the human area to record the main wound's characteristics. After submitting the record, the information can be viewed and managed in the "Wounds and dressings" item of the "EPC" function.

3.2.5.3 Tubes, lines and devices management

This feature supports the management of patient's medical devices, tubes, catheters, and lines. Their use can be temporary or permanent and needs to be carefully followed up by the care team.

The function "Devices Record" supports the user configuring information related to insertion, placement, replacement or removal of devices. In this function, the user can configure for each device, details such as caliber, anatomical topography, duration, specific instructions, and the reason for removal. In addition, the user can link devices to dressings, events, procedures, assessments, clinical protocols, alerts, and clinical notes.

During the clinical workflows, the "Devices Used by the Patient" function interacts, as an external call, with several other clinical functions, such as "EPC", "PEPC", "Patient Anesthetic Form", "Clinical panorama" and "e-MAR".

For example, in the "EPC" and the "PEPC" functions, the user can update and check the details of all patient devices and print reports. In addition, based on the previous configuration, the care team may receive updates in the "e-MAR" function regarding the status of the devices installed and can set programmed interventions related to it.

3.2.5.4 Duty personnel definition and shift handover

This feature supports the processes related to allocation of the healthcare professional responsible for the patient during the work shifts and the recording of the information exchanged during the shift handover.

Accessing the “Admission departments” item and selecting the name of the department in the “EPC” function, the user can view the list of patients in the department. The user can visualize the main patient’s information identifying the professionals responsible for each patient in the department.

Before defining the responsible professional for each patient, the professional uses assessments, and scales to identify accurate data about patient care complexity, according to pre configurable assessments and scales done by the institution.

Considering each patient care complexity, the professional can define the name of the HPC who will be responsible for each patient. Using the “EPC” function selecting the “Specify employee responsible for patient” item and using the right-click mouse option to open the “Professional Scheduling Management” function, to perform and manage the professionals responsible for the patient.

After selecting the department and viewing the patients, the user can select and define the professional responsible for each patient. The professional’s options include the nursing technicians, nurses, physicians, psychologists, pharmacists, and physical therapists.

Accessing the “Nursing-Pending” item in the “EPC” function, the user can record and manage the pendency for nursing team during the work shift.

In addition to selecting the pending shift, it can be eliminated at any time for better management. The visualization of pending items by the nursing team is performed in the “eMAR” function through a list of patients in the department.

During the shift handover, some patient information may be exchanged between the team and must be recorded. To facilitate this process using the “Shift-change” item in the “EPC” function, the user can add a new record selecting the incident/pending type and the standard text, according to previous configuration.

3.2.5.5 Orders and care plans management

This feature supports the nursing review of the therapeutic plan, mainly regarding the scheduling and additional material related to drugs and procedures.

In the function “Therapeutic Plan Management”, the nurses can review the medical orders (scheduling times, materials) before submitting them to the pharmacy, guaranteeing that the electronic dispensation times occur according to the necessity for administration of medicine by the nursing department.

The nurses have access to diets, supplements, nutritional support, parenteral nutrition, medication, exams and procedures, hemotherapy, and more.



WARNING

To avoid safety issues related to the patient therapeutic plan and its details displayed on the e-MAR function, in cases of discrepancies or doubt, the user must double-check the primary source of the ordering process, on the CPOE function.



WARNING

The precise configuration of the ordering time interval options and their properties is critical for the correct behavior of the system, and every orderable item, such as drugs, procedure and exams must be linked to the proper applicable intervals.

3.2.6 Specialized clinical records charting and view

A subgroup of features related to patient history as documented by healthcare professionals. This section includes specialized records related to patient care supported by the system for specific clinical domains.

3.2.6.1 Oncology records

This feature supports physicians to record specific information related to cancer disease and treatment, for example, oncology anamnesis, diagnosis of tumor, staging of the tumor, and cancer treatment. Using the “EPC” function, the physician selects a patient and chooses the information in the filter to see the patient. Then, select the item “Oncology Anamnesis” in the patient tree to input the information regarding the patient’s physical assessment. It is possible to use a structured preconfigured anamnesis.

In the same function, in the item “Diagnosis of the Tumor”, the physician can record the diagnosis-specific for tumors using the ICD-O (ICD-10, topography, and morphology). Additional information can also be recorded here, for example: histological diagnosis, immunohistochemical exam and tumor progression. It is possible to view the admission and the follow-up form recorded in the “Hospital Cancer Registry” function.

For staging the tumor, the physician can select the item Locoregional, in the same function. It is a process to define the location and the extent of cancer in the patient’s body. The staging information can be documented using the TNM system (T-primary tumor; N-nodes; M- metastasis) to define the clinical and pathological TNM, the prognostic factor, and the tumor’s stage. The workflow rules are preconfigured in the Hospital Cancer Registry function. It is essential information to define the patient’s treatment and prognosis.

After defining the stage of the tumor, the user can specify the treatment protocol in the item Cancer Treatment in the “EPC”. The protocol is preconfigured in the function Protocol Record. If the hospital has a third-party system, such as ISPM™ (Philips IntelliSpace Precision Medicine), the physician can select the best clinical pathway related to patient cancer treatment.

As next steps, the physicians can add specific patient data to the selected protocol, such as weight, height, creatinine, treatment purpose, and locoregional result. They can use the same function to edit the information, if necessary, for example: medication or dose, route of administration, day or cycle of application, interval or administration site. It is possible to add and submit a cycle, add and submit a medical order record, submit days or cycles for scheduling and check the inconsistencies.

Also, in the Cancer Treatment in “EPC” function, if the patient has a medication order in CPOE or is taking a medication at home, when the physician selects the protocol, it is possible to see the drug interaction between those medications if the customer has the Micromedex™ database interface.

3.2.6.2 Ophthalmology records

The function “Ophthalmology” supports various professionals who provide ophthalmologic services and care for patients. This function facilitates the recording and visualization of the information collected during the medical encounter and exam information. Used for supporting a physician’s office, it is also possible to use other functions in conjunction, such as, “Consultation Schedule”, “Exam Schedule”, “Perioperative Electronic Patient Chart” and “Surgical Schedule Management”. It provides for the registration of a variety of information in the medical record and monitoring of that same information in subsequent encounters.

The main functions used for configuration are the "Core table settings" and "System Administration". Using the "Core table settings" function to configure the "Types of ophthalmology processes" and the "Types of ophthalmic forms", linking the desired reports. Using the "System administration" function, the user can select the main ophthalmology items for each profile, defining the order of presentation of the items and selecting items for the view tab.

Actions that can be performed by the user in the Ophthalmology process and using the "Ophthalmology" function are: generate ophthalmology based on scheduling via "Consultation Schedule"; generate ophthalmology based on scheduling in "Exam Schedule", generate ophthalmology based on scheduling in "Surgery Management", records accessible in medical record format; complete records regarding assessment and definition of treatment; record exams performed during encounters as well as information related to anamnesis, diagnosis, orders, medical certificates, prescriptions, and custom search of information by using the vision resource.

In the ophthalmic process, clinical professionals work by recording exams, attaching documents, releasing, and finalizing the ophthalmological consultation and generating reports.

3.2.6.3 Maternity & newborn records

This feature allows the health care professional to record and manage the pregnancy process until the baby's birth. During this process it is possible to record the main information, such as: the beginning of pregnancy, the first assessment with physical exam, pregnancy complications, serological tests (HIV, hepatitis, syphilis, rubella, toxoplasmosis), information related to the monitoring of labor and delivery, partograph and the childbirth.

Access the function "Electronic Patient Chart" tree item "Obstetrics/Birth", for the following registration screens:

- 1 Nurse triage
- 2 Medical triage
- 3 Pregnancy
- 4 Prenatal care
- 5 Pre labor
- 6 Partograph
- 7 Childbirth
- 8 Post Natal Obstetrics

3.2.6.4 Check-up records

This feature allows recording and viewing clinical information related to the check-up service flow, from scheduling to patient discharge.

The check-up process allows the correct record and traceability of clinical notes and findings, laboratory test results and reports, diagnostic guidelines. It allows printing clinical data history and recording additional comments. The "Check-up records" is the main function applied to add a list of patient guidelines and procedures, as well as confirm the check-up date to the patient. Also, the clinician can send the data by email. The requester can identify the status of the agenda and confirm the patient and/or the professional according to the service through the scheduling system.

In addition to this function, the physician or specialist can consult clinical data in other functions such as "EPC", "PEPC", "Medical Chart" and "Chemotherapy Schedule".

3.2.6.5 Nutrition records

This feature aims to support healthcare professionals configuring the core table of nutrition elements (such as carbohydrates, lipids, proteins, water, minerals, vitamins, calories), linking them to the institution's products, and informing the number of elements provided for each one. It also supports healthcare professionals in recording physical exams, anthropometric measurements, and nutritional requirements to ensure nutritional diagnosis and treatment.

Regarding configuring the core table of nutrition elements, for example, every 20 mL of the final product “Glucose 5% with 500 mL” provides 1 gram of the glucose element. It is also possible to configure the regular amount and thresholds if a medication has nutrition elements in its composition and the amount of that element. This configuration is essential for Parenteral Nutrition and Intravenous Rehydration Therapy ordering in the “CPOE” function.

The user can configure the core tables of infant milk and formula ordering routines and configure the formula’s solubility. In “Nutrition Records” is configured the infant milk and formulas ordering in the “CPOE” function. The user needs to configure the milk and formulas, solubility, dilution (powder), and water quantity.

To record the Nutritional Assessment, the clinical specialist needs to open the “EPC” function, select the patient and the Nutritional Assessment item. The Objective Nutrition Assessment is suitable for adult patients, and the Pediatric Nutritional Assessment is for babies, children, or teenagers.

In the Objective Nutritional Assessment, it is possible to record the anthropometry (weight, height, circumferences, and skinfolds). After that, the user can view the classification of the nutritional status according to the 50th percentile. Finally, the user defines the nutritional requirements (calories and proteins) and concludes the nutritional diagnosis.

For recording the Pediatric Nutritional Assessment, after filling in the anthropometry data (weight, height, circumferences, and skinfolds), the user can check the anthropometric and growth curves, such as height/age, weight/age, weight/height, and BMI/age, based on reference percentiles and z-score.

Description of the formulas used in the process described above (not necessarily in the presentation sequence):

- Body Mass Index (kg/m²): $BMI: \text{weight (Kg)} / \text{height (m)}^2$
Regarding BMI, different result classifications and descriptions are possible (World Health Association 2000, Pan American Health Organization 2002, Brazilian SISVAN 2004, Brazilian MoH 2004). The user needs to define the default options in the Core Tables Settings function (Patient management -> Electronic patient chart -> Default BMI rule).
- Ideal weight = $BMI (50^{\text{th}} \text{ percentile}) \times \text{Height (cm)}^2$
The 50th percentile is based on the BMI-for-age table according to WHO.
- Estimated Weight:
 - Chumlea (1988):
 - Women = $[1.27 \times \text{calf circumference (cm)}] + [0.87 \times \text{knee height (cm)}] + [0.98 \times \text{arm circumference (cm)}] + [0.4 \times \text{subscapular skinfold (cm)}] - 62.35$
 - Men = $[0.98 \times \text{calf circumference (cm)}] + [1.16 \times \text{knee height (cm)}] + [1.73 \times \text{arm circumference (cm)}] + [0.37 \times \text{subscapular skinfold (mm)}] - 81.69$
 - Rabito (2006) = $[0.5759 \times \text{arm circumference (cm)}] + [0.5263 \times \text{abdominal circumference (cm)}] + [1.2452 \times \text{calf circumference (cm)}] - [4.8689 \times (\text{gender})^*] - 32.9241$ *Gender= women (2) men (1)
- Ideal height (cm): The ideal height is presented according to the height-for-age table according to WHO
- Estimated height – Chumlea (1985):
 - Women = $84.88 + [1.83 \times \text{Knee height (cm)}] - [0.24 \times \text{Age (years)}]$
 - Men = $60.65 + [2.04 \times \text{Knee height (cm)}]$
- Weight loss (%) = $(\text{usual weight} - \text{current weight}) \times 100 / \text{usual weight}$
- Weight loss (Kg) = $(\text{usual weight} - \text{current weight})$
- Adjusted weight (Kg) = $(\text{current weight} - \text{ideal weight}) \times 0.25 + \text{ideal weight}$
- Weight adequacy (%) = $(\text{current weight} \times 100) / \text{usual weight}$

- Amputees adjusted weight (Kg) = (usual weight x 100) / (100 – amputation %)
 - Corrected weight (Kg) = weight before amputation x (100 – amputated %) / 100
 - Ascites corrected weight (Kg) = (current weight – weight to be discounted)
 - Adjusted weight (Kg) = weight regarding amputation, ascites, edema, and information on paraplegia or quadriplegia
 - Waist-hip ratio: WHR = Waist (cm) / Hip (cm)
 - Bone estimation = Height (cm) / Wrist circumference (cm)
 - Arm circumference (%) = (obtained arm circumference x 100) / arm circumference percentile 50
 - Triceps skinfold thickness (%) = (obtained triceps skinfold x 100) / triceps skinfold percentile 50
 - Arm muscle circumference (%) = arm circumference (cm) – (3.14 x triceps skinfold thickness (mm) / 10)
- Percentile 50 is used according to reference define by the user in “Core Tables Settings” function.*
- Classification of nutritional status: The classification of nutritional status is according to the 50th percentile based on the Blackburn reference (1979), embracing arm circumference (cm), triceps skinfold thickness (mm), arm muscle circumference (cm), and arm muscle area (cm²)e
 - 50th percentile: Regarding the 50th percentile, different results are possible according to Philips (1984), Frisancho (1981), Frisancho (1990), Frisancho (2008), and Brazilian SABE (2001). The user needs to define the default options in the “Core Tables Settings” function (Main Application -> Physician – Electronic Patient Chart -> 50th percentile rank rule). It embraces the arm circumference (cm), triceps skinfold thickness (mm), arm muscle circumference (cm), and arm muscle area (cm²)
 - Arm muscle area (cm²) = [arm circumference (cm) – (3.14 x triceps skinfold (cm))] / (4 x 3.14)
 - Corrected arm muscle area (cm²):
 - Men = [(arm circumference (cm) – (3.14 x triceps skinfold (mm) / 10)² - 10] / (4 x 3.14)
 - Women = [(arm circumference (cm) – (3.14 x triceps skinfold (mm) / 10)² - 6.5] / (4 x 3.14)
 - Fat (%) – Faulkner (1968) = (triceps skinfold + suprailiac skinfold + subscapular skinfold + abdominal skinfold) x 0.153 + 5.783
 - Basal Metabolic Rate (Kcal/day):
 - Harris-Benedict (1919):
 - BMR Men = 66.473 + [13.751 x Weight (Kg)] + (5.003 x Height (cm)) – (6.755 x Age)
 - BMR Women = 655.095 + [9.563 x Weight (Kg)] + [(1.849 x Height (cm)) – (4.675 x age)]
 - Total Energy Expenditure (Kcal/day): TEE = BMR x activity factor x stress factor
 - Estimated Energy Expenditure – Ireton-Jones (1997):
 - With mechanical ventilation: EEE = 1784 + [5 x weight (Kg)] – (11 x age) + (244 x gender) + (239 x trauma) + (840 x burn)
 - With spontaneous breathing: EEE = 629 + [25 x weight (Kg)] – (11 x age) – (609 x obesity). *Multiply the formula result by 4.168 to get the energy value in kJ/day*
 - Mifflin – St Jeor (2005):
 - Men = (10 x weight) + [6.25 x height (cm)] – (5 x age) + 5
 - Women: (10 x weight) + [6.25 x height (cm)] – (5 x age) – 161
 - Rule of thumb:
 - 11 to 24 Kcal/Kg = weight reduction
 - 25 to 29 Kcal/Kg = weight maintenance
 - 30 to 35 Kcal/Kg = weight gain
 - 40 Kcal/Kg = polytrauma
 - 30 to 35 Kcal/Kg = sepsis
 - Dietary reference intakes for pediatric (2006):

- Infants and Young Children
 - 0-3 months: $DRI = (89 \times \text{weight (Kg)} - 100) + 175$
 - 4-6 months: $DRI = (89 \times \text{weight (Kg)} - 100) + 56$
 - 7-12 months: $DRI = (89 \times \text{weight (Kg)} - 100) + 22$
 - 13-35 months: $DRI = (89 \times \text{weight (Kg)} - 100) + 20$
- Children and Adolescents 3-18 years
 - (Boys) 3-8 years = $88.5 - (61.9 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(26.7 \times \text{weight (Kg)}) + (903 \times \text{height (m)})] + 20$
 - (Boys) 9-18 years = $88.5 - (61.9 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(26.7 \times \text{weight (Kg)}) + (903 \times \text{height (m)})] + 25$
 - (Girls) 3-8 years = $135.3 - (30.8 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(10.0 \times \text{weight (Kg)}) + (934 \times \text{height (m)})] + 20$
 - (Girls) 9-18 years = $135.3 - (30.8 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(10.0 \times \text{weight (Kg)}) + (934 \times \text{height (m)})] + 25$
- Adults 19 years and older
 - Men = $662 - (9.53 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(15.91 \times \text{weight (Kg)}) + (539.6 \times \text{height (m)})]$
 - Women = $354 - (6.91 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(9.36 \times \text{weight (Kg)}) + (726 \times \text{height (m)})]$
- Institute of Medicine (2002) for pediatric:
 - Boys:
 - 0 – 3 years: $IoM = (0.249 \times \text{current weight}) - 0.127$
 - 3– 10 years: $IoM = (0.095 \times \text{current weight}) + 2.110$
 - 10 – 18 years: $IoM = (0.074 \times \text{current weight}) + 2.754$
 - Girls:
 - 0 – 3 years = $(0.244 \times \text{current weight}) - 0.130$
 - 3– 10 years = $(0.085 \times \text{current weight}) + 2.033$
 - 10 – 18 years = $(0.056 \times \text{current weight}) + 2.898$
- Protein requirement (g/day) = protein (g) x weight (Kg)
- Calorie requirements per day (Kcal/day) = calorie (Kcal/Kg/day) x weight (Kg)
- Percentile classification for pediatric: the result ranges is based on the WHO according to the tables height/age, weight/age, weight/height, and BMI/age
- Z-score classification for pediatric: the result ranges is based on the WHO according to the tables height/age, weight/age, weight/height, and BMI/age

3.2.6.6 Physical body evaluation records

This feature supports the clinical user to record anthropometric and physical structure information.

The physical assessment is an instrument that helps the clinical user to plan and order physical exercise, avoiding patient injuries.

In the “EPC” function, the clinical user needs to open the “Physical Assessment” item to record the patient physical body evaluation. Then, the clinical user enters anthropometric information such as weight, height, knee height, circumferences, and skinfolds. Additionally, the clinical user enters data related to the tests of flexibility, manual gripping strength, static balance, and lower limb strength.

After recording the physical body evaluation, the user can define the exercise scheme the patient needs to follow.

3.2.6.7 Odontology records

This feature supports the dentist professionals to record, view and manage the patient dental-specific information during the appointment.

An odontogram model can be configured by the institution in the “System Administration” function, using images and selecting specific areas to determine each tooth.

In the "EPC" or "EOC" function, the user has access to the Odontology item to record and view the dental assessment, information such as dental procedures, clinical notes, and treatment plans.

During the dental appointment, using the Odontology item, the user can add a new record and select an odontogram model previously configured by the institution. Using the odontogram, the user selects the tooth to start the treatment plan, informing additional data and the applied procedure. When confirming the registration performed, the treatment plan is generated and can be followed in the “Treatment Plan” tab.

The professional can select a status to indicate the progress of each plan, and after confirming the status of the completed plan, can record a clinical note, as well as the execution of the procedure in the patient's account.

Via the odontogram tab, the professional can monitor the progress of a tooth treatment, as well as the complementary information about the treatment, and access the treatment plan.

3.2.6.8 Nutrition intake management

This feature supports the user with the nutritional data analysis from the patient’s treatment plan.

In the “Nutrition Intake Manager” function the user has access to the total amount of volume, macro and micronutrients provided for the patient according to the proposed therapeutic plan. The user can set goals and monitor whether a given therapeutic plan reaches the minimum and maximum expectations stipulated for the patient.

The possible macronutrients to analyze are fats, carbohydrates, and proteins. Micronutrients are sodium, potassium, chloride, calcium, magnesium, and phosphorus. As well as analyzing the calories and volumes provided by each item requested in the therapeutic plan.

The user can follow the evolution of the patient’s weight through a graph and make edits in the “CPOE” function by keeping the edited records in draft mode, through “Nutrition Intake Manager” function, to nutritionally analyze the therapeutic plan before releasing.

The user can directly access the “Nutrition Intake Manager” function and choose a patient with a current treatment plan to analyze or access through an external call to the “CPOE” function.

3.2.6.9 Body graph

Body graph charting is the ability to use the human body graph or scheme as a metaphor to record and display clinical conditions or related information.

HCPs can have a body graph scheme to chart, describe and view clinical conditions related to human body sites, such as devices and wounds.

Using the “Body Site Management” function, the user can configure separate image files for use with patients of different age ranges. The image for a male or female body representation is automatically assigned according to the patient’s biological sex, which is registered and maintained in the “Master Patient Index” function. If necessary, the user can manually edit and save which body representation should be displayed for a specific patient directly from the “Body Site Management” function. The user can then link devices,

wounds, and dressings to a specific body site located in the body graph. For each site it is possible to access the history of the interventions, in chronological order.

After proper settings, the user can use the human body (“Body Site Management” function) to associate devices, wounds, and dressings, by external call to functions such as “EPC” and “Flowsheet”.

3.2.7 Workflow enablers

A subgroup of features for orchestrating and managing workflows related to clinical practice.

3.2.7.1 Patient panorama, dashboard, and census

This feature aims to provide the clinicians a view of a specific cohort of patients to be used in different scenarios, for example, new patients admitted in one or more clinical units or departments, a list of patients by physician, provide the occupancy status of a unit or department, notifications, and icons regarding statuses of clinical processes, discharge process, waiting list, bed request and availability, and support prioritization among a group of patients.

The “Clinical Panorama” function allows HCPs to view the general patient population or subgroups based on filter criteria. This function also has specific views for ICU and Acute Care with information for clinical decision support related to vital signs abnormalities, suspected sepsis, and weaning from mechanical ventilation. The users may use a standard view with sub-groups of patients, including “new”, “worsening”, “both” or customize a list of patients for close oversight.

NOTE The information for clinical decision support related to vital signs abnormalities, suspected sepsis, and weaning from mechanical ventilation in this feature are processed in HIS CDS B, based on data of a specific patient.

Clinical Panorama

Supports the HCP to view a group of patients as a set of visual components described as “cards” or “tiles”, in a list or graphical layout of the unit, which can be organized according to different filters and sorting capabilities. Each tile contains a summary of relevant information regarding the patient, such as patient identification, age, location as well as other visual components such as icons, score result and delta, and the patient's photo. When the clinician double clicks on a tile, it opens an expanded detailed view, which can have more data and relevant information about the selected patient.

Tile content, detailed view content, and icons must be configured in the “Core Table Settings” function. These configurations can consider criteria such as, system locale, user profile, unit and department, user role, and individual user. For tiles, the user can configure by unit which score results will be presented in the patient tile, such as APACHE II, SAPS II, SOFA, Score Flex II, and MEWS. In the list view, the score name, total score, score trend, and delta score are combined into a single column; the score column data can then be filtered by score and also sorted in ascending or descending order by total score or delta score. For detailed view, the user can define what data will be displayed, for example blood type, estimated discharge date, number of days in ICU, submitted diet, clinical protocols, scores, indexes, and scales. For icons, the user can define certain standard icons for situations such as unchecked items, video availability (for telehealth), warnings, suspended medicines, protocols, isolation, and precautions.

NOTE A suspected sepsis icon appears on both the tile view and the detailed view of the clinical panorama when an alert condition is triggered by HIS CDS B product.

Smart Alerts

Supports the HCP in viewing a list of patients with vital sign indicators that fall outside the acceptable ranges. Smart Alert functionality, supported by HIS CDS B algorithms, aims to process a continual stream of vital signs values and calculate when to trigger an alert event for a patient. Trend Smart Alerts are designed to highlight relatively early changes in vital sign trends (before limit alerts are reached) to draw the clinician's attention to the patient's trajectory providing the opportunity to assess the patient and proactively adjust therapy. The system displays Smart Alerts for departments considered Acute Care and ICU (local or remote – telehealth) and each level of care has its own threshold limits for triggering alerts.

The user can filter patients by the date and time of the last alert, department type (ICU or Acute Care), a specific department, or encounter number. More detailed information about the alert is available when hovering over it. Contextual menu options include: limit settings for custom threshold limits, view the threshold limits displayed on a graph, alerts history for previous alert details, and reactivate options for dismissing alerts at specific times. Reactivate options allow the HCP to dismiss individual alerts or all alerts for a patient, either immediately or scheduled.

Limits settings are separated by each vital sign (HR, MAP, O₂ Sat, and RR), each with options for standard or custom values, which can be adjusted to account for pre-existing conditions. A system administrator can define standard limit settings in the "System Administration" function in "Clinical Parameters" > "Information Rule" > "Severity Rule". The vital signs graphs for Acute Care patients displays a period of 48 h with 5-min medians, while the vital signs graphs for ICU patients displays a period of 6 h with 5-min medians and a period of 15 min with 1-min medians. Alert history displays alert details for a patient, grouped by vital sign, for up to the last 96 h.

NOTE Regarding the smart alerts, all rules and calculations that support clinical decisions are processed in HIS CDS B and applicable in the context of a specific patient. For more details refer to the IFU of HIS CDS B.

Ventilated Patient Census

Supports the HCP with an overall view of patients on mechanical ventilation, from the multiple hospitals and units where the HCP has access. This view centralizes a combination of patient information that is important for the HCP when evaluating the cardiopulmonary condition of patients on mechanical ventilation. The Spontaneous Awakening Trial (SAT) and Spontaneous Breathing Trial (SBT) can be coordinated, such that if a patient passes the SAT they are then evaluated for appropriateness for a SBT.

The HCP can also add comments that are visible to other users, document the date and time of SATs and SBTs performed, and see a detailed view with more patient information.

NOTE SAT/SBT readiness considers the use of paralytic drugs. However, the system behavior depends on whether the paralytic drug is administered as a single dose or as a continuous infusion. A single dose triggers a message when the paralytic drug is approved/released by the pharmacy, while a continuous infusion triggers a message when the medication administration record is documented.

Watchlist

Supports the HCP with a view similar to the Clinical Panorama, but focused on specific subsets of patients, allowing users to view selected patients for particular oversight. Patient groups include worsening patients

(identified by significant changes in the delta score), new patients, patients added to a user-specific watchlist. The user can import patients from the watchlists of other users, remove a patient using the contextual menu option, or remove all patients from the watchlist in the handlebar options.

3.2.7.2 Alerts and warnings related to clinical processes

This feature supports the configuration and triggering of notifications, alerts, and warnings related to clinical processes. They may be displayed on the patient bar and different system's screens or sent via e-mail, SMS, and internal communication.

NOTE In the context of this feature, the word “alert” is not intended to support any clinical decision. The alerts and warnings aim to improve HCP collaboration and communication, enhancing care delivery and fulfilling the operational and administrative needs.



WARNING

The alerts depend on different conditions and proper previous configuration. Alerts regarding allergies depend on the right configuration of the drug database and the right input of the drug allergy in the patient health history. Alerts related to out-of-range values depend on proper configuration of the limits to be displayed in functions, such as CPOE, EPC, PEPC, and e-MAR. Alerts can be related to patient specific conditions or be addressed to HCP.

There are five system tools options to configure different alerts, events, warnings, and notifications, described below.

The “Alerts and Events Management” function is one system resource used to configure alerts and warnings. The user can define the main events and rules, trigger modes, event description, messages via text input prompting (macros), start and end time, presenting mode (on-screen, internal communication, and e-mail), and the specific recipients (user, e-mail, department, group, and profile). The function is also used to manage and view the alerts and events history, such as the ones related to medicine and supplies.

On the “Electronic Patient Chart (EPC)” or “Electronic Outpatient Chart (EOC)” functions, after selecting a patient, the user can record alerts (in the “Alerts” item of the patient’s tree), defining if the event is for the patient or one specific encounter, selecting the type of alert with messages that the institution configures in the “Core Tables Settings” function. After submitting the record, the alert is shown to the users when accessing the patient’s record. The alert can be deactivated using the “Set end of alert” option.

The “Professional Notifications” functionality aims to improve communication among the professionals involved in the patient care process. It is accessed via the “Check alerts/consult user alerts” right-click options on the “EPC” function. Adding a new alert in the “Registration” tab, the user can select the type of notification, the recipient, the department, and the warning message. The alert is displayed to the recipient through the “Professional Notifications” functionality when accessing the specific patient via the EPC function, where the user can view and acknowledge them.

Using the “Core Tables Settings” function, the institution can configure alerts regarding the request for additional information. In the “Information request” option, rules can be defined to patients with or without encounter number, surgery, encounter type, specific person, department, and establishment. In addition, the “time of presentation” needs to be selected, defining the workflow moments or when the user adds or submits a clinical record, such as a clinical note, medical certificate, and event. Finally, to complete the configuration, a system query needs to be developed, the appropriate message content, and the user alternatives (notifications only, justification, or immediate action). The alert and message are displayed

during the clinical workflows via the “EPC” or “PEPC” functions, and the professional may accept it and follow the possible instructions.

The HCP can also view alerts related to clinical and documentation tasks of the patient encounter on the left side of the patient bar (bell icon) above the patient’s name. By clicking on “see more” of each type of pendency, the user can flag them as read and view more details and possible actions executed in different system functions. The configuration of the alerts is performed in different system functions, such as the “Core Tables Settings” and “Task List.”

In the “Core Tables Settings” function, the user can configure the multiple approvals rule, selecting the system function, the item, and the accountable professional. To trigger the process, the users need to record and submit specific clinical documentation in the “Electronic Pre-Anesthetic Assessment,” “PEPC,” or “EPC” functions. Then, using the legends, the user can view the status of approval of each document, and at the same time, an alert icon is shown in the patient bar. Regarding document approval, by clicking on “see more,” the user can view the screen with details about the pending approval items, such as the status, date, user, document type, and the approvers, and quickly approve it or not.

At the same place, it is also possible to see alerts related to the interruption of the integration communication with bedside monitors with no vital signs data inbound. To configure this notification, beyond the presence of an active integration with monitors, the institution needs to set up the rules in the “Core Tables Settings” function, followed by an activation of a database stored procedure job in the “System Administration” function.

The alerts related to professional tasks such as the release of a new exam, order, or clinical note also are shown in the same bell icon of the left bar of the patient bar. The institution configures and manages the tasks on the “Task list” function. The rules for viewing the tasks are configured in the “Records” tab, selecting the clinical item, its priority, and the user profile. Using the “Electronic Patient Chart” function, after selecting a patient encounter, the user can view the alert icon in the patient bar. The user can click on the icon to see the number of pending tasks, and by clicking on see more, the user can access the “Task List” function. In the “Task” tab, the user can filter and check the tasks according to the period, status, department, patient, professional, and priority. According to the selected task, the user can access it directly in the patient record, change status and view the status history.

3.2.7.3 Check-lists of clinical processes

This feature supports HCP to perform checklists related to patient care processes, using specific tools that facilitate the recording and managing of them and their steps. The checklists are defined according to the institution’s quality objectives. The more well-known example is the surgery time-out assessment.

This feature can be linked with different workflows functions such as “PEPC,” “Radiotherapy Management,” and “Home Care Management.”

The “Electronic Control of Assistance Processes” function is used to configure the checklist rules and manage the process. The user can define a checklist process(es), define the professional role, link the assessment(s), process dependencies, and trigger rules such as starting the surgery or its events, radiotherapy, and home care process. The “Structured Assessments Settings” is used to create structured forms, including the institution process’s required fields. Refer to the non-hard code configurable templates feature in this document for additional information regarding structured forms configuration.

In the surgery context, after selecting a patient in the “PEPC” function and recording a process triggering event, such as starting the surgery, the user will be asked to complete, for example, the time-out checklist

assessment via the “Electronic Control of Assistance Processes” function. Then, in the “Checklist” tab, the user records the checklist’s previously configured information.

To manage the existing checklists, the user needs to open the tab “Panel” of the “Electronic Control of Assistance Processes” function, where the user has filters to search for pending, partial, and completed checklists.

3.2.7.4 Hard coded configurable templates

This feature allows the creation of structured templates or forms with fields that can be connected with the native tables and structures of the system, allowing the use of the same clinical information in different workflows.

The user can compose structured templates in the “Patient Chart Settings” function, on the “Templates” tab. For each template, elements (archetypes) and native systems tables are available in the system. The elements and systems tables available are clinical concepts created by Philips according to customer requests. This methodology is essential to avoid duplication and guarantee the proper connection with the native system’s data fields.

The user has the option to import pre-configured templates created by Philips. Using the templates, customizations can be made according to the objective of the template. It is located in the “Patient Chart Settings” function, on “Philips Templates” tab.

The user can select the appropriate template during the clinical appointment and record the patient information, mainly using the “EPC” function. After filling in the required information, the user submits the record. The data entered using this feature can also be visualized in other systems’ screens, dedicated to vital signs, scores, clinical notes, diagnoses, and patient summary, for example.

This feature is an alternative to creating forms and preserving data integrity, allowing adequate data research and triggering clinical processes and pathways.

3.2.7.5 Non hard coded configurable templates

This feature allows the creation of structured forms with fields that do not have a relationship with the tables and native structures of the system.

The user can configure these forms in the “Structured Assessments Settings” function. For example, it is possible to define the form’s name, the system function to apply it, create different fields (e.g., edit, check box, look-up) and preview them.

The professional can use the forms mainly in the “EPC” function. After selecting the patient, can choose the form and fill in the information therein.

The “Structured Assessment” function is used to manage the forms and their information already recorded in the system for research and quality purposes.

3.2.7.6 Patient journey

This feature provides relevant information in a timeline perspective from the patient data, through a graphical interface that is activated in some system functions, like a “EPS”, “EPC”, “CPOE” and “EOC”.

The user can configure this feature in the “Patient Chart Settings” function, to set the timeline preview template and the clinical pathways protocols. “EPC”, “EPS”, “CPOE” and “EOC” functions are used to follow up on relevant events in the patient’s life.

According to the clinical pathways protocols and other clinical records registered for the patient in “EPC” function, the user can view the main relevant events in a timeline, the stages and events of the clinical pathways protocol, and information about the phase of the treatment.

Patient Journey is a standard term for the sequence of care events which a patient follows from the point of entry into the system, commonly triggered by illness, until the patient is discharged from the hospital, to his or her home, care home, hospice, or due to death.

This representation provides caregivers with information to check the patient treatment phase to identify delays or missed phases.

3.2.7.7 Calculations Systems

This feature allows the user to create formulas to be used in different functions of the system, such as the “Electronic Patient Chart” and “Multiparameter Flowsheet” functions.

In the “Calculation mechanisms” function, the user can create their own formulas to be applied to the system functions. The variables described in the formula are defined in the “Parameters” tab. A parameter can be set as an attribute from a table or an element from a template. The system displays the formula result in the location defined in the “Destination” tab, following the same concept applied in the “Parameters” tab.

In addition, each calculation can have execution rules defined, that will set if the calculation will be executed. These rules are applied according to the configured parameter value and condition. Rules can be configured with one or more criteria, for example it may be desirable to execute a specific clinical calculation only when the patient is female, or within a certain age range, or both.

The results are presented in the destination data field that was defined in the “Calculation Mechanisms” function. For example, suppose the user has chosen the “Mean Arterial Blood Pressure” attribute in the “Vital signs and general monitoring” table from “Electronic Patient Chart” function as a destination when all required variables are charted. In that case, the result will be presented in the specific data field of the screen. The same concept is applied for templates in the “Electronic Patient Chart” function and models from the “Chartable Flowsheet” tab of the “Multiparameter Flowsheet” function. In “Electronic Patient Chart” function, when a result is generated by a calculation from “Calculation mechanisms” function, an orange icon with an exclamation point is displayed. When the user hovers over this icon, the formula used to obtain the result will be presented. Suppose a calculation created by the “Calculation mechanisms” has a destination attribute that already has a system’s hard-coded calculation. In that case, the customized calculation from the “Calculation mechanisms” substitute the hard-coded calculation

3.2.7.8 Clinical pathways configuration and implementation

This feature aims to provide configuration and processes data using rules to support HCP with supplemental information during the clinical decision-making process.

The main system functions associated with this feature are “Clinical Decision Support - Mentor” for configuration and “Mentor”, “EPC” and “EOC” functions for execution. In practice, the combination of the four functions is needed: “Mentor”, “EPC”, “EOC” and “CPOE”. It includes recommendations, alerts, warnings (including the ones for safety purposes), order sets, clinical protocols, care plans, and further pathway steps.



WARNING

Philips does not provide order sets content by default. It must be configured and maintained by a multidisciplinary team of the healthcare organization. Integration with external content providers may also be available.

**WARNING**

Philips does not provide clinical pathways content by default. It must be configured and maintained by a multidisciplinary team of the healthcare organization. Integration with external content providers may also be available.

NOTE The rules and calculations are configured in the "Clinical Decision Support – Mentor" function to support the Clinical Pathways configuration and implementation processes.

According to configured rules and patient clinical records which form the input to the "EPC" and "EOC" function such as vital signs, diagnosis, scales, events, and lab results, the professional may receive notifications and recommendations via the "Mentor" function. Examples of the suggested actions include assigning a new clinical protocol or pathway or a medical prescription to a patient. If the recommendation is, for example, to include a medication order set, the system can open the "CPOE" function that displays it, with an option to accept or reject.

Institutions can configure and use this workflow tool in different scenarios, for example, related to sepsis early detection and management, deep venous thrombosis prevention, stroke, acute myocardial infarction, and ventilator-associated pneumonia.

There are two main pathways and decision support processes: the "triggering events" and the "assistance protocols."

The "Triggering events" process is used to configure rules triggered by vital signs, respiratory, diagnoses, lab tests, dressings, clinical events, devices, score and indexes, and risk classification. To configure individual rules to each trigger, it is necessary to define the rule's name, the options to trigger it, the actions, the clinical users, profiles, specialties, and departments. Complementary rules can be added to fine-tune the query of the target population, such as gender, age, weight ranges, and pregnancy. Action examples are order sets, nurse interventions, assistance protocol, score and indexes, preventive medicine program, alert and events, care goals, and hyperlinks.

The "Assistance protocols" process is used to define clinical protocols according to specific patient events and the corresponding actions, and the target professionals. The examples of events are birth, department transfer, care plan duplication, new encounter, patient's admission, ICU admission, order submission, associated, and protocol steps.

The event named "associated" is the option that allows the combination of different triggers, mandatory or not. Several clinical decision support actions can be configured according to each event.

The event named "protocol steps" is used to configure clinical protocols in multiple sequential steps. When configuring it, the user can define the name of the steps, tag descriptions, icons, dependent steps, EPC item, response and execution times, score range, or value to proceed to the next step. Each step must be linked to one action, such as assessment, care goal, clinical note, clinical protocol, diagnosis, message on screen, order checking, order set, question, and score. It is necessary to configure additional conditions for each action, such as the complementary and mandatory fields, justification for cancellation or ending the step and protocol, and alerts and events options to assist the process. For each step of the clinical protocol, it is possible to define a clinical document by selecting a file or a hyperlink.

For the use in clinical practice, the combination of four functions is needed: "Mentor", "EPC", "EOC", and "CPOE". According to configured rules and patient clinical records which form the input to the "EPC" or "EOC" function such as vital signs, diagnosis, scales, events, and lab results, the professional may receive notifications and recommendations via the "Mentor" function. Examples of the suggested actions include assigning a new clinical protocol or pathway, or a medical prescription to a patient. If the recommendation

is, for example, to include a medication order set, the HCP can open the “CPOE” function that displays it, with an option to accept or reject. As another example, when the user enters patient clinical information, such as vital signs or diagnosis, the “Mentor” function opens automatically, asking the user to follow and accept the further configured steps. The HCP can view alert reminders of clinical pathways processes related to the patient encounter on the left side of the patient bar (bell icon) above the patient’s name. By clicking on “see more,” the user views the number of this type of pendency, and clicking on it, the system opens the “Mentor” function to view details and perform the actions.

Regarding safety warnings, several system hard-coded options are available such as allergies, surgeries, medications in use, and diseases. Some safety alerts are recorded and managed in the patient’s health history of the EPC and EOC function, such as allergies and adverse reactions, history, current medication, disabilities, risk factors, and restrictions. In addition, safety warnings can also be defined by the institution in the “Core Table Settings” function (“Safety warnings” item) involving a database query. The institution can configure the rules to display the safety alerts (when the user accesses the patient’s record in different system functions) in the “System Administration” function (parameters option). The “Safety warnings” functionality is presented when the user selects a patient in different system functions, such as the EPC. Nevertheless, at any time, the user can also access the safety warnings information via the mouse right-click option “Check alerts -> Consult safety alerts.”

The HCP can also check alerts and warnings related to allergies and anesthesia on the right side of the patient bar (triangle icon). By clicking on the alert, the user has access to more information. The allergies are recorded in the “Health History” of the EPC and EOC function. The institution can configure the types of anesthesia warnings in the “Perioperative Items Settings” function. The anesthesia warning is recorded during the pre-anesthetic assessment process, performed by the anesthesiologist, using the “Electronic Pre-Anesthetic Assessment” function. At any time, if applicable, the alerts can be disabled by the user.

3.2.7.9 Task and worklists

This feature allows the clinician to view and manage patient pending tasks, according to their professional role. It allows to organize, in a consolidated view, tasks related to one or multiple patients. Through the "Task List" function, the clinician can evaluate tasks and can go directly to the execution of the action, such as executing a clinical record submission, reviewing lab or image exams, justifying a need for a procedure, or responding to a medical opinion request in the "Electronic Patient Chart" function.

Through this feature, clinicians can better evaluate tasks that must be performed during the day or a shift, optimizing time, defining priorities, and tracking the executed tasks.

3.3 Controlling (F&A) Features

A group of features related to billing, financial and controlling aspects of care delivery.

3.3.1 Patient account and billing processes

A subgroup of features related to generation of the patient's medical bill.

3.3.1.1 Internal exams and procedures configuration

This feature supports the configuration of service, exam, and procedure catalogs from different sources, creating internal names, codes, and rules facilitating the use by clinicians while directly addressing the clinical, operational, administrative, and billing needs.

The “Core Tables Settings” function supports the users to configure the internal exams and procedures, aiming to streamline the processes and link the medical procedures and materials with reimbursement code tables of health insurance companies and according to the plan categories.

The “Internal Exams and Procedures” function manages and standardizes exams and procedures, creating internal codes, avoiding duplicities, and links them with different procedure tables. Regular use cases include glucose control schemes, image exam sets, and combined surgical procedures.

The information defined in the “Internal Exams and Procedures” function participates in several other functions, for example, “CPOE”, “Schedules”, “Exams”, “Reports”, and “Patient Account”.

3.4 Operational Features

A group of features related to management of data that is available to healthcare professionals to provide delivery of care to patients.

3.4.1 Pharmacy management

A subgroup of features related to the management of processes necessary for the operation of the pharmacy.

3.4.1.1 Clinical pharmacy

Clinical pharmacy includes activities related to the medication plan to guarantee adequate doses, dilution, route, management reconciliation, interactions, high surveillance drugs, and more.

The clinical pharmacists, using the function “Therapeutic Plan Management”, can review the medical orders before the initial dispensing by the pharmacy, to identify adjustments in the patient’s therapeutic plan, such as drug interactions, therapeutic duplications, dose limits, incorrect route of administration, among other essential checks that this professional can review.

Regarding medication reconciliation, the same function allows the pharmacist to verify if the patient’s continuous medications (medication the patient was already using before the hospitalization) were included by the physician in the therapeutic plan.

3.4.1.2 Drug settings

This feature supports the user to configure a data set of medications of the institution.



WARNING

The healthcare organization is responsible for the proper information configuration and maintenance of the medicine and material catalog, since it will influence the clinical workflows bringing information such as default dose, alerts when the dose is out of limits, and dilution and reconstitution.



WARNING

Some medicines and drugs may have the similar spellings related to their commercial name or the active ingredient / formula. This may pose a mix up when ordering the medicine for a selected patient. Hence, configure the medicine and material catalogs in such a way to prevent or reduce the possibility of errors while selecting a medicine or drug. One recommended way of attaining this is uppercase lettering to help distinguish sound-alike or look-alike medicine names. For similar reasons, materials, procedures and exams may also require the same attention during the configuration process.

In the “Medicine” function, the user can link a kit (set) of materials to dispense with the medication, link a reconstitution, dilution, and re-dilution of the medication, and adapt them to the patient’s profile or conditions, if needed. In addition, the user can define medications’ dose limits, drug interactions, and routes of administration suitable for the medication.

NOTE This feature is specific for medications. The feature General Material Settings support the configuration of other materials, such as hospital supplies, office supplies, cleaning materials, enteral diets, infant formula, etc.

This functionality allows the user to configure several aspects related to the medications, such as linking the drug to the active ingredient, the generic drug description, and the conversions of the units of measurement (for example, one tablet is equivalent to 500 mg).

3.4.2 Blood, blood products and other hematology therapies management

A subgroup of features related to blood product collection, production, storage, transfusion and related hematology therapies that are provided by a healthcare institution.

3.4.2.1 Patient transfusion information

This feature supports the management of blood components already assigned to a patient transfusion request and their administration.

In the transfusion tab of the “Hemotherapy” function, the user can check the transfusion requests for the patients. By double-clicking the selected request, the user can check information such as phenotyping, compatibility tests, antibodies’ presence, and transfusion and reaction history. In addition, by selecting the blood component linked to the request, the user can double-check its information (capability to use bar code readers is also available), such as the blood component identification number, production and expiration dates, and bag phenotype. If necessary, the user can also exclude or disregard a blood component from the transfusion request.

During the blood component infusion process, in the “Hemotherapy” function, the user can select the transfusion request to record the start, pause, end, or cancellation of the infusion and follow the process via different statuses displayed on the screen. It is also possible to perform the same actions in the “e-MAR” function.

Suppose the recipient patient has a scheduled surgery or it is in progress. In that case, the user can link the blood component to the surgery identification number, and the component is automatically displayed in the “PEPC” function.

In case of a transfusion reaction suspicion, using the “Hemotherapy” function, the clinical user can record the patient’s vital signs, select the reaction type, describe the observations and symptoms, allowing further investigation and confirmation. In addition, if checking the process via the “e-MAR” function, the user can call the “Hemotherapy” function via the “reaction” option of the right-button mouse menu.

3.4.3 Nutrition and milk processes management

This feature aims to assist healthcare professionals to manage the nutrition processes from the production, portioning and dispensing of oral diet, supplement and milk formula.

3.4.3.1 Diets and nutrition management

This feature supports nutritionists and nutrition teams in the clinical nutrition and production management process.

To have access to clinical nutrition management, the nutritionist, after opening the “Nutrition Management” function, can view the patient worklist according to the information selected in the filter. After selecting a specific patient, the clinical nutritionist needs to choose the item “Patient Assessment” to record structured preconfigured assessments and clinic notes. This information can also be seen in “EPC” function, in the items “Assessments” and “Clinical Note”, respectively.

It is also possible to define the selected diet therapy, submit the service, define the menu, and register extra items (for patients and companions), record diet inconsistencies and guidelines.

The production nutritionists need to configure the core tables of the foodstuff and the recipes before configuring the menu options. This process is made in the “Nutrition Management” function, in the “Records Foodstuff” and “Records Recipe” items, respectively. After these configurations, the production nutritionist can register the menu in the “Records Menu” item of the “Nutrition Management” function. Then, the nutritionist can generate the planning and the request to buy the foodstuff accordingly.

When the clinical nutritionist selects the patient menu in the “Menu” item of the “Nutrition Management” function, it is possible to view all the preconfigured menu options and select one for the patient diet. In the “Production” item of the same function, the production nutritionist and the production can check the defined patient menu.

To view the list of patients according to the service generated in the “Nutrition Management” function, the nutritionist can access the “Nutrition Service Panel” function. In this function it is possible to check the information generated in the “Nutrition Management” function, for example: submit the service, define the menu, delivery the service, if the patient is in fasting or to view the patient’s specific diet.

3.4.3.2 Milk formula production and management

This feature supports the nutrition team in preparing the artificial milk formulas according to the physician’s ordering. Artificial milk formula is a processed food designed and marketed for feeding babies and newborns. It is a partial or a complete substitute for breast milk and is suitable to be the only food consumed by babies or newborns.

After the physician has ordered the artificial milk formula, in the item “Infant milks/formulas” in the “Nutrition” group of the “CPOE” function, the nutrition team can view the information in the item “Milk Production” in the “Nutrition Management” function.

The nutrition team needs to generate the production in the item “Milk Production” in “Nutrition Management” function to view the quantity of powder and water necessary to prepare the artificial milk. The user needs to double-check the products using the bar code reader in the same function before starting the artificial milk preparation.

After preparing the milk, the nutrition team can tag the device (for example, baby bottle) with a bar code label in the “Milk Production” tab in the “Nutrition Management” function and deliver it to the nursing team to feed the baby.

3.4.4 Emergency department

This feature includes the patient registration, the patient list management, triage, and consulting aiming at adequate control and prioritization.

Emergency department demands a system to manage the process of multiple patient admissions with different conditions and severity during an emergency.

The main system function associated with this feature to perform the emergency management processes is the “Electronic Patient Chart”. The user can access the “Electronic Patient Chart” function, go to the “Emergency” item, and see the list of patients in the emergency department. According to the applied process, the user can select actions through right-click mouse button to perform patient care.

To control and manage the process, the user can follow the patient list through the status interacting and defining priorities, as well as following the actions performed on the patients.

3.4.4.1 Emergency management

This feature includes the patient registration in the emergency department, the patient list management, triage process, medical consultation process, and monitoring aiming at adequate control and prioritization.

Emergency department demands a system to manage the process of multiple patient admissions with different conditions and severity during an emergency.

The main system function associated with this feature to perform the emergency management processes is the “Electronic Patient Chart”. The user can access the “Electronic Patient Chart” function, go to the “Emergency” item, using filters to see the list of patients in the emergency department. According to the applied process, the user can select actions through right-click mouse button to perform patient care.

To control and manage the process, the user can follow the patient list through the status interacting and defining priorities, as well as following the actions performed on the patients.

After selecting a patient from the list, the professional can do some actions like call the patient for a consultation via call panel, define the physician responsible for the patient, define or change the level of urgency and priority, start and finalize the medical consultation, generate reports, record the outcomes and discharge process.

3.4.4.2 Patient triage

This feature allows the trained healthcare professionals to carry out the triage process using pre-configured tools to perform the risk assessment.

Patients seeking emergency department consultation may have serious life-threatening situations that require immediate attention.

For configuration “Nursing Records” is used, to set the triage protocol defining the Type, Item, Diagnosis, and the Model to organize the assessment structure.

The type of risk classification is configured in the “Core Table Settings” defining the desired description and the priority. This configuration is necessary to connect with the triage protocol diagnostics.

The “EPC” function is used to perform the triage processes from the list of patients pending in triage tab, and to start the processes the “Classificatory triage” function is used.

After selecting a patient, you can start triage using the “Triage protocol” tab, opening the protocol, selecting patient’s signs and symptoms, confirming diagnoses, and risk classification finalizing the assessment.

To manage the status of patient’s list, the practitioner can view each patient’s risk classification through colors and descriptions.

3.4.4.3 Emergency protocols configuration

This feature is used to provide standard protocols configuration, to use during the emergency patient care process, which may contain orders set for certain diseases, conditions, and procedures, to facilitate the process.

To configure the protocol, the user can access the “Protocol Record” function, by adding a new protocol template and informing the use in the emergency, add the desired items like clinical note, diagnosis, prescription, medical certificates, discharge instructions, medications and procedures.

To apply the protocol, the user can access the “EPC” function, select a patient from the list of emergency patients, with right-click option selecting the configured protocol name and confirm the generation to the patient.

3.4.5 Specialized clinical services

A subgroup of features related to specialized clinical services offered by the institution.

3.4.5.1 Health check-up management

The health check-up feature aims to support an overall evaluation of a patient's health condition with a battery of examinations, lab tests and procedures. This overall evaluation can be customized for each patient taking into consideration variables such as sex, age, habits, and personal history related to family, environmental and professional characteristics.

Configure default information for standard checkups, items, orders, and the check-up process in the "Core Tables Settings" function under the item "Check-up".

After a patient is admitted and an encounter number has been created, all the medical orders associated with the checkup will be linked to that encounter. Use the "Check-up" function to manage the calendar of scheduled checkups, select the steps in the check-up process for individual patients, update the flow of steps in a patient's checkup process as they are completed, and view. After the associated exams, tests, and procedures have been documented in the system they will be available via the "EPC" function in the "check-up" item.

3.4.5.2 Organ transplant (donors and recipients) process and management

This feature supports the search for potential donors and to manage the uptake processes, implant, and postoperative care of transplant patients.

After identifying patients as potential living donors and/or cadaver donors, the user registers in the "Transplant Management" function all information regarding laboratory and non-laboratory tests, compatibility tests such as: HLA, Antibody Reactive Panel and Crossmatch.

In cadaveric donor patients, the user can record information related to organ removal such as: perfusion solutions, date and time of hot and cold ischemia and other surgical characteristics evidenced in the surgical report.

Once the recipient has been selected, the user registers the recipient's treatment (Pre-transplant, Transplant and Post-transplant), and configures protocols for laboratory and non-laboratory tests, types of tests and compatibility.

For consulting patients (recipients and donors), the user can record the actions of calling for any consultations, pre-transplant and post-transplant.

3.4.5.3 Dialysis process

This feature aims to support health professionals in the reception and care of dialysis patients.

Before starting the reception and care, the user accesses the function "Kidney Failure Management" to register the patient, define the scale, shifts and treatment units, the access technique, the dialyzer and dialysis point, and whether the patient uses any medication.

In this same function, the user accesses the tab "Records" to register the patient, dialyzer, machines and reprocessors. In the tab "Records", after the patient's previous registration, the user selects the patient, using double click, and registers information such as: dialysis access, serology, dialysis scale and shift, type of treatment, teams, exams protocol, vaccines, among other information. Still in the same function, on the tab "Reuse Management", the user registers the dialyzer for the patient, initiates and finalizes reprocessing, prepares or discards the dialyzer.

In the tab "Occupancy", the user monitors the scheduling of the session and also, transfers the patient to another dialysis point through the right click mouse option "Transfer selected time slot".

3.4.5.4 Telehealth

This feature supports the configuration and activation of audiovisual communication tools to allow access between patients and/or bedside clinical users to the remote clinical users.

In the function "Audio Video Communication", the users can configure the video servers (tenant) for communication with audio and video providers, linking them to the respective departments and beds. It is possible to define the notification recipients and view the notification logs. The units connected to audio and video resources must be previously identified in the "Organizational Structure" function.

NOTE If there is an error in the audio/video communication, the system will display a message to inform the user.

The bedside user needs to press the virtual call routine or emergency soft button to get telehealth support, notifying users of specific establishments, departments, units, or patients.

Remote users receive on-screen notifications, alerting incoming calls. By clicking on the notification, the user opens the screen for audiovisual communication. This call can involve multiple stakeholders according to proper privilege and invitations. There are three possible call statuses (available, in progress, and privacy mode, respecting momentaneous conditions of the patient). Video calls can also be triggered using the "Patient Summary" and "Clinical Panorama" functions.

3.4.6 Management, execution and reporting of exams and procedures

A subgroup of features related to management of the processes that involve exams and procedures and controls inherent to each type.

3.4.6.1 Laboratory exams (management, execution and reporting)

This feature provides detailed information about laboratory exams workflows, including prescription, sample collection, execution, submission, reporting, and traceability.



WARNING

Some medicines and drugs may have the similar spellings related to their commercial name or the active ingredient / formula. This may pose a mix up when ordering the medicine for a selected patient. Hence, configure the medicine and material catalogs in such a way to prevent or reduce the possibility of errors while selecting a medicine or drug. One recommended way of attaining this is uppercase lettering to help distinguish sound-alike or look-alike medicine names. For similar reasons, materials, procedures and exams may also require the same attention during the configuration process.

Hospitals and clinics use the function "Laboratory Tests" to configure the laboratory exams, defining relevant information such as specimen, methods, equipment, reference values, and report structure.

Based on the exams configured in the previous function, the clinician can request them in the "CPOE" function and verify the schedule of sample collections in the "e-MAR" function.

The function "Laboratory Management/LIS" manages laboratory tests internally performed or exam results received via an interface. It supports the entire specimen process and tracking in the laboratory department,

including sample identification and distribution, accountable professionals of each analytical step, tests applied for each sample, result submission, and printing reports.

The patient submitted results are also available in the “Lab tests” item on the “EPC” function for clinical use.

3.4.6.2 Image exams (management, execution and reporting)

This feature supports the management of the entire flow of imaging exams, from viewing the order request to releasing the report.

The workflow of imaging exams consists of the following steps: View exam order request, record and monitor the transition of exam from one status to another in the workflow process, follow-up and release of the patient reports through a worklist.

The primary function of the system associated with setup of the reports is “Medical Report Infrastructure”. The user can configure different report templates, using macros and standardized sentences. Rules for access control to these templates can be defined for specific users, and for specific exams.

Clinical and administrative professionals can access the “Exam Management” and “Patient Registration” functions to manage and view the imaging exam orders. Access the “Exam Management” function to register and manage each step of the workflow process, choose the exam in the worklist and confirm the finalization of each step as the exam passes through the workflow.

Radiologists use the function “Medical Report Processing” to manage reports by using functionalities such as, managing a user-specific worklist, requesting/providing the medical opinion of another professional in a report, and managing the status of the processes via the worklist.

Use the “Medical Report Processing” function to choose previously executed exams from the worklist. The process of creating and releasing the report uses the predefined configurations from the function “Medical Report Infrastructure” to standardize and automate certain elements in the report.

3.4.6.3 Anatomical pathology (management, execution and reporting)

The anatomical pathology allows an analysis of cells, tissues and organs from the reception of the samples, manufacturing of slides and preparation of cytological, histological, immunohistochemistry and immunofluorescence tests to support pre- and post-surgical processes, as well as diagnoses. In addition, it is possible to carry out complementary tests to ensure the exact analysis. After the analysis, the results will be delivered together with the diagnosis directly in the electronic health record.

The anatomical pathology management includes sample received, defining and executing the technique to be applied for analysis, complementary exams request and issuing reports, being fundamental action to ensure traceability in the sample sent and as well as safe and effective results.

Samples can be received via a prescription created in the “CPOE” or “Patient Registration” functions. After the samples arrive in the technical area, it is possible to carry out the macroscopy and the separation of the samples into sub-samples for analysis, according to the process of each type of sample.

After the macroscopy is released, the pathologist initiates the report using the “Histopathology Report” function, loads administrative information for the report, and finally the responsible medical area types the macroscopy results used when composing the final report. The pathologist will then be able to type the final report including the microscopy results, conclusion and guidance in the report. After finalizing the report, the medical professional can approve and release the report by making the report available on the portal and in the patient's chart.

3.4.7 Scheduling system

A subgroup of features related to scheduling of the clinical services offered by the institution.

3.4.7.1 Image exams scheduling process

This function allows the user to schedule Image Exams such as, magnetic resonance, x-Ray, computed tomography, and the management of the main system agendas such as exams, services, surgeries, procedures, and appointments schedule. The function “Exam Schedule” is used to facilitate the scheduling process independently, by schedule type or in an integrated way grouping several schedule types. Usage can be either be by sector or in an appointment center.

You can create a scheduling structure by group of exams or sectors, for each structure it allows you to create mandatory professional information, consent, and procedures. It also allows you to create differentiated and temporary scheduling times, and it also provides resources for the use of a call panel for patients who will be seen and who will undergo exams.

Scheduling can be performed independently, by type of agenda, in an integrated way, grouping several types of agendas. It can be used either by sector or in a call center.

This function has communication with other functions such as “Patient Registration”, “Electronic Patient Chart”, and “Patient Account”.

3.4.8 Occupation, beds and units management

A subgroup of features related to capacity management including the configuration of units, sectors and beds, occupation and hygiene.

3.4.8.1 Beds, rooms and units configuration

This feature supports users in configuring beds, rooms, and units of healthcare organizations, defining their capacity to host patients.

Using the function “Organizational Structure”, the user can create departments and units defining the configuration, such as unit classification and location in the hospital.

For each unit, the user can configure the number of rooms and beds. Each bed has multiple parameters, for example, the number of beds inside a room, gender assignment, and configure the beds and which beds can be accessed from an external interface, in case of telehealth.

Medical department is a concept of associating units, not in a hierarchy structure. By associating a unit with a medical department, a logical structure is created in the system to be used in other functions, such as “Clinical Panorama”. For example, by filtering in the function “Clinical Panorama”, it is possible to select a specific medical department, which displays the associated units. This association is important for loaned beds and billing perspectives.

3.4.8.2 Occupation management

This feature supports the healthcare organization’s occupation capacity management, critical to their operational and financial performances.

Using the “Core Tables Settings” function, the institution can configure related information such as age classification, sanitization reasons, bed isolation, visitors flow, and displaying beds methods. In addition, it is possible to set user access privileges and information qualifications, such as mandatory.

The “Hospital Occupancy” function allows the user to have an integrated view of the occupancy maps and units (census) and manage them with relevant information such as the probability of discharge, bed isolation and reservation, current bed status, sanitization control, hospitalizations, and surgeries.

The information recorded in the “Hospital Occupancy” is used in several other parts of the system, such as “Visitor Control”, “Movement of Patients”, “Patient Registration”, and “Organizational Structure” functions.

3.4.9 Personnel, visitors and legal entity management

A subgroup of features related to information of the personnel and physicians that work in the institution.

3.4.9.1 Employee index

This feature supports the enrollment, viewing, and management of hospital employees, job title, and department changes. Use the “Employee Record” function to add new employee records or edit existing records. First, add information related to the person such as, the name, ID number, nationality, gender and blood type. Next, add professional data, which includes the hiring and/or termination date, profession/occupation, employee department. Finally, add attachments and documentation, bank account information, and education.

Use the right-click options to create a user and password so that the new employee can access the system. Also, change the employee password, department, or job title when the employee is promoted, for example.

Use the “Person/Legal Entity Consultation” function for read-only access to employee information, such as the name, phone number, address, level of education and occupation.

3.4.9.2 Legal entity index

This feature supports the enrollment, view, and management of the legal entities the hospital has a relationship with, such as suppliers, insurance companies, laboratories, service providers, and clinics.

To enroll a legal entity, open the “Legal Entity” function and record the required information, such as the entity’s name, the reference number or code (for example, the EIN in the USA and RFC in Australia), address, phone number, e-mail, payment method, and terms. In addition, it is possible to attach specific documentation or certificates.

This function also allows the user to modify entity records, adjust duplicated records, check change logs, and evaluate the legal entity quality performance. When physicians have their legal entity, it is possible to link the physician’s legal entity to the physician record in the “Physician Record” function, which facilitates separating the medical services from the hospital bill.

After the proper enrollment of the legal entity, the users can generate new contracts, purchase orders, and invoices. In addition, it is possible to link a legal entity to an incoming medicine batch, there by maintaining traceability between products and suppliers.

3.4.9.3 Physician index

This feature allows the user to create and manage a database of professional information for physicians linked to the institution.

The “Physician Record” function presents a set of professional information from the institution’s physicians, a mandatory requirement for all management and for the quality of care provided.

The physician formalizes the professional registration for various accesses in the entity. In the “Physician Record” function it is possible to establish records such as area of activity, employment relationship, professional advice, specialty, professional code, legal entity, insurance, attach documents, personnel management, visitors and legal entity.

When the physician information is linked with the user information, the system allows the physician to register the order in the “CPOE” function, access the patient’s record in the “EPC” function, and access their schedules.

3.4.9.4 Visitors and personnel access control

feature supports the clinical user to register the people circulating in the institution, as well as restrict access levels as needed.

By opening the “Visitor Control” function, the user selects a patient according to filter options such as encounter or department. Next, the user can add the visitor information (entry and exit date, person’s name, type of relationship with the patient, date of birth, personal data) and capture an image the visitor. The user can also register blocked and authorized visitors and companions or only the companions and print the label to identify the visitor.

In the same function, the user can view the entries by department and check the outflows.

To register the professional assessment recording the approval result (canceled, not assessed, approved, disapproved), is it necessary to open the “Professional Access Management” function. First, the user can add the professional, define the process type and generate stages. In each stage, the user can define the result (if the professional was approved, disapproved, or not assessed) and link the courses, training, and documents.

In the same function, the user can follow the professional assessment and define if she/he is able to work in the institution or in the new team.

3.4.10 Processes, documents and quality management systems

A subgroup of features to register, manage, and monitor documents, aiming to improve results within operational and clinical processes.

3.4.10.1 Paper health records management

The paper medical record is necessary even when the institution uses an electronic medical record. It can be used for legal and clinical reasons, enabling communication between the care team, and giving continuity of care.

This feature aims to organize and manage paper-based data and is used for both the administrative staff and the clinical team. The main functions associated with it are “Health Information Management”, “Medical record control”, “Medical record Internal control”, and “Medical Record Issue”.

The “Health Information Management” function supports the management of medical record movements, the requests submitted, and pending medical records. This function allows the user to add new volumes in a medical record; group, inactivate, and destroy records; define the type of physical record; register lends and copies; transfer the medical record storage to different locations.

In Addition, the user can view the information of the volume of records, status, sequence, current department of the medical record, location within the department, add comments in the notes section, and create alerts for the patients.

In the “Medical Record Control” and “Medical Record Internal Control” functions, the user can register the medical record operations, like requests, loans and reviews. As well as check the lent medical records in pendency.

The function “Medical Record Issue” allows the user to select and print the content of the patient medical record. For reasons of data security, only responsible professionals assigned by the institution can record and print the report with some or all of the patient’s data. The main data set involves the requesting professional, start and end dates, as well as definition of the full or partial issuance of the medical record. The institution can control the sequence of requested items selected and generated for each patient.

3.4.10.2 Attachment document process

The attachment document process feature enables the user to attach documents, photos, exams and other kinds of paper-based information to the electronic health record and other operational activities.

Allows relevant external information to be available in the electronic health record and other operational functionalities.

3.4.10.3 Glossary tools

This feature aims provide the user possibilities to set and identify terms and concepts that the institution allows to use in the clinical record.

The user can configure the glossary with the main acronyms, terms, and abbreviations in the function “Patient Chart Settings”, informing the abbreviation name, abbreviated meaning, classification, and the meaning expression specified.

In the “Electronic Patient Chart” function, after selecting a patient and entering a new clinical note, the user can access and check the glossary clicking on the “select glossary word” option.

The user can search in the “Glossary Consultation” function by using the filter to find acronyms, terms, and abbreviations available.

3.4.10.4 Clinical quality management

This feature aims to facilitate the search for previously recorded clinical information that can support the follow-up of the quality of assistance offered to patient.

The main functions associated with this feature are “Healthcare Quality Management – HQM” to search and view the main data and the “EPC” function to document the clinical records.

Through settings with filters the user obtains clinical information, allowing for an analysis and understanding of the care processes from the professional workflow. For example, searching for inpatients with prophylaxis for venous thromboembolism, by any diagnosis, surgery or a related key-word. This analysis targets to match the quality goals of the institution using auto-refresh to guarantee the most up-to-date information.

3.4.11 Purchase and warehouse management

A subgroup of features related to asset and service acquisition needs of the institution.

3.4.11.1 General material settings

This feature supports the user in configuring a data set of items that need inventory control or purchasing by the institution, such as hospital supplies, office supplies, cleaning materials, medication, enteral diets, and infant formula.



WARNING

The healthcare organization is responsible for the proper information configuration and maintenance of the medicine and material catalog, since it will influence the clinical workflows bringing information such as default dose, alerts when the dose is out of limits, and dilution and reconstitution.



WARNING

Some medicines and drugs may have the similar spellings related to their commercial name or the active ingredient / formula. This may pose a mix up when ordering the medicine for a selected patient. Hence, configure the medicine and material catalogs in such a way to prevent or reduce the possibility of errors while selecting a medicine or drug. One recommended way of attaining this is uppercase lettering to help distinguish sound-alike or look-alike medicine names. For similar reasons, materials, procedures and exams may also require the same attention during the configuration process.

In the “Material Record” function, the user can check the quantity of the item in stock and its price, link a kit (set) of materials to dispense with the medication, link a reconstitution, dilution, and re-dilution of the medication, and adapt them to patient’s profile or conditions, if needed. In addition, the user can define medication dose limits, drug interactions, and routes of administration suitable for the medication.

The user can still define a minimum stock limit to support the proper purchasing process, aiming to resupply the stock efficiently.

This functionality allows the user to configure several aspects related to the medications, such as linking the drug to the active ingredient, the generic drug and the stock material, for inventory controlling (when having the same drug from different brands), informing if the item is or not standardized in the institution, and the conversions of the units of measurement (for example, one tablet is equivalent to 500 mg).

NOTE For medication configuration, the institution can use either this feature or an one specific for medications, called Drug Settings.

3.4.12 Operational maintenance

A subgroup of features related to the service orders maintenance system and equipment management.

3.4.12.1 Equipment management

This feature supports the user to register the institution’s equipment and vehicles, aiming to have an accurate inventory, ability to manage the maintenance, and share them among different system functions.

In the “Equipment Control” function, the user can register several sorts of available equipment in the institution, linking each of them to cost center, year of manufacture, manufacturer, brand, model, batch, serial number, voltage, power, color, life span in years and months, technical assistance information, and information about any transfers between locations. In the case of infusion pumps, it is possible to register the pump channels if it has more than one.

In addition, the “Equipment Control” function supports the user to manage the equipment maintenance, allowing to define preventive maintenance schedule, corrective maintenance, life span, and the need for replacement in some instances. Rules can be created to automate this process and notify the professional staff. Finally, it is also possible to register automotive vehicles, linking the license plate number, chassis, year of manufacture, and other relevant information.

3.4.12.2 Service orders management

This feature allows the institution to configure, record, and manage the service orders (SO’s) for operational maintenance.

The main system functions associated with this feature are “Core Tables Settings”, “Maintenance Records”, “Planning group”, “Workgroup”, and “Service Orders Management” functions.

Each institution needs to configure the main records using the “Core Table Settings” function. According to the processes defined, some records are needed such as the “Categories of service order”, “Classification of Service Orders”, “Complexity of the SO”, “Equipment status”, “Process stage”, “Service orders protocol”, and “Types of SO History”.

In the “Maintenance Records” function the user can record the location of the equipment that needs maintenance. In the “Workgroup” function it is possible to configure the professionals responsible for carrying out maintenance. The “Planning group” function is used to associate the records performed from the “Workgroup” function, complementing the configuration to manage the service orders.

In the “Equipment control” function the user can configure the equipment types, rules to generate the preventive work order, and the equipment with additional data such as description, year of manufacture, series, value acquisition, width, height, weight (kg).

In the “Service Orders Management” function the institution can manage the processes monitoring the service orders generation, execution, allocation, and closing the service orders. For each service order performed, the user can carry out actions such as adding history, changing process status, attaching files, activities performed, sending e-mail, assigning people responsible and control pending, and performed actions.

According to the previous configuration, the user can allocate the right order to the right professional, generating indicators for quality purposes. Alerts and other types of communication can be viewed such as email and messages on the screen. It allows the user to record and follow up of service orders for the treatment and fulfillment of specific demands with detailed data used for allocation of resources, costing, quotations, and materials used.

3.4.13 Business intelligence and strategy

A subgroup of features that encompass the healthcare institution’s strategic planning measurement and control tools through key performance indicators (KPI) and balanced scorecard (BSC).

3.4.13.1 Key performance indicators configuration

This feature supports the user to manage the registration of indicator rules for the generation of standardized information that supports performance measurement and monitoring.

The indicator rules configuration is used to automate the records, transactions, and analysis performed in the management processes and entity strategic performance.

The resource can record indicators such as visualizations per user, record the dimensions of the indicators, record the indicators for viewing in the dashboard, select multiple indicators for viewing on the dashboard, and selection of different chart types available on the functionality to display the indicators.

3.4.13.2 Key performance indicators dashboard

Performance indicators are management tools that track the measurement of an entity’s process on its global performance. They are used by the leadership, supporting them to reach their targets and objectives.

This feature supports the user to configure the dashboards that will be available for the beds in the “Clinical Panorama” function, configure whether the dashboard will be available only in the function “Clinical Panorama”, configure the display of data in the dashboard and configure the query with conditions, data elements, properties, and time interval.

The recording and monitoring of indicators allow the entity to check the critical processes and staff performance.

3.4.14 Advanced business management

Advanced business management provides an integrated solution that helps with hospitals' operational improvements by using analytics that highlight bottlenecks and enable insights-to-action workflows.

3.4.14.1 Capacity and performance management

This feature aggregates, stores, and displays operational capacity information obtained from electronic medical records, patient monitoring systems and ancillary systems connected through networks.

NOTE This feature is an informational tool for operational support and is not intended to be used for active patient care, care management or to support any clinical decision process.

Capacity and performance management aims to display information relevant for allocating the clinical resources of one or more hospitals with a data-driven approach. It uses current data to measure throughput and makes projections based on previous data.

Hospitals View

A healthcare institution may consist of multiple establishments that operate in conjunction to provide services over a large geographic area. Organizational structure refers to the way in which one or more healthcare institutions are organized in terms of establishments, units, and beds. After defining the organizational structure in the function "PFCS – Settings", the initial screen of the function "Enterprise Demand" will display a tile for each establishment. This initial screen is also referred to as the "Hospitals" view. Each tile contains a high-level summary with the following data: Overall capacity, Census, ED census, Average ED waiting time, Available beds, Unavailable beds, Available ICU beds, Available telemetry beds, Admissions (last 24h), Discharges (last 24h), Capacity, Surgical Indicators (Estimated, Slots available, Performed/Scheduled, Urgent surgery, Cancelled, OR Occupancy, Not approved). The metrics present current values, and projected values when available. Metrics are displayed for periods of 8, 12 or 14 hours, which is defined in the filter.

Using the current overview, predicted capacity, and bed availability of the hospital(s) on this dashboard, a qualified professional can:

- Redirect Incoming patient arrivals to lower census hospitals
- Match incoming ambulances to the right acuity hospitals
- Activate surge plans in a timely manner to prevent bottlenecks
- Plan for and appropriately allocate staffing and resources (PPE, ventilators, and ancillary staff) to match the demand

Click on a tile to drill down and see more detailed information specific to that hospital. The screen switches to a module overview, and a breadcrumb component is displayed in the top left corner above the left panel. Click an item in the breadcrumb trail to return to a previous screen.

The information in the module overview screen is useful for identifying the overall situation of a hospital. This general summary may be useful for identifying bottlenecks and managing resources within the hospital. The screen is divided into a left panel and a right panel. The left panel shows hospital indicators from the hospital selected in the previous screen. The module overview on the right panel displays the modules which are enabled for the hospital.

The following modules are available and can be enabled for the hospital: Admission Prioritizer, Intensive Care Units, Transitional Care units, Acute Care Units, Discharge Manager, Telemetry, Emergency Department, Surgical Center, Hospital at Home

Module Overview

From the module overview list, each module is accessed by double-clicking on its corresponding row on the dashboard.

Modules all follow a similar layout, separated into a smaller side-panel on the left side for ease of navigation between modules and a larger panel on the right side with the main dashboard elements. The tiles on the left side panel provide a summary of relevant metrics for each module. The user can switch between modules by clicking on the corresponding card on the left panel. The right-side panel contains the dashboard, which is composed of various tiles organized in different layouts depending on the module. After entering a module view, another level appears in the breadcrumb component, which is displayed in the top left corner above the left panel, click an item in the breadcrumb trail to return to a previous screen. Right click on the main dashboard to get an option to display the main dashboard in full screen view, an option that is useful for displaying on larger screens for shared viewing, in a control center for example.

Admission Prioritizer

Double click on the “Admission Prioritizer” module row in the “Module Overview” screen to access the module. On the left, there is a list of enabled dashboards, click on the items in the list to switch between modules without having to go back to the “Module Overview”.

The “Admission Prioritizer” module aims to predict admission volumes & transition reviews to prioritize admissions and prevent delays in care.

- Predicted Census Analytic projects the census for the next few shifts.
- Transition Review Score provides early signaling to command center operators to alert clinicians to check on patients who may be clinically deteriorating or need escalated care.
- Readmission Prediction Score (RPS) Analytic scores patients for risk of readmission as soon as possible after the patient is admitted to the hospital.
- Recurring Patient Analytic flags patients who are readmitted. A patient checklist tracks the care progression and provides visual alerts for any delays in care.

Together, these analytics aim to help care coordinators proactively identify high risk patients, prioritize their care to prevent deterioration and prevent unnecessary days by starting early care coordination plans for post-acute care services, ensuring continuity of care that improves patient outcomes.

Intensive Care Units

Double click on the “Intensive Care Unit” module row in the “Module Overview” screen to access the module. On the left, there is a list of enabled dashboards, click on the items in the list to switch between modules without having to go back to the “Module Overview”.

There are three unit categories that populate Intensive Care Unit indicators: Intensive Care Unit (ICU), Pediatric Intensive Care Unit (PEDIKU) and Pediatric Neonatal Intensive Care Unit (PENICU). The ICU module shows current demand and predicted demand for intensive care beds, incoming critical care admissions, and transitioning of intensive care patients out of ICU. These metrics support qualified professionals to manage ICU transitions and to plan for adequate staffing and resources, expected to decrease ICU LOS and improve patient outcomes and the hospitals bottom line.

Double-clicking on any of these metrics on the dashboard opens a Multi-Patient List “MPL” that displays a related and more detailed patient data screen.

Transitional Care Units

Double click on the “Transitional Care Units” row in the “Module Overview” screen to access the module. On the left, there is a list of enabled dashboards, click on the items in the list to switch between modules without having to go back to the “Module Overview”.

There are two unit categories that populate Transitional Care Unit indicators: Transitional Care Units (TCU) and Progressive Care Unit (PCU). The main screen of the module “Transitional Care Units” displays the Care Unit Modules indicators (on the right-side screen). These are the same indicators that are described above in the Intensive Care Unit module. The TCU module uses the same analytics as the ICU module to help determine and manage resources needed and beds.

The “Transitional Care Units” module supports qualified professionals to manage transitional care capacity and identify patients to evaluate for transition out of ICU or other care settings.

Acute Care Units

Double click on the “Acute Care Units” row in the “Module Overview” screen to access this module. On the left, there is a list of enabled dashboards, click on the items in the list to switch between modules without having to go back to the “Module Overview”.

There are four unit categories that populate Acute Care Unit indicators: Acute Care Unit (ACU), Medical-Surgical (MEDSURG), Hospitalization units (HU), and Rehabilitation Hospital Unit (RHU). The main screen of the module “Acute Care Units” displays the Care Unit Modules indicators (on the right-side screen). These are the same indicators that are described above in the Intensive Care Unit module. The ACU module uses the same analytics as the ICU module to help determine and manage resources needed and beds.

The “Acute Care Units” module supports qualified professionals to manage acute care capacity and identify patients to evaluate for transition out or other care settings.

Telemetry Performance Management



WARNING

The web based DWC or PICiX system is the final source of truth for displaying the information and grouping by colors. The user must be aware of this when configuring the system, and the user must set the display and color rules according to the definitions used in the DWC or PICiX system. The Telemetry Performance Management module must remain aligned with DWC or PICiX system because it operates within the definitions of these other systems.



WARNING

The system summarizes data coming from PICiX. Before taking any decision about the patient, the clinicians must confirm the origin of the information. The system only displays the data received from these external systems.



WARNING

Transition Review Score (TRS) is a Philips proprietary algorithm that combines patients' vital signs and physiological data to predict readiness to move to the next care setting. The users must not use TRS score to support any clinical decision or any clinical process.

Double click on the “Telemetry” row in the “Module Overview” screen to access this module. On the left, there is a list of enabled dashboards, click on the items in the list to switch between modules without having to go back to the “Module Overview”.

The module “Telemetry” displays information about telemetry monitors of the hospital, telemetry requests and discontinuation of telemetry. This module supports the health care provider to manage use and avoids overuse of telemetry monitoring equipment. The telemetry overview includes:

Incoming telemetry requests for patients who need to start being monitored on telemetry.

Current telemetry device utilization across all units in the hospital, include device battery information.

Transitioning patients off telemetry monitoring including discharge orders and patients who have been on telemetry monitoring over a specified period.

MPL at the patient level to easily manage patient transitions in this module.

This module uses analytics to visualize telemetry utilization and prioritizes telemetry discontinuation reviews to prevent upstream bottlenecks that can result from telemetry overuse.

Telemetry Alarm Load and Trending Analytic map out the number, frequency, and occurrence of telemetry alarms to help determine if continued telemetry monitoring is necessary.

The transition review score (TRS) identifies telemetry patients who are physiologically stable to be evaluated for telemetry discontinuation.

In addition to device management, this module combines these two analytics to prioritize patients to review for telemetry discontinuation and free up telemetry devices to meet demand.

Emergency Department

Double click on the “Emergency Department” row in the “Module Overview” screen to access this module. On the left, there is a list of enabled dashboards, click on the items in the list to switch between modules without having to go back to the “Module Overview”.

The right-side panel of the Emergency Department dashboard shows a division into three parts of the same size. On the left is the subpanel “Reception”, in the middle is the subpanel “Encounters”, and on the right is the subpanel “Outcome”.

The “Reception” panel displays data related to the ED waiting room, such as waiting time and waiting numbers grouped by queues, in addition to data on ongoing encounters, such as number of encounters (inside and outside the hospital network, if applicable), encounters grouped by specialties and programs (if applicable).

The “Encounters” panel displays information about encounters in progress by separating data into three main stages: triage, medical consultation, and care flow.

The “Outcome” panel shows both encounters in progress (such as number of patients under observation, total time in the emergency department and encounters grouped by risk classification) and encounters that have already been completed.

Discharge Manager

Double click on the “Discharge Manager” row in the “Module Overview” screen to access this module. On the left, there is a list of enabled dashboards, click on the items in the list to switch between modules without having to go back to the “Module Overview”.

The right-side panel of the Discharge Manager dashboard shows a division into two parts of the same size. On the left is the subpanel “Discharge order management”, and on the right is the subpanel “Discharge delay management”

Surgical Center

Double click on the “Surgical Center” row in the “Module Overview” screen to access this module. On the left, there is a list of enabled dashboards, click on the items in the list to switch between modules without having to go back to the “Module Overview”.

The “Surgical Center” module provides an overview of the hospital's surgical procedures, requests for operating room time, current ongoing surgeries, available operating room hours and post-anesthetic recovery time using the following metrics: Percentage of performed surgeries out of total scheduled surgeries in the hospital, Fraction of occupied rooms out of total operating rooms, Fraction of occupied PACU beds out of total PACU beds.

The right-side panel of the dashboard further divides the information into three parts. “Scheduled procedure”, “Operating room”, and “PACU”.

Hospital at Home

Double click on the “Hospital at Home” row in the “Module Overview” screen to access this module. On the left, there is a list of enabled dashboards, click on the items in the list to switch between modules without having to go back to the “Module Overview”.

This module uses the following metrics in the context of hospital at home units: Census, Total admissions, Discharge orders, Potential patients

Toggle between the radio buttons to switch between “Current” and “Potential” panels.

The panel “Current” displays information about the current situation in the units with “Hospital at Home”. When the “Current” tab is selected, the screen shows unit-wise details for the “Hospital at Home” module in a grid with the following columns: Unit, Census, Exp discharge, Total discharge, Discharge orders, Expected transfer (in), Expected transfer (out), Total admissions, Expected admissions, Admission orders, Special requirements, Average admission time, Transfer orders, Delays

The panel “Potential” displays patients who are candidates for a care settings change. Specify search criteria in the filter to identify patients who are currently in other care settings (Emergency Department, ICU, TCU) and can be moved to the “Hospital at Home” program or other care settings. Filter criteria: Care setting, Diagnosis, TRS score, Readmission risk, Recurring patient flag, Predicted remaining LOS, Postal code, Marital status, Age.

Staffing

Double click on the “Staffing” row in the “Module Overview” screen to access this module. On the left, there is a list of enabled dashboards, click on the items in the list to switch between modules without having to go back to the “Module Overview”.

This module provides visibility of the number of nursing staff, with the objective aiding qualified professionals to monitor the ratio of nurses to patients, identify bottlenecks, and prepare for periods of increased demand.

The right-side panel displays horizontal tabs along the top for different types of care level. The tab for an overview considers all types of care level units combined, while the tabs for ICU, TCU, and ACU consider only the data from their respective types of care unit. Regardless of the horizontal tab that is selected, the layout of the cards on the dashboard in the main panel remains the same. The main panel is divided into two equal parts, one for metrics regarding staffing of nurses, and the other for patient flow.

The staffing overview displays the current number of assigned nursing staff, the optimal number of assigned nursing staff, and the difference, also referred to as the deficit. A grid below contains staffing information where each line is grouped by unit, it displays the unit name, number of assigned staff, staff deficit, and the number of pending admissions versus discharges as a ratio.

The patient flow overview displays the current patient census, number of pending procedures, and number of delayed pending procedures. A grid below contains information about patient flow activity, it displays the number of patients with a pending request for admission, number of patients with a pending request for discharge, number of patients with a pending request for transfer to another unit, and the corresponding average wait time for each.

Customization of Modules

Standard modules can be copied, renamed, reorganized to present the existing functionalities in a custom layout, and the main user interface texts can be adjusted to accommodate the terminology desired by healthcare institution. The standard modules cannot be edited, however, to facilitate the customization process, the standard modules can be viewed through the customization tools in a read-only fashion. This serves as an example of how the layouts are constructed and configured.

3.4.15 Operation and legal supporting tools

A subgroup of features related to operation and legal supporting tools.

3.4.15.1 Chemotherapy scheduling process

This feature supports nurses and pharmacists in the chemotherapy management process. To use the feature, select the “Chemotherapy” function and use the filter options to view the information in the patient worklist.

When selecting the patient, it is possible to check the arrival, define accommodation, start, and end the triage, generate chemotherapy orders, and visualize inconsistencies. Select the “Nursing” and “Schedule” tabs in the “Chemotherapy” function to perform these actions.

The pharmacist can see the patient medications to be handled for the day. According to the information added in the filter, it is possible to generate chemotherapy production orders, double-check them, generate the manipulation steps, add the medication in the handling cabin, manipulate the medication, register the surplus and the overfill. The user needs to access the “Chemotherapy” function directly and select the Pharmacy tab. After the medication is handled, it can be appropriately dispensed and delivered to the patient.

3.4.15.2 Master person index

This feature supports the recording and management of the personal, demographic, and socioeconomic information related to every stakeholder involved in healthcare, such as patients, physicians, and all healthcare professionals, employees, visitors, and companions.

Using the “Core Tables Settings” function, the institution can configure related information such as nationality, religion, and occupation, define if it is mandatory and if it can be edited, and user access privileges.

The “Master Person Index” (MPI) function allows the user to record and manage the complete personal information, including family ties, contacts, addresses, national identification number, health insurance information. In the “Record” tab, the user can enter information such as past medical history, allergies, language, and habits. In addition, it is possible to check the logs of changes and authorship of the person’s records.

**WARNING**

To avoid data-related issues, it is highly recommended to maintain an accurate MPI database, without ambiguities or duplications, particularly related to names with similar spellings. In case of duplication of a person's records, there is a capability in the “MPI” function to merge them into one.

Apart from the capability to support a complete and potentially unequivocal identification of a patient in a non-urgent condition, the system allows the institution to handle situations in which it is important to have a quick enrollment of a person with basic information to characterize someone and expedite care delivery in an emergency department.

NOTE The information recorded in the “MPI” function is used in several other parts of the system, such as “Patient Registration”, “Simplified Register of People”, “Physician Record”, “Emergency Services” and “System Administration”.

NOTE To support the recording and management of legal entities, refer to the Legal Entity Index feature for further information.

3.4.15.3 Patient registration

This feature supports the user in the patient identification to be used in an admission into the healthcare organization. Besides that, this feature supports the user to register people (patients, companions, visitors, physicians, professionals, service provider), and ensure the data is up to date.

The admission process is done in the “Patient Registration” function. The user can register important information such as source of referral, method of arrival, physician responsible, type of insurance, person responsible for the patient, and define the patient accommodation. From a new encounter, it is possible to register other information, for example diagnosis, health history, professionals and retrieved exams.

Before starting the patient registration, the user needs to open the “Master Person Index” or “Simplified register of people” functions to fill out fields such as: personal information (name, date of birth, gender, documents, contact person, address), socioeconomic profile, consents, privacy, authorized access and visits. The user can manage and update patient’s information and register data not only about the patient but also companions, visitors, physicians, professionals, service provider.

3.4.15.4 Patient related specific operational processes

The feature supports the user in the operational processes related to patient care.

The main functions used to perform the processes are the “Electronic Patient Chart (EPC)”, “Electronic Outpatient Chart (EOC)”, “Ophthalmology”, and “Patient belongings”.

In the “Patient belongings” function, the user has a departmental view with several patients together, aiming to record and manage their belongings, exams, and other materials received or delivered during the admission episode.

In the “EPC”, “EOC”, and Ophthalmology functions, the user can record and manage the patient’s request and justifications (including attachments), the materials, exams and belongings receiving and delivery, questionnaires, probability of discharge, record the patient contact after discharge and managing the printing of patient information.

3.4.15.5 Patient tracking

This feature supports the recording and checking patient movement among the departments, units, sectors, and facilities of a healthcare organization.

In the “Core Tables Settings” function, the user can configure information such as types of transfer, department places, reasons, and types for bed reservation and discharge, prioritization of bed services, patient’s origin, age classifications, and patient’s companion. In addition, it is possible to set user access privileges and information qualifications, such as editable or mandatory.

The “Movement of Patients” function allows the user to change and track the patient’s movement along the journey in the institution from admission to discharge. All the movement among the units are updated and presented in an organized and chronological view. In addition, it is possible to check the logs of the changes and the authorship.

The information of patient tracking is also used by other services, such as the hospital occupation and infection stewardship.

4 Abbreviations, Acronyms and Definitions

Term	Definition
.dbf	dBase database file
@	At
2FA	Two-factor authentication
a.m.	Ante meridiem (before midday)
A-aO ₂	Alveolar to arterial Oxygen Gradient
ACC/ AHA	American College of Cardiology and the American Heart Association
ACP	American College of Physicians
ACS	Acute Coronary Syndrome
ACU	Acute Care Unit
AD	Active Directory
ADL	Activities of Daily Living
AF	Atrial Fibrillation
AKI	Acute Kidney Injury
AKIN	Acute Kidney Injury Network
AMC	Arm Muscle Circumference
amp	Ampoule
AMTS	Abbreviated Mental Test Score
ANSG	Subjective Global Nutritional Assessment. From the Portuguese “Avaliação Nutricional Subjetiva Global”
AOP	Arterial Occlusion Pressure
APAC	Authorization for Procedures of High Complexity from the Portuguese “Autorização de Procedimento de Alta Complexidade”
API	Application Programming Interface
aPTT	Activated Partial Thromboplastin Time
ARDS	Acute Respiratory Distress Syndrome
ASA	American Society of Anesthesiology
ASIA	American Spinal Injury Association
AST	Aspartate Aminotransferase
AUC	Area Under the Curve
AUDIT	Alcohol Use Disorder Identification Test
AWS	Alcohol Withdrawal Score
BAROS	Bariatric Analysis and Reporting Outcome System
BFP	Body Fat Percentage
BG	Blood Glucose
BI	Barthel Index
BMI	Body Mass Index
BMR	Basal Metabolic Rate
BP	Blood Pressure
BPA	Outpatient Production Bulletin from the Portuguese “Boletim de Produção Ambulatorial”
BPH	Benign Prostatic Hyperplasia
BPS	Behavioral Pain Scale
BSA	Body Surface Area
BSFS	Bristol Stool Form Scale
BSL	Blood Sugar Level
BUN	Blood Urea Nitrogen

Term	Definition
CABG	Coronary Artery Bypass Graft
CAM-ICU	Confusion Assessment Method for the Intensive Care Unit Scale
CAP	Community Acquired Pneumonia
CAT	COPD Assessment Test
CDS	Clinical Decision Support
Cdyn	Dynamic Compliance
CGC	Conventional Glucose Control
CGI-SCH SI	Clinical Global Impression – Schizophrenia Scale Severity of Illness
CHD	Coronary Heart Disease
CHEOPS	Children’s Hospital of Easter Ontario Pain Scale
CI	Cardiac Index
CIN	Contrast Induced Nephropathy
CL	Cormack-Lehane
CLMAP	Closed Loop Medication Administration Process
cm	Centimeter
cmH ₂ O	Centimeter of Water Column
CO	Cardiac Output
COPD	Chronic Obstructive Pulmonary Disease
CPAP	Continuous Positive Airway Pressure
CPIS	Clinical Pulmonary Infection Score
CPOE	Computerized Provider Order Entry
CPOT	Critical Care Pain Observation Tool
CPSS	Cincinnati Prehospital Stroke Scale
CrCl	Creatinine Clearance
CRIB	Clinical Risk Index for Babies
CRIES	Crying Requires oxygen Increased vital signs Expression Sleep
Cst	Static Lung Compliance
CT	Computed Tomography
CVA	Cerebrovascular Accident
CVP	Central Venous Pressure
CVVHD	Continuous Veno-venous Hemodialysis
CVVHDF	Continuous Veno-venous Hemodiafiltration
D50	25 grams of glucose in a 50 mL prefilled syringe (50% glucose)
DAP	Diastolic Arterial Pressure
DBP	Diastolic Blood Pressure
DFAP	Diastolic Femoral Arterial Pressure
DIS	Digital Interventional Suite
dL	Deciliter
DMS	Dialysis Malnutrition Score
DPAP	Diastolic Pulmonary Arterial Pressure
DRI	Dietary Reference Intake
DVT	Deep Vein Thrombosis
DWC	Data Warehouse Connect (Separate Philips product)
EAT	Eating Assessment Tool
EBI	Extended Barthel Index
ECOG	Eastern Cooperative Oncology Group
ED	Emergency Department
EDD	Expected discharge date
EEE	Estimated Energy Expenditure

Term	Definition
eGFR	Estimated Glomerular Filtration Rate
EHR	Electronic Health Record
EIN	Employer Identification Number
ELPO	Risk Assessment Scale for the Development of Injuries Resulting from Surgical Positioning
eMAR	Electronic Medication Administration Record
EMR	Electronic Medical Record
EOC	Electronic Outpatient Chart
EORTC QLQ-C30	European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core-30
EPAA	Electronic Pre-Anesthetic Assessment
EPAP	Expiratory Positive Airway Pressure
EPC	Electronic Patient Chart
EPS	Electronic Patient Summary
ER	Emergency Room
ESAS	Edmonton Symptom Assessment System
ESAS-Br	Edmonton Symptom Assessment System – Brazilian Version
ESI	Emergency Severity Index
ESPEN	European Society for Clinical Nutrition and Metabolism
ESS	Epworth Sleepiness Scale
EuroSCORE	European System for Cardiac Operative Risk Evaluation
F&A	Financial & Accounting
FEV1	Forced expiratory volume in 1 second
FHIR	Fast Healthcare Interoperability Resources
FIM	Functional Independence Measure
FiO ₂	Fraction of Inspired Oxygen
FIQ	Fibromyalgia Impact Questionnaire
FLACC	Face, Legs, Activity, Cry, Consolability scale
FM	Fibromyalgia
FRS	Framingham Risk Score
g	Gram
GA	Gestation Age
GCS	Glasgow Coma Scale
GCS-P	GCS Pupils Score
GF	Glomerular Filtration
GIR	Glucose Infusion Rate
GMFM	Gross Motor Function Measurement
GRC	Global Risk Classification
GRO	Austrian Federal Statistical Institute from Austrian German “Geburtenregister Österreich”
h	hour
HADS	Hospital Anxiety and Depression Score
HCP	Health Care Professional
HDF	Daily Hemodiafiltration
HDL	High-density Lipoprotein
HDRS	Hamilton Depression Rating Scale
HF	Heart Failure
HIS	Health Informatics Suite
HL7	Health Level 7






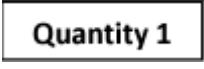

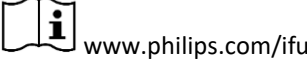



Term	Definition
HPAS	Health Professional Assistance Systematization
HR	Heart Rate
Hz	Hertz
IABP	Elective Intra-aortic Balloon Pump
IBE	IntelliBrigde Enterprise (Separate Philips product)
IBS	Irritable Bowel Syndrome
ICD	International Classification of Disease
ICDSC	Intensive Care Delirium Triage Checklist
ICPC	International Classification of Primary Care
ICU	Intensive Care Unit
IFU	Instruction for Use
IGC	Intensive Glucose Control
IHD	Intermittent Hemodialysis
INR	International Normalized Ratio
IoM	Institute of Medicine
IPAP	Inspiratory Positive Airway Pressure
ISNCSCI	International Standards for Neurological Classification of Spinal Cord Injury
IUD	Intrauterine Device
IV	Intravenous
IVCF-20	Clinical-Functional Vulnerability Index. From the Portuguese “Índice de Vulnerabilidade Clínico Funcional”
IVUS	Intravascular Ultrasound
JCS	Japan Coma Scale
Kcal	Kilocalorie
Kcal/Kg/day	Calorie intake per day
KDIGO	Kidney Disease Improving Global Outcomes
Kg	Kilogram
L	Liter
LDAP	Lightweight Directory Access Protocol
LDH	Lactate Dehydrogenase
LDL	Low-density Lipoprotein
LIS	Laboratory Information System
LMCA	Left Main Coronary Artery
LOS	Length of Stay
LVSW	Left Ventricle Systolic Work
LVSWI	Left Ventricle Systolic Work Index
m ²	Square meter
MAP	Mean Arterial Pressure
mcg	Microgram
MDF	Maddrey’s Discriminant Function
mEq	Milliequivalent
MEWS	Modified Early Warning Score
MFAP	Mean Femoral Arterial Pressure
MFS	Morse Fall Scale
mg	Milligram
MI	Myocardial Infarction
min	Minute
mL	Milliliter
mm	Millimeter

Term	Definition
mmHg	Millimeter of Mercury
mmol	Millimole
MNA	Mini Nutritional Assessment
MOPS	Modified Objective Pain Score
MOS	Medical Outcomes Study
MPAP	Mean Pulmonary Arterial Pressure
MPI	Master Person Index
MPL	Multi Patient List
MRN	Medical Record Number
MST	Malnutrition Screening Tool
MUST	Malnutrition Universal Screening Tool
NAS	Nursing Activities Score
NEWS	National Early Warning Score
NFCS	Neonatal Facial Coding System Score
NHL	Non-Hodgkin Lymphoma
NICU	Neonatal Intensive Care Unit
NIH	National Institute of Health
NIHSS	National Institute of Health Stroke Scale
NIPS	Neonatal Infant Pain Scale
N-PASS	Neonatal Pain, Agitation and Sedation Scale
NPC:N	Nonprotein calorie to nitrogen gram
NPP	Neuropathic Pain
NPRS	Numeric Pain Rating Scale
NRS	Nutritional Risk Screening
NSRAS	Neonatal Skin Risk Assessment Scale
NSTEMI	Non-ST Segment Elevation Myocardial Infarction
NTISS	Neonatal Therapeutic Intervention Scoring System
O ₂ Sat	Oxygen Saturation
OCT	Optical Coherence Tomography
OPS	Objective Pain Score
OR	Operating Room
p.m.	Post meridiem (after midday)
PaCO ₂	Partial Pressure of Carbon Dioxide
PACS	Picture Archiving and Communication System
PACU	Post-Anesthesia Care Unit
PAINAD	Pain Assessment Scale in Advanced Dementia
PaO ₂	Partial Pressure of Oxygen
PAOP	Pulmonary Artery Occluded Pressure
PCA	Patient-controlled Analgesia
PCI	Percutaneous Coronary Intervention
PE	Pulmonary Embolism
PEEP	Positive End-Expiratory Pressure
PEPC	Perioperative Electronic Patient Chart
PEWS	Pediatric Early Warning Score
PFCS	Patient Flow Capacity Suite
PG-SGA	Patient Generated Subjective Global Assessment
PHQ	Patient Health Questionnaire
PICiX	Patient Information Center iX (Separate Philips product)
PIM	Pediatric Index of Mortality

Term	Definition
PIP	Peak Inspiratory Pressure
PPI	Palliative Prognostic Index
PP-SGA	Patient-Produced Subjective Global Assessment
PRN	Pro Re Nata (Latin for “As needed” / “As the situation arises”)
PT	Prothrombin Time
PVR	Pulmonary Vascular Resistance
PVRI	Pulmonary Vascular Resistance Index
RASS	Richmond Agitation Sedation Scale
Raw	Resistance Airway
RFC	Registered Financial Corporations
RFID	Radio-frequency Identification
RIS	Radiological Information System
RPF	Recurring Patient Flag
RPS	Readmission Prediction Score
RR	Respiratory Rate
Rsr	Respiratory Resistance
RSS	Respiratory Severity Score
RVSW	Right Ventricle Systolic Work
RVSWI	Right Ventricle Systolic Work Index
s	Second
SAH	Subarachnoid Hemorrhage
SAP	Systolic Arterial Pressure
SBP	Systolic Blood Pressure
SCI	Spinal Cord Injury
SCUF	Slow Continuous Ultrafiltration
SDB	Stroke Data Bank
SFAP	Systolic Femoral Arterial Pressure
SI	Systolic Index
SIRS	Systemic Inflammatory Response Syndrome
SIV	Scale Integrated View
SLED	Sustained Low-efficiency Dialysis
SMS	Short Message Service
SNCP	Structured Nursing Care Process
SPAP	Systolic Pulmonary Arterial Pressure
SQL	Structured Query Language
STRONG	Screening Tool for Risk of Nutritional Status and Growth
SUS	Unified Health System. From the Portuguese “Sistema Único de Saúde”
SV	Systolic Volume
SVR	Systemic Vascular Resistance
SVRI	Systemic Vascular Resistance Index
TCU	Transitional Care Unit
TCV	Total Caloric Value
TEE	Total Energy Expenditure
TIA	Transient Ischemic Attack
TIE	Tasy Interface Engine
TNM	Cancer Staging System. Tumor (T), Node (N) and Metastasis (M).
TPE	Therapeutic Plasma Exchange
TPN	Total Parenteral Nutrition
TRS	Transition review score

Term	Definition
TUG	Timed Up and Go
TWSTRS	Toronto Western Spasmodic Torticollis Rating Scale
UoM	Units of Measure
USA	United States of America
UUN	Urinary Urea Nitrogen
VAP	Ventilator Associated Pneumonia
VAS	Visual Analogue Scale
VNS	Visual Numeric Scale
VTE	Venous Thromboembolism
WAT	Withdrawal Assessment Tool
WBC	White Blood Cells
WHO	World Health Organization
WHR	Waist-hip Ratio
XLS	File extension used for Microsoft Excel spreadsheets.
XML	Extensible Markup Language

5 Symbols Glossary

Symbol	Symbol Name	Symbol Description
	Manufacturer	Indicates the name and address of the manufacturer
	Date of Manufacturing	Indicates the date when the device was manufactured.
	Catalogue number	Indicates the manufacturer's catalogue number so that the device can be identified
	Batch code	Indicates the full Software Release/ Version number.
	Unique device identifier	Indicates a carrier that contains unique device identifier information
	Quantity of packaging	Indicates that there is only one of the software.
	Caution	CAUTIONS are directions, which if not followed, could cause damage to the equipment described in this Instructions for Use and/or any other equipment or goods, and/or cause environmental pollution. Also: This symbol is used on the device label to highlight the fact that there are specific warnings or precautions associated with the device, which are not otherwise found on the label.
	Consult instructions for use	Indicates the need for the user to consult the Instructions for use.
	Warning	WARNINGS are directions which if not followed could cause moderate to serious injury to a user, patient, or other person, or could lead to clinical misdiagnosis, and/or loss or damage of patient-related data. Also: This symbol is used on the device label to highlight the fact that there are specific warnings or precautions associated with the device, which are not otherwise found on the label.
	CE Marking of Conformity	Product meets the requirements of (EU) 2017/745 for Medical Devices distributed in the European Economic Area (EEA).
	Medical Device Indication	An indication that the device is a medical device.



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