

OMG – What is going wrong with PIVCs and how can we fix it?

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Welcome to the AVATAR Group

Making vascular access complications history!

Many vascular access devices are painful and difficult to insert. Studies show that 25% to 50% then fail due to infection, blockage, dislodgement or blood vessel damage.

Our goal is to make vascular access complications history.

The AVATAR Group undertakes committed scientific work to improve hospital and home care practices, to rigorously and independently test new products, and to promote global networks of vascular access researchers.

We strive to eliminate ineffective practices and replace them with innovative solutions, providing patients with a better healthcare experience, and saving global healthcare providers hundreds of millions of dollars.

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Vascular Access



PIVC complications



PIVC failure in the adult population:
a systematic review (under review).
Marsh N et al.



92 studies, 64 observational, 28 RCTs

75,433 participants

Overall failure 36%

PIVCs

Complication	Studies (PIVCs)	%
Phlebitis	77 (62,294)	16%
Infiltration	40 (24,919)	12%
Occlusion	31 (32,672)	8%
Pain	23 (18,070)	7%
Leakage	17 (9,339)	7%
Dislodgment	36 (18,425)	6%
Local infection	11 (13,884)	0.7%
CRBSI	12 (14,954)	<0.1%

PIVC failure in the adult population: a systematic review (under review) Marsh N et al.

PEDIATRICS. 2015. Ullman A et al.

Complications of Central Venous Access Devices: A Systematic Review

Ullman A, Chinn EK, Mulla SA, Nandy M, et al. *Pediatrics*. 2015;135(1):e1-11.

OBJECTIVE: The failure and complications of central venous access devices (CVADs) result in interrupted medical treatment, morbidity, and mortality for the patient. The resulting insertion of a new CVAD further contributes to risk and increases extra resources, expense. To systematically review existing evidence of the incidence of CVAD failure and complications across CVAD types within pediatrics.

DESIGN: Central Register of Controlled Trials, PubMed, and Cochrane Incentive to Missing and Added Health databases were systematically searched up to January 2015.

SETTING: Included studies were of cohort design and examined the incidence of CVAD failure and complications across CVAD type in pediatrics within the last 18 years. CVAD failure was defined as CVAD loss of function before the completion of necessary treatment, and complications were defined as CVAD-associated bloodstream infection, CVAD local infection, dislodgement, occlusion, thrombosis, and leakage.

MEASUREMENTS AND MAIN RESULTS: Data were independently extracted and critiqued for quality by 2 authors.

CONCLUSIONS: Twenty-four cohort studies met the inclusion criteria, with mixed quality of reporting and methods. Overall, 25% of CVADs failed before completion of therapy (95% confidence interval [CI] 20.6%-29.2%) at a rate of 1.97 per 1000 catheter days (95% CI 1.71-2.23). The failure per CVAD device was highest proportionally in hemodialysis catheters (96.4%, [95% CI 25.6%-63.6%]) and per 1000 catheter days in subclavian catheters (2.61 per 1000 catheter days [95% CI 1.74-3.98]). Totally implanted devices had the lowest rate of failure per 1000 catheter days (0.15 [95% CI 0.09-0.23]).

KEY WORDS: The inclusion of nonrandomized and noncomparator studies may have affected the robustness of the research.

CONCLUSIONS: CVAD failure and complications in pediatrics are a significant burden on the health care system internationally.

CVAD failure average 25%



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CVAD complications

Complication	Studies (CVADs)	%
Suspected infection	19 (9306)	17%
Occlusion	5 (807)	11%
Thrombosis	22 (7224)	10%
Dislodgement	16 (4934)	2%
CLABSI	14 (20,297)	2%
Local infection or phlebitis	7 (2044)	1%

Takashima M et al, Critical Care Medicine 2018 Complication and Failures of Central Vascular Access Device in Adult Critical Care Settings

The economic burden of vascular access devices in public hospitals in Queensland.

Australian Health Review, 2018. Tuffaha H et al.

- Population 4.7 million
- 2.75 million VADs used in 2016 in public hospitals
- Cost of \$59 million (\$10 million products)
- 2.69 million were PIVCs – about $\frac{3}{4}$ are inserted successfully
- 60,000 CVCs – about 50,000 are inserted successfully

Argentina 44 million



In my 900 bed hospital each year

One or more of

- Dislodge 13,500
- Phlebitis 25,500
- Occlusion 37,500

200,000 purchased

150,000

88,500 removed at end of treatment

50,000

Failed insertion

Primary BSI

60

12

SAB

105

Local infection

Rickard et al. Lancet 2018





But – does my hospital know it has these problems??

- The problems we have

- Failed insertions
- Phlebitis
- Occlusion
- Dislodgement
- Thrombosis
- Infiltration, extravasation
- Local & bloodstream infections
- **PIVCs**
- **Central venous catheters**

- The problems we measure

- CLABSI
 - Only one problem measured
 - In only one device type

My hospital ~1000 CLABSI/ year

***But ~ 112,000 PIVC and
~13,000 CVC problems each year***

– why don't we measure these?

“If you can't measure it, you can't improve it”
Peter Drucker



How many KPIs do we want?



Vascular access specialist



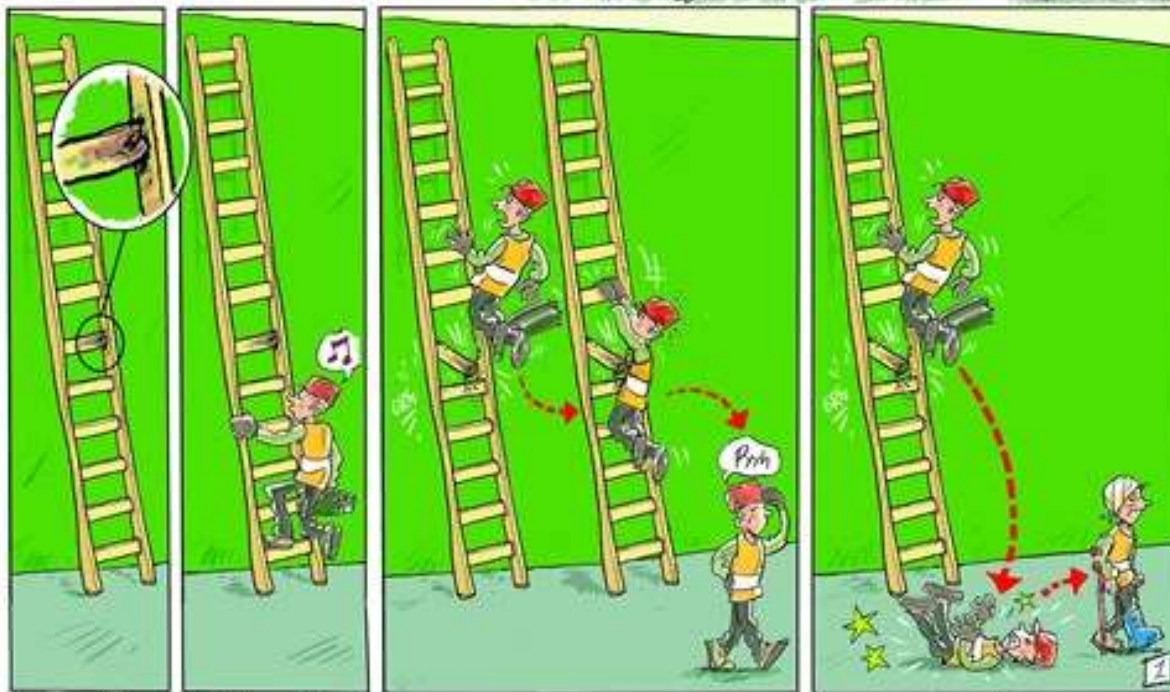
Hospital Executive

What KPIs should we collect?

What can we learn from other industries?



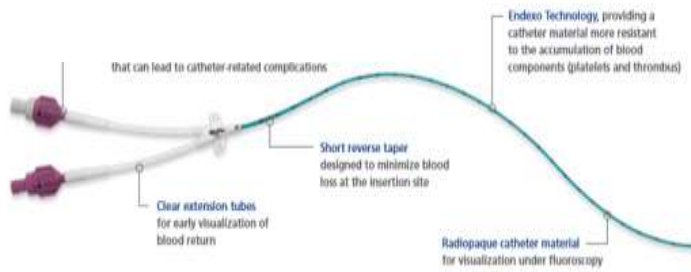
The broken ladder



Poor dressing -> Bloodstream Infection -> Death

Quality measures can be:

- Outcome KPI – collect at/soon after catheter removal
 - Pull charts/EMR
- Process KPI – collect at any time during dwell
 - Audit inpatients



Device choice

Removal

Insertion

Function

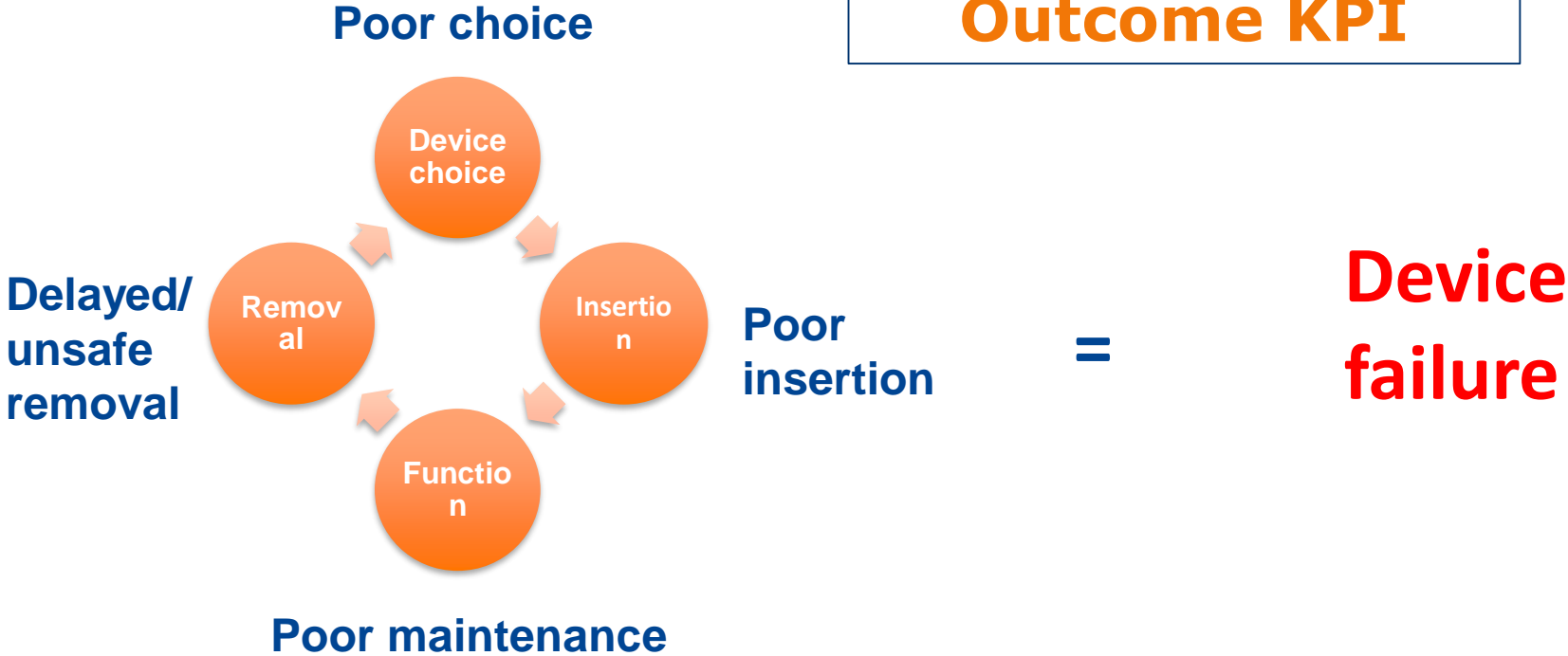


What do we want?

1. Inserted on the first attempt
 2. Keeps working and no infection
 3. Comfortable for the patient
 4. Patient engaged in care
 5. Removed when therapy complete
- Documented in medical record



Outcome KPI



KPI: Device Failure

Now

- PIVC – 36%
- CVAD – 25%

Benchmark

- PIVC – 10%
- CVAD – 5%

Device Failure – PIVCs

- Any complication at removal

Device Failure – CVADs

- Any complication at removal

+ plus

- Reversible complications during dwell

Device Failure – PIVCs

- Phlebitis, Pain
- Occlusion
- Infiltration, Extravasation
- Dislodgement, Leaking
- Primary BSI
- Local infection

Device Failure – CVADs

- Thrombosis, Pain
- Reversible/Non-reversible Occlusion or Fracture
- Infiltration, Extravasation
- Dislodgement, Leaking
- Dislodgement
- Primary BSI
- Local infection

Patient centred care

- Patient Reported Outcome Measures – PROMs
 - Pain
 - Anxiety
- Patient Reported Experience Measures – PREM
 - Multiple attempts at IV cannulation

Walton et al BMJ Safety & Quality 2017

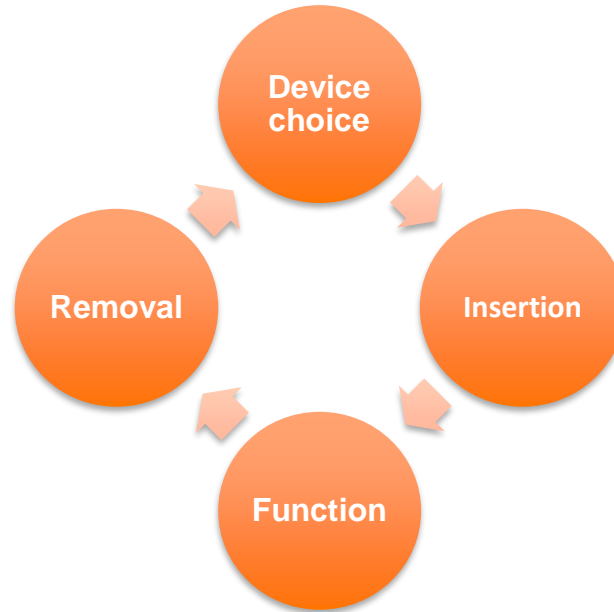
- Communication by inserter

Larsen et al Brit J Nurs 2017



Outcome KPIs

3. Device Failure



1. PREM – Multiple insertion attempts

2. PROM - Pain

Process KPIs

What predicts failure?

Process KPI: Device Selection

- Peripherally compatible medication – Yes or No

Process KPI: Device Insertion

- Aseptic insertion – Yes or No
 - Hand hygiene performed,
 - ANTT
 - Hair clipped on hirsute patients
 - Skin decontamination CHG in alcohol, allowed to dry
 - Sterile dressing applied

Device Maintenance KPI



I-DECIDED™ INSTRUMENTO DE
EVALUACIÓN & DECISIÓN IV

Device Removal KPI

Clinical monitoring, documentation and decision making tool
Replaces VIP, INS tools



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I-DECIDED™ INSTRUMENTO DE EVALUACIÓN & DECISIÓN IV

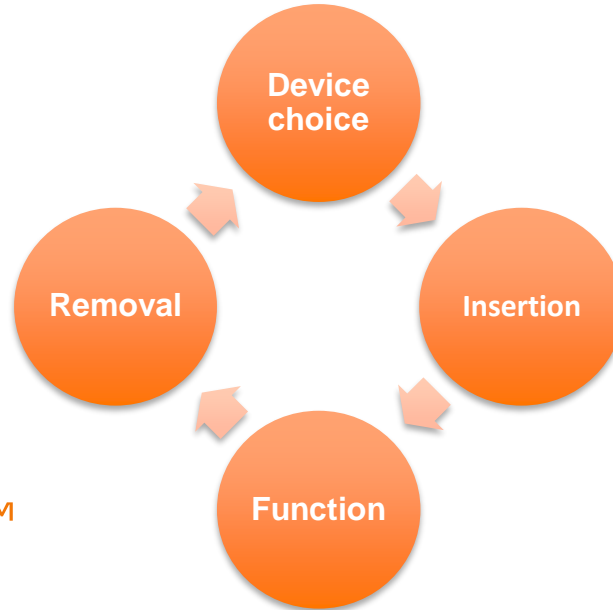
- | | |
|----------|--|
| I | IDENTIFICAR Si el paciente tiene un catéter IV. |
| D | ¿EL DISPOSITIVO IV ES NECESARIO? Considere la retirada si no se utilizó en las últimas 24 horas, o es improbable su uso en las siguientes 24 horas. Considere el cambio a medicamentos orales. |
| E | ¿EFECTIVO funcionamiento? Siga las recomendaciones de la institución sobre la verificación y el mantenimiento de la permeabilidad. |
| C | ¿COMPLICACIONES en el sitio de inserción IV? Dolor $\geq 2/10$, enrojecimiento, edema, fuga, infiltración, extravasación, endurecimiento, cordón venoso palpable o purulencia |
| I | INFECCIÓN prevención Higiene de manos. Realizar antisepsia de las conexiones & permitir secar. Uso cuidadoso de los dispositivos de administración. |
| D | DETERMINAR CURACIÓN & sujeción. Curación limpia, seca e intacta. Catéter IV y tubuladuras aseguradas. |
| E | EDUCAR & EVALUAR. Discutir el plan de cuidado IV con el paciente y la familia |
| D | DOCUMENTAR su decisión. Mantener, cambiar la curación, o quitar el catéter IV.
Siempre considere la política de su institución y consulte a el equipo y el paciente, según necesidad. |

1. Peripherally compatible meds

KPIs

3. Device Failure

3. I-DECIDED™



1. PREM – Multiple insertion attempts

2. Aseptic insertion

2. PROM - Pain

What do we want?

1. Inserted on the first attempt ✓
 2. Keeps working and no infection ✓
 3. Comfortable for the patient ✓
 4. Patient engaged in care ✓
 5. Removed when therapy complete ✓
- Documented in medical record ✓



To ensure representative measures:

- Choose one or more measures (Peripherally compatible meds; Aseptic Insertions; I-DECIDED; PREM; PROM; Device failure)

If you can't audit ALL patients

- Obtain complete list of all hospitalised patients on one day/date
- Decide how many patients you can audit
- Divide total number by number you can audit – this will give you an 'n'
- Take every 'nth' patient on the list and audit them

This means you don't introduce bias into the measures

Global VA Registry

Towards better health system data

- Current feasibility study
- Scoping of minimum dataset
 - Literature review
 - Interviews/focus groups
 - eDelphi survey
- Validate measures
- Consumer views, IT/privacy issues



OMG Study

J Hospital Medicine 2018
Alexandrou et al.

A screenshot of the OMG PIVC study website. At the top, it says 'OMGPIVC One Million Global Catheters PIVC Worldwide Prevalence Study'. Below that is a navigation bar with links like 'Home', 'About This Project', 'Hospital sites', 'The Research Team', 'FAQ', 'Newsletter', and 'Contact Us'. The main heading is 'Participate in the One Million Global Catheters Study 2014-2015'. Below the heading is a row of small national flags representing the 51 participating countries. A large globe icon is on the left, and on the right, a text box says 'Registration for the OMG PIVC study has now closed.' followed by a paragraph of text: 'Over 700 hospitals in more than 50 countries are enrolled to participate in this one-day prevalence study, making this the largest intravascular study ever undertaken! A huge thank you to everyone who has worked so hard and shown such amazing support for this ambitious project. If you have already registered to participate, don't forget that data collection finishes on 30 April 2015. If you have any questions, please contact us by email.'

- 40620 patients
- 409 hospitals
- 51 countries
- 15 languages
- 4 million datapoints

Aim: to benchmark processes of care

OMG - Latin America

1. Argentina
2. Bolivia
3. Brazil
4. Chile
5. Colombia
6. Mexico
7. Panama
8. Peru
9. El Salvador
10. Venezuela



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Gracias! Thank you!



Findings of OMG Study



Idle **14%**



Suboptimal dressing **21%**

Phlebitis **10%**



No documented site assessment **36%**



PIVC malfunction **10%**



No documented insertion date/time **49%**



Area of flexion **75%**



WORLDWIDE PRIORITIES

No documentation last 24h

~~Idle PIVs~~

Symptomatic PIVs

Substandard dressings

LATIN AMERICA

Reduce 18 gauge use

Reduce use of non-sterile tape

as PIV dressing

Use dressing PLUS securement

Reduce blood in line

Care “Bundles”

1. Why do we need bundles and what are they?
2. What items are in published PIVC bundles, and what evidence is there of effectiveness?
3. What items should be in PIVC bundles?



Choosing bundle 'items'

- ✓ Must be based on level 1 evidence
- ✓ Are ALL necessary
- ✓ Can be answered "yes"/"no" if done/not done
- ✓ Must occur every day

Bundles associated with:

- ✓ Inconsistent items (23 in 5 studies)
- ✓ Focus on infection prevention but ignore other complications
- ✓ Some studies found reduced PIV-BSI and PIV-SAB
- ✓ Reduced number of starter kits
- ✓ Trend to reduced infiltration
- ✓ Improved documentation

Bundles don't work by themselves. Sustainability is not guaranteed.
Multi-modal approach must include cultural and system changes.

- ❖ Freixas et al. Clin Micro Infection, 2013; 19(9)
- ❖ Rhodes et al. J Hospital Infection, 2016; 94(1)
- ❖ De Vries M et al. J Assoc Vasc Access, 2016; 21(2)
- ❖ Upadhyaya et al. J Infection Prevention, 2018; 19(1)
- ❖ Watterson et al. J Pediatric Nurs 2018; online early.

Bundle - definition

“A structured way of improving the processes of care and patient outcomes:

a small, straightforward **set of evidence-based practices — generally three to five —**

that, when performed collectively and reliably, have been proven to improve patient outcomes”.

www.ihl.org



**What PIVC interventions are proven in RCTs or meta-analyses?
Takashima et al 2015 Vascular Access**

Items with RCT Evidence (2005-2015)

Takashima et al 2015 Vascular Access

Scoping Review:

94 PIVCs and 2 midline RCTs published

75% adults / 25% paediatrics

84% hospital / 16% home setting

Most (61%) RCTs on insertion topics:

- 30 pain relief
- 21 technology guided
- 4 device type

Less (39%) RCTs on maintenance topics:

- 12 add-ons/connectors
- 8 flushing
- 7 removal time-frame
- 5 dressing & securement
- 2 blood sampling

Bundle items with RCT evidence

Gonzalez Lopez et al J Hosp Infect 2014

- Integrated PIVC with flatter profile against skin

Signif 1 day longer function



Bugden et al Annals Emerg Med 2016

- Tissue adhesive
- 1-2 drops

Signif 10% reduced PIV failure



Bundle items with systematic review evidence

Offer vapocoolant spray

Griffith et al 2016 Cochrane Systematic Review
9 RCTs, 1070 paed-adults
Signif reduction in pain (33 to 20 out of 100)
72% said they would want it again



Do not routinely remove PIVCs

Webster et al. 2015 Cochrane SR
7 RCTs, 4895 patients
No diff in complications or infections
Signif cost savings and less procedures



Evidence from cohort studies

Significant predictors of failure

1. Insertion at flexion point
2. Traumatic insertion
3. Gauge size/length
4. Poor securement
5. Multiple use

Marsh et al. J Hospital Medicine, 2018; 13:83-89; Wallis et al Infect Cont Hosp Epi 2014

Infection prevention bundle items (strong epidemiological evidence)

ANTT & hand hygiene on insertion - *and during use*

Skin decontamination with CHG in alcohol

Sterile dressing

Consider removal daily

Decontaminate access points before each use



Reducing risk must cover the entire dwell

**PIVC
Insertion
bundle**



**+ PIVC
Maintenance
bundle**

We need both

Insertion bundle

1. Use ANTT & hand hygiene
2. Offer vapocoolant spray
3. Decontaminate skin with alcoholic CHG & let dry
4. Use an integrated PIVC
5. One-two drops of glue to entry point & under hub with a sterile dressing



Maintenance bundle

I-DECIDED™ INSTRUMENTO DE EVALUACIÓN & DECISIÓN IV

I	IDENTIFICAR Si el paciente tiene un catéter IV.
D	¿EL DISPOSITIVO IV ES NECESARIO? Considere la retirada si no se utilizó en las últimas 24 horas, o es improbable su uso en las siguientes 24 horas. Considere el cambio a medicamentos orales.
E	¿EFECTIVO funcionamiento? Siga las recomendaciones de la institución sobre la verificación y el mantenimiento de la permeabilidad.
C	¿COMPLICACIONES en el sitio de inserción IV? Dolor $\geq 2/10$, enrojecimiento, edema, fuga, infiltración, extravasación, endurecimiento, cordón venoso palpable o purulencia
I	INFECCIÓN prevención Higiene de manos. Realizar antisepsia de las conexiones & permitir secar. Uso cuidadoso de los dispositivos de administración.
D	DETERMINAR CURACIÓN & sujeción. Curación limpia, seca e intacta. Catéter IV y tubuladuras aseguradas.
E	EDUCAR & EVALUAR. Discutir el plan de cuidado IV con el paciente y la familia
D	DOCUMENTAR su decisión. Mantener, cambiar la curación, o quitar el catéter IV. Siempre considere la política de su institución y consulte a el equipo y el paciente, según necesidad.

VASCULAR

Vascular Access Catheter Use in Latin America



- Argentina
- Brazil
- Chile
- Colombia
- Mexico

2018-2019

Academic study with funding from BD

Lead investigator

- Dr Rachel Walker, Melissa Arneil, and Claire Rickard, Griffith University, Australia

Latin America Lead Investigator

- Prof Mavilde Pedreira, Unifesp, Brazil

Lead study contacts

- Cirlia Alvarez, Argentina
- RAs: Maria Paula Pires, Larissa Perez, Marcelle Ambar, Silvia Azevedo - Prof Maria Angélica Peterlini and Prof Denise Kusahara, Brazil
- Marcela Quintanilla Reyes, Chile
- Martha Claudia Corzo, Colombia
- Gabriela Cortes Villareal and Eliazib Nataren, Mexico



Rachel



Claire

Mavilde



Mel



Marcell



Mª Paula



Mª Angélica



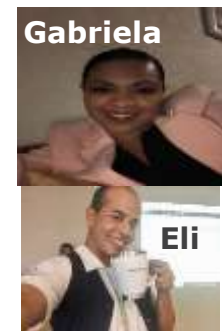
Cirlia



Marcela



Martha

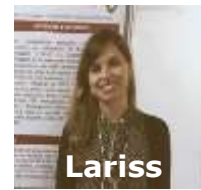


Gabriela

Eli



Silvia



Lariss



Denise



Objectives

1. What is happening with PIVCs in my hospital?
2. How does my care compare to best practice guidelines?
3. Are PIVCs causing bloodstream infection risk?
4. Are patients having a good experience ?
5. What is the economic burden of PIVCs?
6. How can we improve?

Aim: a
more
indepth
LATAM
study
than the
OMG
study

Each hospital will receive an individual report

- 10,000-15,000 PIVCs to be audited
 - ✓ different regions from each country
 - ✓ adult and paediatric patients
- Fed Uni Sao Paulo gives training and data coordination
- Patient consent verbal (preferred) or written only if required by local policy/committee
- Data collected electronically (preferred) or paper

Hospitals will audit:

- PIVC site, dressing, securement, pain or other problems
- Insertion details, date, inserter (nurse/doctor)
- IV medication and fluid orders
- Hospital policies related to IVs

VASCULAR
 Instituto de Diagnóstico y Referencia Epidemiológica

USO DE CATÉTERES INTRAVENOSOS PERIFÉRICOS (CIP) EM HOSPITAIS DA AMÉRICA LATINA (AL)

VASCULAR é um estudo multicêntrico e retrospectivo, financiado pelo Instituto Brasileiro de Geriatria do Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).

OBJETIVOS

- Identificar a prevalência de CIP em hospitais de AL
- Identificar a prevalência de CIP em hospitais de AL
- Identificar a prevalência de CIP em hospitais de AL
- Identificar a prevalência de CIP em hospitais de AL

RELEVÂNCIA

Cada de **1 MILHÃO** de CIP são colocados no mundo. CIP trazem indústrias, benefícios, custos, complicações podem ocorrer, como:

Falhas
 Mágoas
 Falta de guarda

Seus eventos adversos

Aumentar o conhecimento do paciente, melhorar o tratamento, aumentar os custos, aumentar o tempo de internação.

IMPORTÂNCIA DO ESTUDO NA AL

Informações sobre a prática clínica de uso de CIP nos hospitais de AL são escassas.

VANTAGENS

Participar do estudo pode trazer benefícios para o paciente, como:

- Participar de um estudo científico
- Participar de um estudo científico
- Participar de um estudo científico

COMO PARTICIPAR

Quem quiser fazer parte do estudo, basta entrar em contato conosco pelo e-mail: vasculard@swissmedical.com

REDES SOCIAIS

Experimente que não se trata de mais um sistema de informações, mas sim de uma rede!

Twitter: @VascularStudy
 Facebook: <https://www.facebook.com/VascularStudy/>
 Website: <https://www.swissgroup.org.br/vascular-study.html>

COORDENADOR: **Dr. Gustavo A. de Sá**

Invitation to participate



Ciria Alvarez

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Facebook/Twitter:
 @VascularStudy

VASCULAR
 Instituto de Diagnóstico y Referencia Epidemiológica

USO DE CATÉTERES VENOSOS PERIFÉRICOS CORTOS EN AMÉRICA LATINA

VASCULAR es un estudio multicéntrico y retrospectivo financiado por ANADIC, el mismo grupo de investigación responsable del estudio DRG "¿La infraestructura de catéteres intravenosos periféricos es segura?"

OBJETIVOS

- Identificar la prevalencia de CIPC en hospitales de AL
- Identificar la prevalencia de CIPC en hospitales de AL
- Identificar la prevalencia de CIPC en hospitales de AL
- Identificar la prevalencia de CIPC en hospitales de AL

PERTINENCIA

Cada de **1 MIL MILLONES** de CIPC se colocan en todo el mundo. Los CIPC pueden ofrecer muchas ventajas, sin embargo, pueden traer complicaciones, como:

Falhas
 Mágoas
 Falta de guarda

Seus eventos adversos

Aumentar el conocimiento del paciente, mejorar el tratamiento, aumentar los costos, aumentar el tiempo de internación.

IMPORTANCIA DEL ESTUDIO

La información sobre la práctica clínica de uso de CIPC en hospitales latinoamericanos es escasa.

VENTAJAS

Participar del estudio puede traer beneficios para el paciente, como:

- Participar de un estudio científico
- Participar de un estudio científico
- Participar de un estudio científico

COMO PARTICIPAR

Quem quiser fazer parte do estudo, basta entrar em contato conosco pelo e-mail: vasculard@swissmedical.com

MEDIOS DE COMUNICACIÓN SOCIAL

Experimente que no es un sistema de información, sino una red de información en una red social!

Twitter: @VascularStudy
 Facebook: <https://www.facebook.com/VascularStudy/>
 Website: <https://www.swissgroup.org.br/vascular-study.html>

COORDENADOR: **Dr. Gustavo A. de Sá**





Australian Vascular Access Society
Promoting safety and excellence in Vascular Access

