JOINT LEGISLATIVE BUDGET COMMITTEE

Wednesday, April 10, 2019

9:00 a.m.

House Hearing Room 1

JLBC

STATE OF ARIZONA

Joint Legislative Budget Committee

1716 WEST ADAMS
PHOENIX, ARIZONA 85007

(602) 926-5491

azleg.gov

JOINT LEGISLATIVE BUDGET COMMITTEE
Wednesday, April 10, 2019
9:00 A.M.
House Hearing Room 1

MEETING NOTICE

- Call to Order

- Approval of Minutes of December 18, 2018.

- DIRECTOR'S REPORT (if necessary).

- EXECUTIVE SESSION - Arizona Department of Administration, Risk Management Services - Consideration of Proposed Settlements under Rule 14.

1. ADOPTION OF COMMITTEE RULES AND REGULATIONS.

2. AHCCCS/DEPARTMENT OF ECONOMIC SECURITY/DEPARTMENT OF CHILD SAFETY - Review of Capitation Rate Changes for Plan Year 2019.

3. ***ARIZONA DEPARTMENT OF ADMINISTRATION/AUTOMATION PROJECTS FUND - Review of CHILDS (Department of Child Safety Subaccount).

4. DEPARTMENT OF CHILD SAFETY
***A. Review of FY 2019 Second and Third Quarter Benchmarks.
***B. Review of Line Item Transfers.

5. ***ARIZONA DEPARTMENT OF EDUCATION - Review of College Credit by Examination Incentive Program Report.

6. ***NORTHERN ARIZONA UNIVERSITY - Review of Expenditure and Performance Report of Nonprofit Biotechnology Research Appropriation.

*** Consent Agenda - These items will be considered in one motion and no testimony will be taken.

The Chairman reserves the right to set the order of the agenda.
4/3/19
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People with disabilities may request accommodations such as interpreters, alternative formats, or assistance with physical accessibility. Requests for accommodations must be made with 72 hours prior notice. If you require accommodations, please contact the JLBC Office at (602) 926-5491.

STATE OF ARIZONA

Joint Legislative Budget Committee

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VACANT

MINUTES OF THE MEETING

JOINT LEGISLATIVE BUDGET COMMITTEE

December 18, 2018

The Chairman called the meeting to order at 12:39 p.m., Tuesday, December 18, 2018, in House Hearing Room 1. The following were present:

Members:	Senator Kavanagh, Chairman	Representative Livingston, Vice-Chairman
	Senator Fann	Representative Allen
	Senator Farley	Representative Alston
	Senator Farnsworth	Representative Fernandez
	Senator Hobbs	
	Senator Petersen	
Absent:	Senator Cajero Bedford	Representative Bowers
	Senator Yee	Representative Leach
		Representative Ugenti-Rita

APPROVAL OF MINUTES

Hearing no objections from the members of the Committee to the minutes of September 20, 2018, Chairman John Kavanagh stated that the minutes would stand approved.

ARIZONA DEPARTMENT OF CORRECTIONS (ADC) - Review of FY 2019 Proposed Bed Capacity Changes.

Pursuant to an FY 2019 General Appropriation Act footnote, ADC previously submitted for Committee review its report detailing proposed bed capacity changes in FY 2019. The Committee reviewed the plan at its September JLBC meeting. ADC is now requesting the Committee review its revised FY 2019 changes.

(Continued)

Table 1
ADC Permanent Bed Capacity - Proposed FY 2019 Changes

	FY 2018	September Changes	December Changes	FY 2019
State Prisons				
Minimum	10,165	0	30	10,195
Medium	11,289	0	240	11,529
Close	7,216	(27)	(15)	7,174
Maximum	1,989	(29)	0	1,960
Reception	96	0	0	96
Subtotal	30,755	(56)	255	30,954
Private Prisons				
Minimum	3,500	0	0	3,500
Medium	4,400	0	0	4,400
Subtotal	7,900	0	0	7,900
Systemwide Total	**38,655**	**(56)**	**255**	**38,854**

Mr. Charles Ryan, Director, ADC, responded to member questions

This agenda item was for information only and no Committee action was taken.

CONSENT AGENDA

The following items were considered without discussion.

ARIZONA DEPARTMENT OF EDUCATION (ADE) - Review of Career Technical Education District Quarterly Report.

Laws 2016, Chapter 4 requires ADE to submit for Committee review its quarterly reports on ADE's progress and the subsequent approval or rejection of currently eligible Career Technical Education District (CTED) programs and courses for eligibility for state funding under the new requirements established in Chapter 4. ADE submitted its July 1, 2018-December 31, 2018 CTED quarterly reports for Committee Review. The JLBC Staff provided options.

ARIZONA DEPARTMENT OF ADMINISTRATION (ADOA) - Review of Public Safety Broadband.

Pursuant to an FY 2019 General Appropriation Act footnote, ADOA submitted for Committee review an annual report on expenditures for the State and Local Implementation Grant Program associated with the National Public Safety Broadband Network Initiative. The JLBC Staff provided options.

ARIZONA DEPARTMENT OF ADMINISTRATION/AUTOMATION PROJECT FUND (APF) - Review of myDEQ Project (DEQ Subaccount).

A.R.S. § 41-714 requires Committee review of proposed Automation Projects Fund (APF) expenditures. ADOA requested that the Committee review $3,200,000 in proposed FY 2019 expenditures from the APF Department of Environmental Quality (DEQ) Subaccount for the continued development of the myDEQ project. The JLBC Staff provided options and potential provisions:

(Continued)

A. *The results of the quarterly third-party reviews are to be provided to the JLBC Staff.*

B. *Should the final costs exceed the estimated costs by 10% or more or should there be significant changes to the proposed technology, scope of work or implementation schedule, ADEQ shall submit these changes to the Committee prior to further expenditure of funds.*

ARIZONA DEPARTMENT OF ADMINISTRATION/AUTOMATION PROJECT FUND (APF) - Review of Arizona Strategic Enterprise Technology Projects (ADOA Subaccount).

A.R.S. § 41-714 requires Committee review of proposed Automation Projects Fund (APF) expenditures. ADOA requested that the Committee review $500,000 in proposed FY 2019 expenditures from the APF/ADOA Subaccount for information technology projects at the Arizona Strategic Enterprise Technology (ASET) Office. The JLBC Staff provided options.

Representative Livingston moved *that the Committee give a favorable review, including provisions as outlined in the JLBC Staff analysis, to the 4 consent agenda items listed above.* The motion carried.

REGULAR AGENDA

JLBC STAFF - Consider Approval of Index for School Facilities Board Construction Costs.

Ms. Rebecca Perrera, JLBC Staff, stated that A.R.S. § 15-2041 requires that the cost-per-square-foot factors used in School Facilities Board (SFB) new school construction financing be adjusted annually for construction market considerations based on an index identified or developed by the Committee as necessary but not less than once each year. The JLBC Staff provided options.

Table 1

Cost-Per-Square-Foot Amounts

	K-6	7-8	9-12
Prior January 2018 Cost-Per-Square-Foot Amounts	$ 147.00	155.19	179.69
New December 2018 Cost-Per-Square-Foot Amounts	156.10	164.80	190.81

Mr. Paul Bakalis, Executive Director, SFB, responded to member questions.

Representative Livingston moved *that the Committee approve a 6.19% adjustment in the cost-per-square-foot factors. The adjustment is based on the change in the Rider Levett Bucknall (RLB) Phoenix construction cost index since the cost factors were last adjusted in January 2018. A.R.S. § 15-2041D requires this adjustment to only be applied prospectively.* The motion carried.

DEPARTMENT OF CHILD SAFETY (DCS) - Review of FY 2019 First Quarter Benchmarks.

Mr. Patrick Moran, JLBC Staff, stated that the FY 2019 General Appropriation Act requires DCS to submit a report to the Committee for its review a report on quarterly benchmarks for assessing progress made in increasing the department's number of FTE Positions, meeting caseload standards for caseworkers, reducing the number of backlog cases and open reports, and reducing the number of children in out-of-home care. The JLBC Staff provided options.

(Continued)

Mr. Mike Faust, Deputy Director, DCS, responded to member questions.

Representative Livingston moved that the Committee give a favorable review of the department's FY 2019 first quarter benchmark report. The motion carried.

DEPARTMENT OF CHILD SAFETY (DCS) - Review of Line Item Transfers.

Mr. Patrick Moran, JLBC Staff, stated that the FY 2018 General Appropriation Act and the FY 2019 General Appropriation Act require DCS to submit proposed line item transfers to the Committee for review. DCS requested Committee review of the following transfers shown below. The JLBC Staff provided options.

FY 2019

- $400,000 Federal Temporary Assistance for Needy Families (TANF) Block Grant into the Kinship Care line item from the Out-of-Home Support Services line item.

FY 2018

- $185,000 Federal TANF Block Grant into the Kinship Care line item from the Out-of-Home Support Services line item.
- $1,333,000 General Fund into the Foster Home Recruitment, Study, and Supervision (HRSS) line item from the Foster Home Placement line item.
- $1,606,000 Child Safety Expenditure Authority into the Foster HRSS line item from the Out-of-Home Support Services line item.

Mr. Mike Faust, Deputy Director, DCS, responded to member questions

Representative Livingston moved that the Committee give a favorable review of the transfers noted above. The motion carried.

DEPARTMENT OF ECONOMIC SECURITY (DES) - Review of Plan for the Arizona Training Program at Coolidge.

Mr. Patrick Moran, JLBC Staff, stated that A.R.S. § 36-570 requires DES to submit an annual report for review by the Committee on the department's plans for the Arizona Training Program at Coolidge (ATP-C) and associated group homes, including any plans to close the facilities. The JLBC Staff provided options.

Mr. Sean Price, Deputy Director of Programs, DES, responded to member questions.

Representative Livingston moved that the Committee give a favorable review of the report, with the following provision:

A. *The department shall include a status update on the future use of the 5 state-operated group homes at the ATP-C campus in its next report to the Committee on the ATP-C facility.*

The motion carried.

(Continued)

ARIZONA DEPARTMENT OF EDUCATION (ADE) - Review of Federal Monies Report.

Mr. Steve Schimpp, JLBC Staff, stated that A.R.S. § 15-1052 requires the Department of Education (ADE) to submit for Committee review its annual report on how much noncustodial and other federal monies it receives. The JLBC Staff provided options.

Mr. Charles Tack, Associate Superintendent of Policy Development and Government Relations, ADE, responded to member questions.

Representative Livingston moved that the Committee give a favorable review of ADE's FY 2019 Report of Federal Monies Received with the following provision:

A. In its next annual submission, ADE shall report for each of its federal grants:
   1. The amount of discretion it has in allocating pass-through funding.
   2. How pass-through funding is allocated.
   3. The amount of funding retained for program administration and how it is spent.

The motion carried.

EXECUTIVE SESSION

Representative Livingston moved that the Committee go into Executive Session. The motion carried.

At 1:57 p.m. the Joint Legislative Budget Committee went into Executive Session.

Representative Livingston moved that the Committee reconvene into open session. The motion carried.

At 3:06 p.m. the Committee reconvened into open session.

A. Arizona Department of Administration, Risk Management Services - Consideration of Proposed Settlements under Rule 14.

Representative Livingston moved that the Committee approve the recommended settlements proposed by the Attorney General's office in the cases of:

- *Kelley, et al. v. State of Arizona*
- *Pellerin v. State of Arizona*
- *Demaree v. Pederson, et al.*
- *Boyles, et al. v. State of Arizona, et al.*

The motion carried.

B. ARIZONA DEPARTMENT OF ADMINISTRATION - Risk Management Annual Report.

This item was for information only and no Committee action was required. The Committee received the Risk Management Annual Report pursuant to JLBC Rule 14. The Committee requests that future annual reports continue to include the following information:

(Continued)

- Status of open claims and lawsuits.
- Status of claims and lawsuits reported on the prior year annual report.
- Total number of claims and lawsuits filed with Risk Management during the prior fiscal year.
- Total settlement and judgment costs during the prior fiscal year.
- Number of liability settlements greater than the JLBC level and cost of each settlement.
- Number of liability cases taken to trial by Risk Management categorized by:
  - Number of verdicts for the state with detail of the associated judgment amounts.
  - Number of verdicts against the state with detail of the associated judgment amounts.
- Projected Risk Management Fund balance.
- Proposed changes to state insurance coverage, state statutes, and claim procedures.

C. JLBC Annual Performance Review per Rule 7

This item was for information only and no Committee action was required.

Without objection, the meeting adjourned at 3:07 p.m.

Respectfully submitted:

Kristy Paddack, Secretary

Richard Stavneak, Director

Senator John Kavanagh, Chairman

NOTE: A full audio recording of this meeting is available at the JLBC Staff Office, 1716 W. Adams. A full video recording of this meeting is available at http://www.azleg.gov/jlbc/meeting.htm

STATE OF ARIZONA

Joint Legislative Budget Committee

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DATE: April 3, 2019

TO: Members of the Joint Legislative Budget Committee

FROM: Richard Stavneak, Director RS

SUBJECT: Adoption of Committee Rules and Regulations

The Committee will consider the attached rules and regulations for adoption at its April 10th meeting. The rules are the same as in the prior session with one exception. In 2000, the JLBC increased the Arizona Department of Administration's (ADOA) ability to settle claims on its own up to $100,000. Given the JLBC's authority to approve claims at $250,000 and above pursuant to Rule 14 1A, the Attorney General (AG) then had the authority to settle claims between $100,001 and $249,999. The rule change clarifies the existing ADOA and AG settlement limits.

RS:kp
Attachment

JOINT LEGISLATIVE BUDGET COMMITTEE OF ARIZONA

RULES AND REGULATIONS

RULE 1

NAME OF COMMITTEE AND METHOD OF APPOINTMENT

The name of the Committee is the Joint Legislative Budget Committee, hereinafter referred to as the Committee, consisting of sixteen members designated or appointed as follows:

1. The majority leaders of the Senate and House of Representatives, the Chairmen of the Senate and House of Representatives Appropriations Committees, the Chairman of the Senate Finance Committee and the Chairman of the House of Representatives Ways and Means Committee.

2. Five members of the Senate and five members of the House of Representatives who are members of their Appropriations Committees shall be appointed to the Committee by the President of the Senate and the Speaker of the House of Representatives, respectively.

RULE 2

STATUTORY POWERS AND DUTIES OF THE COMMITTEE

1. The Committee shall ascertain facts and make recommendations to the Legislature relating to the State budget, revenues and expenditures of the State, future fiscal needs, the organization and functions of State agencies or divisions thereof and such other matters incident to the above functions as may be provided for by rules and regulations of the Committee.

2. The Committee shall promulgate rules and regulations for the operation of the Committee.

3. The Committee shall have the powers conferred by law upon legislative committees.

4. The Committee shall make studies, conduct inquiries, investigations and hold hearings.

5. The Committee may meet and conduct its business any place within the State during the sessions of the Legislature or any recess thereof and in the period when the Legislature is not in session.

6. The Committee may establish subcommittees from the membership of the Legislature and assign to such subcommittees any study, inquiry, investigation or hearing, with the right to call witnesses, which the Committee has authority to undertake.

RULE 3

CHAIRMAN OF THE COMMITTEE

The Chairman of the House of Representatives Appropriations Committee shall have a term as Chairman of the Committee from the first day of the First Regular Session to the first day of the Second Regular Session of each Legislature and the Chairman of the Senate Appropriations Committee shall have a term from the first day of the Second Regular Session to the first day of the next Legislature's First Regular Session.

JOINT LEGISLATIVE BUDGET COMMITTEE OF ARIZONA

RULES AND REGULATIONS

RULE 4

COMMITTEE PROCEEDINGS

The Committee proceedings shall be conducted in accordance with Mason's Manual of Legislative Procedure, except as otherwise provided by these rules.

RULE 5

SUBCOMMITTEES

The Committee may establish subcommittees from the membership of the Legislature and assign to such subcommittees any study, inquiry, investigation or hearing with the right to call witnesses which the Committee has authority to undertake. Each such subcommittee shall include in its membership an equal number of Senate and House of Representatives members.

RULE 6

QUORUM

A majority of the members of the Committee shall constitute a quorum for the transaction of business.

RULE 7

LEGISLATIVE BUDGET ANALYST

The Legislative Budget Analyst (hereinafter "Director") shall be the Staff Director and the Chief Executive Officer of the Committee. The Director shall be appointed by the Committee and shall serve on a full-time basis. The Committee shall annually review the Director's performance and the Committee or the Chairman and Vice Chairman shall determine the Director's salary within the limits prescribed by law. The Chairman of the Committee may appoint a subcommittee to make recommendations concerning these matters.

In addition to the responsibilities prescribed by A.R.S. § 41-1273, the duties of the Director shall include any duties which shall be assigned by the Committee, including the following:

1. Compilation of information for the Committee.

2. A continuous review of State expenditures, revenues and analysis of the budget to ascertain facts, compare costs, workload and other data and make recommendations concerning the State's budget and revenue of the departments, boards, commissions and agencies of the State.

3. Act as administrative head of the Committee Staff, with authority to hire and dismiss such personnel as may be necessary for the proper conduct of the office, and fix compensation of staff members within any limits set by the Committee.

4. Maintain the records and files of the Committee.

5. Shall make special reports for presentation to the Committee and to others as directed by the Committee.

6. Attend all meetings of the Committee and such other meetings and hearings as are necessary to facilitate the work of the Committee.

7. Examine as to correctness all vouchers for the expenditure of funds appropriated for the use of the Committee.

RULE 8

AGENDA FOR MEETINGS

An agenda for each Committee Meeting shall be prepared by the Director and, whenever possible, mailed or delivered to members of the Committee, not less than one week prior to the meeting. The Director must have at least three weeks prior notice for any state agency-requested items that appear on the agenda, unless the Chairman of the Committee approves of a later submission.

RULE 9

ORDER OF BUSINESS

The Order of Business at a Committee meeting shall be determined by the Chairman of the Committee. It shall normally be as follows:

1. Call to order and roll call
2. Reading and approval of minutes
3. Director's Report [if any]
4. Executive Session (including Rule 14 items)
5. Items requiring Committee review and/or approval
6. Other Business - For Information Only
7. Adjournment

RULE 10

DISBURSEMENTS

1. All expenditures of the Committee shall be by vouchers properly itemized and supported by receipts and shall be approved by the Director when authorized by the Chairman of the Committee.

2. All contracts and studies authorized by the Committee shall be approved by the Committee after examination.

JOINT LEGISLATIVE BUDGET COMMITTEE OF ARIZONA

RULES AND REGULATIONS

RULE 11

MEETINGS OF THE COMMITTEE

The Committee shall meet at such times and places as the Committee may determine. Additional special meetings may be called by the Chairman or by a majority of the members of the Committee.

RULE 12

ADOPTION AND AMENDMENT OF THE RULES AND REGULATIONS

These rules and regulations shall be adopted and may be amended by a majority vote of the members of the Committee, provided that a quorum is present.

RULE 13

FISCAL NOTES

1. The President of the Senate and the Speaker of the House of Representatives or their designees may each designate bills that shall have a fiscal note prepared regarding their impact.

2. The JLBC Staff shall prepare the fiscal notes utilizing an impact period that covers the full cost of the legislation. The fiscal notes shall indicate any local fiscal impact, where appropriate.

3. Fiscal notes shall not contain comments or opinions on the merits of the bill.

4. Exceptions to the procedure set forth in this rule shall be permitted with the approval of the Chairman and Vice Chairman of the Committee.

5. The Committee may amend or suspend this rule or any subsection hereof by a majority vote of those present and eligible to vote.

6. Procedures to implement this rule shall be prepared by the Director and approved by the Chairman and Vice Chairman of the Committee.

RULE 14

STATE LIABILITY CLAIMS - PROCEDURE FOR SETTLEMENT WHEN COVERED BY RISK MANAGEMENT SELF-INSURANCE FUND

1. General provisions for presentation of settlement to the Committee:

STATE LIABILITY CLAIMS (CONT'D)

A. Settlements of $250,000 or less do not require approval of the Committee pursuant to A.R.S. § 41-621(N). THE DEPARTMENT OF ADMINISTRATION HAS AUTHORITY TO SETTLE CLAIMS UP TO $100,000 AND THE ATTORNEY GENERAL HAS AUTHORITY TO SETTLE CLAIMS BETWEEN $100,001 AND $249,999. All proposed liability settlements must be presented to the Committee in accordance with these provisions and accompanied by a report containing the information specified in Paragraph 3.

B. The report shall be filed with the Chairman of the Committee seven days before the meeting scheduled to consider the settlement proposal.

C. A limited number of items may be excluded from the written report and presented orally at the Committee meeting, if the Attorney General and Risk Management Division find the exclusion to be absolutely necessary for the protection of the State's case.

D. All Committee settlement proceedings and material prepared for such proceedings shall be required to be kept confidential.

E. Any plaintiff's inquiries regarding Committee meeting dates, times and agendas should be directed to the Attorney General's Insurance Defense Section which shall consult with the JLBC Staff Director.

2. At a Committee meeting at which a settlement proposal is considered:

A. Material shall be presented by the Attorney General or retained defense counsel who had primary responsibility over negotiation of the settlement and/or handling of the case, together with the Manager of the Risk Management Division of the Department of Administration.

B. The Committee Chairman or a majority of the Committee, may request other witnesses to attend and testify at any settlement proposal meeting. When requested by a Committee member, the director of an agency named in a lawsuit for which a settlement is proposed shall be requested to appear at the meeting at which the settlement is proposed.

C. The presentation of the settlement proposal at the Committee meeting shall contain, at a minimum, the information required to be submitted pursuant to Paragraph 3.

D. In addition to the report, additional drafts, charts, pictures, documents or other items may be presented to the Committee by the Attorney General or Risk Management Division, if helpful in reviewing the merits of the settlement. Additional items shall be presented when requested by the Committee Chairman, or a majority of the Committee at a prior meeting, or a JLBC subcommittee to which the matter has been referred.

STATE LIABILITY CLAIMS (CONT'D)

E. Upon a conclusion of the presentation, the Committee may accept the settlement as proposed, reject the settlement as proposed, recommend an alternative settlement with the advice of the Attorney General and Risk Management Division, request additional information, evaluations or appearances of witnesses, or the matter may be referred to a JLBC subcommittee for further study.

3. The written settlement proposal report submitted to the Committee for each settlement offer shall contain the following information:

A. A one to two page executive summary of pertinent information related to the case that, at a minimum, summarizes information contained in items B, D, G, H, I, K, L, N and P below.

B. The names of the plaintiffs or claimants.

C. Whether a lawsuit has been filed, the date on which it was filed and the current status of the lawsuit. If a lawsuit has not been filed, the last date upon which a lawsuit could be filed.

D. The basic facts of the case including, first, the undisputed facts and secondly, those facts in dispute.

E. A summary of the basis or bases of liability claimed by plaintiff or claimant and the State's defenses to such liability, including the key evidence relied upon by each party.

F. The amount originally claimed by the plaintiff or claimant.

G. The identifiable damages and/or costs incurred by plaintiff or claimant to date.

H. Costs incurred by the State in defending the claim or suit to date.

I. Estimated costs to the State of defending the claim or suit through trial.

J. Attorney for plaintiff, Attorney General assigned to the case, retained defense counsel, if any.

K. Estimate of plaintiff or claimant's chances of prevailing in suit against the State.

L. Range of recovery likely at trial for plaintiff's claims.

M. Complete terms of settlement including:

1. To whom payment is to be made;

STATE LIABILITY CLAIMS (CONT'D)

2. The amount of payment;

3. The conditions, if any, attached to the payment; and

4. Deadline for settlement, if any.

N. Settlement recommendations of Attorney General and Risk Management and recommended response to settlement offer.

O. Whether the State has any claim or right of recovery against other parties, e.g., subrogation or indemnification.

P. An agency and an Arizona Department of Administration response that shall contain the following information:

1. Actions taken to eliminate or limit the future risk of liability to the state.

2. Statement as to any disciplinary action(s) taken against any employee(s) that were negligent in carrying out their duties.

3. An agency loss prevention plan approved by the Arizona Department of Administration (ADOA). If an approved plan is not available, ADOA will provide an explanation of why it is not approved at that time, and a timetable for submitting an approved plan.

4. In conjunction with the settlement procedures prescribed pursuant to this rule, the Risk Management Division shall:

A. Annually report to the Committee on 1) the operations of the Division, 2) the status of pending claims and lawsuits, 3) information on actual judgements and settlements, 4) status of claims and lawsuits reported on the prior year annual report, 5) number of claims and lawsuits filed since the last report, 6) number of liability cases taken to trial with information on the verdicts and judgment amounts, and 7) projected fund balances.

B. With the assistance of the Attorney General, propose to the Committee any changes in State insurance coverage, State statutes, State liability principles or claims procedures which may help to limit future State liability.

C. Provide the Committee with an agency loss prevention plan that results from a judgment against the state in an amount equal to or greater than that which requires JLBC settlement authority. Within sixty days after payment of the judgment, ADOA will either indicate approval of the plan, provide an explanation of why it is not approved, or provide an explanation as to why a plan is no longer applicable.

JOINT LEGISLATIVE BUDGET COMMITTEE OF ARIZONA

RULES AND REGULATIONS

RULE 15

CONFIDENTIAL NATURE OF SERVICES

The Director, members of the JLBC Staff, and those charged with the duty of processing in any manner proposed budget estimates, recommendations or research, shall not, without consent of the recipient legislator(s), disclose to any other person whomsoever, the contents of any letter, memorandum, report, or other written communique.

This provision does not apply to regular JLBC Staff reports nor information which the Staff prepares and disseminates under the general authority of the Director that was not specifically requested by a legislator(s).

The violation of any provision of this rule by the Director, a member of his staff, or any person charged in any manner with the duty of processing proposed analysis or research may be deemed sufficient cause for dismissal by the Director and in the case of the Director, by the Committee.

2

STATE OF ARIZONA

Joint Legislative Budget Committee

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DATE: April 3, 2019

TO: Members of the Joint Legislative Budget Committee

FROM: Patrick Moran, Senior Fiscal Analyst PM

SUBJECT: AHCCCS/Department of Economic Security/Department of Child Safety - Review of Capitation Rate Changes for Plan Year 2019

Request

Pursuant to an FY 2019 General Appropriation Act footnote, the state Medicaid agencies must present their plans to the Committee for review prior to implementing any changes in capitation rates. The Executive request includes new plan year 2019 capitation rates for the Department of Economic Security's (DES) Arizona Long Term Care System (ALTCS) program and the Department of Child Safety's (DCS) Comprehensive Medical & Dental Program (CMDP) for children in foster care.

Committee Options

The Committee has at least the following 2 options:

1. A favorable review.

2. An unfavorable review.

Under either option, the Committee may also consider the following provision:

A. It is the intent of the Committee that the Department of Child Safety and the Arizona Health Care Cost Containment system request any budgetary changes associated with an integrated CMDP health plan in their FY 2021 budget submissions.

(Continued)

Key Points

1) AHCCCS is revising the current year capitation rates for DD (DES) and CMDP (DCS foster care).
2) The cost of the adjustments is $7 million General Fund above the FY 2019 budget.
3) The $7 million is neither covered by the JLBC Baseline nor the Executive Budget.
4) The increase mainly funds a reduction of a backlog for DD services.
5) DCS' administrative funding is increasing to begin shifting foster care behavioral health to DCS.
6) The administrative funding increase is small now, but will grow significantly once full shift occurs.
7) The programmatic and fiscal impacts of this shift are unknown.
8) Pending legislation would authorize the shift, subject to available funding.

Analysis

Capitation is the per-member, per-month payment that AHCCCS makes to its contracted Medicaid managed care plans for Medicaid-covered acute, behavioral health, and long-term care services. 1/ AHCCCS is proposing mid-year adjustments to the capitation rates for the DD program operated by DES and the CMDP program operated by DCS. These adjustments are discussed in further detail below.

DES - DD

The DD capitation payment covers long term care services, acute care, and, effective October 1, 2018, Children's Rehabilitative Services for 33,898 individuals with a diagnosis of intellectual disability or other qualifying conditions. The Committee already favorably reviewed adjustments to the DD capitation rate at its meetings in July 2018 and September 2018. By January 2019, the rate had reached $4,137.17 per member per month, or $49,646.04 annually.

After the initial rates were established, DES informed AHCCCS of its efforts to reduce a backlog of services that were authorized by a DD case manager, but for which a provider was not identified. DES refers to these cases as "unassigned authorizations," and reports that as of January 2018, there were 4,738 unassigned authorizations. Due to administrative efforts made by DES to identify providers for these services, the department reports that the number of unassigned authorizations had declined to 1,927 by December 2018, or a decrease of (2,811). As a result, there was a corresponding increase in utilization of services that were previously on the backlog.

The original capitation rates did not capture the change in utilization. As a result, the AHCCCS actuary has determined that the original FY 2019 capitation rates are no longer actuarially sound, requiring AHCCCS to make an adjustment to the rates.

AHCCCS is proposing to adjust rates by 1.8% retroactively to July 1, 2018 for these utilization increases. This adjustment is partially offset by:

- A (0.1)% decrease associated with the reduction in the provider rate for the private Intermediate Care Facility administered by Hacienda from $1,100 per patient per day to an average of $955 per day, or a (13.2)% provider rate decrease effective July 1, 2018. The decrease is based on a tiered

1/ The capitation rates are updated annually for changes in utilization and unit costs, as well as AHCCCS fee schedule changes and programmatic adjustments. Federal regulations require that AHCCCS establish rates that are "actuarially sound," meaning that the rates "are projected to provide for all reasonable, appropriate, and attainable costs that are required under the terms of the contract" with the managed care plan. The proposed rates must be certified by an actuary and approved by the federal Centers for Medicare and Medicaid Services (CMS), among other requirements specified in federal law.

rate structure that differentiates reimbursement based on the level of care Hacienda provides. The new rates range from $652 per day to $1,286 per day depending on client need. As a result, Hacienda received increased reimbursement for its highest need clients compared to the prior rates, but experienced a rate reduction for clients with lower assessed needs.

- A (0.2)% decrease for technical adjustments associated with the transfer of Children's Rehabilitative Services (CRS) for DD clients from AHCCCS to DES, which occurred in October 2018.

On net, these adjustments result in a 1.5% capitation rate increase for DD above the level already reviewed by the Committee, generating a state General Fund cost of $7.1 million and a Total Funds cost of $23.7 million in FY 2019. These costs would be ongoing in FY 2020. Since the amount of the DD retroactive adjustment was not finalized until February, neither the Baseline nor the Executive Budget proposal include funding for the increased cost.

DCS - CMDP

DCS administers the acute care health insurance plan for children in foster care. AHCCCS is implementing a retroactive adjustment, effective October 1, 2018, for technical changes associated with the transfer of CRS for foster children from AHCCCS to DCS. On an annualized basis, the cost of the technical changes is $175,700 in state funds ($585,200 in Total Funds) in FY 2020.

An additional increase effective April 1, 2019 would provide DCS increased administrative funding in anticipation of transferring behavioral health services for foster children from AHCCCS to DCS beginning in FY 2021, including the hiring of a full-time chief financial officer for the CMDP program. On an annualized basis, the cost of this adjustment is $153,300 from the General Fund ($510,700 Total Funds).

AHCCCS and DCS still need statutory changes, however, to transfer foster care behavioral health to DCS. SB 1246 (behavioral health; foster children) would authorize the transfer contingent on funding being "made available by the federal government and this state." As of April 3, the bill had been passed by the Senate and received a do-pass recommendation from the House Health and Human Services Committee. According to a February 2018 Mercer study, the department could incur administrative costs of up to $21.6 million Total Funds for administration of an integrated CMDP health plan, including the addition of 198 FTE Positions, if DCS administered all managed care health plan functions (e.g. medical management, network development, claims processing, etc.). By comparison the agencies report that existing administrative spending of the RBHAs is approximately $12.0 million, or $(9.6) million below the estimate from the 2018 study.

Given the cost and other challenges of having DCS absorb all administrative responsibilities for managing behavioral health services of foster children, the Mercer study also evaluated the viability of an alternative integrated care model using an "Administrative Services Organization" (ASO). Under the ASO model, DCS would subcontract with an entity, such as a RBHA, that would have responsibility for claims processing and network development, while DCS would retain responsibility for "clinical operations," such as prior authorization and care coordination.

DCS issued a Request for Information (RFI) in August 2018 seeking feedback from stakeholders on how best to proceed with an integrated CMDP plan. The department has not yet issued a Request for Proposals (RFP). Given that the exact parameters of DCS' plans are still under development, the fiscal and programmatic impacts of the integrated plan are difficult to determine at this time.

(Continued)

The Committee may therefore consider Provision A, which would state that it is the Committee's intent that any budgetary changes associated with the integrated CMDP plan be requested by AHCCCS and DCS as part of their FY 2021 budget submissions. This provision is consistent with SB 1246's requirement that behavioral health only be transferred to DCS/CMDP contingent on authorization of state funding.

The budget request is a more transparent mechanism than a capitation rate review for assessing any fiscal impacts associated with the integrated CMDP plan because the budget process would permit the Legislature to evaluate such impacts and, if necessary, make modifications to the Executive's proposal in advance of implementation. The capitation review process, on the other hand, is more suitable as an oversight mechanism to ensure that AHCCCS' capitation rates are consistent with legislative intent after the budget has been enacted.

PM:lm

AHCCCS
Arizona Health Care Cost Containment System

Douglas A. Ducey, Governor
Jami Snyder, Director

February 28, 2019

The Honorable Regina Cobb
Chairman, Joint Legislative Budget Committee
1700 W Washington
Phoenix, Arizona 85007

Dear Representative Cobb:

The Arizona Health Care Cost Containment System (AHCCCS) has completed actuarial analysis on select Managed Care Organization (MCO) capitation rates that are effective from July 1, 2018 through September 30, 2019 and respectfully requests to be placed on the agenda of the next JLBC meeting to review these rates.

In accordance with Federal regulations, MCO capitation rates must be actuarially sound and must be approved by the Centers for Medicare and Medicaid Services (CMS). They must cover the anticipated costs for providing medically necessary services to AHCCCS members. As such, capitation rates, calculated as a per-member-per-month (PMPM) expenditure, are developed to reflect the costs of services provided as well as utilization of those services by AHCCCS members. Capitation rate trends reflect a combination of changes in cost and utilization to AHCCCS contractors (including other state agencies: the Arizona Department of Economic Security/Division of Disabilities (DES/DDD) and the Department of Child Safety/Comprehensive Medical and Dental Program (DCS/CMDP)).

Capitation rates are certified by actuaries and must be recertified every year to coincide with MCO annual contract periods. In addition, if a rate is determined to not be actuarially sound, the actuary is required to amend the capitation rate accordingly. AHCCCS is requesting review of DES/DDD and DCS/CMDP rates for the following periods:

1. DCS/CMDP
    a. July 1, 2018 through September 30, 2018
    b. October 1, 2018 through March 31, 2019
    c. April 1, 2019 through September 30, 2019
2. DES/DDD
    a. July 1, 2018 through September 30, 2018
    b. October 1, 2018 through December 31, 2018
    c. January 1, 2019 through September 30, 2019

Subsequent to the development of the original capitation rates, additional items described below were identified and the AHCCCS actuary determined the rates were not actuarially sound and has revised them to ensure actuarial soundness. AHCCCS intends to implement both prospective and retroactive changes to capitation rates, beginning April 1, 2019. AHCCCS has submitted updated actuarial certifications to CMS, which are provided as attachments to this letter and were made available to Joint Legislative Budget Committee (JLBC) staff on February 15, 2019.

AHCCCS previously communicated these anticipated changes in the letter sent to you on January 11, 2019. This letter provides additional detail and amends responses previously provided to JLBC staff.

Background and Summary

The amended rates for DCS/CMDP and DES/DDD address several items:

1. Change in contract terms for both programs from a State Fiscal Year (SFY) basis to a Federal Fiscal Year (FFY), via a 15-month contract period ending September 30, 2019.
2. Retroactive update to the base period time frame and trend assumptions for DES/DDD to reflect additional utilization, effective July 1, 2018.
3. Retroactive update to program reimbursement for DES/DDD to reflect change to contracted rates, effective July 1, 2018.
4. Retroactive correction of technical oversights in rate development, primarily related to the transition of Children's Rehabilitative Services (CRS), for both DCS/CMDP and DES/DDD, effective October 1, 2018.
5. Prospective increase to administrative and care management funding for DCS/CMDP to reflect additional contractual requirements, effective April 1, 2019.

1. Change in contract terms for both programs from a State Fiscal Year (SFY) basis to a Federal Fiscal Year (FFY), via a 15-month contract period ending September 30, 2019.

   This action will align these two contracts with all other AHCCCS lines of business (LOBs), with program and reimbursement changes typically implemented October 1st, and with DES/DDD subcontractor contract periods. In order to implement this change, AHCCCS intends to extend the current 12-month contract periods effective July 1, 2018 through June 30, 2019 to 15-month contract periods effective July 1, 2018 through September 30, 2019. The subsequent contract period would put these LOBs on the regular cadence every 12 months, effective October 1, 2019.

2. Retroactively update the base period and trend assumptions for DES/DDD to reflect additional utilization, effective July 1, 2018.

   The original DES/DDD capitation rate, effective July 1, 2018, was based on Calendar Year (CY) 2017 data, which were the most current data available at the time the rate was developed. Subsequent to the development of the rate, at the beginning of August 2018, DES/DDD informed AHCCCS that it was beginning to observe an increase in utilization associated with administrative efforts beginning in November 2017 to address a backlog of

unassigned authorizations. Unassigned authorizations are instances in which a member has been authorized to receive a service but that service has not yet been assigned to a qualified provider.

In mid-October 2018, the Actuary reviewed encounter data for SFY 2018 and observed an increase in utilization that was slightly higher than what was assumed in capitation rate development, however, the overall rate appeared to be actuarially sound. In mid-December 2018, the Actuary again reviewed encounter data for SFY 2018, which had completed more fully since the last review, and observed that an increase in utilization had materialized that was greater than was assumed in the July 1, 2018 rate, and, in light of this new information, determined that the rate was no longer actuarially sound. AHCCCS is required by Federal law to pay capitation rates that are actuarially sound. In order to ensure actuarial soundness, the Actuary has updated the base period data and trend assumptions to reflect the additional utilization.

3. Retroactive update to program reimbursement for DES/DDD to reflect change to contracted rates, effective July 1, 2018.

   Subsequent to the development of the original capitation rate, DES/DDD notified AHCCCS of the effective impact of revised contracted rates for the private Intermediate Care Facility for Individuals with Intellectual Disabilities (ICF/IID). Prior to July 1, 2018, a single daily rate was paid for all members in this setting. Effective July 1, 2018, differentiated daily rates based on level of care were included in the contract and communicated to AHCCCS. However, DES/DDD was not able to determine the level of care for affected members, and thus the applicable rates under the new contract, until after the beginning of the contract period, so no change to unit cost for the private ICF/IID was included in the original capitation rate development. Subsequently, DES/DDD provided the information required in order to determine that a lower average rate would be paid under the revised contract, and AHCCCS is now retroactively adjusting the capitation rate accordingly.

4. Retroactive correction of technical oversights in rate development, primarily related to the transition of Children's Rehabilitative Services (CRS), for both DCS/CMDP and DES/DDD, effective October 1, 2018.

   As part of the ongoing rate review process that occurs throughout the year, the AHCCCS actuary identified technical oversights in the development of capitation rates that have been corrected in these rate updates. For example, the transition of CRS services to both programs impacted the reinsurance offset, which has been recomputed for each to accurately reflect the associated changes. More detail on each change is provided in the respective actuarial certifications. Technical adjustments account for a 0.6% increase for DCS/CMDP and a 0.2% decrease for DES/DDD.

5. Prospective increase to administrative and care management funding for DCS/CMDP to reflect additional contractual requirements, effective April 1, 2019.

   The DCS/CMDP capitation rate includes an adjustment effective April 1, 2019 to reflect additional administrative costs associated with new contract requirements that both mandate a full-time, dedicated chief financial officer be staffed by the program and also require the program to engage in comprehensive readiness planning activities to facilitate the anticipated integration of behavioral health services currently administered through the Regional Behavioral Health Authorities for members enrolled in the CMDP.

DCS/CMDP Amended Rates

Amended CYE 2019 rates for DCS/CMDP reflect an overall increase of 1.1% on a 12-month, SFY 2019, weighted average basis, as compared to previously submitted rates. The following factors contributed to the increase:

- 0.6% for technical adjustments to the integration of CRS services, effective October 1, 2018.
- 0.3% for administrative and care management expenditures, effective April 1, 2019.
- 0.2% for trend to reflect adjusted contract period, effective July 1, 2018.

Table I. DCS/CMDP Projected Expenditures

	SFY 19 Orig. Rate	SFY 19 Rev. Rate	SFY 19 Member Months	Expenditures with SFY 19 Orig. Rate	Expenditures with SFY 19 Rev. Rate	Change Inc.(Dec.)
DCS/CMDP	$293.57	$296.71	173,301	$50,876,400	$51,419,300	$542,900

Please also see additional detail provided in Appendix 1A for the originally published rate, as well as Appendix 1B for the revised rate.

DES/DDD Amended Rates

Amended CYE 2019 rates for DES/DDD reflect an overall increase of 1.5% on a 12-month, SFY 2019, weighted average basis, as compared to previously submitted rates. The following factors contributed to the increase:

- 1.8% for rebase and trend adjustments, effective July 1, 2018.
- -0.1% for program reimbursement change, effective July 1, 2018.
- -0.2% for technical adjustments to reinsurance and member month basis for acute components, effective October 1, 2018.

Table II. DES/DDD Projected Expenditures

	SFY 19 Orig. Rate	SFY 19 Rev. Rate	SFY 19 Member Months	Expenditures with SFY 19 Orig. Rate	Expenditures with SFY 19 Rev. Rate	Change Inc.(Dec.)
DES/DDD	$4,067.09	$4,126.68	397,271	$1,615,736,100	$1,639,409,400	$23,673,300

Please also see additional detail provided in Appendix 2A for the originally published rate, as well as Appendix 2B for the revised rate.

Responses to JLBC Questions

AHCCCS received a letter from Director Stavneak dated January 4, 2019 that included several questions related to the DES/DDD capitation rate. In the letter dated January 11, 2019, AHCCCS provided preliminary answers to those questions. AHCCCS is providing amended responses below, with additions underlined.

1. **In its FY 2020 budget submittal to the Legislature in September 2018, DES identified certain categories of services, such as therapies and in-home nursing, with backlogs of "unassigned authorizations." We understand that "unassigned authorizations" include services that have been deemed medically necessary or otherwise appropriate for a DD client for which a provider has not yet been identified. How did the actuaries incorporate this information in the development of the original CYE 2019 capitation rates implemented in October 2018?**

   The original DDD CYE 2019 capitation rates were developed in May 2018 based on CY 2017 data, effective 7/1/18, and so did not incorporate assumptions or information regarding the unassigned authorizations subsequently communicated by DDD to AHCCCS. AHCCCS Actuaries set capitation rates based on approved encounters submitted by DDD and do not set rates based on data regarding unassigned authorizations or services that have not been provided. In order to consider an adjustment to the DDD capitation rate, the AHCCCS Actuary found it necessary to observe an actual increase in utilization of services in the encounter data. Given the lag in submission of encounters, a minor increase was observed in October 2018, and a significant increase was observed in December 2018, which prompted action by AHCCCS.

   The anticipated revision to DDD capitation rates will address the increase in utilization by adjusting the base period data used for rate development from CY 2017 to SFY 2018, which includes the increase in utilization attributable to administrative efforts to reduce the backlog in unassigned authorizations that began in November 2017. Utilization trend assumptions will also take into account the new base period data.

The revision to capitation rates adjusted the base period data from calendar year 2017 to SFY 2018, which brings six months of increased utilization into the base period data. The utilization trend assumptions used in the updated rates (Appendix 6 of the actuarial certification) are also higher than those assumed in the original 7/1/18 rates. The combined effect of these two pieces can be seen in the change from the original rates submitted for 7/1/18 and the revised rates for 7/1/18 which are 1.9% higher in terms of claims costs (Appendix 5b of the actuarial certification).

2. **Please provide us with any reports from the actuaries used to determine utilization was higher-than-anticipated in the original capitation rates.**

   The Actuary is currently preparing a comprehensive actuarial analysis, which includes a comparison of revised utilization assumptions to the original utilization assumptions. The Actuary utilizes encounter data to prepare this analysis and a summary report is not immediately available. When the revised DDD capitation rate is finalized, AHCCCS will provide the revised actuarial certification to JLBC, including the updated utilization trend assumptions by category of service.

   Please see the attached certification, in which updated utilization trend assumptions by category of service can be found in Appendix 6.

3. **How many DDD clients had at least one authorized service that was unassigned when the actuaries developed the original CYE 2019 capitation rates? Please provide a detailed listing by service category. (e.g. occupational therapy, in-home nursing, etc.)**

   As noted above, the Actuary does not review unassigned authorizations as part of capitation rate development. However, please see Appendix Table 3 of this letter, which is a report submitted by DDD to AHCCCS that identifies the number of unassigned authorizations aged 30 days or more for the period January 2018 through December 2018. The table illustrates that the number of unassigned authorizations declined from 4,738 in January 2018 to 1,719 in June 2018, which corresponds to the revised encounter data period the Actuary is currently analyzing.

   No change to this response.

4. **How many DD clients had at least one authorized service that was unassigned when the revised January 1 rates were finalized? Again, please provide a listing by service category.**

   Please see response to #3 above and Appendix Table 3 of this letter.

No change to this response.

5. **What is the revised per-member, per-month rate for each expense subcategory of the DD capitation rate for the January 1 rates (e.g. HCBS, premium tax, etc.)?**

   AHCCCS is withdrawing the January 1st rate increase previously communicated. AHCCCS will provide a revised actuarial certification that identifies the PMPM rate for each expense subcategory of the DDD capitation rate in a future submission.

   The revised projected benefit cost PMPM for each expense subcategory for the three capitation rates certified are provided in Appendix 5a of the actuarial certification.

6. **What are the components of the $12.4 million cost increase in FY 2019 by service category?**

   AHCCCS is withdrawing the January 1st rate increase previously communicated. AHCCCS will provide a notification to JLBC that includes the components of the final cost increase in FY 2019 by service in a future submission.

   The final cost increase is estimated to be $23.1 million for benefit costs and $0.5 million for non-benefit costs, for a total of $23.7 million for SFY 2019 (difference is due to rounding). Detail by service category is provided in Appendix Table 4 of this letter.

7. **What per-unit cost assumptions did the actuaries employ to calculate the total funds cost of the increase in utilization?**

   AHCCCS is withdrawing the January 1st rate increase previously communicated. AHCCCS will provide a revised actuarial certification that identifies the per-unit cost assumptions in a future submission.

   AHCCCS actuaries develop capitation rates on a PMPM expenditure basis, using unit cost and utilization to inform growth estimates of those PMPM amounts. The cost of the increase in utilization was developed as a change in the PMPM expenditures, not analyzed at a specific cost level for anticipated increases in utilization. Details on the PMPM growth assumptions, for both unit cost and utilization, are provided in Appendix 6 of the revised certification.

8. **Does AHCCCS anticipate that the $12.4 million cost increase represents a one-time expense to reduce the backlog of "unassigned authorizations"? Or do the actuaries anticipate the higher utilization level will be ongoing in FY 2020?**

   The final cost increase will differ from the $12.4 million figure previously communicated, but it will not be considered a one-time expense and AHCCCS does anticipate the higher utilization level will be sustained prospectively into FY 2020.

The final cost increase is estimated to be $23.7 million for SFY 2019. The higher utilization level is anticipated to be ongoing, and therefore the associated costs should not be considered to be one-time. As unassigned authorizations continue to be managed and members receive services they were not already receiving, future utilization could be impacted.

9. **We assume that the January 1 capitation adjustment does not require supplemental funding since neither AHCCCS nor DES has filed a "35-131D" report. In conjunction with A.R.S. § 1-254, A.R.S. § 35-131D requires state agencies to notify the Governor, the Speaker of the House of Representatives, the President of the Senate, and the Chairman of the Joint Legislative Budget Committee of any projected shortfall in funds in a fiscal year and submit a complete report on the matter within 10 days of the initial notification. Please notify us if our assumption is incorrect. If we are incorrect, we request that you file a "35-131D" report.**

   The AHCCCS Actuary continues to work with DES on the anticipated revision to DDD capitation rates. AHCCCS cannot opine as to the status of the DES appropriations, but notes that DES has communicated that it intends to work with the Governor's Office of Strategic Planning and Budgeting (OSPB) and JLBC to address any necessary adjustment to its appropriations.

   The revised capitation rates have been provided to DES in order to inform their analysis of any supplemental funding need.

10. **In its FY 2020 budget submittal from September 2018, DES requested funding to implement provider rate increases for certain services with unassigned authorizations. Can you please re-estimate the cost of those proposed rate increases with the higher utilization rates recognized by the actuaries in the January 1 rate adjustment?**

    Upon completion of the revised capitation rate and actuarial certification, AHCCCS will provide updated utilization assumptions to DDD for purposes of revising their cost estimates associated with the decision packages submitted by DES.

    AHCCCS has provided the revised capitation rate and actuarial certification, including updated utilization assumptions, to DES/DDD for this purpose.

AHCCCS Actuaries and staff are available to answer any additional questions or provide additional information. Should you have any questions please feel free to contact Shelli Silver, Assistant Director, at (602) 417-4647.

Sincerely,

Jami Snyder
Director

Cc: The Honorable David Gowan, Arizona Senate
Matthew Gress, Office of Strategic Planning and Budgeting
Richard Stavneak, Joint Legislative Budget Committee
Christina Corieri, Senior Policy Advisor, Office of the Governor
Bret Cloninger, Office of Strategic Planning and Budgeting

APPENDIX TABLE 1A

ORIGINAL PUBLISHED
Comprehensive Medical and Dental Program (CMDP)
CYE 19 Capitation Rate Development

	PMPM	
CYE 18 Rate (1/1/18)	**$ 226.52**	
7/1/18 Baseline Adjustments	**PMPM**	
Rebase	$ 34.66	15.3%
Trend	$ 13.09	5.8%
Program and Reimbursement Changes	$ 3.32	1.5%
UW Gain	$ 0.53	0.2%
Premium Tax	$ 1.05	0.5%
Subtotal	$ 52.66	23.2%
CYE 19 Rate (7/1/18)	**$ 279.18**	**23.2%**
10/1/18 Baseline Adjustments		
Children's Rehabilitative Services Base Modification	**PMPM**	
Rebase	$ 16.04	5.7%
Trend	$ 1.03	0.4%
Program and Reimbursement Changes	$ 0.11	0.0%
Differential Adjusted Payments (excludes 2.5% Hospital DAP)	$ 0.07	0.0%
UW Gain	$ 0.20	0.1%
Premium Tax	$ 0.36	0.1%
Subtotal	$ 17.81	6.4%
CMDP Regular Adjustments	**PMPM**	
Rebase	$ (1.71)	-0.6%
Trend	$ -	0.0%
Program and Reimbursement Changes	$ 0.91	0.3%
Differential Adjusted Payments (excludes 2.5% Hospital DAP)	$ 0.71	0.3%
UW Gain	$ 0.00	0.0%
Premium Tax	$ (0.00)	0.0%
Subtotal	$ (0.09)	0.0%

10/1/18 Non-Baseline Adjustments[1]		
Children's Rehabilitative Services Base Modification	PMPM	
2.5% Increase for Differential Adjusted Payment to Hospitals	$ 0.13	0.0%
UW Gain	$ 0.00	0.0%
Premium Tax	$ 0.00	0.0%
Subtotal	$ 0.13	0.0%

CMDP Regular Adjustments	PMPM	
2.5% Increase for Differential Adjusted Payment to Hospitals	$ 1.30	0.5%
UW Gain	$ 0.01	0.0%
Premium Tax	$ 0.03	0.0%
Subtotal	$ 1.34	0.5%

CYE 19 Rate (10/1/18)	**$ 298.38**	**6.9%**

4/1/19 Baseline Adjustments		
Children's Rehabilitative Services Base Modification	PMPM	
Care Management	$ -	0.0%
Administrative	$ -	0.0%
UW Gain	$ -	0.0%
Premium Tax	$ -	0.0%
Subtotal	$ -	0.0%

CMDP Regular Adjustments	PMPM	
Care Management	$ -	0.0%
Administrative	$ -	0.0%
UW Gain	$ -	0.0%
Premium Tax	$ -	0.0%
Subtotal	$ -	0.0%

CYE 19 CMDP Rate (4/1/19)	**$ 298.38**	**0.0%**

	PMPM	% Chg from 1/1/18
Blended CYE 19 Rate	**$ 293.57**	**29.6%**
Growth Excluding CRS Base Modification	*$ 280.12*	*23.7%*
Growth Excluding CRS Base Modification and Non-Baseline Adj.	*$ 279.12*	*23.2%*

1/ Laws 2018, Chapter 276 included appropriations for these adjustments, in addition to appropriations for baseline capitation rate growth.

APPENDIX TABLE 1B

REVISED
Comprehensive Medical and Dental Program (CMDP)
CYE 19 Capitation Rate Development (12 Months Jul 18 - Jun 19)

	PMPM	
CYE 18 Rate (1/1/18)	**$ 226.52**	
7/1/18 Baseline Adjustments	**PMPM**	
Rebase	$ 33.23	14.7%
Trend	$ 14.37	6.3%
Program and Reimbursement Changes	$ 2.95	1.3%
UW Gain	$ 0.53	0.2%
Premium Tax	$ 1.04	0.5%
Subtotal	$ 52.12	23.0%
CYE 19 Rate (7/1/18)	**$ 278.64**	**23.0%**
10/1/18 Baseline Adjustments		
Children's Rehabilitative Services Base Modification	**PMPM**	
Rebase	$ 17.80	6.4%
Trend	$ 1.62	0.6%
Program and Reimbursement Changes	$ 0.13	0.0%
Differential Adjusted Payments (excludes 2.5% Hospital DAP)	$ 0.09	0.0%
UW Gain	$ 0.20	0.1%
Premium Tax	$ 0.41	0.1%
Subtotal	$ 20.26	7.3%
CMDP Regular Adjustments	**PMPM**	
Rebase	$ -	0.0%
Trend	$ -	0.0%
Program and Reimbursement Changes	$ 0.59	0.2%
Differential Adjusted Payments (excludes 2.5% Hospital DAP)	$ 0.71	0.3%
UW Gain	$ 0.02	0.0%
Premium Tax	$ 0.03	0.0%
Subtotal	$ 1.35	0.5%

10/1/18 Non-Baseline Adjustments[1]

Children's Rehabilitative Services Base Modification	PMPM	
2.5% Increase for Differential Adjusted Payment to Hospitals	$ 0.17	0.1%
UW Gain	$ 0.00	0.0%
Premium Tax	$ 0.00	0.0%
Subtotal	$ 0.17	0.1%

CMDP Regular Adjustments	PMPM	
2.5% Increase for Differential Adjusted Payment to Hospitals	$ 1.30	0.5%
UW Gain	$ 0.01	0.0%
Premium Tax	$ 0.03	0.0%
Subtotal	$ 1.34	0.5%

CYE 19 Rate (10/1/18)	**$ 301.76**	**8.3%**

4/1/19 Baseline Adjustments

Children's Rehabilitative Services Base Modification	PMPM	
Care Management	$ 0.13	0.0%
Administrative	$ 0.00	0.0%
UW Gain	$ 0.00	0.0%
Premium Tax	$ 0.00	0.0%
Subtotal	$ 0.14	0.0%

CMDP Regular Adjustments	PMPM	
Care Management	$ 0.78	0.3%
Administrative	$ 1.95	0.6%
UW Gain	$ 0.03	0.0%
Premium Tax	$ 0.06	0.0%
Subtotal	$ 2.81	0.9%

CYE 19 CMDP Rate (4/1/19)	**$ 304.71**	**1.0%**

	PMPM	% Chg from 1/1/18
Blended CYE 19 Rate	**$ 296.71**	**31.0%**
Growth Excluding CRS Base Modification	*$ 281.36*	*24.2%*
Growth Excluding CRS Base Modification and Non-Baseline Adj.	*$ 279.65*	*23.5%*

1/ Laws 2018, Chapter 276 included appropriations for these adjustments, in addition to appropriations for baseline capitation rate growth.

APPENDIX TABLE 2A

ORIGINAL PUBLISHED
Arizona Long Term Care System/Division of Developmental Disabilities
Regular DDD CYE 19 Capitation Rate Development

	PMPM	
CYE 18 Rate (1/1/18)	**$ 3,804.90**	
7/1/18 Baseline Adjustments	**PMPM**	
Rebase	$ (22.15)	-0.6%
Trend	$ 107.04	2.8%
Program and Reimbursement Changes	$ -	0.0%
UW Gain	$ 0.62	0.0%
Premium Tax	$ 1.74	0.0%
Subtotal	$ 87.25	2.3%
CYE 19 Rate (7/1/18)	**$ 3,892.14**	**2.3%**
10/1/18 Baseline Adjustments	**PMPM**	
Children's Rehabilitative Services Base Modification		
Rebase	$ 176.37	4.5%
Trend	$ 16.03	0.4%
Program and Reimbursement Changes	$ 0.11	0.0%
Differential Adjusted Payments (excludes 2.5% Hospital DAP)	$ 0.30	0.0%
UW Gain	$ 1.82	0.0%
Premium Tax	$ 3.98	0.1%
Subtotal	$ 198.62	5.1%
DDD Regular Adjustments		
Rebase	$ (43.36)	-1.1%
Trend	$ 25.82	0.7%
Program and Reimbursement Changes	$ 7.58	0.2%
Differential Adjusted Payments (excludes 2.5% Hospital DAP)	$ 0.94	0.0%
UW Gain	$ (0.05)	0.0%
Premium Tax	$ (0.19)	0.0%
Subtotal	$ (9.26)	-0.2%

10/1/18 Non-Baseline Adjustments[1]	PMPM	
Children's Rehabilitative Services Base Modification		
Access to Professional Services Initiative	$ 7.23	0.2%
2.5% Increase for Differential Adjusted Payment to Hospitals	$ 0.81	0.0%
UW Gain	$ 0.08	0.0%
Premium Tax	$ 0.17	0.0%
Subtotal	$ 8.29	0.2%
DDD Regular Adjustments		
Access to Professional Services Initiative	$ 4.17	0.1%
2.5% Increase for Differential Adjusted Payment to Hospitals	$ 2.50	0.1%
Nursing Facility 3% Rate Increase	$ 1.79	0.0%
UW Gain	$ 0.08	0.0%
Premium Tax	$ 0.17	0.0%
Subtotal	$ 8.72	0.2%
CYE 19 Rate (10/1/18)	**$ 4,098.51**	**5.3%**

1/1/19 Non-Baseline Adjustments[1]	PMPM	
Prop 206 Adjustment	$ 37.52	0.9%
UW Gain	$ 0.38	0.0%
Premium Tax	$ 0.77	0.0%
Subtotal	$ 38.66	0.9%
CYE 19 Rate (1/1/19)	**$ 4,137.17**	**0.9%**

	PMPM	% Chg from 1/1/18
Blended CYE 19 Rate	**$ 4,067.09**	**6.9%**
Growth Excluding CRS Base Mod.	*$ 3,911.21*	*2.8%*
Growth Excluding CRS Base Mod. And Non-Baseline	*$ 3,885.16*	*2.1%*

1/ Laws 2018, Chapter 276 included appropriations for these adjustments, in addition to appropriations for baseline capitation rate growth.

APPENDIX TABLE 2B

REVISED
Arizona Long Term Care System/Division of Developmental Disabilities
Regular DDD CYE 19 Capitation Rate Development (12 Months Jul 18 - Jun 19)

	PMPM	
CYE 18 Rate (1/1/18)	**$ 3,804.90**	
7/1/18 Baseline Adjustments	**PMPM**	
Rebase	$ 53.05	1.4%
Trend	$ 102.45	2.7%
Program and Reimbursement Changes	$ (5.56)	-0.1%
UW Gain	$ 1.26	0.0%
Premium Tax	$ 3.08	0.1%
Subtotal	$ 154.29	4.1%
CYE 19 Rate (7/1/18)	**$ 3,959.18**	**4.1%**
10/1/18 Baseline Adjustments	**PMPM**	
Children's Rehabilitative Services Base Modification		
Rebase	$ 178.49	4.5%
Trend	$ 15.95	0.4%
Program and Reimbursement Changes	$ 0.55	0.0%
Differential Adjusted Payments (excludes 2.5% Hospital DAP)	$ 0.30	0.0%
UW Gain	$ 1.85	0.0%
Premium Tax	$ 4.02	0.1%
Subtotal	$ 201.16	5.1%
DDD Regular Adjustments		
Rebase	$ (53.39)	-1.3%
Trend	$ 25.27	0.6%
Program and Reimbursement Changes	$ 7.43	0.2%
Differential Adjusted Payments (excludes 2.5% Hospital DAP)	$ 0.93	0.0%
UW Gain	$ (0.12)	0.0%
Premium Tax	$ (0.41)	0.0%
Subtotal	$ (20.29)	-0.5%

10/1/18 Non-Baseline Adjustments[1]		
Children's Rehabilitative Services Base Modification		
Access to Professional Services Initiative	$ 7.23	0.2%
2.5% Increase for Differential Adjusted Payment to Hospitals	$ 0.79	0.0%
UW Gain	$ 0.08	0.0%
Premium Tax	$ 0.17	0.0%
Subtotal	$ 8.27	0.2%
DDD Regular Adjustments		
Access to Professional Services Initiative	$ 4.17	0.1%
2.5% Increase for Differential Adjusted Payment to Hospitals	$ 2.46	0.1%
Nursing Facility 3% Rate Increase	$ 0.47	0.0%
UW Gain	$ 0.07	0.0%
Premium Tax	$ 0.15	0.0%
Subtotal	$ 7.32	0.2%
CYE 19 Rate (10/1/18)	**$ 4,155.65**	**5.0%**

1/1/19 Non-Baseline Adjustments[1]	PMPM	
Prop 206 Adjustment	$ 37.52	0.9%
UW Gain	$ 0.38	0.0%
Premium Tax	$ 0.78	0.0%
Subtotal	$ 38.67	0.9%
CYE 19 Rate (1/1/19)	**$ 4,194.32**	**0.9%**

	PMPM	% Chg from 1/1/18
Blended CYE 19 Rate	**$ 4,126.68**	**8.5%**
Growth Excluding CRS Base Mod.	*$ 3,968.90*	*4.3%*
Growth Excluding CRS Base Mod. And Non-Baseline	*$ 3,943.90*	*3.7%*

/ Laws 2018, Chapter 276 included appropriations for these adjustments, in addition to appropriations for baseline capitation rate growth.

APPENDIX TABLE 3

DES/DDD Report Submitted to AHCCCS
Timely Provision of Services
Unassigned Authorizations Aged 30 days or more for All Members

Service Category	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Attendant Care	82	56	43	30	24	23	22	21	34	36	33	33
Day Treatment	187	94	62	42	45	32	95	40	26	45	52	49
Early Childhood	77	60	66	75	62	56	56	50	53	50	50	56
Employment	47	17	23	24	29	22	22	14	23	17	27	33
Habilitation, Per Diem	21	14	12	6	3	9	6	3	5	7	6	9
Habilitation, Per 15 min	848	500	383	312	280	275	249	197	221	237	257	288
Nursing, In-Home	51	40	54	31	40	50	45	41	39	26	42	46
Respite	1,026	554	411	290	264	230	210	183	206	-	305	309
Therapies	2,274	1,531	1,350	1,222	1,160	999	965	948	992	978	1,040	1,065
Transportation	125	57	42	29	24	23	64	38	27	32	40	39
Total	**4,738**	**2,923**	**2,446**	**2,061**	**1,931**	**1,719**	**1,734**	**1,535**	**1,626**	**1,428**	**1,852**	**1,927**

Comments:

1. Members may have more than one unassigned authorization
2. Data is not available prior to January 2018

APPENDIX TABLE 4

DES/DDD Member Months	7/1/18 to 9/30/18	10/1/18 to 12/31/18	1/1/19 to 6/30/19	SFY 19 Total
	97,979	99,180	200,112	397,271

DES/DDD Capitation Rate	CYE 19 Revised Capitation Rates Effective 07/01/18 - 09/30/18	CYE 19 Revised Capitation Rates Effective 10/01/18 - 12/31/18	CYE 19 Revised Capitation Rates Effective 01/01/19 - 09/30/19	SFY 19 Revised	CYE 19 Prior Submitted Rate (7/1/18)	CYE 19 Prior Submitted Rate (10/1/18)	CYE 19 Prior Submitted Rate (1/1/19)	SFY 19 Prior	SFY 19 Revised Less SFY 19 Prior	SFY 19 Revised Less SFY 19 Prior in $s
Claim Costs										
Institutional Services										
Institutional Encounters	$ 52.49	$ 52.84	$ 53.05	$ 52.86	$ 59.80	$ 61.46	$ 61.68	$ 61.16	$ (8.30)	$ (3,297,600)
ICF/IID[1,2]	$ 51.87	$ 51.87	$ 51.87	$ 51.87	$ 58.95	$ 58.95	$ 58.95	$ 58.95	$ (7.08)	$ (2,813,600)
Subtotal	$ 104.36	$ 104.71	$ 104.92	$ 104.73	$ 118.75	$ 120.41	$ 120.63	$ 120.11	$ (15.38)	$ (6,111,200)
Home and Community Based Services										
Attendant Care	$ 331.43	$ 331.43	$ 335.66	$ 333.56	$ 320.37	$ 320.37	$ 324.60	$ 322.50	$ 11.06	$ 4,393,000
Respite	$ 291.97	$ 291.97	$ 295.78	$ 293.89	$ 288.49	$ 288.49	$ 292.30	$ 290.41	$ 3.48	$ 1,381,300
Hab Res Per Diem	$ 1,096.25	$ 1,096.25	$ 1,110.38	$ 1,103.37	$ 1,071.67	$ 1,071.67	$ 1,085.81	$ 1,078.79	$ 24.57	$ 9,762,300
Hab Res Per 15 mins	$ 341.88	$ 341.88	$ 346.21	$ 344.06	$ 328.83	$ 328.83	$ 333.17	$ 331.01	$ 13.05	$ 5,183,000
Day Treatment	$ 363.58	$ 363.58	$ 368.24	$ 365.93	$ 353.26	$ 353.26	$ 357.92	$ 355.61	$ 10.32	$ 4,099,000
Self Care Home	$ 6.04	$ 6.04	$ 6.12	$ 6.08	$ 5.91	$ 5.91	$ 5.99	$ 5.95	$ 0.13	$ 51,900
Therapy and Evals	$ 154.59	$ 154.59	$ 156.56	$ 155.58	$ 149.07	$ 149.07	$ 151.03	$ 150.06	$ 5.52	$ 2,194,100
Transportation	$ 53.00	$ 53.00	$ 53.70	$ 53.35	$ 52.70	$ 52.70	$ 53.39	$ 53.05	$ 0.30	$ 120,100
Nursing	$ 150.90	$ 150.90	$ 152.88	$ 151.90	$ 150.26	$ 150.26	$ 152.24	$ 151.26	$ 0.64	$ 254,600
Employment	$ 86.23	$ 86.23	$ 87.42	$ 86.83	$ 89.75	$ 89.75	$ 90.93	$ 90.34	$ (3.52)	$ (1,396,500)
Misc	$ 18.64	$ 18.64	$ 18.87	$ 18.76	$ 17.14	$ 17.14	$ 17.37	$ 17.25	$ 1.50	$ 597,400
SOGH[2]	$ 25.46	$ 25.46	$ 25.46	$ 25.46	$ 13.20	$ 13.20	$ 13.20	$ 13.20	$ 12.26	$ 4,871,400
Subtotal	$ 2,919.98	$ 2,919.98	$ 2,957.28	$ 2,938.77	$ 2,840.66	$ 2,840.66	$ 2,877.96	$ 2,859.45	$ 79.32	$ 31,511,600
Acute Services[3]										
Acute MCO	$ 438.85	$ 435.01	$ 435.01	$ 435.96	$ 438.85	$ 442.24	$ 442.24	$ 441.40	$ (5.45)	$ (2,164,600)
Acute CRS	$ -	$ 193.13	$ 193.13	$ 145.50	$ -	$ 190.20	$ 190.20	$ 143.29	$ 2.21	$ 877,500
Acute FFS	$ 8.21	$ 6.81	$ 6.81	$ 7.15	$ 8.21	$ 6.65	$ 6.65	$ 7.03	$ 0.12	$ 48,000
Subtotal	$ 447.05	$ 634.95	$ 634.95	$ 588.61	$ 447.05	$ 639.09	$ 639.09	$ 591.73	$ (3.12)	$ (1,239,100)
Total Claim Costs	**$ 3,471.38**	**$ 3,659.63**	**$ 3,697.15**	**$ 3,632.10**	**$ 3,406.46**	**$ 3,600.16**	**$ 3,637.68**	**$ 3,571.28**	**$ 60.82**	**$ 24,161,300**
Share of Cost	$ (4.57)	$ (4.57)	$ (4.57)	$ (4.57)	$ (4.70)	$ (4.57)	$ (4.57)	$ (4.60)	$ 0.03	$ 12,300
Acute Services Reinsurance[3]										
Acute RI (non-CRS)	$ (26.60)	$ (33.37)	$ (33.37)	$ (31.70)	$ (26.60)	$ (30.55)	$ (30.55)	$ (29.58)	$ (2.12)	$ (843,100)
Acute RI (CRS)	$ -	$ (6.12)	$ (6.12)	$ (4.61)	$ -	$ (5.44)	$ (5.44)	$ (4.10)	$ (0.52)	$ (205,900)
Subtotal	$ (26.60)	$ (39.49)	$ (39.49)	$ (36.31)	$ (26.60)	$ (35.99)	$ (35.99)	$ (33.67)	$ (2.64)	($1,049,000)
Total Net Claim Costs	**$ 3,440.22**	**$ 3,615.57**	**$ 3,653.08**	**$ 3,591.22**	**$ 3,375.16**	**$ 3,559.60**	**$ 3,597.12**	**$ 3,533.01**	**$ 58.21**	**$ 23,124,600**
Non-Benefit Costs										
Case Management	$ 176.01	$ 176.01	$ 176.01	$ 176.01	$ 176.01	$ 176.01	$ 176.01	$ 176.01	$ -	$ -
Administration[3]										
Admin Acute Non-CRS	$ 40.81	$ 39.81	$ 39.81	$ 40.06	$ 40.81	$ 40.58	$ 40.58	$ 40.64	$ (0.58)	$ (229,600)
Admin Acute CRS	$ -	$ 16.31	$ 16.31	$ 12.28	$ -	$ 16.10	$ 16.10	$ 12.13	$ 0.16	$ 62,200
Admin LTSS	$ 186.50	$ 186.50	$ 186.50	$ 186.50	$ 186.50	$ 186.50	$ 186.50	$ 186.50	$ -	$ -
Subtotal	$ 227.31	$ 242.61	$ 242.61	$ 238.84	$ 227.31	$ 243.17	$ 243.17	$ 239.26	$ (0.42)	($167,400)
Underwriting Gain	$ 36.47	$ 38.36	$ 38.73	$ 38.08	$ 35.82	$ 37.76	$ 38.14	$ 37.47	$ 0.61	$ 241,600
Premium Tax	$ 79.18	$ 83.11	$ 83.89	$ 82.53	$ 77.84	$ 81.97	$ 82.74	$ 81.34	$ 1.19	$ 474,500
Total Non-Benefit Costs	**$ 518.97**	**$ 540.09**	**$ 541.24**	**$ 535.46**	**$ 516.98**	**$ 538.91**	**$ 540.06**	**$ 534.08**	**$ 1.38**	**$ 548,700**
DES/DDD Capitation Rate	**$ 3,959.18**	**$ 4,155.65**	**$ 4,194.32**	**$ 4,126.68**	**$ 3,892.14**	**$ 4,098.51**	**$ 4,137.17**	**$ 4,067.09**	**$ 59.59**	**$ 23,673,300**

Appendix Table 4 Footnotes:

1) The Intermediate Care Facility/Individuals with Intellectual Disabilities (ICF/IID) category includes the ICF operated by the Arizona Training Program at Coolidge (ATPC) in addition to all other state operated ICFs.

2) The State Operated Group Home (SOGH) category covers all SOGH facilities including those at the ATPC campus. Previous certifications included the state operated group homes at the ATPC campus in the ICF/IID category (previously labeled ATPC, ICF/IID).

3) The Acute Services, Acute Services Reinsurance, and Administration categories of expense include CRS-related costs as of October 1, 2018.

3

STATE OF ARIZONA

Joint Legislative Budget Committee

1716 WEST ADAMS
PHOENIX, ARIZONA 85007

(602) 926-5491

azleg.gov

DATE: April 3, 2019

TO: Members of the Joint Legislative Budget Committee

FROM: Patrick Moran, Senior Fiscal Analyst PM

SUBJECT: Arizona Department of Administration/Automation Projects Fund - Review of CHILDS (Department of Child Safety Subaccount).

Request

A.R.S. § 41-714 requires Committee review prior to any monies being expended from the Arizona Department of Administration's (ADOA) Automation Projects Fund (APF) for the Children's Information Library and Data Source (CHILDS) replacement project. ADOA is requesting Committee review of $5,000,000 in FY 2019 funds to continue the project.

Committee Options

The Committee has at least the following 2 options:

1. A favorable review of the request.

2. An unfavorable review of the request.

Key Points

1) ADOA/DCS are requesting review of $5.0 M for CHILDS Replacement from FY 2019 funds.
2) Including unspent prior year monies, the project expenditure plan would be $13.1 M in FY 2019.
3) An independent third-party review indicates that the project is "positioned for success."
4) The estimated project completion date is December 2020.

(Continued)

Analysis

CHILDS is the information management system used to document the status, demographics, location and outcomes for children in the care of DCS. The system assists with various business processes including hotline intake, initial assessments and investigations, case management, adoptions, eligibility determinations, staff management, provider management and payment processing. DCS is replacing CHILDS with "Guardian." Instead of purchasing a whole new system, DCS is developing Guardian as a "synthesized solution" in which a contracted "technical integrator" will be responsible for incrementally bringing together independent subsystems ("modules") within the Guardian platform. The total cost of the CHILDS replacement project is estimated at $86.0 million, of which the state share is 50% (or $43.0 million).

Table 1
CHILDS Replacement Project Budget (State Match)

Fiscal Year	Appropriations	JLBC Review	Expenditures
2015	$ 5.0	$ 0.3	$ 0.1
2016	0.0	0.3	0.5
2017	4.6	6.2	4.0
2018	11.1	7.6	6.7
2019 (YTD)	5.0	6.3	4.4
2019 (March-June)	0.0	5.0	8.7
2019 Total	*$ 5.0*	*$11.3*	*$13.1*
Grand Total	**$25.7**	**$25.7**	**$24.4**

As outlined in *Table 1*, between FY 2015 and FY 2019, ADOA and DCS were appropriated a total of $25.7 million from APF for CHILDS replacement. Through September 2018, the Committee had reviewed $20.7 million of that amount.

Since FY 2015, DCS has expended $15.7 million. This amount includes $4.4 million in FY 2019 through February. The department plans to expend an additional $8.7 million between March and June. Under the DCS plan, total cumulative spending level for the project would reach $24.4 million by June 2019. Given the $20.7 million in already reviewed expenditures, DCS' plan is $3.7 million above the level that the Committee previously reviewed. With the $5.0 million appropriation for CHILDS Replacement in FY 2019, the department's plan would result in $1.3 million of FY 2019 funds being carried over into FY 2020.

Details on DCS' total FY 2019 expenditure plan can be found in *Table 2*. The $13.1 million FY 2019 expenditure plan is $6.4 million above FY 2018 expenditures, mostly due to the onboarding of the technical integrator. The expenditure plan would be funded with $9.4 million of unspent FY 2018 funds, and $3.7 million of the department's FY 2019 appropriation.

DCS estimates that the state share of the total project cost will be $43.0 million by the time the project is completed. Based on that estimate, DCS would need $17.3 million in additional state funding across FY 2020 and FY 2021. To that end, the Executive is requesting an additional $10.1 million to continue the project in FY 2020. The JLBC Baseline has $5.0 million in FY 2020 based on the 3-year spending plan associated with the enacted FY 2019 budget.

Independent Third-Party Review

Consistent with several JLBC provisions and the requirements in A.R.S. § 41-714, DCS has hired an independent third-party consultant to provide the Committee with quarterly reports on the CHILDS replacement project for the life of the project. The latest assessment was completed on February 28, 2019. The independent consultant concluded that the project "continues to be positioned for success." The project demonstrates "strong health" on 3 of 10 metrics of plan viability and 6 of 9 metrics on project management practice, with all remaining metrics rated as "moderate health."

(Continued)

Table 2

Components of DCS' Guardian Expenditure Plan for FY 2019

Component	Estimated State Cost
Program Management - Communicates status and other information to oversight and management committees	$ 590,800
Business Integration - Specifies business requirements for new system	1,062,700
Mobile Solution - Application for caseworkers in the field	78,000
Independent Third-Party Consultant - Contracted quarterly evaluations	111,400
Quality Management - Conducts system testing on the new CHILDS system	423,700
Platform - Foundation for configuring modules (Microsoft Dynamics)	20,000
Enterprise Content Management - Stores and manages digital documents	1,556,500
Hosting - Cloud-based hosting environment	135,200
Integrated Shared Services - Allows sharing of information with other agencies	92,000
Data Management - Migration of data from CHILDS to Guardian	378,100
Training - Costs of instruction for all users	250,000
Service Management Office - Support services for Guardian post-implementation	83,000
Technical Integration - Integrates each system applications with the platform	8,356,700
Total	**$13,138,100**
Fund Sources	
Unexpended FY 2018 Monies (Previously Reviewed)	$ 9,399,300
New FY 2019 Monies (Not Previously Reviewed)	3,738,800
Total	**$13,138,100**

PM:kp

Douglas A. Ducey
Governor

Elizabeth Thorson
Interim Director

ARIZONA DEPARTMENT OF ADMINISTRATION

OFFICE OF THE DIRECTOR

100 NORTH FIFTEENTH AVENUE · SUITE 401
PHOENIX, ARIZONA 85007

(602) 542-1500

March 20, 2019

The Honorable John Kavanagh, Chairman
Arizona State Senate
Joint Legislative Budget Committee
1700 West Washington Street
Phoenix, Arizona 85007

The Honorable David Livingston, Vice-Chairman
Arizona House of Representatives
Joint Legislative Budget Committee
1700 West Washington Street
Phoenix, Arizona 85007

Dear Senator Kavanagh and Representative Livingston:

The Arizona Department of Administration (ADOA) is submitting this request for review of fiscal year 2019 of the Automation Projects Fund (APF) projects related to Department of Child Safety. The monies have been appropriated to support APF expenditure plans.

The attached documents contain a detailed explanation of the proposed project. We will be happy to meet with your staff to provide further explanation as appropriate.

Sincerely,

ELIZABETH THORSON (Mar 21, 2019)
Elizabeth Thorson
Interim Director

Enclosures
cc: Richard Stavneak, Director, JLBC
Matthew Gress, Director, OSPB
Derik Leavitt, Assistant Director, ADOA
Rebecca Perrera, JLBC Staff
Jacob Wingate, OSPB Staff
Morgan Reed, State CIO

ARIZONA
DEPARTMENT OF ADMINISTRATION
TECHNOLOGY

FY 2019 Automation Projects Fund (APF; A.R.S. § 41-714)

Favorable Review Request for April 2019 JLBC Meeting

Agency	Appropriation Name	JLBC Favorable Review Request	PIJ/ITAC Status
Dept. of Child Safety	Implement upgrades to the Children's Information Library and Data Source System (CHILDS)	$5,000,000	Approved
	Total FY19 APF April 2019 Request	**$5,000,000**	
	Total FY19 APF Funds Not Yet Reviewed by JLBC	$450,000	
	Total FY19 APF Funds Favorably Reviewed	$17,675,100	
	Total FY19 Appropriated APF Budget	**$23,125,100**	

Favorably Reviewed FY19 APF Projects

Agency	Appropriation Name	FY19 APF Appropriation	JLBC Favorable Review Amount	PIJ/ITAC Status
Dept. of Administration	Relocate State Data Center	$4,697,000	$4,697,000	JLBC Favorable Review 06/19/18
Dept. of Administration	HRIS	$821,900	$821,900	JLBC Favorable Review 06/19/18
Dept. of Administration	eProcurement	$3,000,000	$3,000,000	JLBC Favorable Review 06/19/18
Dept. of Administration	Projects related to e-Government	$500,000	$500,000	JLBC Favorable Review 12/18/18
Dept. of Environmental Quality	Projects related to e-Licensing	$3,200,000	$3,200,000	JLBC Favorable Review 12/18/18
Dept. of Financial Institutions	eLicensing	$1,400,000	$1,400,000	JLBC Favorable Review 06/19/18
Dept. of Public Safety	Microwave Upgrade System Project	$1,250,000	$1,250,000	JLBC Favorable Review 09/20/2018
Dept. of Public Safety	Criminal Justice Information System (CJIS)	$2,806,200	$2,806,200	JLBC Favorable Review 06/19/18
	Total Favorably Reviewed FY19 APF Projects		**$17,675,100**	

ARIZONA
DEPARTMENT OF ADMINISTRATION
TECHNOLOGY

Agency: Department of Child Safety

Project: CHILDS Replacement (Guardian)

Appropriation: Implement upgrades to the Children's Information Library and Data Source System (CHILDS)

CURRENT REQUEST

The Department of Administration (ADOA) is requesting favorable review of the $5,000,000 appropriated from the Automation Projects Funds in FY 2019 to continue the CHILDS replacement program (Guardian) development.

FY 2019 Appropriation	FY 2019 Favorably Reviewed	FY 2019 Current Request	Remaining FY 2019 Appropriation Requiring Future Review
$5,000,000	$0	$5,000,000	$0

PROJECT DESCRIPTION

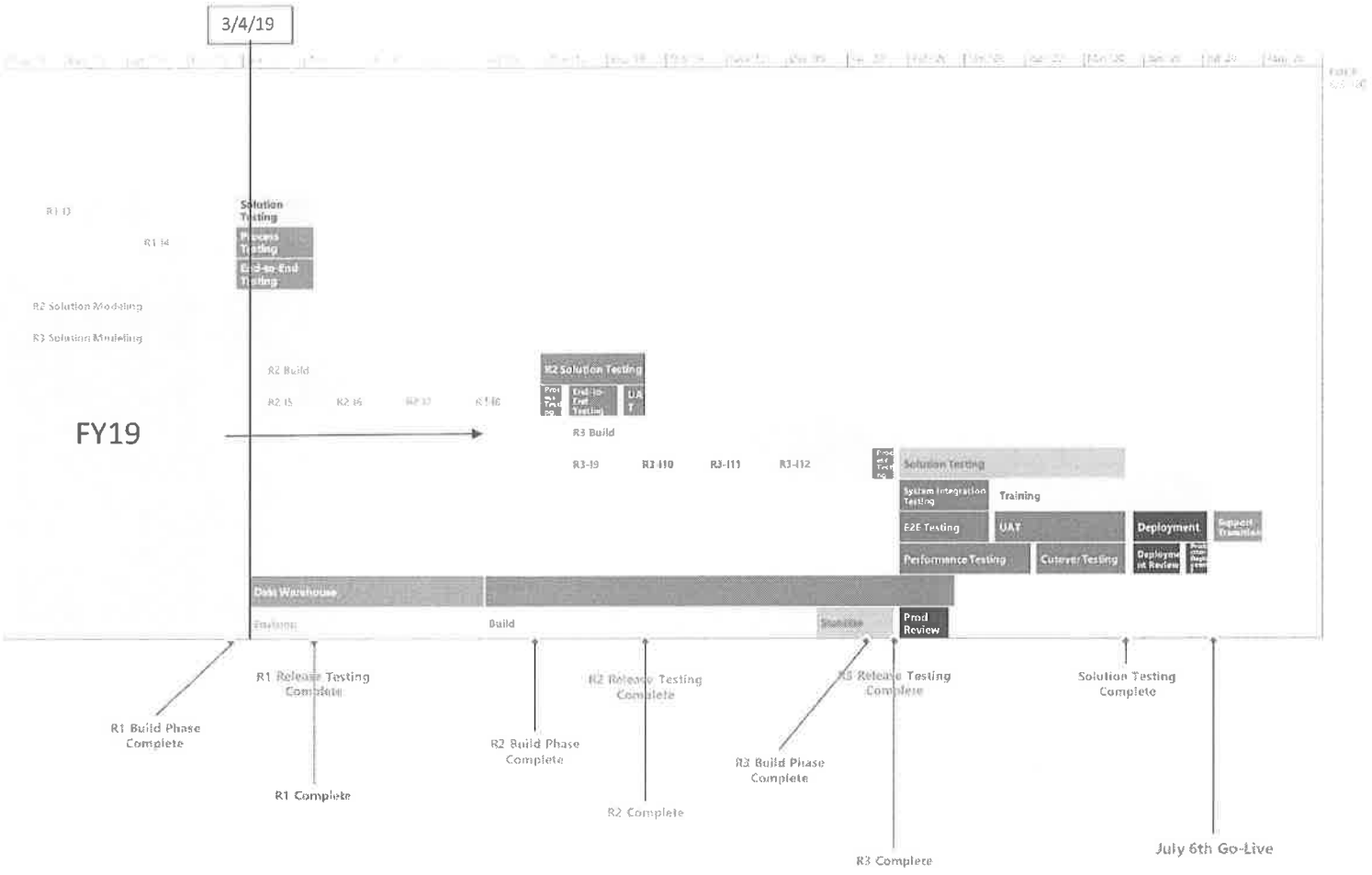
Background
The current Department of Child Safety (DCS) child welfare system, Children's Information Library and Data Source (CHILDS), is used for case management, federal reporting, provider management and Title IV-E eligibility determination for children under DCS care. Due to the current age, complexity, and inefficiencies of CHILDS, DCS has been limited in its ability to enhance the system fast enough to provide important processing functions identified as crucial by the Department.

Proposed Solution
The solution is based on the security of a stable, proven technology platform. The platform ensures management of data models, data standards, and other technology standards between all components in the system and between all systems that interoperate with Guardian, and CHILDS is no longer necessary and can be decommissioned.

Benefits
The new system, known as Guardian, will be capable of increasing efficiency and service delivery to Arizona's families and children in need, while also supporting child safety specialist needs to effectively and efficiently execute the mission of DCS. The new system will also ensure data integrity for improved reporting, consistent usability across work functions, a mobile platform for supporting staff visits, improved decision support through formal assessments, and potentially access for providers to input data for case management and placement information.

ARIZONA
DEPARTMENT OF ADMINISTRATION
TECHNOLOGY

FY19 PROGRAM ROADMAP



ARIZONA
DEPARTMENT OF ADMINISTRATION
TECHNOLOGY

FY19 PROJECT MILESTONES

Program	Start Date (est)	End Date (est)	Duration
Development Planning	Jul-18	Nov-18	5 Months
Plan development activities for the MS Dynamics platform.			
Solution Modeling 1	Jul-18	Dec-18	6 months
Solution modelling is the requirements and design portion of software development. It is comprised of features and requirements.			
Build Iteration 2	Sep-18	Dec-18	4 months
The program build cycle is comprised of 12 total 5 week iterations. Build iteration 2 completed in FY19 and developed 45 features.			
Build Iteration 4	Nov-18	Feb-19	4 months
The program build cycle is comprised of 12 total 5 week iterations. Build iteration 4 completed in FY19 and developed 97 features.			
Testing 1	Feb-19	Apr-19	3 months
Testing 1 relates to the process and end-to-end testing effort upon completion of the 1st 4 iterations (Release 1) . Release 1 developed 276 features.			
Solution Modeling 2 and 3	Nov-18	Jun-19	8 months
Solution Modeling 2 and 3 reviews all of the remaining 2,170 features/requirements of the program relating to Release 2 and 3. At the end of this effort, all items will be ready for development and prioritized.			
Build iteration 6	Mar-19	May-19	3 Months
The program build cycle is comprised of 12 total 5 week iterations. Iteration 6 has 257 features planned.			
Service Management Office FY19 Effort	Jun-18	Jun-19	12 months
Service Management Office is focused on day 2 support. The documentation created as part of this effort ensures that after program go-live, DCS will continue to support the solution.			
Training FY19 Effort	Jun-18	Jun-19	12 months
For FY19, the program will complete a training assessment identifying the training required to successfully go live, and be used for future DCS staff.			

PROJECT COST DETAIL (FY19 Baseline)

Program Management – Supports the organization and management of the program scope, schedule, budget, and the sub projects.	$1,181,557
Business Integration – Ensures that the business requirements are met through, program outreach, user acceptance testing, and operational readiness.	$2,125,414
Mobile Solution – Provides access to the solution through a format compatible with a mobile device (tablet)	$156,000
IV&V – Provides independent reviews and feedback on the health of the program.	$222,768
Quality Management – Responsible for the complete solution testing and quality of the solutions throughout the build, and in preparation for go-live	$847,400
Platform – The platform is the foundation from which the solution is configured and built upon (MS Dynamics). This includes the software and licensing costs during the development of the solution.	$40,000
Hosting – The hosting project establishes the infrastructure required to support the new cloud hosted solution.	$270,440
Enterprise Content Management – Provides the repository and workflow for the different document/artifact types.	$3,112,994
Integrated Shared Services – The development and implementation of the interfaces and exchanges required to share information between other agencies.	$184,104
Data Management – The data migration of data from the legacy system to the new solution, the implementation of the new data warehouse, and the establishment of the agency reports from the new warehouse.	$756,248
CRM – The solution modeling, build, test, and deployment of the CRM piece of the final solution.	$16,713,396
Training – The training of the final solution to all users, and the documentation to support.	$500,000
Service Management Office – The processes, procedures, and technical documentation and training in order to support the new solution post go live.	$165,910
Total Development Cost for FY 2019	**$26,276,231**

4A

STATE OF ARIZONA

Joint Legislative Budget Committee

1716 WEST ADAMS
PHOENIX, ARIZONA 85007

(602) 926-5491

azleg.gov

DATE: April 3, 2019

TO: Members of the Joint Legislative Budget Committee

FROM: Patrick Moran, Senior Fiscal Analyst PM

SUBJECT: Department of Child Safety - Review of FY 2019 Second and Third Quarter Benchmarks

Request

Pursuant to an FY 2019 General Appropriation Act (Laws 2018, Chapter 276) footnote, the Department of Child Safety (DCS) is submitting for Committee review a report of quarterly benchmarks for assessing progress made in increasing the department's number of FTE Positions, meeting caseload standards for caseworkers, reducing the number of backlog cases and open reports, and reducing the number of children in out-of-home care.

Committee Options

The Committee has at least the following 2 options:

1. A favorable review of the report.

2. An unfavorable review of the report.

Key Points

1) DCS has filled 1,304 out of 1,406 funded direct line staff positions (caseworkers and hotline).
2) The department continues to meet its benchmarks for the backlog (less than 1,000 cases) and open reports (less than 8,000).
3) DCS has met the Out-of-Home Population benchmark (13,964 by June).
4) Caseworker workload continues to be above the caseload standard.

(Continued)

Analysis

An FY 2019 General Appropriation Act footnote requires DCS to report on caseworker hiring, caseworker workload, the backlog, the number of open reports, and the number of children in out-of-home care at the end of each quarter. DCS has submitted its report for the second and third quarters of FY 2019.

Filled FTE Positions

Table 1 outlines DCS' progress in hiring caseworkers by quarter. DCS is funded for 1,406 caseworkers. The department has filled 1,304 direct line positions, or (102) fewer positions than the benchmark.

Table 1

Caseworker Hiring by Quarter

Direct Line Staff Type	Benchmark	June 2018	Sept. 2018	Dec. 2018	Feb. 2019
Case-Carrying Caseworkers	1,190	1,053	1,026	1,054	1,041
Caseworkers in Training	140	209	230	204	191
Hotline Staff	76	70	71	71	72
Total	**1,406**	**1,332**	**1,327**	**1,329**	**1,304**

Backlog and Open Reports

The backlog is defined as non-active cases for which documentation has not been entered into the child welfare automated system for at least 60 days and for which services have not been authorized for at least 60 days. Open reports are either under investigation or awaiting closure by a supervisor. DCS is to have no more than 1,000 backlog cases and fewer than 8,000 open reports. As of February 2019, DCS had 372 backlog cases and 6,526 open reports, continuing to meet both benchmarks.

Out-of-Home Children

DCS' benchmark is to reduce the out-of-home population to 13,964 by June 2019. As shown in *Table 2*, the out-of-home population had declined to 13,841 by January 2019, or (123) children below the June 2019 benchmark. As a result, no further reductions are required for DCS to meet its FY 2019 out-of-home benchmark.

Table 2

Progress in Reducing the Out-of-Home Population

	June 2018	Sept. 2018	Dec. 2018	Jan. 2019	June 2019
Actual	14,482	14,179	13,792	13,841	--
Benchmark	15,191	14,836	14,539	14,442	13,964

Caseload Standard

DCS established revised caseload goals during the May 2014 Special Session for case-carrying caseworkers. These goals include the following number of cases per worker: 13 for investigations, 33 for in-home cases, and 20 for out-of-home cases. The FY 2019 General Appropriation Act requires DCS to report the caseload for each DCS field office. Estimated caseworker caseload for individual offices can be found on page 6 of DCS' attached submission. DCS estimates that most field offices are above at least one of the caseload standards.

PM:lm

DEPARTMENT OF CHILD SAFETY
STATE OF ARIZONA

Douglas A. Ducey
Governor

Arizona Department of Child Safety

Gregory McKay
Director

April 1, 2019

The Honorable Regina Cobb
Chairman, Joint Legislative Budget Committee
Arizona State Senate
1700 West Washington
Phoenix, Arizona 85007

Re: Department of Child Safety Quarterly Benchmark Progress Report

Dear Chairman Cobb:

Pursuant to Laws 2018, 2nd Regular Session, the Department submits its report on the progress made increasing the number of filled FTE positions, meeting the caseload standard and reducing the number of backlog cases and out-of-home children for the third quarter of FY 2019.

If you have any questions, please contact our office at (602) 255-2500.

Sincerely,

Gregory McKay
Director

Enclosure

cc: Richard Stavneak, Director, Joint Legislative Budget Committee
Representative David Gowan, Chairman, Joint Legislative Budget Committee
Matt Gress, Director, Governor's Office and Strategic Planning and Budgeting
Patrick Moran, Joint Legislative Budget Committee
Yan Gao, Governor's Office and Strategic Planning and Budgeting

DEPARTMENT OF CHILD SAFETY

Quarterly Progress Report
(Filling FTE Positions and Reducing the Inactive)
March 2019

PROGRESS MADE IN INCREASING THE NUMBER OF FILLED FTE POSITIONS

The Department of Child Safety (DCS) maintains continuous efforts to reduce turnover in order to sustain sufficient staff resources that provide quality services to the children and families it serves. In state fiscal year 2019 (FY19), one of the Department's strategic objectives is to develop and retain a highly effective workforce by improving employee retention through improved supervision.

DCS identified several key actions in FY17 and FY18, which were implemented. These included realignment of pay structure and job classification for the DCS Specialists; improvements to Core Training curriculum; improving the onboarding experience of all new DCS employees; and the development of general management and leadership skills for supervisors and managers.

For FY19, DCS aims to further its efforts to improve employee retention by improving supervision. This includes objectives to implement infrastructure and tiered accountability for a supervisor coaching model and to define and implement a "Day 1 as a New Supervisor" training. During the second and third quarters of FY19, the Department began developing roles and responsibilities for supervision coaches, developing the standard work, filling coaching positions and developing training.

During the current quarter, DCS began implementing a hiring selection process and interview guide for new field supervisors and has standardized onboarding and on the job training experience for new field supervisors. Additionally, the Department has been building a training outline and related materials to create a curriculum and exam for new supervisors.

The Department has been evaluating and working to improve the organizational design that supports ongoing coaching to supervisors and Program Managers (PM) in the elements of the practice model and problem solving. DCS also developed new position description and standard work for Supervision Coaches that will support practice fidelity. DSC HR continues to target recruitment efforts at the local office level for DCS Specialist vacancies as compared to historical practices of posting for a specific city or county. This helps identify candidates who can work in their community and aims to improve the candidate's experience because applicants are applying for the office location in which they prefer to be placed.

DCS HR has been working closely with local hiring managers to identify candidates based on selective preferences. Since different offices may have different or unique needs, HR's work with managers will help identify candidates who more closely meet the office's needs. It is important to note that exit surveys completed by Child Safety Specialists when they leave employment with DCS continue to reveal that low pay is a key reason for their decision to leave. Currently, a Child Safety Specialist's starting pay is $33,000 annually.

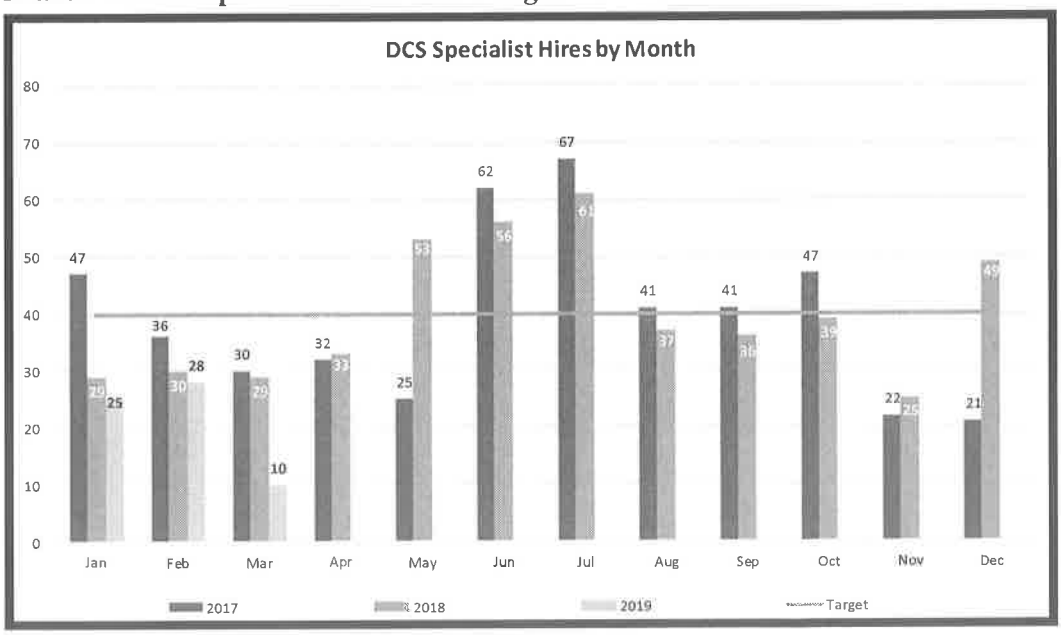
DCS has developed multiple partnerships with local colleges and universities to attract potential candidates for employment. DCS continues to attend job fairs including the ASU School of Social Work Career Fair; expand its presence on online job boards to recruit for hard to fill positions that require specific skill sets to reach likely candidates.

The Department has been sustaining its active recruitment process to fill all Child Safety Specialist positions. As of February 2019, the Department filled 1,304 (93 percent) of the 1,406 funded positions. DCS funds 236 supervisor positions, 223 (95 percent) of which are filled.

To support DCS Specialists, Supervisors, case aides and other front line staff experiencing secondary trauma, DCS implemented its peer-to-peer support program, Workforce Resilience. This program seeks to enhance a healthy workforce, provide staff a safe and supportive environment when coping with the experiences inherent in child welfare and help address burnout staff may experience.

The Department continues its efforts to minimize the overall attrition of all DCS employees. Chart 1 shows the number of DCS Specialist hires for CY 2017 through CY 2019 to date, along with hiring targets. These targets were established against historically observed attrition rates.

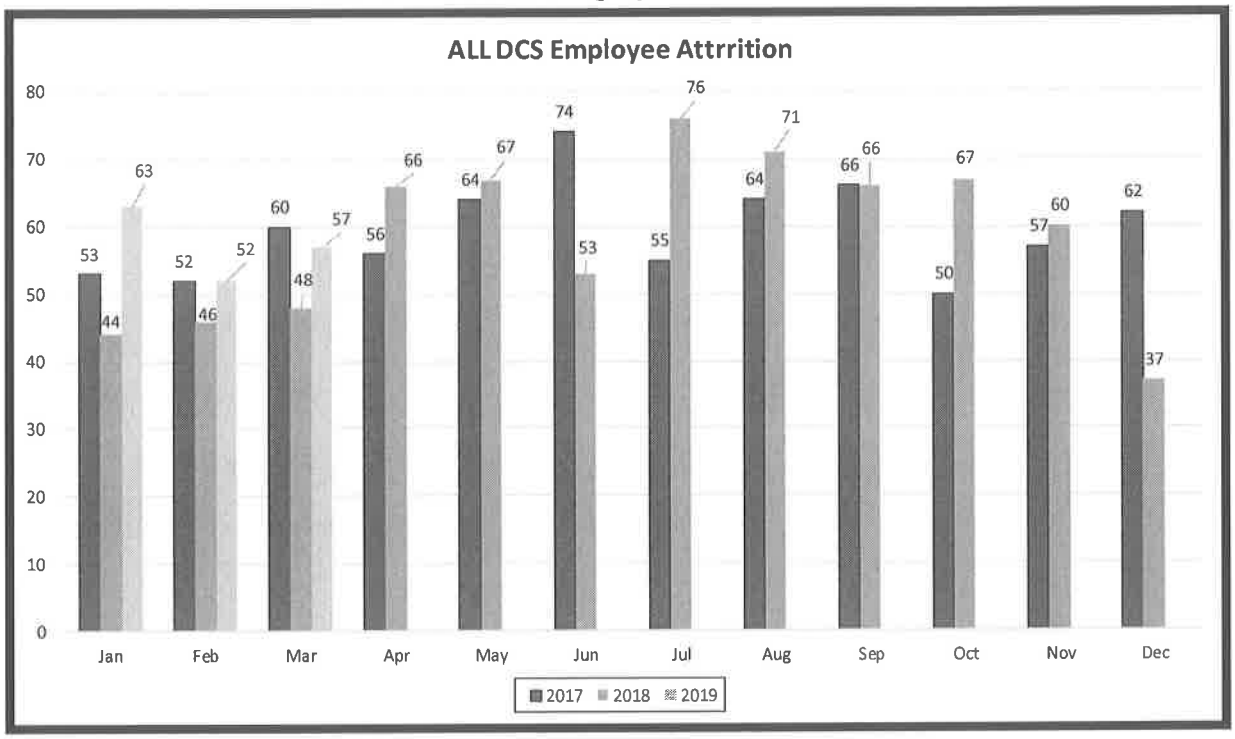
Chart 1 – DCS Specialist Hires and Target Trends



*Data has been updated from prior reporting periods. March data will be updated in future reports as this report is required prior to the end of the reporting period.

Chart 2 shows the Department's reduction in turnover for all employees for CY 2017 through CY 2019.

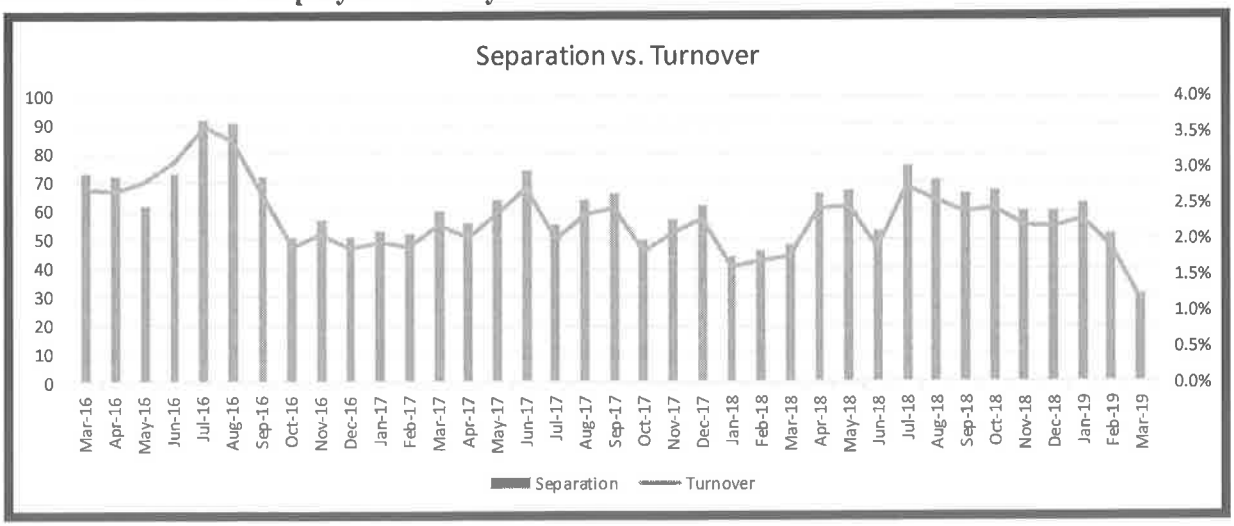
Chart 2 – All DCS Employee Attrition Trends



*DCS Employee Attrition for March 2019 will be updated in the next quarterly report.

Chart 3 demonstrates the Department's monthly separation data and monthly turnover rate since March 2016.

Chart 3 – All DCS Employee Monthly Turnover Rate Trends



*March 2019 turnover rate data will be updated in the next quarterly report.

PROGRESS MAINTAINING INACTIVE CASES AND IMPROVING CASELOADS

DCS has maintained the inactive cases well below the legislative benchmark of 1,000 since April 2017. Additionally, the Department reduced the number of open reports from 9,611 in December of 2016 to 6,554 in March 2019. The Department has experienced a stabilization in the number of open reports where is has remained below 7,500 since February 2017.

Additionally, DCS HR continues its efforts to hire and place Specialists at a rate equal to or greater than departures from the Department. Sustained staffing levels help contribute to the reduced number of inactive cases, total open reports, and foster care population, the overall caseloads for DCS investigators continue to decline across most offices (see Table 2).

In March 2017, DCS fell below the legislatively required benchmark of 1,000 inactive cases. From a peak of 16,014 in January of 2015, the Department now has only 355 inactive cases as of March 18, 2019, representing a 98 percent decrease. To avoid a return to higher numbers of inactive cases, the Department uses performance management and other elements of the management system to maintain caseload levels. Across the state, sustainment measures include: the implementation of performance management metrics to monitor and control the total number of open reports and the percentage of those reports that are overdue for investigation; and completion and closure and the implementation of leader standard work to ensure routine follow-up.

The Department achieved the benchmark of less than 13,000 open reports six months ahead of the established target date. From a peak of 33,245 open reports in April 2015, the Department reduced that to only 6,554 as of March 2019, representing an 80 percent reduction (see Table 1).

PROGRESS MADE REDUCING THE OUT-OF-HOME POPULATION

The Department continues to achieve a safe reduction in the out-of-home foster care population. In the third quarter of SFY 2019, the Department reduced the out-of-home foster care population by 2.6 percent (368 children) from the previous quarter (see Table 1). The progress made since the baseline period of March 31, 2016 (18,917 children) is a 27 percent reduction (5,076 children) to the current number of children in out-of-home care (13,841).

By slowing the entry rate and sustaining performance for children exiting care, the Department has been able to maintain a safe reduction of the foster care population. In addition, this highlighted by no significant change in the re-entry rate for children who left care within the past 12 months. The entry rate per 1,000 of Arizona's general population was 4.7 in February 2019. The reduction in the number of children entering out-of-home care can be attributed to several factors. These include, but are not limited to, the additional standardized process tools including supervisory administrative and case progress review checklists, as well as standardized safety discussions guides and training staff to better engage a family's network to identify in-home options in order to maintain children safely in the home. Improved response times also contributes to the reduction of children entering care as this enables Child Safety Specialists to make decisions that will help support families, provide services in a timely manner and avoid entry into care.

Through the continued application of monthly clinical staffings on reunification cases using a standardized process, ongoing workers have been able to maintain the rate of children exiting care.

Through these standard process activities, paired with the continued to use of cursory case reviews and Fostering Sustainable Connections (the Title IV-E Waiver demonstration project), the Department seeks to continue realizing safe and sustainable out-of-home care population reductions.

Table 1 – Benchmark Performance

		Q3FY17	Q4FY17	Q1FY18	Q2FY18	Q3FY18	Q4FY18	Q1FY19	Q2FY19	Q3FY19
Backlog Cases										
	Benchmark (less than)	4,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
	Actual	746	354	212	265	176	225	183	302	355
Backlog Case by disposition										
	Investigation Phase	633	222	125	165	84	115	74	188	227
	In-Home Cases	99	111	77	89	84	98	93	98	112
	Out-of-Home Cases	14	21	10	11	8	12	16	16	16
Number of Open Reports										
	Benchmark (less than)	---	13,000	13,000	13,000	13,000	13,000	8,000	8,000	8,000
	Actual	6,610	5,644	6,444	6,621	6,087	5,871	6,562	6,695	6,554
Number of Out-of-Home Children										
	Benchmark (less than)	17,150	16,807	16,471	16,142	15,819	15,503	15,192	14,889	14,591
	Benchmark (% reduction	2%	2%	2%	2%	2%	2%	2%	2%	2%
	Actual	17,174	16,917	16,316	15,744	15,139	14,869	14,241	14,209	13,841

Footnotes

- Number of open reports is the actual figure as of the Monday before the legislatively required reporting period based on the automated report run. Due to the holidays, this quarter the report was
- Number of inactive cases is the actual figure as of the Monday before the legislatively required reporting period based on the automated report run. Due to the holidays, this quarter the report was
- Out-of-home population figures are directly from the Monthly Out-of-Home Care run for the Monthly Outcome and Operational Report (MOOR) which is a lagging 60 day metric.

Table 2 – Headcount and Caseload Performance

		March 31, 2016 Baseline			Quarter 2 FY 2019							Quarter 3 FY 2019							
		Workload			FTE		Workload						FTE		Workload					
Region	Section #	# Open Reports (investigations)	# of In home cases	# of Out-of-Home Children	Investigators	Case Managers	# Open Reports (investigations)	# of In home cases	# of Out-of-Home Children	Investigation (reports per worker)	In Home (cases per worker)	Out of Home (children per worker)	Investigators	Case Managers	# Open Reports (investigations)	# of In home cases	# of Out-of-Home Children	Investigation (reports per worker)	In Home (cases per worker)	Out of Home (children per worker)
10 - Central	0, 1	576	0	601	18	18	172		464	9		26	17	17	197		477	11		27
	2	834	0	688	21	21	159		507	8		24	18	18	145		457	8		25
	3	1005	0	542	17	17	276		659	16		38	19	19	327		585	17		31
	4	17	495	111		39	27	557	35	1	14	1		57	33	562	24	1	13	1
	5	1423	0	615	18	18	261		446	14		25	20	20	229		414	12		21
	6	1236	0	824	19	19	314		391	17		21	20	20	292		362	15		18
	7	1786	0	913	20	20	284		538	14		27	20	20	270		498	14		25
	8	1493	0	663	18	18	308		615	17		33	16	16	447		567	27		34
	9	1522	0	275	19	19	224		453	12		24	17	17	208		498	12		30
	10	2	0	1520		40	---		1369	0		34		42	---		1484	0		35
20 - Pima **	1	980	49	342	17	21	196	24	237	12	1	11	16	20	181		223	11		11
	2	227	27	398	11	21	121	40	336	11	2	17	11	21	125		248	13		12
	7	132	18	370	11	21	133	26	303	12	1	14	9	18	133		269	14		15
	4	126	19	313	9	18	183	19	135	19	1	7	7	13	211		141	31		11
	5	599	39	164	10	19	152	0	211	15	0	11	20	16	161		187	8		18
	6, 9	7	0	555	12	23	0	0	472	0	0	20		31	7		537			17
	7	326	53	379	11	22	142	34	248	12	2	11	9	17	180		215	21		13
	8												7		102			13		
	9	174	15	312	11	22	165	45	213	15	2	10	11	20	170	6	244	16	0	12
	10	82	0	340	9	4	0	0	71	0	0	18	0	29	8	196	149	0	7	5
30 - Northern	1	266	---	398	14	14	188	8	252	13	1	18	12	12	201	38	283	16	3	23
	2	127	---	188	11	11	56	15	158	5	1	15	11	11	60	12	192	5	1	17
	3	200	---	220	10	10	133	38	161	13	4	16	6	12	78	---	138	13	---	12
	4	176	---	399	13	13	91	33	286	7	2	21	8	15	119	39	320	13	3	21
	5, 00	198	---	132	11	11	88	16	429	8	2	40	7	14	60	8	448	9	1	32
40 - Southeast **	1	254	30	243	5	9	133	18	114	27	2	12	1	2	9	5	56	7	2	23
	2	645	34	169	7	14	55	20	174	8	1	13	3	6	2	30	180	1	5	29
	3	383	14	119	4	7	44	18	94	13	3	14	5	5	69	20	103	14	4	21
50 - Southwest	2, 1	483	0	4	21		1		7	0		0	18		1		1	0		0
	3	44	---	101		37	21	536	30	1	14	1	2	39	33	617	35	17	16	1
	4	937	0	774	20	20	316		573	15		28	19	19	273		533	14		27
	5	1999	0	859	19	19	270		568	14		29	17	17	277		476	16		27
	6	1558	0	584	19	10	398		440	19		24	17	17	307		390	18		22
	7	614	0	804	20	20	199		567	10		29	21	21	252		592	12		28
	8	0	0	1667		43			1172	0		27		42			1258	0		30
	9	347	0	418	14	14	145		381	10		27	13	13	153		285	12		22
	12	953	0	670	19	19	334		569	18		29	18	18	310		534	17		29
	13	597	0	213	19	19	184		384	10		20	17	17	137		373	8		22
185, 186 - Other	various	370		48	90		944		125	10			69		781		65	11		
Totals		22,698	793	18,917			6,695	1,447	14,209						6,554	1,533	13,841			

Footnotes:
- FTE reporting for March 31, 2016: The process of reporting FTE, in particular the specific section assignment of trainees, was not yet established in March 2016. As a result, the FTE counts for that period are not available since they do not match the information on the total number of filled FTE positions as is required by the monthly hiring report.
- Number of open reports is the actual figure as of the Monday before the legislatively required reporting period based on the automated report run.
- As of Q1 FY2019, Specialists in a trainee status are accounted for in FTE figures in each section with an equal distribution of 66% caseload.
- Out-of-home population figures are directly from the Monthly Out-of-Home Care run for the Monthly Outcome and Operational Report (MOOR) which is a lagging 60 day metric.
- In Home cases are based on a headcount of cases actively managed in each respective Region. March 2016 values for Northern Region are not available given that the Region counted the number of children and not the number of cases.
- In Home case figures were not handcounted in Southwest Region in March 2016. The handcount only included total child count.

In Home cases assignments differ Regionally. Central and Southwest Regions employ specific in-home units who manage in-home cases only, while Northern, Pima and Southeast Regions have mixed units that may carry in-home or out-of-home cases.

FTE assignments to investigations or case management are based on assignment of 50% investigative and 50% ongoing in Central, Northern and Southwest Regions. Pima and Southeast Regions and certain Northern Region sections employ a distribution of 34% Investigations and 66% ongoing.

* In Home data for Pima Region in Q1 FY2019 was updated in Q2 FY2019 to reflect case count rather than kid count.
- As of Q1 FY2019, Specialists in a trainee status are accounted for in FTE figures in each section with an equal distribution of 66% caseload.
** As of Q3 FY2019, DCS began realignment of regional offices. Select units from the Southeast Region have been moved to Pima Region which includes assigning these to Section 9 and the previously inactive Section 8. Additionally, Northern Region changes include reassigning Section 03 in home cases to Section 01.

Arizona Department of Child Safety

Douglas A. Ducey
Governor

Gregory McKay
Director

December 31, 2018

The Honorable John Kavanagh
Chairman, Joint Legislative Budget Committee
Arizona State Senate
1700 West Washington
Phoenix, Arizona 85007

Re: Department of Child Safety Quarterly Benchmark Progress Report

Dear Chairman Kavanagh:

Pursuant to Laws 2018, 2nd Regular Session, the Department submits its report on the progress made increasing the number of filled FTE positions, meeting the caseload standard and reducing the number of backlog cases and out-of-home children for the second quarter of FY 2019.

If you have any questions, please contact our office at (602) 255-2500.

Sincerely,

Shalom Jacobs for

Gregory McKay
Director

Enclosure

cc: Richard Stavneak, Director, Joint Legislative Budget Committee
Representative David Livingston, Chairman, Joint Legislative Budget Committee
Matt Gress, Director, Governor's Office and Strategic Planning and Budgeting
Patrick Moran, Joint Legislative Budget Committee
Sarah Pirzada, Governor's Office and Strategic Planning and Budgeting

DEPARTMENT OF CHILD SAFETY

Quarterly Progress Report
(Filling FTE Positions and Reducing the Inactive)
December 2018

PROGRESS MADE IN INCREASING THE NUMBER OF FILLED FTE POSITIONS

The Department of Child Safety (DCS) maintains continuous efforts to reduce turnover in order to sustain sufficient staff resources that provide quality services to the children and families it serves. In state fiscal year 2019 (FY19), one of the Department's strategic objectives is to develop and retain a highly effective workforce by improving employee retention through improved supervision.

DCS identified several key actions in FY17 and FY18, which were implemented. These included realignment of pay structure and job classification for the DCS Specialists; improvements to Core Training curriculum; improving the onboarding experience of all new DCS employees; and the development of general management and leadership skills for supervisors and managers.

For FY19, DCS aims to further its efforts to improve employee retention by improving supervision. This includes objectives to implement infrastructure and tiered accountability for a supervisor coaching model and to define and implement a "Day 1 as a New Supervisor" training. This quarter, the Department began developing roles and responsibilities for supervision coaches, developing the standard work, filling coaching positions and developing training.

DSC HR continues to target recruitment efforts at the local office level for DCS Specialist vacancies as compared to historical practices of posting for a specific city or county. This helps identify candidates who can work in their community and aims to improve the candidate's experience because applicants are applying for the office location in which they prefer to be placed.

DCS HR has been working closely with local hiring managers to identify candidates based on selective preferences. Since different offices may have different or unique needs, HR's work with managers will help identify candidates who more closely meet the office's needs. It is important to note that exit surveys completed by Child Safety Specialists when they leave employment with DCS continue to reveal that low pay is a key reason for their decision to leave. Currently, a Child Safety Specialist's starting pay is $33,000 annually.

DCS HR analysis of DCS Specialists leaving the Department indicates a majority of employees that choose to leave the agency were hired under the "old" hiring process. For those candidates who were hired under the current hiring process, very few have resigned. During this quarter, 76 Specialists resigned who were hired under the previous hiring process and only eight Specialists who resigned were hired under the current process. Additionally, DCS continuously reviews the recruitment/hiring process by including necessary stakeholders that will provide information to expedite the hiring process.

DCS has developed multiple partnerships with local colleges and universities to attract potential candidates for employment. DCS continues to attend job fairs; expand its presence on online job boards to recruit for hard to fill positions that require specific skill sets to reach likely candidates.

The Department has been sustaining its active recruitment process to fill all Child Safety Specialist positions. As of November 2018, the Department filled 1,326 (94 percent) of the 1,406 funded positions. DCS funds 236 supervisor positions, 221 (94 percent) of which are filled.

To support DCS Specialists, Supervisors, case aides and other front line staff experiencing secondary trauma, DCS implemented its peer-to-peer support program, Workforce Resilience. This program seeks to enhance a healthy workforce, provide staff a safe and supportive environment when coping with the experiences inherent in child welfare and help address burnout staff may experience.

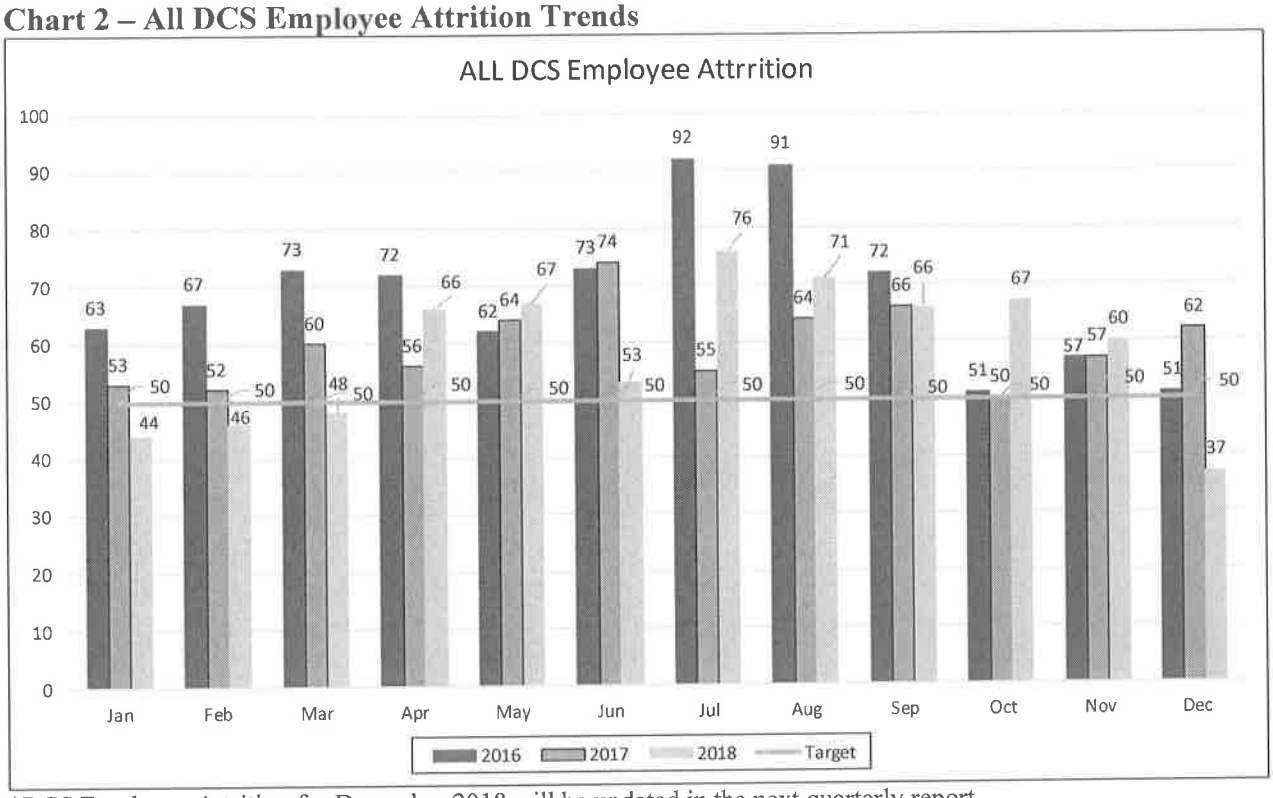
The Department continues its efforts to minimize the overall attrition of all DCS employees. Chart 1 shows the number of DCS Specialist hires for CY 2016 through CY 2018 to date, along with hiring targets. These targets were established against historically observed attrition rates.

Chart 1 – DCS Specialist Hires and Target Trends

*Data has been updated from prior reporting periods. December data will be updated in future reports as this report is required prior to the end of the reporting period.

Chart 2 shows the Department's reduction in turnover for all employees for CY 2016 through CY 2018.

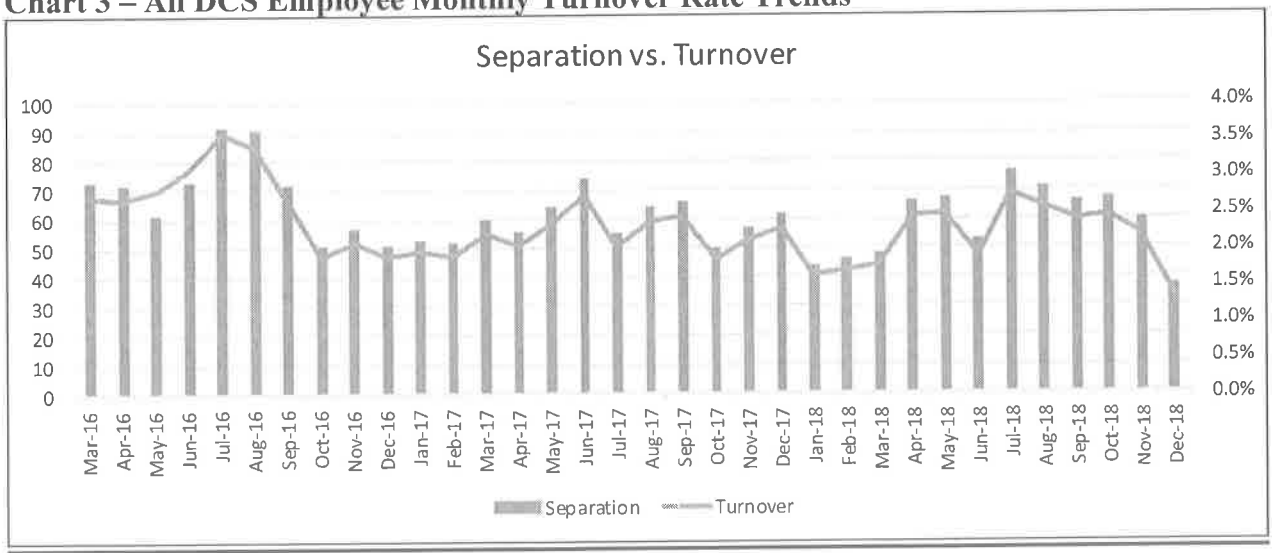
Chart 2 – All DCS Employee Attrition Trends



*DCS Employee Attrition for December 2018 will be updated in the next quarterly report.

Chart 3 demonstrates the Department's monthly separation data and monthly turnover rate since March 2016.

Chart 3 – All DCS Employee Monthly Turnover Rate Trends



*December 2018 turnover rate data will be updated in the next quarterly report.

PROGRESS MAINTAINING INACTIVE CASES AND IMPROVING CASELOADS

DCS has maintained the inactive cases well below the legislative benchmark of 1,000 since April 2017. Additionally, the Department reduced the number of open reports from 9,611 in December of 2016 to 6,695 in December 2018. The Department has experienced a stabilization in the number of open reports where is has remained below 7,500 since February 2017.

Additionally, DCS HR continues its efforts to hire and place Specialists at a rate equal to or greater than departures from the Department. Sustained staffing levels help contribute to the reduced number of inactive cases, total open reports, and foster care population, the overall caseloads for DCS investigators continue to decline across most offices (see Table 2).

In March 2017, DCS fell below the legislatively required benchmark of 1,000 inactive cases. From a peak of 16,014 in January of 2015, the Department now has only 302 inactive cases as of December 17, 2018, representing a 98 percent decrease. To avoid a return to higher numbers of inactive cases, the Department uses performance management and other elements of the management system to maintain caseload levels. Across the state, sustainment measures include: the implementation of performance management metrics to monitor and control the total number of open reports and the percentage of those reports that are overdue for investigation; and completion and closure and the implementation of leader standard work to ensure routine follow-up.

The Department achieved the benchmark of less than 13,000 open reports six months ahead of the established target date. From a peak of 33,245 open reports in April 2015, the Department reduced that to only 6,695 as of December 2018, representing an 80 percent reduction (see Table 1).

PROGRESS MADE REDUCING THE OUT-OF-HOME POPULATION

The Department continues to achieve a safe reduction in the out-of-home foster care population. In the second quarter of SFY 2019, the Department reduced the out-of-home foster care population by 0.2 percent (32 children) from the previous quarter (see Table 1). The progress made since the baseline period of March 31, 2016 (18,917 children) is a 25 percent reduction (4,708 children) to the current number of children in out-of-home care (14,209).

By slowing the entry rate and sustaining performance for children exiting care, the Department has been able to maintain a safe reduction of the foster care population. In addition, this highlighted by no significant change in the re-entry rate for children who left care within the past 12 months. The reduction in the number of children entering out-of-home care can be attributed to several factors. These include, but are not limited to, the additional standardized process tools including supervisory administrative and case progress review checklists, as well as standardized safety discussions guides and training staff to better engage a family's network to identify in-home options in order to maintain children safely in the home. Improved response times also contributes to the reduction of children entering care as this enables Child Safety Specialists to make decisions that will help support families, provide services in a timely manner and avoid entry into care.

Through the continued application of monthly clinical staffings on reunification cases using a standardized process, ongoing workers have been able to maintain the rate of children exiting care.

Through these standard process activities, paired with the continued to use of cursory case reviews and Fostering Sustainable Connections (the Title IV-E Waiver demonstration project), the Department seeks to continue realizing safe and sustainable out-of-home care population reductions.

Table 1 – Benchmark Performance

		Q1FY18	Q2FY18	Q3FY18	Q4FY18	Q1FY19	Q2FY19
Backlog Cases							
	Benchmark (less than)	1,000	1,000	1,000	1,000	1,000	1,000
	Actual	212	265	176	225	183	302
Backlog Case by disposition							
	Investigation Phase	125	165	84	115	74	188
	In-Home Cases	77	89	84	98	93	98
	Out-of-Home Cases	10	11	8	12	16	16
Number of Open Reports							
	Benchmark (less than)	13,000	13,000	13,000	13,000	8,000	8,000
	Actual	6,444	6,621	6,087	5,871	6,562	6,695
Number of Out-of-Home Children							
	Benchmark (less than)	16,471	16,142	15,819	15,503	15,192	14,889
	Benchmark (% reduction,	2%	2%	2%	2%	2%	2%
	Actual	16,316	15,744	15,139	14,869	14,241	14,209

Footnotes

- Number of open reports is the actual figure as of the Monday before the legislatively required reporting period based on the automated report run. Due to the
- Number of inactive cases is the actual figure as of the Monday before the legislatively required reporting period based on the automated report run. Due to
- Out-of-home population figures are directly from the Monthly Out-of-Home Care run for the Monthly Outcome and Operational Report (MOOR) which is a lagging 60 day metric.

Headcount and Caseload Performance

		March 31, 2016 Baseline			Quarter 1 FY 2019							Quarter 2 FY 2019						
		Workload			FTE		Workload					FTE		Workload				
	Section #	# Open Reports (investigations)	# of In home cases	# of Out-of-Home Children	Investigators	Case Managers	# Open Reports (investigations)	# of In home cases *	# of Out-of-Home Children	Investigation (reports per worker)	In Home (cases per worker)	Out of Home (children per worker)	Investigators	Case Managers	# Open Reports (investigations)	# of In home cases	# of Out-of-Home Children	Investigation (reports per worker)	In Home (cases per worker)	Out of Home (children per worker)
	0, 1	576	0	601	17	17	181		488	10		28	18	18	172		464	9		26
	2	834	0	688	19	19	185		506	10		26	21	21	159		507	8		24
	3	1005	0	542	19	19	242		682	13		35	17	17	276		659	16		38
	4	17	495	111		38	15	380	16	0	10	0		39	27	557	35	1	14	1
ıl	5	1423	0	615	18	18	244		455	13		25	18	18	261		446	14		25
	6	1236	0	824	17	17	270		389	16		23	19	19	314		391	17		21
	7	1786	0	913	19	19	252		572	13		29	20	20	284		538	14		27
	8	1493	0	663	20	20	363		614	18		31	18	18	308		615	17		33
	9	1522	0	775	17	17	273		476	16		29	19	19	224		453	12		24
	10	2	0	1520		39	0		1423	0		36		40	---		1369	0		34
	1	980	49	342	17	22	171	31	224	10	1	10	17	21	196	24	237	12	1	11
	2	227	27	398	11	22	151	32	342	13	1	16	11	21	121	40	356	11	2	17
	3	132	18	370	10	18	97	28	283	10	2	15	11	21	131	26	303	12	1	14
	4	126	19	313	9	17	173	22	145	19	1	8	9	18	183	19	135	19	1	7
	5	599	39	164	10	18	142	0	211	15	0	11	10	19	152	0	211	15	0	11
	6, 0	7	0	555	12	23	5	0	570	0	0	25	12	23	0	0	472	0	0	20
	7	326	53	379	12	23	174	33	252	15	1	11	11	22	142	34	248	12	2	11
	9	174	15	312	11	20	146	41	193	14	2	9	11	22	165	45	215	15	2	10
	10	82	0	340	0	5	1	0	71	0	0	14	0	4	0	0	71	0	0	18
	1	266	---	398	14	14	239	22	230	17	2	16	14	14	188	8	252	13	1	18
	2	127	---	188	10	10	72	12	317	7	1	31	11	11	56	15	158	5	1	15
rn	3	200	---	220	10	10	147	17	159	14	2	16	10	10	133	38	161	13	4	16
	4	176	---	399	11	11	79	21	276	7	2	25	13	13	91	33	286	7	2	21
	5, 00	198	---	132	10	10	111	13	290	11	1	29	11	11	88	16	429	8	2	40
	1	254	30	245	5	9	71	19	118	15	2	13	5	9	133	18	114	27	2	12
ast	2	645	34	169	7	14	48	16	184	7	1	13	7	14	55	20	174	8	1	13
	3	383	14	119	3	6	55	7	78	17	1	13	4	7	44	18	94	13	3	14
	0, 1	483	0	4	24		1		4	0		0	21		1		7	0		0
	3	44	---	101		39	20	383	73	1	10	2		37	21	536	30	1	14	1
	4	937	0	774	20	20	313		570	16		29	20	20	316		573	15		28
	5	1999	0	839	19	18	300		547	16		30	19	19	270		568	14		29
est	6	1558	0	584	20	22	270		419	14		19	19	19	358		440	19		24
	7	614	0	804	21	21	162		628	8		30	20	20	199		567	10		29
	8	0	0	1667		38	3		1137	0		30		43			1172	0		27
	9	347	0	418	16	17	168		377	10		22	14	14	145		381	10		27
	12	953	0	670	18	20	305		535	17		27	19	19	354		569	18		29
	13	597	0	713	19	17	220		373	11		22	19	19	184		384	10		20
																	4691	10		
her	various	370		48	81		893		14	11			90		944		125	10		
Totals		22,698	793	18,917			6,562	1,077	14,241						6,695	1,447	14,209			

ing for March 31,2016: The process of reporting FTE, in particular the specific section assignment of trainees, was not yet established in March 2016. As a result, the FTE counts for that period are not available since they do not match the information on the total number of positions as is required by the monthly hiring report.

open reports is the actual figure as of the Monday before the legislatively required reporting period based on the automated report run.

Q1 FY2019, Specialists in a trainee status are accounted for in FTE figures in each section with an equal distribution of 66% caseload.

ne population figures are directly from the Monthly Out-of-Home Care run for the Monthly Outcome and Operational Report (MOOR) which is a lagging 60 day metric.

ases are based on a handcount of cases activitly managed in each respective Region. March 2016 values for Northern Region are not available given that the Region counted the number of children and not the number of cases.

ase figures were not handcounted in Soutwest Region in March 2016. The handcount only included total child count.

ases assignments differ Regionally. Central and Southwest Regions employ specific in-home units who manage in-home cases only, while Northen, Pima and Southeast Regions have mixed units that may carry in-home or out-of-home cases.

ments to investigations or case management are based on assignment of 50% investigative and 50% ongoing in Central, Northern and Southwest Regions. Pima and Southeast Regions employ a distribution of 34% Investigations and 66% ongoing.

a for Pima Region in Q1 FY2019 was updated in Q2 FY2019 to reflect case count rather than kid count

STATE OF ARIZONA

Joint Legislative Budget Committee

1716 WEST ADAMS
PHOENIX, ARIZONA 85007

(602) 926-5491

azleg.gov

DATE: April 3, 2019

TO: Members of the Joint Legislative Budget Committee

FROM: Patrick Moran, Senior Fiscal Analyst PM

SUBJECT: Department of Child Safety - Review of Line Item Transfers

Request

Pursuant to a footnote in the FY 2019 General Appropriation Act (Laws 2018, Chapter 276), the Department of Child Safety (DCS) is requesting Committee review of the transfer of $208,000 Federal Temporary Assistance for Needy Families (TANF) Block Grant monies into the Kinship Care line item from the Out-of-Home Support Services line item.

Committee Options

The Committee has at least the following 2 options:

1. A favorable review of the request.

2. An unfavorable review of the request.

Key Points

1) DCS is requesting a transfer of $208,000 of FY 2019 TANF monies from Out-of-Home funding into Kinship Care.
2) The transfer would address higher-than-budgeted caseload growth in Kinship Care.
3) DCS' proposal brings total Kinship Care funding to the FY 2018 spending level of $2.6 million.

Analysis

The Kinship Care line item provides a $75/month stipend to unlicensed kinship caregivers with incomes below 200% of the Federal Poverty Level who do not receive other financial assistance from DCS. The

(Continued)

enacted FY 2019 budget included $2.0 million from the General Fund for Kinship Care, which is sufficient to fund a monthly average of 2,222 enrollees. At its December 2018 meeting, the Committee favorably reviewed the department's proposal to transfer $400,000 of Federal TANF Block Grant monies into Kinship Care to address higher-than budgeted caseload growth.

The department is proposing to increase the transfer into the Kinship Care line in FY 2019 by an additional $208,000 using Federal TANF Block Grant monies. Combined with the prior transfer of $400,000, the proposal would increase the total resources for Kinship Care to $2.6 million, which is sufficient to serve approximately 2,898 enrollees. The $2.6 million spending level is equivalent to DCS' expenditures on Kinship Care in FY 2018. The current number of enrollees is 2,820.

The $208,000 would be transferred from the Out-of-Home Support Services line item, which DCS estimates will have a surplus in FY 2019 due to declining out-of-home caseloads. The previous $400,000 transfer was also sourced from Out-of-Home Support Services.

The 3-year spending plan associated with the enacted FY 2019 budget did not include any adjustments to the $2.0 million appropriation for Kinship Care, and the FY 2020 Baseline continues to include $2.0 million for the line item. As a result, to the extent that higher-than-budgeted caseloads continue next year, the department would either have to repeat this transfer or make changes to the program. An FY 2019 General Appropriation Act footnote continues to require DCS to submit any proposed changes in eligibility for the program or the amount of the stipend to JLBC for review before implementation.

PM:lm

Arizona Department of Child Safety

Douglas A. Ducey
Governor

Gregory McKay
Director

Friday, March 20, 2019
The Honorable Regina Cobb
Chairman, Joint Legislative Budget Committee
1700 West Washington
Phoenix, Arizona 85007

Re: Appropriation Transfer Request

Dear Representative Cobb:

The Department requests the Joint Legislative Budget approval for a TANF appropriation transfer requests below:

Summary of Requested Appropriation Transfers for FY19

Special Line Item	TANF Authority (in $1,000)
Kinship Stipend	$208.0
Out-of-Home Services	($208.0)
TOTAL	**$ 0.0**

TANF Appropriation Requests – FY19

Pursuant to Laws 2018, Second Regular Session, Chapter 276, Section 17, the amount appropriated for any line item may not be transferred to another line item or the operating budget unless the transfer is review by the joint legislative budget committee. The Department requests the committee review the following TANF transfer requests:

- Kinship Stipend: The Department requests a total of $208 Thousand TANF to be transferred from Out-of-Home Services to Kinship Stipend line item. Without this transfer, the department will have to create a waitlist and/or suspend benefits for the Kinship Stipend.

Special Line Item	TANF Authority (in $1,000)
Kinship Stipend	$208.0
Out-of-Home Services	($208.0)
TOTAL	**$ 0.0**

Sincerely,

Gregory McKay
Director

FOR DIRECTOR McKay.

Enclosure

cc: The Honorable David Gowan, Arizona State Senate
Matthew Gress, Office of Strategic Planning and Budgeting
Richard Stavneak, Joint Legislative Budget Committee
Patrick Moran, Joint Legislative Budget Committee
Yan Gao, Office of Strategic Planning and Budgeting

STATE OF ARIZONA

Joint Legislative Budget Committee

1716 WEST ADAMS
PHOENIX, ARIZONA 85007

(602) 926-5491

azleg.gov

DATE: April 3, 2019

TO: Members of the Joint Legislative Budget Committee

FROM: Steve Schimpp, Deputy Director

SUBJECT: Arizona Department of Education - Review of College Credit by Examination Incentive Program Report

Request

The Arizona Department of Education (ADE) requests Committee review of its annual report on the College Credit by Examination Incentive Program (CCEIP) as required by A.R.S. § 15-249.06F.

Committee Options

The Committee has at least the following 2 options:

1. A favorable review of the request.

2. An unfavorable review of the request.

Key Points

1) The state gives schools a bonus for each student passing a college credit exam.
2) The bonus is $450 per pupil for each test passed in low income schools.
3) Otherwise the bonus is $300.
4) Schools statewide received $4.2 M in bonuses for FY 2018:
   - $0.6 M went to low-income schools
   - $3.6 M went to all other schools
5) 8,834 of 23,192 participating students (38%) received a passing score(s) on qualifying exam(s).

(Continued)

Analysis

A.R.S. § 15-249.06 establishes the CCEIP, which provides incentive bonuses to school districts and charter schools for students who obtain a passing score on a qualifying examination for college credit while in high school. The bonus is $450 per passing score for a student who is enrolled in a school where at least 50% of students are eligible for free or reduced-price lunches (FRPL) under the Federal School Lunch program; otherwise, it is $300 per passing score. Bonuses shall be reduced proportionately if the appropriated amount is insufficient to fully fund them. A school district or charter schools that receives a CCEIP bonus shall distribute at least 50% of it to the associated classroom teacher.

Qualifying examinations for the CCEIP include Advance Placement Exams, Cambridge International Exams and International Baccalaureate Exams approved by the Arizona Board of Regents pursuant to A.R.S. § 15-249.06, Subsection B *(see Appendix A).*

A.R.S. § 15-249.06F requires ADE to report the following information each year by December 15:

1. The number of students who took a qualifying examination at each school.
2. The number of students who received a passing score on a qualifying examination and the number of incentive bonus awards distributed.
3. The number and types of qualifying examinations taken by students.
4. The amount of bonus monies received by each school.

ADE's CCEIP report for FY 2018 is attached and reports school by school information for the required items listed above. Highlights include the following:

- 23,192 students took a qualifying exam(s) in FY 2017 (affected program funding for FY 2018).
- 8,834 students (38%) received a passing score.
- $4.2 million in bonuses were awarded statewide ($3.6 million to < 50% FRPL schools and $0.6 million to 50%+ FRPL schools).

Schools receiving the largest CCEIP award totals appear in *Table 1*.

Table 1

Schools with the Largest Total CCEIP Awards for FY 2018

School	District or Charter Holder	Award Total
Hamilton High School	Chandler Unified	$215,700
University High School	Tucson Unified	$179,400
BASIS Scottsdale	BASIS	$157,200
BASIS Chandler	BASIS	$156,900
Perry High School	Chandler	$155,400
BASIS Tucson North	BASIS	$121,500
Pinnacle High School	Paradise Valley Unified	$99,300
Chaparral High School	Scottsdale Unified	$88,800
Basha High School	Chandler Unified	$85,200
Mountain View High School	Mesa Unified	$81,900

SSc:kp
Attachment

Appendix A

Qualifying College Credit Examinations in English Language, Mathematics, Science, & Social Sciences

	Passing Score [1/]				
	ASU	NAU	UA	New 2018	Revised Score
Advanced Placement (AP)					
Biology	3	3	3		
Calculus AB	3	3	3		
Calculus BC	3	3	3		
Chemistry	4	4	4		
Comparative Government & Politics	4	4	4	Y	
Computer Science A	4	4	4		
Computer Science Principles	4	3	3	Y	
English Language and Composition	4	4	4		
English Literature and Composition	4	4	4		
Environmental Science	4	4	4		
European History	4	4	4	Y	
Human Geography	4	4	4	Y	
Macroeconomics	4	4	4	Y	
Microeconomics	4	4	4	Y	
Physics 1	4	4	4		
Physics 2	4	4	4		
Physics C: Electricity and Magnetism	3	3	3		
Physics C: Mechanics	3	3	3		
Psychology	4	4	4	Y	
Statistics	3	3	3		
US Government & Politics	4	4	4	Y	
US History	4	4	4	Y	
World History	4	4	4	Y	
Cambridge International Exam (CIE)					
Biology-A Level	E	E	E		All
Biology-AS Level	E	D	D		ASU
Chemistry-A Level	E	E	E		ASU
Chemistry-AS Level	D	D	D		
Economics A Level	D	D	D	Y	
English Language A Level	E	E	E		
Geography A Level	E	E	E	Y	
Geography AS Level	E	E	E	Y	
History A Level	C	C	C	Y	
History AS Level	C	C	C	Y	
Information Technology A Level	E	E	E	Y	
Mathematics A Level	E	E	E		NAU
Mathematics AS Level	E	E	E	Y	
Mathematics Further A Level	E	E	E		NAU
Psychology A Level	E	E	E	Y	
Psychology AS Level	E	E	E	Y	

(Continued)

	Passing Score [1/]				
	ASU	NAU	UA	New 2018	Revised Score
International Baccalaureate (IB)					
Biology HL	4	4	4		
Biology SL	4	4	4		
Chemistry	4	4	4		
Computer Science HL	5	5	5	Y	
Computer Science SL	4	4	4	Y	
Economics	5	5	5	Y	
English A	5	4	4	Y	
Geography HL	5	5	5	Y	
Geography SL	4	4	4	Y	
History	5	5	5	Y	
History, Africa and the Middle East HL	5	5	5	Y	
History, Americas HL	4	4	4	Y	
History, Europe HL	4	4	4	Y	
Information Technology in a Global Society	5	4	5	Y	
Mathematics	5	5	5		
Physics	5	5	5		
Psychology HL	5	5	5	Y	
Psychology SL	4	4	4	Y	
Social and Cultural Anthropology HL	4	4	4	Y	
Social and Cultural Anthropology SL	5	5	5	Y	
World Religions	5	5	5	Y	

1/ AP examination scores range from 5 (highest) to 1 (lowest). CIE scores range from A (highest), B, C, D, E, F, G, U (lowest). IB scores range from 7 (highest) to 1 (lowest).

Arizona Department of Education
Office of Superintendent Kathy Hoffman

March 20, 2019

The Honorable Regina E. Cobb
Chairwoman, Joint Legislative Budget Committee
Arizona State House of Representatives
1700 West Washington Street
Phoenix, AZ 85007

Dear Representative Cobb,

The purpose of this letter is to request that one item be included on the agenda for consideration at the April 10, 2019 meeting of the Joint Legislative Budget Committee(JLBC) to fulfill the statutory requirements as outlined below.

1) Laws 2017, Chapter 304, Section 2, relating to the College Credit by Examination Incentive Program. This requirement states that on or before December 15, 2018, and each year thereafter, the Department of Education is required to submit for JLBC review a report on the College Credit by Examination Incentive Program pursuant to A.R.S. 15-249.06(F).

The report on the outcome of this program is found attached for your review.

Please do not hesitate to contact my office with any questions.

Sincerely,

Callie Kozlak

Callie Kozlak
Associate Superintendent, Policy and Government Relations
Arizona Department of Education

College Credit by Examination Incentive Program (CCEIP)

Report as of February 4, 2019

Annual report submitted by the Arizona Department of Education per ARS §15-249.06 (F)

1. **The number of students who took a qualifying examination at each school.**

Total Number of Students Who Took a Qualifying Examination at Each School.	23,192*

** Does not include students taking IB and Cambridge A-Level and AS-Level Examinations due to data limitations. These limitations have been addressed for the 2017-2018 cycle.*

2. **The number of students who received a passing score on a qualifying examination and the number of incentive bonus awards distributed.**

Total Number of Students Who Received a Passing Score on a Qualifying Examination	8,834*
Total CCEIP Bonus Awards Distributed	**13,338**

** Does not include IB and Cambridge A-Level and AS-Level Examinations due to data limitations. These limitations have been addressed for the 2017-2018 cycle.*

3. **The number and types of qualifying examinations taken by students.**

Summary by Examination Type

Total College Board Advanced Placement (AP) Examinations	**12,900**
Total International Baccalaureate Examinations	**426**
Total Cambridge A-Level and Cambridge AS-Level Examinations	**12**
Total All CCCEIP Qualifying Examinations	**13,338**

CCEIP Exam Type	Total # of Exams from Schools with 50% or Higher Free or Reduced-Price Meals	Total # of Exams from Schools with Less than 50% or Higher Free or Reduced-Price Meals	Total # of Exams	Total CCEIP Bonus for Exams from Schools with 50% or Higher Free or Reduced-Price Meals	Total CCEIP Bonus for Exams from Schools with Less than 50% or Higher Free or Reduced-Price Meals	Total CCEIP Bonus Payments
College Board Advanced Placement (AP) Examinations	1,234	11,666	12,900	$555,300	$3,499,800	$4,055,100
International Baccalaureate Examinations	155	271	426	$69,750	$81,300	$151,050
Cambridge A-Level and Cambridge AS-Level Examinations	3	9	12	$1,350	$2,700	$4,050
TOTAL ALL CCEIP Eligible Exams	**1,392**	**11,946**	**13,338**	**$626,400**	**$3,583,800**	**$4,210,200**

4. **The amount of bonus monies received by each school.**

Total Participating High Schools	**199**
Total CCEIP Qualifying Examinations	**13,338**
Total CCEIP Bonus Monies Received by Each School	**$4,210,200**

School ID	School Name	LEA Name	Total Exams	Total Bonus
78898	Academy of Tucson High School	Academy of Tucson, Inc.	2	$600
5891	Accelerated Learning Laboratory	Accelerated Elementary and Secondary Schools	7	$2,100
5454	Agua Fria High School	Agua Fria Union High School District	27	$12,150
5436	Alhambra High School	Phoenix Union High School District	10	$4,500
92885	American Leadership Academy - Ironwood	American Leadership Academy, Inc.	8	$2,400
90769	American Leadership Academy - Queen Creek	American Leadership Academy, Inc.	22	$6,600
6055	Amphitheater High School	Amphitheater Unified District	24	$10,800
6188	Antelope Union HS	Antelope Union High School District	1	$450
5925	Apache Junction High School	Apache Junction Unified District	20	$9,000
5431	Apollo High School	Glendale Union High School District	41	$18,450
5066	Arcadia High School	Scottsdale Unified District	126	$37,800
89591	Arizona College Prep Erie Campus	Chandler Unified District #80	128	$38,400
81179	Arizona Connections Academy	Arizona Connections Academy Charter School, Inc.	3	$900
5519	Arizona School For The Arts	Arizona School For The Arts	53	$15,900
79705	Arizona Virtual Academy	Portable Practical Educational Preparation, Inc. (PPEP, Inc.)	5	$1,500
91304	ASU Preparatory Academy- Phoenix High School	ASU Preparatory Academy	7	$3,150
91306	ASU Preparatory Academy-Polytechnic High School	ASU Preparatory Academy	5	$1,500
5162	Barry Goldwater High School	Deer Valley Unified District	20	$9,000
79633	Basha High School	Chandler Unified District #80	284	$85,200
92030	BASIS Ahwatukee	BASIS Schools, Inc.	147	$44,100

91056	BASIS Chandler	BASIS Schools, Inc.	523	$156,900
90863	BASIS Flagstaff	BASIS Schools, Inc.	164	$49,200
91997	BASIS Mesa	BASIS Schools, Inc.	99	$29,700
90509	BASIS Oro Valley	BASIS Schools, Inc.	167	$50,100
91055	BASIS Peoria	BASIS Schools, Inc.	234	$70,200
91343	BASIS Phoenix	BASIS Schools, Inc.	273	$81,900
92321	BASIS Prescott	BASIS Schools, Inc.	62	$18,600
81079	BASIS Scottsdale	BASIS Schools, Inc.	524	$157,200
91766	BASIS Tucson North	BASIS Schools, Inc.	405	$121,500
92270	Benjamin Franklin High School	Benjamin Franklin Charter School	15	$4,500
5648	Blue Ridge HS	Blue Ridge Unified School District No. 32	23	$6,900
85850	Boulder Creek High School	Deer Valley Unified District	187	$56,100
6097	Bradshaw Mountain High School	Humboldt Unified District	40	$18,000
5424	Buckeye Union High School	Buckeye Union High School District	10	$4,500
4783	Buena High School	Sierra Vista Unified District	46	$13,800
5014	Cactus High School	Peoria Unified School District	2	$600
5137	Cactus Shadows High School	Cave Creek Unified District	115	$34,500
5438	Camelback High School	Phoenix Union High School District	14	$6,300
6100	Camp Verde High School	Camp Verde Unified District	1	$450
90124	Campo Verde High School	Gilbert Unified District	187	$56,100
5808	Canyon Del Oro High School	Amphitheater Unified District	212	$63,600
5440	Carl Hayden High School	Phoenix Union High School District	38	$17,100
5948	Casa Grande Union High School	Casa Grande Union High School District	36	$16,200
5839	Catalina Foothills High School	Catalina Foothills Unified District	234	$70,200
5756	Catalina High School	Tucson Unified District	1	$450
5016	Centennial High School	Peoria Unified School District	46	$13,800
5439	Central High School	Phoenix Union High School District	9	$4,050

78847	Cesar Chavez High School	Phoenix Union High School District	38	$17,100
5127	Chandler High School	Chandler Unified District #80	248	$74,400
5069	Chaparral High School	Scottsdale Unified District	296	$88,800
6110	Chino Valley High School	Chino Valley Unified District	1	$300
5757	Cholla High Magnet School	Tucson Unified District	13	$5,850
6191	Cibola High School	Yuma Union High School District	51	$22,950
79721	Cienega High School	Vail Unified District	111	$33,300
4820	Coconino High School	Flagstaff Unified District	13	$3,900
89859	Combs High School	J O Combs Unified School District	13	$3,900
85810	Copper Canyon High School	Tolleson Union High School District	11	$4,950
5447	Corona Del Sol High School	Tempe Union High School District	152	$45,600
5067	Coronado High School	Scottsdale Unified District	6	$2,700
5429	Cortez High School	Glendale Union High School District	20	$9,000
5161	Deer Valley High School	Deer Valley Unified District	22	$6,600
79799	Desert Edge High School	Agua Fria Union High School District	28	$12,600
92249	Desert Heights Preparatory Academy	Desert Heights Charter Schools	4	$1,200
5070	Desert Mountain High School	Scottsdale Unified District	253	$75,900
79823	Desert Ridge High	Gilbert Unified District	89	$26,700
5826	Desert View High School	Sunnyside Unified District	5	$2,250
5449	Desert Vista High School	Tempe Union High School District	240	$72,000
4983	Dobson High School	Mesa Unified District	67	$30,150
4773	Douglas HS	Douglas Unified District	6	$2,700
92892	Dr. Camille Casteel High School	Chandler Unified District #80	10	$3,000
5133	Dysart High School	Dysart Unified District	4	$1,800
5479	EDUPRIZE SCHOOL Gilbert	Eduprize Schools, LLC	1	$300
87875	Empire High School	Vail Unified District	56	$16,800
79376	Estrella Foothills High School	Buckeye Union High School District	20	$6,000

4842	Flagstaff Arts And Leadership Academy	Flagstaff Arts And Leadership Academy	16	$4,800
4819	Flagstaff High School	Flagstaff Unified District	99	$29,700
5897	Florence High School	Florence Unified School District	4	$1,200
5791	Flowing Wells High School	Flowing Wells Unified District	29	$13,050
5167	Fountain Hills High School	Fountain Hills Unified District	61	$18,300
89576	Gila Ridge High School	Yuma Union High School District	29	$13,050
89606	Gilbert Classical Acad	Gilbert Unified District	106	$31,800
5039	Gilbert High School	Gilbert Unified District	57	$17,100
5426	Glendale High School	Glendale Union High School District	7	$3,150
4855	Globe High School	Globe Unified District	3	$1,350
4825	Grand Canyon HS	Grand Canyon Unified District	2	$900
88300	Great Hearts Academies - Chandler Prep	Chandler Preparatory Academy	1	$300
89757	Great Hearts Academies - Scottsdale Prep	Scottsdale Preparatory Academy	10	$3,000
5433	Greenway High School	Glendale Union High School District	56	$16,800
6015	Hamilton High School	Chandler Unified District #80	719	$215,700
5509	Heritage Academy	Heritage Academy, Inc.	6	$1,800
92521	Heritage Academy Laveen	Heritage Academy Laveen, Inc.	1	$300
5040	Highland High School	Gilbert Unified District	167	$50,100
79374	Higley High School	Higley Unified School District	143	$42,900
78809	Horizon Community Learning Center	Horizon Community Learning Center, Inc.	29	$8,700
5106	Horizon High School	Paradise Valley Unified District	167	$50,100
90035	Imagine Prep - Coolidge	Imagine Prep Coolidge, Inc.	1	$450
89789	Imagine Prep Superstition	Imagine Prep Superstition, Inc.	1	$450
5434	Independence High School	Glendale Union High School District	47	$21,150
5015	Ironwood High School	Peoria Unified School District	56	$16,800
79378	Ironwood Ridge High School	Amphitheater Unified District	104	$31,200
79113	James Madison Preparatory School	James Madison Preparatory School	2	$600

5606	Joseph City HS	Joseph City Unified District	1	$300
5595	Kingman High School	Kingman Unified School District	2	$900
6190	Kofa High School	Yuma Union High School District	6	$2,700
80051	La Joya Community High School	Tolleson Union High School District	13	$5,850
5565	Lake Havasu High School	Lake Havasu Unified District	15	$4,500
91772	Lee Williams High School	Kingman Unified School District	4	$1,200
4878	Liberty High School	Liberty High School	30	$9,000
92605	Madison Highland Prep	Madison Highland Prep	13	$3,900
5781	Marana High School	Marana Unified District	73	$21,900
5446	Marcos De Niza High School	Tempe Union High School District	12	$3,600
5910	Maricopa High School	Maricopa Unified School District	8	$2,400
5441	Maryvale High School	Phoenix Union High School District	18	$8,100
6106	Mayer High School	Mayer Unified School District	2	$900
5445	Mcclintock High School	Tempe Union High School District	107	$32,100
4980	Mesa High School	Mesa Unified District	59	$26,550
6007	Mesquite High School	Gilbert Unified District	36	$10,800
6248	Metro Tech High School	Phoenix Union High School District	4	$1,800
78926	Millennium High School	Agua Fria Union High School District	111	$33,300
6127	Mingus Union High School	Mingus Union High School District	15	$6,750
91158	Mission Heights Preparatory High School	Kaizen Education Foundation dba Mission Heights Preparatory High School	1	$300
5644	Monument Valley High School	Kayenta Unified School District #27	4	$1,800
5430	Moon Valley High School	Glendale Union High School District	43	$19,350
5448	Mountain Pointe High School	Tempe Union High School District	71	$21,300
5163	Mountain Ridge High School	Deer Valley Unified District	244	$73,200
4982	Mountain View High School	Mesa Unified District	273	$81,900
5782	Mountain View High School	Marana Unified District	76	$22,800
5482	New School Arts Academics	New School For The Arts	1	$300

5962	Nogales High School	Nogales Unified District	22	$9,900
5107	North Canyon High School	Paradise Valley Unified District	28	$12,600
5442	North High School	Phoenix Union High School District	26	$11,700
79456	North Pointe Preparatory	Pointe Educational Services	12	$3,600
4845	Northland Preparatory Academy	Northland Preparatory Academy	92	$27,600
91825	Odyssey Institute for Advanced and International Studies	The Odyssey Preparatory Academy, Inc.	4	$1,200
4832	Page High School	Page Unified District	4	$1,200
5758	Palo Verde High Magnet School	Tucson Unified District	1	$450
5105	Paradise Valley High School	Paradise Valley Unified District	76	$22,800
89918	Paragon Science Academy	Daisy Education Corporation dba Paragon Science Academy	7	$2,100
4860	Payson High School	Payson Unified District	3	$900
5013	Peoria HS	Peoria Unified School District	25	$11,250
89613	Perry High School	Chandler Unified District #80	518	$155,400
90274	Phoenix Collegiate Academy Charter School	ASU Preparatory Academy	2	$600
88407	Phoenix Union Bioscience High School	Phoenix Union High School District	4	$1,800
79268	Pinnacle High School	Paradise Valley Unified District	331	$99,300
90309	Poston Butte High School	Florence Unified School District	43	$12,900
8135	Prescott High School	Prescott Unified School District	67	$20,100
5865	Presidio School	Presidio School	4	$1,800
5759	Pueblo High Magnet School	Tucson Unified District	4	$1,800
5141	Queen Creek High School	Queen Creek Unified District	21	$6,300
85835	Raymond S. Kellis	Peoria Unified School District	18	$8,100
4984	Red Mountain High School	Mesa Unified District	179	$53,700
5760	Rincon High School	Tucson Unified District	11	$3,300
5966	Rio Rico High School	Santa Cruz Valley Unified District	32	$14,400
5593	River Valley High School	Colorado River Union High School District	4	$1,800
5761	Sabino High School	Tucson Unified District	65	$19,500

5068	Saguaro High School	Scottsdale Unified District	32	$9,600
5843	Sahuarita High School	Sahuarita Unified District	33	$9,900
5762	Sahuaro High School	Tucson Unified District	35	$10,500
80409	San Luis High School	Yuma Union High School District	21	$9,450
89907	San Tan Foothills High School	Florence Unified School District	3	$1,350
80317	Sandra Day O'Connor High School	Deer Valley Unified District	216	$64,800
91286	Scottsdale Online Learning	Scottsdale Unified District	1	$300
6085	Sedona Red Rock Junior/Senior High School	Sedona-Oak Creek JUSD #9	10	$3,000
90377	Sequoia Pathway Academy	Edkey, Inc. - Sequoia Pathway Academy	6	$1,800
5108	Shadow Mountain High School	Paradise Valley Unified District	56	$16,800
90134	Shadow Ridge High School	Dysart Unified District	36	$10,800
5653	Shonto Prep Technology HS	Shonto Governing Board of Education, Inc.	1	$450
5632	Show Low High School	Show Low Unified District	3	$900
78917	Skyline High School	Mesa Unified District	59	$26,550
79092	Skyline Prep HS	Skyline Schools, Inc.	2	$600
6350	Skyview HS	Kaizen Education Foundation dba Skyview High School	1	$300
90285	Sonoran Science Academy - Davis Monthan	Daisy Education Corporation dba. Sonoran Science Academy Davis Monthan	1	$300
79127	Sonoran Science Academy - Tucson	Daisy Education Corporation dba Sonoran Science Academy	20	$6,000
5443	South Mountain High School	Phoenix Union High School District	2	$900
88335	South Ridge High School	American Charter Schools Foundation d.b.a. South Ridge High School	9	$4,050
5827	Sunnyside High School	Sunnyside Unified District	5	$2,250
5427	Sunnyslope High School	Glendale Union High School District	150	$45,000
5017	Sunrise Mountain High School	Peoria Unified School District	49	$14,700
5907	Superior HS	Superior Unified School District	6	$2,700
87466	Tanque Verde High School	Tanque Verde Unified District	22	$6,600
5444	Tempe High School	Tempe Union High School District	20	$9,000
5549	Tempe Preparatory Academy	Tempe Preparatory Academy	19	$5,700

5432	Thunderbird High School	Glendale Union High School District	148	$44,400
5452	Tolleson Union High School	Tolleson Union High School District	9	$4,050
5437	Trevor Browne High School	Phoenix Union High School District	39	$17,550
78821	Tri-City College Prep High School	Mary Ellen Halvorson Educational Foundation. dba: Tri-City Prep High School	3	$900
4838	Tuba City High School	Tuba City Unified School District #15	3	$1,350
5764	Tucson Magnet High School	Tucson Unified District	25	$11,250
90551	University High School	Tolleson Union High School District	96	$28,800
5766	University High School	Tucson Unified District	598	$179,400
10855	Vail Academy & High School	Vail Unified District	5	$1,500
4800	Valley Union High School	Valley Union High School District	2	$900
88417	Valley Vista High School	Dysart Unified District	36	$10,800
87903	Verrado High School	Agua Fria Union High School District	63	$18,900
78822	Victory High School	Victory High School, Inc.	1	$450
90084	Vista Grande High School	Casa Grande Union High School District	9	$4,050
90824	Walden Grove High School	Sahuarita Unified District	46	$13,800
5428	Washington High School	Glendale Union High School District	69	$31,050
5453	Westview High School	Tolleson Union High School District	21	$9,450
4981	Westwood High School	Mesa Unified District	81	$36,450
4987	Wickenburg High School	Wickenburg Unified District	2	$600
89581	Williams Field High School	Higley Unified School District	53	$15,900
81113	Willow Canyon High School	Dysart Unified District	52	$15,600
6189	Yuma High School	Yuma Union High School District	6	$2,700
			13,338	**$4,210,200**

6

STATE OF ARIZONA

Joint Legislative Budget Committee

1716 WEST ADAMS
PHOENIX, ARIZONA 85007

(602) 926-5491

azleg.gov

DATE: April 3, 2019

TO: Members of the Joint Legislative Budget Committee

FROM: Elizabeth Dagle, Fiscal Analyst ED

SUBJECT: Northern Arizona University - Review of Expenditure and Performance Report of Nonprofit Biotechnology Research Appropriation

Request

The FY 2015 General Appropriation Act (Laws 2014, Chapter 18, Section 132) appropriates $3,000,000 each year from FY 2015 to FY 2019 to Northern Arizona University (NAU) to grant to a nonprofit biomedical research entity. The act requires NAU to provide a report to the Joint Legislative Budget Committee (JLBC) for its review on the expenditures and performance of the grant recipient by February 1 of each year.

Committee Options

The Committee has at least the following 2 options:

1. A favorable review of NAU's biomedical research report.

2. An unfavorable review of NAU's biomedical research report.

Key Points

1) NAU receives $3.0 million per year from the General Fund, which it then grants to the Translational Genomics Research Institute (TGen) for its unrestricted use. FY 2019 is the final year of this appropriation.
2) The majority of this funding ($2.4 million) was used to support projects funded by other grants
3) In 2018, TGen reports receiving $13.7 million in grants, publishing 156 academic articles, and being awarded 33 patents.

(Continued)

Analysis

The FY 2015 budget required that NAU contract with a nonprofit biomedical research entity for a $3 million annual grant over a 5-year period (FY 2015 - FY 2019). The grantee is required to report to NAU annually on the following information:

1. The type and amount of expenditures from all state sources of monies.
2. A description of each grant received as well as the positions and locations of positions solely or partly funded by the state.
3. Performance measures, including outcomes related to use of state monies, progress made toward the achievement of each outcome, reportable inventions or discoveries made and publication related to research funded by state monies.

The grantee is the Translational Genomics Research Institute (TGen). TGen is a nonprofit organization which studies the genetic components of diseases to develop diagnostics, prognostics and therapies for cancer, neurological disorders, diabetes and other complex medical conditions. TGen staff are located in their Phoenix headquarters as well as offices in Scottsdale and Flagstaff.

All Sources of State Monies

In addition to the $3 million NAU appropriation, TGen receives $2 million from the Department of Health Services (DHS) from the Tobacco Tax and Health Care Fund - Health Research Account.

The state funding provides unrestricted financial support for TGen's operations. TGen reports that the state monies are used to supplement research grants. This "research capital" covers indirect costs not funded by award amounts or allows TGen to match project costs in accordance with grant program criteria. The report lists 10 grant funded projects that are supported in part by state funds.

The expenditures of the TGen monies from NAU in 2018 are summarized in *Table 1*. The majority of the funding from NAU was spent on research capital. In prior years, some funding has been used for Research Equipment Service maintenance. This line item was not included in the 2018 report.

Table 1
CY 2018 Expenditures of NAU Funding

Expenditure Category	Expenditures
Research Supplies	$ 33,000
Research Outside Services	172,000
Research Capital	2,395,000
Proposal Development	100,000
Project Management	100,000
Technical Infrastructure	100,000
Education	100,000
Total	**$3,000,000**

Grants and Full-Time Positions

In 2018, TGen submitted 132 grant applications to various entities totaling $883 million. Of that amount, TGen was awarded grants totaling $13.7 million. *(Please see the NAU report attached to this*

(Continued)

memo for the list of grant awards.) As described above, TGen reports that these projects and others are supported in part by the underlying technology funded by state appropriations.

TGen reports that in 2018, 45 FTE Positions were funded with salaries and benefits totaling $2.6 million. In addition, student salaries totaled $403,600. The majority of the funding for these positions comes from non-state sources and grants.

Performance Measures

TGen's 2018 report highlights the following progress and outcomes of its research initiatives:

- TGen researchers devised a test that can be used in a non-invasive "liquid biopsy" to detect and monitor cancers through analysis of cell-free DNA found floating in blood.
- TGen used genomic technology and statistics to enable improved tracking of potentially deadly infectious agents. Scientists analyzed genetic material of West Nile Virus directly from mosquitos collected in Arizona to build a genomic family tree of the virus.
- The TGen Center for Rare Childhood Disorders provided diagnosis for a young girl with severe neurological symptoms following the discovery of a genetic mutation which is suspected to cause additional genetic damage. This study was published in the American Journal of Medical Genetics.
- A TGen Research Assistant Professor is working to discover new treatments for diabetic blindness (diabetic retinopathy).
- The TGen Glioma Research Lab expanded a program focused on aggressive childhood brain tumors and raised over $200,000 for research.
- A TGen led study has identified for the first time a gene expression pattern associated with obesity related non-alcoholic steatohepatitis (a fatty liver disease), suggesting a genomic framework around which new treatments might be based.
- In collaboration with Arizona State University's College of Health Solutions, TGen has characterized the molecular changes that happen in muscle tissue following different types of exercise.
- TGen's Applied Cancer Research and Drug Discovery Division Director received a $6.7 million grant from the Department of Defense focused on targeting breast cancer that has spread to the bone by reigniting the body's own immune system.
- Conducted a first-of-its-kind study to detail the genetic basis of melanoma in dogs, which could someday lead to improved genome-based cancer treatments for both dogs and humans.

In addition to these research projects, TGen reports that it contributed to the publication of 156 academic articles in various journals, which includes at least 31 articles that were partially supported by technology provided through state funds. TGen researchers presented at 50 conferences throughout the year, including at the annual meeting of the American Association for Cancer Research in Chicago.

TGen lists 33 patents issued in 2018, as well as 22 other patent applications filed, resulting from projects funded by external sponsors and supported by the technologies provided for by state funding. The attached pages from the TGen report provide a list of these patents, as well as the organization's 2018 scientific publications.

ED:kp

NAU NORTHERN ARIZONA UNIVERSITY
Office of the Vice President for Research

PO Box 4087
Flagstaff, AZ 86011-4087
www.nau.edu/research

February 1, 2019

Director Richard Stavneak
Joint Legislative Budget Committee
1716 W. Adams
Phoenix, AZ 85007

Director Stavneak:

In accordance with Laws 2014, Chapter 18, Section 132, enclosed please find the annual expenditure and performance report provided to Northern Arizona University (NAU) by the Translational Genomics Research Institute (TGen). The report details the grant activity and performance measures as related to state funding for fiscal year 2018.

As demonstrated in the attached report, the $3 million state investment in TGen has leveraged external funding that supports essential research activities.

NAU appreciates its partnership with TGen and looks forward to the continued individual success of the organization as well as the continued success of our partnership. Our relationship exemplifies the importance of the biosciences to NAU and Arizona's economy. We are gratified that the state recognizes our ongoing relationship and sees the benefits that derive from scientific discoveries and their practical translations to positively impact health outcomes.

Do not hesitate to contact me if you have any questions regarding the attached report or NAU's partnership with TGen and the state as they relate to these grant monies.

Sincerely,

David Schultz
Vice President for Research

cc: Elizabeth Dagle, Fiscal Analyst

Annual Arizona Legislature Report

tgen®
AN AFFILIATE OF City of Hope

REPORT DATE:

FEBRUARY 1, 2019

Summary of 2018 Activities
from The Translational Genomics Research Institute

Contract No. ADHS16-102814

Summary of 2018 Activities

During 2018, TGen pursued the goal of H82703, Fifty-first Legislature, Second Regular Session, Chapter 18, Section 132, as adopted by the Arizona Legislature pursuant to the FY 2014-2015 budget and signed by the Governor on April 11, 2014 to support a non-profit medical research institute in Arizona that specializes in biotechnology and that collaborates with universities, hospitals, biotechnology and other health science research centers.

Expenditures from all state sources of monies

NAU/State of Arizona Grant:

	Second Half FY 18 (January 18 - June 18)	First Half FY 19 (July 18 - December 18)	Total
Research Supplies	$9,000	$24,000	$33,000
Research Outside Services	$101,000	$71,000	$172,000
Research Capital	$1,190,000	$1,205,000	$2,395,000
Proposal Development	$50,000	$50,000	$100,000
Project Management	$50,000	$50,000	$100,000
Technical Inftrstructure	$50,000	$50,000	$100,000
Education	$50,000	$50,000	$100,000
	$1,500,000	**$1,500,000**	**3,000,000**

		Second Half FY 18 (January 18 - June 18)	First Half FY 19 (July 18 - December 18)
Ultimate 3000 NanoLCRS 2D	60959	$15,287	
RSLCnano System-NCS 3500RS	60960	$39,938	
RSLCnano Pump	60961	$19,960	
RS Variable Wavelength Detector	60962	$8,471	
Autosampler	60963	$24,922	
iScan LIMS System (110/220V)	61959	$238,196	
LIMS System Server	61960	$30,600	
IBright CL1000 Western blot/gel doc system	66961	$29,996	
Tissuelyser II w/ adapter set	66963	$13,075	
TSQ Altis - Main Unit	67959-67962	$309,504	
Sony Flow Cytometer	67963	$197,029	
Agilent Seahorse XFe96 Analyzer	69960	$120,082	
Back-up Generator Panel	70966	$119,426	
Nano Acquity Autosampler UPLC	70977	$27,825	
NovaSeq 6000 Sequencing System	71959		$993,850
LSM 880 Observer.Z1 Confocal Microscope	73960		$211,861
		$1,194,311	**$1,205,711**

Other State Funding

	Second Half FY 18 (January 18 - June 18)	First Half FY 19 (July 18 - December 18)	Total
Personal Services	$59,780	$61,408	$121,188
Professional & Outside Services (Consultants)	$846,783	$847,683	$1,694,466
Equipment	$0	$0	$0
Facilities and Administrative	$90,656	$90,909	$181,565
Totals	**$997,219**	**$1,000,000**	**$1,997,219**

Grant Support

In additional to philanthropic donations and research contracts, grant funding is an important funding source for research. In 2018, TGen investigators submitted 132 grants totaling $883M **(See Appendix A for complete listing)**. During this period, TGen was awarded grants, totaling $13.7M. The projects outlined below, in addition to many others, are supported in part under the $3M per year in general funds appropriation as distributed by Northern Arizona University, as well as the $2M per year in tobacco tax funding received from the Arizona Department of Health Services.

1. Four-year grant from the Nomis foundation and Banner Health totaling $3,870,627 to Dr. Winnie Liang for the sequencing of RNA data from different human brain cells, regions, networks in the Alzheimer's and Aging Brain.
2. Two-year grant from the National Foundation for Cancer Research totaling $200,000 to Dr. Daniel Von Hoff to continue to explore new therapeutics for pancreatic cancer.
3. Five-year grant from the National Institutes of Health and Mayo Clinic totaling $764,611 to Dr. Jonathan Keats to explore the PD-1 blockade with cryoablation and dendritic vaccine to treat lymphoma.
4. Five-year grant from National Institutes of Health totaling $2,119,055 to Dr. Muhammad Murtaza to study treatment response and resistance in patients with metastatic melanoma.
5. Four-year grant from the Department of Defense to Dr. Sunil Sharma totaling $2,974,223 to explore Ron Kinase as a therapeutic target for metastatic breast cancer.
6. Three-year grant from the National Institutes of Health totaling $1,552,863 to Dr. Johanna DiStefano to study epigenetic markers of severity in nonalcoholic fatty liver disease.
7. One-year grant from National Institutes of Health and Banner Health totaling $261,430 to Dr. Matt Huentelman to study brain imaging and APOE in Alzheimer's Disease.
8. Two-year grant from the National Institutes of Health and the University of California San Diego totaling $278,027 to Dr. David Engelthaler to examine culture-free next generation sequencing for rapid detection of drug-resistant tuberculosis.
9. One-year grant from the Centers for Disease Control totaling $109,504 to Dr. David Engelthaler to study homologous and non-homologous recombinations in disease outbreaks.
10. One-year fellowship award from the Multiple Myeloma Research Foundation totaling $75,000 to Dr. Nicholas Banovich to study the characterization of genetic vulnerabilities in multiple myeloma.

Outcomes and Progress

In 2018, TGen advanced a series of innovative research initiatives that yielded numerous scientific discoveries (many with potential clinical application), established national and international collaborations, and led new and exciting clinical trials with promising results. Notable are:

- A study funded by the Science Foundation Arizona, The V Foundation for Cancer Research, Stand Up To Cancer (SU2C), The Ben and Catherine Ivy Foundation, and Desert Mountain CARE enabled TGen researchers to devise a rapid test that can be used in a so-called non-invasive "liquid biopsy" to detect and monitor cancer through analysis of cell-free DNA (cfDNA) found floating in the blood. This new test has shown promising results in helping evaluate cfDNA biomarkers in several cancer types, including melanoma, cholangiocarcinoma (bile duct cancer), rectal cancer and breast cancer, according to the study, "Evaluation of pre-analytical factors affecting plasma DNA analysis" published in the journal Scientific Reports. The new TGen assay is a significant step towards making these liquid biopsies a routine, non-invasive and accurate method of screening for cancer, detecting early-stage cancer, making treatment decisions, and monitoring how well a treatment is working. Dr. Muhammed Murtaza, the study's lead investigator, was also awarded a $2 million grant this year towards discovering a new way to detect and track metastatic melanoma and understand how it escapes treatment using these liquid biopsy approaches.

- TGen North faculty have continued to make key discoveries that leverage genomic technology and statistics to enable improved tracking of potentially deadly infectious agents including West Nile Virus (WNV) and a deadly fungus known as cryptococcus gattii. In a first-of-its-kind study, TGen scientists analyzed the genetic material of WNV directly from mosquitos collected in Arizona to build a genomic family tree of the virus. NAU and TGen researchers then used advanced computer algorithms to develop a theoretical model of how the virus moves around the American Southwest. As a result, researchers believe Arizona is a likely permanent source of WNV infection that is annually exported by migratory birds to other states, according to the study, "Phylogenetic analysis of West Nile Virus in Maricopa County, Arizona: Evidence for dynamic behavior of strains in two major lineages in the American Southwest", published in the journal PLOS ONE. Additionally, working with international investigators, TGen North faculty tracked the source of cryptococcus gattii, which can cause deadly lung and brain infections in both people and animals. Until a 1999 outbreak in British Columbia's Vancouver Island and subsequent spread to Washington, Oregon, and California, it was considered primarily a tropical fungus primarily found in places like Brazil, New Guinea and Australia. TGen researchers used genomic analysis and advanced statistics to trace the likely evolution of the disease, correlating it in time to the 1914 opening of the Panama Canal and a surge of shipping trade between Brazil and the Pacific Northwest. The results were published in the journal mSphere.

- TGen continues to use precision medicine to search for answers for young patients on diagnostic odysseys, who present with complex symptoms and no clear diagnosis. Clinicians and scientists in the TGen Center for Rare Childhood Disorders (C4RCD) have provided such a diagnosis for a young girl with severe neurological symptoms, following the discovery of a genetic mutation in the gene FBXO28, which is suspected to cause additional genetic damage leading to a host of neurological and developmental defects. There is no name for the girl's disease, but her symptoms are similar to other children who experience gene deletions in Chromosome 1 along a region of DNA known as 1q41-q42. Children with this syndrome experience a jumble of symptoms, including developmental delay, intellectual disability, epilepsy, brain anomalies and other symptoms generally referred to as birth defects, such as delayed growth, changes in facial features, and abnormal development of fingers, toes and nails. This study, "A novel FBXO28 frameshift mutation in a child with developmental delay, dysmorphic features, and intractable epilepsy: A second gene that may contribute to the 1q41-q42 deletion phenotype" was published in the American Journal of Medical Genetics.

- In the fight against diabetes and its complications, Dr. Sampath Rangasamy, A Research Assistant Professor at TGen, was awarded a $2.8 million grant from the NIH alongside collaborators at the University of New Mexico (UNM) in a groundbreaking major new initiative to discover new treatments for diabetic blindness. Known as diabetic retinopathy, this disease is one of the nation's leading causes of blindness, afflicting as many as 24,000 Americans each year. Nearly 2 of every 5 patients with diabetes also develop diabetic retinopathy. TGen and UNM will lead a consortium that includes Harvard University's Joslin Diabetes Center, and NIH's National Eye Institute. Because diabetic retinopathy can affect patients in so many varying ways, the study will focus on possible genetic causes of this disease, which could potentially lead to precision medicine-based treatments that would help thousands preserve their sight.

- The need for new treatments for aggressive brain tumors remains as pressing as ever. Dr. Michael Berens, a TGen Deputy Director and head of TGen's Glioma Research Lab, co-authored a study published in the prestigious journal Science that describes the Ivy Glioblastoma Atlas Project (Ivy GAP): a publicly available anatomic transcriptional atlas of human glioblastoma and the associated Ivy GAP Clinical and Genomic Database, a resource that provides researchers with a map of glioblastoma that can direct them to the doorstep of the disease biology through the lens of genomics. Dr. Berens has additionally continued to grow a program focused on aggressive childhood brain tumors called Diffuse Intrinsic Pontine Glioma (DIPG) and through collaboration with the Hope Through Hollis Fund at TGen, raised more than $200,000 for DIPG research. This support has fueled new research at TGen as well as the opening of a DIPG tissue donation portal and the launch of a research study entitled "See the Change" in collaboration with Dr. Murtaza to study DIPG at the molecular level through liquid biopsy.

- A fatty liver disease known as NASH — non-alcoholic steatohepatitis — is the nation's major cause of chronic liver disease, and is projected to become the most common indicator for liver transplants. The number of Americans with NASH has soared in recent decades to more than 6 million. NASH is strongly associated with patients who are obese and those with type 2 diabetes. Yet, despite the growing number of patients, there are no effective treatments for this disease, which most often progresses to liver inflammation, fibrosis, cirrhosis and death. A TGen-led study has now identified for the first time a gene expression pattern associated with obesity-related NASH inflammation and fibrosis. The study, done in collaboration with the Geisinger Obesity Institute and Temple University, was published in the Journal of the Endocrine Society. The study results suggest that there may be a genomic framework around which new treatments might be based.

- Studies in TGen's Neurogenomics Division led by Professor Matthew Huentelman have also shed new light on the genetic underpinnings of human health and performance. In a publication in Frontiers in Aging Neuroscience, Dr. Huentelman describes genetic variants in the gene MAP2K3 may be associated with slowed age-related memory loss in "SuperAgers," those in their 80s who still have the memory capacity of 30-year-olds. Further, Dr. Huentelman's team, in collaboration with ASU's College of Health Solutions, have characterized the molecular changes that happen in muscle tissue following different types of exercise, specifically resistance exercise (lifting weights), versus that of aerobic exercise (in this study, cycling). Using genomics, they identified genes that were affected uniquely by each type of exercise. By better understanding the unique molecular processes stimulated by different types of exercise, the researchers hope to find better ways to promote muscle health. This research, published in the Journal of Applied Physiology, could also lead to more effective exercise interventions that target abnormalities associated with specific muscle dysfunctions.

- In a program jointly led by Dr. Sunil Sharma, MD, TGen's new Director of TGen's Applied Cancer Research and Drug Discovery Division, and Dr. Alana Welm of the Hunstman Cancer Institute (HCI) in Utah, the institutes were awarded a $6.7 million Depart of Defense grant focused on targeting breast cancer that has spread to the bone by re-igniting the body's own immune system. Often what kills cancer patients is not the cancer at its original or primary site, but its spread to secondary sites within the body, through a process called metastasis. In the case of breast cancer, the tumor often spreads to the bone, and it is this bone metastasis that results in intense pain and precedes the cancer's spread to other organs. With this new funding, HCI will focus on the biology of an important cellular pathway in metastatic breast cancer while TGen will focus on drug development and supervise clinical trials to test those drugs.

- TGen's cancer programs extend not only to human patients, but also to our canine companions. In a first-of-its-kind study led by Drs. Trent and Hendricks, TGen scientists working with veterinary and scientific collaborators throughout the United States, detailed the genetic basis of melanoma in pet dogs. These discoveries could someday lead to improved genome-based cancer treatments for both dogs and humans through a discipline known as "comparative oncology." The study "Somatic inactivating PTPRJ mutations and dysregulated pathways identified in canine malignant melanoma by integrated comparative genomic analysis" was published in the journal PLOS Genetics.

Clinical Trials

The Virginia G. Piper Cancer Center (VGPCC) Clinical Trials Program at HonorHealth Research Institute (HHRI) (formerly Scottsdale Healthcare) provides a direct clinical research site for TGen. TGen Physician-in-Chief, Daniel Von Hoff, M.D., F.A.C.P., serves as Chief Scientific Officer. Program clinicians focus on clinical trials with targeted agents and genomics-based individualized therapy. Sunil Sharma, M.D., F.A.C.P., M.B.A., is TGen's newly appointed Deputy Director for Clinical Sciences and the Chief of Translational Oncology and Drug Development at the HonorHealth Research Institute and brings a wealth of knowledge in novel therapeutic strategies for targets in cancer that have been typically considered difficult to drug. Their initial focus on cancer allows the unique opportunity for TGen to transition its laboratory-based research to patient care centered on individualized therapy. Program staff currently working on the Phase I clinical trials.

Clinically, we continue to launch innovative programs that expand the boundaries of science and medicine. Current initiatives include:

1. Multiple clinical trials underway to investigate new chemical agents for a variety of tumor types in different cancers.

2. Incorporation of modern tools to identify patients' genomic characteristics that could lead to a more targeted approach.

Patents and Licenses

During 2018, TGen filed the patent applications on TGen-generated research. The list below reflects patent applications resulting from projects funded by external sponsors, but supported by underlying technology provided for by State of Arizona funding via the $3M per year in general funds appropriation as distributed by Northern Arizona University, as well as the $2M per year in tobacco tax funding received from the Arizona Department of Health Services.

Patents Applications Filed

File Date	Tech ID	Title	App Type	Country	Status	Serial No.
1/15/18	150416-237	Systems and Methods for Obtaining Biological Molecules from a Sample	Nationalized PCT	Europe	Filed	16812586.2
1/18/18	150416-237	Systems and Methods for Obtaining Biological Molecules from a Sample	Nationalized PCT	United States	Filed	15/736,296
1/24/18	091102-125	Methods for the Detection of Fungus	European	France	Issued	11737612.9
2/1/18	161021-260	System And Method For Reducing Ancestry Related Germline False Positives In Tumor Only Somatic Variant Calling	PCT	PCT	Filed	PCT/
2/7/18	091102-125	Methods for the Detection of Fungus	European	Germany	Issued	60 2011 045 287.8
2/7/18	091102-125	Methods for the Detection of Fungus	European	Great Britain	Issued	11737612.9
2/7/18	091102-125	Methods for the Detection of Fungus	European	Ireland	Issued	11737612.9
2/13/18	091102-125	Methods for the Detection of Fungus	European	Switzerland	Issued	11737612.9
3/1/18	150714-246	Small Molecule Inhibitors of Dyrk1A and Uses Thereof | UofA ref: 14-059	Nationalized PCT	Mexico	Prosecution by Other Party	
3/1/18	150714-246	Small Molecule Inhibitors of Dyrk1A and Uses Thereof| UofA ref: 14-059	Nationalized PCT	United States	Prosecution by Other Party	15/756,917
3/2/18	150714-246	Small Molecule Inhibitors of Dyrk1A and Uses Thereof | UofA ref: 14-059	Nationalized PCT	Australia	Prosecution by Other Party	2016315881
3/2/18	150714-246	Small Molecule Inhibitors of Dyrk1A and Uses Thereof | UofA ref: 14-059	Nationalized PCT	Canada	Prosecution by Other Party	2997556
3/2/18	150714-246	Small Molecule Inhibitors of Dyrk1A and Uses Thereof | UofA ref: 14-059	Nationalized PCT	Japan	Prosecution by Other Party	2018-531299
3/2/18	150714-246	Small Molecule Inhibitors of Dyrk1A and Uses Thereof | UofA ref: 14-059	Nationalized PCT	New Zealand	Prosecution by Other Party	740447
3/7/18	140521-224	Biomarkers and Methods of Diagnosing and Prognosing Mild Traumatic Brain Injuries	Nationalized PCT	United States	Filed	15/758,213
3/7/18	180307-271	Systems and Methods of Diagnosing and Prognosing Cancer	Provisional	United States	Filed	62/639,546
3/29/18	140521-224	Biomarkers and Methods of Diagnosing and Prognosing Mild Traumatic Brain Injuries	Nationalized PCT	Europe	Filed	16845064.1
4/3/18	150714-246	Small Molecule Inhibitors of Dyrk1A and Uses Thereof | UofA ref: 14-059	Nationalized PCT	Europe	Prosecution by Other Party	16843107
4/26/18	151124-249 CC8MRSA	Methods and Assays for Subtyping Staphylococcus Aureus Clonal Complex 8 Strains	PCT	PCT	Filed	PCT/
5/3/18	150702-244	Systems and Methods of Diagnosing and Characterizing Infections	Nationalized PCT	United States	Filed	15/773,270

Patents Applications Filed cont.

File Date	Tech ID	Title	App Type	Country	Status	Serial No.
5/23/18	150702-244	Systems and Methods of Diagnosing and Characterizing Infections	Nationalized PCT	Europe	Filed	16862986.3
5/30/18	131203-218	Canine Autolmmune Conditions and Diagnosis and Treatment Thereof	European	Germany	Prosecution by Other Party	13802806.3
5/30/18	131203-218	Canine Autolmmune Conditions and Diagnosis and Treatment Thereof	European	France	Prosecution by Other Party	13802806.3
5/30/18	131203-218	Canine Autolmmune Conditions and Diagnosis and Treatment Thereof	European	United Kingdom	Prosecution by Other Party	13802806.3
6/8/18	110509-156 Autophagy	Autophagy Inhibitors	Continuation	United States	Filed	16/003,990
6/11/18	140611-227	Methods and Kits to Identify and Genotype Cryptococcus Species	Divisional	United States	Filed	16/005,012
6/12/18	180509-272	Enhancing the efficacy of tumor-infiltrating lymphocyte (TIL) therapy by enriching tumor neoantigen specificity	Provisional	United States	Filed	62/683,957
7/20/18	170223-261	Methods for the Detection of Enterovirus D68 in Complex Samples	Utility	United States	Filed	16/041,711
7/26/18	180726-274	Method to Increase Detection of EV Biomarkers	Provisional	United States	Filed	62/703,845
7/30/18	170720-267	Methods of Profiling Mass Spectral Data Using Neural Networks	Utility	United States	Filed	16/049,651
8/8/18	160210-254	Systems and Methods for the Detection of Infectious Diseases (LymeSeq)	Nationalized PCT	United States	Filed	16/076,608
9/10/18	160314-255	Methods and Kits to Identify Klebsiella Strains	Nationalized PCT	United States	Filed	16/083,860
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Belgium	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Switzerland	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Germany	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Denmark	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Spain	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	France	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	United Kingdom	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Ireland	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Italy	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Netherlands	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Norway	Issued	11757080.4
9/20/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Sweden	Issued	11757080.4

Patents Applications Filed cont.

File Date	Tech ID	Title	App Type	Country	Status	Serial No.
11/6/18	180809-273	Apparatus and Method for Electrochemical Reduction of Biochemical Compositions for Bioconjugation	Nationalized PCT	Japan	Filed	PCT/
11/7/18	160518-257	Molecular Tagging Methods and Sequencing Libraries	Nationalized PCT	United States	Filed	16/099,664
11/15/18	170530-265	Biomarker Proxies for Standard Blood Chemistry Tests and Related Methods	PCT	PCT	Filed	PCT/
11/16/18	151215-252	Molecular Tagging Methods and Sequencing Libraries	Nationalized PCT	United States	Filed	16/302,568
11/20/18	170923-268	Methods for Enriching Microbial Cell-Free DNA in Plasma	Utility	United States	Filed	16/197,319
11/20/18	180809-273	Apparatus and Method for Electrochemical Reduction of Biochemical Compositions for Bioconjugation	Nationalized PCT	Australia	Filed	2017260371
11/30/18	180809-273	Apparatus and Method for Electrochemical Reduction of Biochemical Compositions for Bioconjugation	Nationalized PCT	Europe	Filed	17793482.5
12/7/18	070223-038 FGFR2	Method Of Diagnosing, Classifying And Treating Endometrial Cancer And Precancer	Continuation	United States	Filed	16/213,924
12/11/18	181018-279	Identification of HER2 Mutations In Canine Lung Cancer and Methods of Treatment	Provisional	United States	Filed	62/778,282
12/19/18	151215-252	Molecular Tagging Methods and Sequencing Libraries	Nationalized PCT	Europe	Filed	17803528.3
12/19/18	160518-257	Molecular Tagging Methods and Sequencing Libraries	Nationalized PCT	Europe	Filed	17807450.6

Issued Patents

Issue Date	Tech ID	Title	App Type	Country	Status	Patent No.
1/9/18	130315-198 CD9	Hybridoma Clones and Monoclonal Antibodies to CD9	Nationalized PCT	United States	Issued	9,862,773
1/23/18	150226-234	Methods Of Using Propentofylline To Treat Glioma And Glioblastoma	Continuation In Part	United States	Issued	9,872,857
1/24/18	091102-125 PANFUNGAL	Methods for the Detection of Fungus	Nationalized PCT	Europe	Issued	2529034
1/24/18	091102-125 PANFUNGAL	Methods for the Detection of Fungus	European	Switzerland	Issued	2529034
1/24/18	091102-125 PANFUNGAL	Methods for the Detection of Fungus	European	France	Issued	2529034
1/24/18	091102-125 PANFUNGAL	Methods for the Detection of Fungus	European	Germany	Issued	6.02011E+11
1/24/18	091102-125 PANFUNGAL	Methods for the Detection of Fungus	European	Great Britain	Issued	2529034
1/24/18	091102-125 PANFUNGAL	Methods for the Detection of Fungus	European	Ireland	Issued	2529034
2/23/18	131203-218	Canine Autolmmune Conditions and Diagnosis and Treatment Thereof	Nationalized PCT	Japan	Prosecution by Other Party	6293859
3/13/18	090314-095B	Methods, Kits and Compositions Useful in Selecting an Antibiotic to Treat MRSA	Utility	United States	Issued	9,914,978
4/13/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	Nationalized PCT	Japan	Issued	6320041

Issued Patents cont.

Issue Date	Tech ID	Title	App Type	Country	Status	Patent No.
5/15/18	160401-256	Method Of Detecting and Quantifying Coccidioides Species	Continuation In Part	United States	Issued	9,970,066
5/30/18	131203-218	Canine AutoImmune Conditions and Diagnosis and Treatment Thereof	Nationalized PCT	Europe	Prosecution by Other Party	3074527
6/12/18	140611-227	Methods and Kits to Identify and Genotype Cryptococcus Species	Utility	United States	Issued	9,994,917
7/12/18	120424-177 BurkAssay	Primers, Assays And Methods For Detecting Burkholderia Pseudomallei And Burkholderia Mallei	Nationalized PCT	Australia	Issued	2013262783
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	Nationalized PCT	Europe	Issued	2547782
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Belgium	Issued	2547782
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Switzerland	Issued	2547782
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Germany	Issued	60 2011 050 582.3
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Denmark	Issued	2547782
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Spain	Issued	2547782
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	France	Issued	2547782
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	United Kingdom	Issued	2547782
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Ireland	Issued	2547782
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Italy	Issued	5.02018E+14
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Netherlands	Issued	2547782
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Norway	Issued	2547782
8/1/18	090314-095A MRSA	Methods, Kits and Compositions useful in the detection of MRSA	European	Sweden	Issued	2547782
9/4/18	091113-127 PTTG1	Methods And Kits Used In Classifying Adrenocortical Carcinoma	Continuation	United States	Issued	10,066,270
10/16/18	090314-095A MRSA	Methods, Kits and Compositions Useful in the Detection of MRSA	Utility	United States	Issued	10,100,368
11/6/18	150519-240	Methods Used to Treat Cancer	Utility	United States	Issued	10,119,137
11/13/18	131203-218	Canine AutoImmune Conditions and Diagnosis and Treatment Thereof	Nationalized PCT	United States	Prosecution by Other Party	10,125,397
12/4/18	140219-221 MALTESE	Methods of Assessing a Risk of Developing Necrotizing Meningoencephalitis UGRF Ref: 2352	Continuation In Part	United States	Issued	10,147,505

Peer-Reviewed Laboratory Research Publications and Presentations

In 2018, TGen's 16th year of operations, we experienced significant scientific and medical progress across multiple areas of the institute, many of which reached new heights and forged the potential for significantly greater achievements in the future.

Our capacity to understand and leverage what the genome is telling us has never been greater. Long-term, our hope is that doctors will leverage this information to inform decisions about patient care as the standard rather than the exception. And while this is happening today on a limited basis, we envision a day in the not too distant future where it will happen for all patients across all diseases. Toward that end, much of what we learn is published in leading scientific and medical journals, which continuously adds to the growing knowledge base of molecular research and medicine.

In 2018, TGen researchers published their research results extensively in numerous scholarly peer-reviewed academic journals and through presentations at leading national and international conferences (see Appendix A for complete listing). The list below reflects publications and presentations resulting from projects funded by external sponsors, but supported by underlying technology provided for by State of Arizona funding via the $3M per year in general funds appropriation as distributed by Northern Arizona University, as well as the $2M per year in tobacco tax funding received from the Arizona Department of Health Services. These include publication in leading scientific journals such as American Journal of Human Genetics, Cell, Nature Communications, Journal of Neuroscience, Clinical Cancer Research, Clinical Infectious Disease, JAMA Neurology, Lancet, MBio, Neurology, New England Journal of Medicine, and Science Translational Medicine.

Our annual Scientific Retreat brought together nearly 150 registrants from within TGen, including faculty, lab personnel and administrators. This annual event alters yearly between a format that includes a great number our collaborators and a closed, internal meeting focused solely on TGen.

1. Differential Response of Glioma Stem Cells to Arsenic Trioxide Therapy Is Regulated by MNK1 and mRNA Translation. Bell JB, Eckerdt F, Dhruv HD, Finlay D, Peng S, Kim S, Kroczynska B, Beauchamp EM, Alley K, Clymer J, Goldman S, Cheng SY, James CD, Nakano I, Horbinski C, Mazar AP, Vuori K, Kumthekar P, Raizer J, **Berens ME**, Platanias LC. *Mol Cancer Res.* 2018 Jan;16(1):32-46.

2. Tumor-Treating Fields: A Fourth Modality in Cancer Treatment. Mun EJ, Babiker HM, Weinberg U, Kirson ED, **Von Hoff DD**. *Clin Cancer Res.* 2018 Jan 15;24(2):266-275.

3. Identification of satellite cells from anole lizard skeletal muscle and demonstration of expanded musculoskeletal potential. Palade J, Djordjevic D, **Hutchins ED**, George RM, Cornelius JA, Rawls A, Ho JWK, Kusumi K, Wilson-Rawls J. *Dev Biol.* 2018 Jan 15;433(2):344-356.

4. Dating the *Cryptococcus gattii* Dispersal to the North American Pacific Northwest. Chandler C. Roe, **Jolene Bowers**, Hanna Oltean, Emilio DeBess, Philippe J. Dufresne, Scott McBurney, David P. Overy, Bodo Wanke, Colleen Lysen, Tom Chiller, Wieland Meyer, George R. Thompson III, Shawn R. Lockhart, Crystal M. Hepp, **David M. Engelthaler**. 10.1128/*mSphere*.00499-17, Jan. 17, 2018.

5. Prospective Feasibility Trial for Genomics-Informed Treatment in Recurrent and Progressive Glioblastoma. **Byron SA**, Tran NL, **Halperin RF**, Phillips JJ, Kuhn JG, de Groot JF, Colman H, Ligon KL, Wen PY, Cloughesy TF, Mellinghoff IK, Butowski NA, Taylor JW, Clarke JL, Chang SM, Berger MS, Molinaro AM, Maggiora GM, Peng S, Nasser S, **Liang WS**, **Trent JM**, **Berens ME**, Carpten JD, Craig DW, Prados MD. *Clin Cancer Res.* 2018 Jan 15;24(2):295-305.

6. De Novo Missense Mutations in DHX30 Impair Global Translation and Cause a Neurodevelopmental Disorder. Lessel D, Schob C, Küry S, Reijnders MRF, Harel T, Eldomery MK, Coban-Akdemir Z, Denecke J, Edvardson S, Colin E, Stegmann APA, Gerkes EH, Tessarech M, Bonneau D, Barth M, Besnard T, Cogné B, Revah-Politi A, Strom TM, Rosenfeld JA, Yang Y, Posey JE, Immken L, Oundjian N, Helbig KL, Meeks N, Zegar K, Morton J, The Ddd Study, Schieving JH, Claasen A, **Huentelman M**, **Narayanan V**, **Ramsey K**; C4RCD Research Group, Brunner HG, Elpeleg O, Mercier S, Bézieau S, Kubisch C, Kleefstra T, Kindler S, Lupski JR, Kreienkamp HJ. *Am J Hum Genet.* 2018 Jan 4;102(1):196.

7. Identification of Driver Mutations in Rare Cancers: The Role of SMARCA4 in Small Cell Carcinoma of the Ovary, Hypercalcemic Type (SCCOHT). **Lang JD**, **Hendricks WPD**. *Methods Mol Biol*. February 9, 2018;1706:367-379.

8. RNA Interference to Knock Down Gene Expression. **Han H**. *Methods Mol Biol*. Feb. 9, 2018;1706:293-302.

9. Whole Exome Library Construction for Next Generation Sequencing. **Liang WS**, Stephenson K, Adkins J, Christofferson A, Helland A, Cuyugan L, **Keats JJ**. *Methods Mol Biol*. Feb. 9, 2018;1706:163-174.

10. Development of Targeted Therapies Based on Gene Modification. Benson TM, Leti F, **DiStefano JK**. *Methods Mol Biol*. Feb. 9, 2018;1706:39-51.

11. Females have the survival advantage in glioblastoma. Ostrom QT, Rubin JB, Lathia JD, **Berens ME**, Barnholtz-Sloan JS. *Neuro Oncol*. 2018 Mar 27;20(4):576-577.

12. Comparison of phasing strategies for whole human genomes. Choi Y, Chan AP, Kirkness E, Telenti A, **Schork NJ**. *PLoS Genet*. 2018 Apr 5;14(4):e1007308.

13. Ponatinib Shows Potent Antitumor Activity in Small Cell Carcinoma of the Ovary Hypercalcemic Type (SCCOHT) through Multikinase Inhibition. **Lang JD**, **Hendricks WPD**, Orlando KA, Yin H, Kiefer J, **Ramos P**, Sharma R, **Pirrotte P**, Raupach EA, Sereduk C, Tang N, **Liang WS**, Washington M, Facista SJ, Zismann VL, Cousins EM, Major MB, Wang Y, Karnezis AN, **Sekulic A**, Hass R, Vanderhyden BC, Nair P, Weissman BE, Huntsman DG, **Trent JM**. *Clin Cancer Res*. 2018 Apr 15;24(8):1932-1943.

14. Evaluation of pre-analytical factors affecting plasma DNA analysis. Markus H, Contente-Cuomo T, Farooq M, **Liang WS**, Borad MJ, Sivakumar S, Gollins S, Tran NL, **Dhruv HD**, **Berens ME**, Bryce A, **Sekulic A**, Ribas A, **Trent JM**, LoRusso PM, **Murtaza M**. *Sci Rep*. 2018 May 9;8(1):7375.

15. Associations of MAP2K3 Gene Variants With Superior Memory in SuperAgers. **Huentelman MJ**, **Piras IS**, Siniard AL, De Both MD, Richholt RF, Balak CD, Jamshidi P, Bigio EH, Weintraub S, Loyer ET, Mesulam M-M, Geula C, Rogalski EJ*, The Alzheimer's Disease Neuroimaging Initiative. *Front Aging Neurosci*. 2018; 10: 155. Published online 2018 May 29.

16. Personalized medicine: motivation, challenges, and progress. Goetz LH, **Schork NJ**. *Fertil Steril*. 2018 Jun;109(6):952-963.

17. Plasma Circulating Extracellular RNAs in Left Ventricular Remodeling Post-Myocardial Infarction. Danielson KM, Shah R, Yeri A, Liu X, Camacho Garcia F, Silverman M, Tanriverdi K, Das A, Xiao C, Jerosch-Herold M, Heydari B, Abbasi S, **Van Keuren-Jensen K**, Freedman JE, Wang YE, Rosenzweig A, Kwong RY, Das S. *EBioMedicine*. 2018 Jun;32:172-181.

18. Transcriptomic Profiling of Obesity-Related Nonalcoholic Steatohepatitis Reveals a Core Set of Fibrosis-Specific Genes. Gerhard GS, Legendre C, Still CD, Chu X, Petrick A, **DiStefano JK**. *J Endocr Soc*. 2018 Jun 5;2(7):710-726.

19. Network Rewiring in Cancer: Applications to Melanoma Cell Lines and the Cancer Genome Atlas Patients. Ding KF, Finlay D, Yin H, **Hendricks WPD**, Sereduk C, Kiefer J, **Sekulic A**, LoRusso PM, Vuori K, **Trent JM**, **Schork NJ**. *Front Genet*. 2018 Jul 10;9:228.

20. Multiscale Analysis of Independent Alzheimer's Cohorts Finds Disruption of Molecular, Genetic, and Clinical Networks by Human Herpesvirus. Readhead B, Haure-Mirande JV, Funk CC, Richards MA, Shannon P, Haroutunian V, Sano M, **Liang WS**, Beckmann ND, Price ND, **Reiman EM**, Schadt EE, Ehrlich ME, Gandy S, Dudley JT. *Neuron*. 2018 Jul 11; 99(1):64-82.

21. Finding useful biomarkers for Parkinson's disease. Chen-Plotkin AS, Albin R, Alcalay R, Babcock D, Bajaj V, Bowman D, Buko A, Cedarbaum J, Chelsky D, Cookson MR, Dawson TM, Dewey R, Foroud T, Frasier M, German D, Gwinn K, Huang X, Kopil C, Kremer T, Lasch S, Marek K, Marto JA, Merchant K, Mollenhauer B, Naito A, Potashkin J, Reimer A, Rosenthal LS, Saunders-Pullman R, Scherzer CR, Sherer T, Singleton A, Sutherland M, Thiele I, van der Brug M, **Van Keuren-Jensen K**, Vaillancourt D, Walt D, West A, Zhang J.*Sci Transl Med*. 2018 Aug 15;10(454).

22. Transcriptomic and morphophysiological evidence for a specialized human cortical GABAergic cell type. Boldog E, Bakken TE, Hodge RD, Novotny M, Aevermann BD, Baka J, Bordé S, Close JL, Diez-Fuertes F, Ding SL, Faragó N, Kocsis ÁK, Kovács B, Maltzer Z, McCorrison JM, Miller JA, Molnár G, Oláh G, Ozsvár A, Rózsa M, Shehata SI, Smith KA, Sunkin SM, Tran DN, Venepally P, Wall A, Puskás LG, Barzó P, Steemers FJ, **Schork NJ**, Scheuermann RH, Lasken RS, Lein ES, Tamás G. *Nat Neurosci*. 2018 Sep;21(9):1185-1195.

23. Genetic risks and clinical rewards. Schork AJ, Schork MA, **Schork NJ**. *Nat Genet*. 2018 Sep;50(9):1210-1211.

24. Comprehensive multi-center assessment of small RNA-seq methods for quantitative miRNA profiling. Giraldez MD, Spengler RM, Etheridge A, Godoy PM, Barczak AJ, Srinivasan S, De Hoff PL, Tanriverdi K, Courtright A, Lu S, Khoory J, Rubio R, Baxter D, Driedonks TAP, Buermans HPJ, Nolte-'t Hoen ENM, Jiang H, Wang K, Ghiran I, Wang YE, **Van Keuren-Jensen K**, Freedman JE, Woodruff PG, Laurent LC, Erle DJ, Galas DJ, Tewari M. *Nat Biotechnol.* 2018 Sep;36(8):746-757.

25. Phylogenetic analysis of West Nile Virus in Maricopa County, Arizona: Evidence for dynamic behavior of strains in two major lineages in the American Southwest. Hepp CM, Cocking JH, Valentine M, Young SJ, Damian D, Samuels-Crow KE, Sheridan K, Fofanov VY, Furstenau TN, Busch JD, Erickson DE, Lancione RC, Smith K, Will J, Townsend J, **Keim PS**, **Engelthaler DM**. *PLoS One*. 2018 Nov 26;13(11):e0205801.

26. Short-term safety of mTOR inhibitors in infants and very young children with tuberous sclerosis complex (TSC): Multicentre clinical experience. Krueger DA, Capal JK, Curatolo P, Devinsky O, Ess K, Tzadok M, Koenig MK, **Narayanan V**, Ramos F, Jozwiak S, de Vries P, Jansen AC, Wong M, Mowat D, Lawson J, Bruns S, Franz DN; TSCure Research Group. *Eur J Paediatr Neurol.* 2018 Nov;22(6):1066-1073.

27. RNA-seq of newly diagnosed patients in the PADIMAC study leads to a bortezomib/lenalidomide decision signature. Chapman MA, Sive J, Ambrose J, Roddie C, Counsell N, Lach A, Abbasian M, Popat R, Cavenagh JD, Oakervee H, Streetly MJ, Schey S, Koh M, Willis F, Virchis AE, Crowe J, Quinn MF, Cook G, Crawley CR, Pratt G, Cook M, Braganza N, Adedayo T, Smith P, Clifton-Hadley L, Owen RG, Sonneveld P, **Keats JJ**, Herrero J, Yong K. *Blood.* 2018 Nov 15;132(20):2154-2165.

28. Report: NIA workshop on translating genetic variants associated with longevity into drug targets. **Schork NJ**, Raghavachari N; Workshop Speakers and Participants. *Geroscience.* 2018 Dec;40(5-6):523-538.

29. Single cell dissection of plasma cell heterogeneity in symptomatic and asymptomatic myeloma. Ledergor G, Weiner A, Zada M, Wang SY, Cohen YC, Gatt ME, Snir N, Magen H, Koren-Michowitz M, Herzog-Tzarfati K, Keren-Shaul H, Bornstein C, Rotkopf R, Yofe I, David E, Yellapantula V, Kay S, Salai M, Ben Yehuda D, Nagler A, Shvidel L, Orr-Urtreger A, Halpern KB, Itzkovitz S, Landgren O, San-Miguel J, Paiva B, **Keats JJ**, Papaemmanuil E, Avivi I, Barbash GI, Tanay A, Amit I. *Nat Med.* 2018 Dec;24(12):1867-1876.

30. Bcl-2 inhibitors enhance FGFR inhibitor-induced mitochondrial-dependent cell death in FGFR2 mutant endometrial cancer. Packer LM, Stehbens SJ, Bonazzi VF, Gunter J, Ju RJ, Ward M, Gartside M, **Byron S**, Pollock PM. *Mol Oncol.* 2018 Dec 8.

31. Targeting nuclear β-catenin as therapy for post-myeloproliferative neoplasm secondary AML. Saenz DT, Fiskus W, Manshouri T, Mill CP, Qian Y, Raina K, Rajapakshe K, Coarfa C, Soldi R, Bose P, Borthakur G, Kadia TM, Khoury JD, Masarova L, Nowak AJ, Sun B, Saenz DN, Kornblau SM, Horrigan S, **Sharma S**, Qiu P, Crews CM, Verstovsek S, Bhalla KN. *Leukemia.* 2018 Dec 21.

Presentations

University of Arizona College of Pharmacy, Drug Discovery and Development Symposium
Phoenix, AZ — January 2018
Development of Inhibitors of Beta Catenin for the Treatment of Cancer and Lung Disease.
Dr. Sunil Sharma

2018 Rachmiel Levine-Arthur Riggs Diabetes Research Symposium
Pasadena, CA — January 2018
Development Of Reversible Inhibitors Of Lysine Specific Demethylase-1 (LSD1) For Treatment Of Cancer.
Dr. Sunil Sharma

Arizona State University, Center for Evolution and Medicine Seminar Series
Tempe, AZ — February 15, 2018
Single Cell RNA Sequencing Uncovers Molecular Mechanisms Associated With Treatment Response In A Mouse Model Of Multiple Myeloma.
Dr. Nicholas Banovich

NIH Accelerating Medicines Partnership (AMP) Parkinson's Disease Workshop
Washington, DC — March 2018
RNASeq and transcriptomic analysis in PD
Dr. Kendall Jensen

2nd Pediatric Precision Oncology Conference
Scottsdale, AZ — March 4, 2018
LSD1 Inhibitor SP-2509 Promotes Transcriptional Reprogramming And Impairs Growth Of High-Risk Neuroblastoma Cells.
Dr. Mohan Kaadige

2nd Pediatric Precision Oncology Conference
Scottsdale, AZ — March 8, 2018
Genomic and Transcriptomic Landscapes of Pediatric Cancers in the BCC Consortium.
Dr. William Hendricks

City of Hope Argyros Research Forum
Duarte, CA — March 15, 2018
Proteomics and Beyond.
Dr. Patrick Pirrotte

University of Minnesota, Masonic Cancer Center
Minneapolis, MN — April 1, 2018
Development Of Reversible Inhibitors Of Lysine Specific Demethylase-1 (LSD1) For Treatment Of Cancer.
Dr. Sunil Sharma

University of Minnesota, Academic Health Center
Duluth, MN — April 1, 2018
Development Of Reversible Inhibitors Of Lysine Specific Demethylase-1 (LSD1) For Treatment Of Cancer.
Dr. Sunil Sharma

Bioscience Roadmap Annual Meeting
Flagstaff, AZ - April 10, 2018
One Health Genomics
Dr. David Engelthaler

Arizona Osteopathic Medical Association Annual Meeting
Scottsdale, AZ — April 11, 2018
Mastering the Practice of Precision Medicine.
Dr. Michael Berens

2018 AACR Annual Meeting
Chicago, IL — April 14, 2018
Single cell RNA sequencing of pancreatic ductal adenocarcinoma reveals tumor heterogeneity.
Dr. Haiyong Han

2018 AACR Annual Meeting
Chicago, IL — April 16, 2018
Discovery Of ENPP1 Inhibitors As Agonists Of STING Pathway.
Dr. Sunil Sharma

Baylor Scott & White, Best Science Breakfast
Dallas, TX — April 19, 2018
Genomic Insights Into Tumor Immune Interactions: Examples In Melanoma And Opportunities In Post Transplant Skin Cancers.
Dr. Rebecca Halperin

Michael J. Fox Foundation
New York, NY — April 25, 2018
Pre-analytical extracellular vesicle enrichment for increased reliability for alpha-synuclein detection in plasma and CSF.
Dr. Kendall Jensen

38th Annual Advance of the Research Staff Organization, UCLA Conference Center
Lake Arrowhead, CA — April 30, 2018
The Human Microbiome in Health and Disease: An Overview.
Dr. Sarah Highlander

Arizona Alzheimer's Consortium Annual Conference
Phoenix, AZ - May 17, 2018
A public cell-specific Alzheimer's & aging brain resource: Evaluation & implementation of single cell transcriptomic analyses
Dr. Winnie Liang

Banner-Good Samaritan Grand Rounds
Phoenix, AZ - May 18, 2018
The Next Generation of Infectious Disease Sciences
Dr. David Engelthaler

66th ASMS Conference on Mass Spectrometry and Allied Topics
San Diego, CA, June 3, 2108
Measuring Human Exposure to Glyphosate Using a Rapid Urinary LC-MS/MS Assay.
Dr. Patrick Pirrotte

City of Hope Precision Medicine Symposium
Duarte, CA - June 13, 2018
TGen Clinical Microbiome Service Center
Dr. Sarah Highlander

City of Hope Argyros Research Forum
Duarte, CA - June 21, 2018
A Brief History of TB at TGen
Dr. David Engelthaler

International Society for Human and Animal Mycology
Amsterdam, The Netherlands - July 2, 2018
Viewing species complexes through a phylogenomic lens: the Curious Case of Cryptococcus
Dr. David Engelthaler

International Society for Computational Biology 2018
Chicago, Illinois — July 10, 2018
Joint Analysis Of Low And High Tumor Content Samples From The Same Patient Improves Somatic Variant Calling In Tumor-Only Samples.
Dr. Rebecca Halperin

Best of ASCO 2018
San Diego, CA — July 14, 2018
Non Colorectal GI Cancers.
Dr. Sunil Sharma

International Mycology Congress
San Juan, Puerto Rico — July 21, 2018
Global Phylogenomics to Understand Fungal Species.
Dr. David Engelthaler

TSC World Conference
Dallas, TX — July 26, 2018
TSC Project Updates, TSC Clinic Directors Meeting
Dr. Vinodh Narayanan

Mayo Clinic Grand Rounds - Mayo Hospital
Phoenix, AZ — August 3, 2018
Applying The Next Generation of Infectious Disease Sciences.
Dr. David Engelthaler

Arizona Biosafety Alliance Annual Meeting
Flagstaff, AZ — August 17, 2018
The Human Microbiome in Health and Disease: Approaches & Examples.
Dr. Sarah Highlander

Association of Community Cancer Centers (ACCC)
Phoenix, AZ — August 18, 2018
Oncology Drug Development: First in Human Clinical Trials.
Dr. Derek Cridebring

The Biomarkers and Biogenesis of Extracellular Vesicles Workshop
Padova, Italy — August 30, 2018
Analysis Of Extracellular Rnas For Monitoring Disease And Injuries Of The Central Nervous System.
Dr. Kendall Jensen

SU2C Mini Summit
Philadelphia, PA — August 30, 2018
SU2C DT Review - Reprogramming Transcriptional Circuitry To Control Pancreatic Cancer.
Dr. Daniel Von Hoff

Arizona Wellbeing Commons
Phoenix, AZ — September 7, 2018
Use Of Brain Homogenate RNA Expression Data To Identify Novel Cell-Type Specific Alterations In Alzheimer's Disease.
Dr. Ignazio Piras

SRM University
Tamilnadu, India - September 12, 2018
Whole Exome Sequencing in the Diagnosis of Early Infantile Epileptic Encephalopathy: The Path from Gene Discovery to Therapy
Dr. Sampath Rangasamy

3rd Annual AZ ALS Symposium
Flagstaff, AZ — September 16, 2018
Single Cell Approaches & Alternative Treatments In ALS.
Dr. Winnie Liang

Baylor, Scott and White Sammons Cancer Center
Dallas, TX — September 20, 2018
The Human Microbiome in Health and Cancer: Approaches & Examples
Dr. Sarah Highlander

Pancreatic Cancer: Advances in Science and Clinical Care
Boston, Massachusetts — Sept. 21-24, 2018
The Beta-Blocker Propranolol As A Supportive Care Option In A Mouse Model Of Pancreatic Cancer.
Dr. Haiyong Han

Pancreatic Cancer: Advances in Science and Clinical Care
Boston, Massachusetts — Sept. 21-24, 2018
Modulation Of Tumor Microenvironment By Nab-Paclitaxel Plus Gemcitabine Plus Cisplatin Chemotherapy In The KPC Transgenic Mouse Model.
Dr. Haiyong Han

Pancreatic Cancer: Advances in Science and Clinical Care
Boston, Massachusetts — Sept. 21-24, 2018
Superct, A Supervised Machine Learning Method To Characterize Cell Types And States Within Solid Tumor Tissues.
Dr. Haiyong Han

Beat Childhood Cancer Consortium Annual Principal Investigator Meeting
Grand Rapids, MI - September 30, 2018
Genomic Landscapes of Relapsed and Refractory Pediatric Cancers in the BCC Consortium.
Dr. William Hendricks

17th Human Proteome Organization (HuPO) World Congress
Orlando, FL - October 3, 2018
The design and implementation of integrated personalized trials
Dr. Nicholas Schork

World Congress of Psychiatric Genetics
Glasgow, UK - October 10, 2018
Identification Of Peripheral Biomarkers In Schizophrenia: A Meta-Analysis Of Microarray Gene-Expression Datasets.
Dr. Ignazio Piras

American Society of Human Genetics
San Diego, CA - October 10, 2018
Differentially Methylated Loci In NAFLD Cirrhosis Are Associated With Key Signaling Pathways.
Dr. Johanna DiStefano

2017 AACR-NCI-EORTC International Conference on Molecular Targets and Cancer Therapeutics
Philadelphia, PA — October 26, 2018
Super-Enhancer Signatures Of Pancreatic Ductal Adenocarcinoma And Associated Fibroblasts.
Dr. Haiyong Han

Baylor, Scott, & White/TGen Retreat
Dallas, TX - November 3, 2018
The Human Microbiome: in Health and Cancer: The Good, the Bad and the Ugly
Dr. Sarah Highlander

Society For Neuroscience 2018
San Diego, CA — November 3, 2018
Use Of Brain Homogenate RNA Expression Data To Identify Novel Cell-Type Specific Alterations In Alzheimer's Disease.
Dr. Ignazio Piras

Society for Neuroscience 2018 Annual Meeting
San Diego, CA — November 7, 2018
Characterization Of Mammalian Target Of Rapamycin (Mtor) Pathway Alterations In Rett Syndrome Mice Model.
Dr. Sampath Rangasamy

SITC Rapid Oral Abstract Presentation Session
Washington, DC - November 10, 2018
Initial results from a phase 1a/b study of Etigilimab (OMP-313M32), an anti-T cell immunoreceptor with Ig and ITIM domains (TIGIT) antibody, in advanced solid tumors
Dr. Sunil Sharma

PAWS for a Cure, Merck Research Labs
Boston, MA - November 11, 2018
The Role of HER2 Mutations in Canine Lung Cancer: Translating a Genomic Discovery into a Clinical Trial
Dr. William Hendricks

City of Hope Argyros Research Forum
Duarte, CA - November 15, 2018
The Human Microbiome and Health
Dr. Sarah Highlander

2018 TGen Scientific Retreat
Tucson, AZ - November 28, 2018
Next generation clinical research paradigm
Dr. Sunil Sharma

2018 TGen Scientific Retreat
Tucson, AZ - November 28, 2018
Spotlight on the Microbiome and Diabetes
Dr. Sarah Highlander

City of Hope Young PI Meeting, Lightning Talk
Monterey Bay, CA - December 13, 2018
Barking up the right tree
Dr. William Hendricks

MIT Media Lab Symposium on Personalized Medicine
Monterey Bay, CA - December 13, 2018
Dr. Nicholas Schork

City of Hope Argyros Research Forum
Duarte, CA - December 20, 2018
Multi-omic approaches to profiling individual variability in metabolic disease
Dr. Johanna DiStefano

Full-time positions filled (new and replacements) included:

In 2018, 45 new full-time equivalent positions were created with salaries and benefits totaling $2,611,985. Salaries for temporary positions (those positions created for a finite period of time) totaled $310,539, which includes temporary TGen staff and temporary service fees. Student salaries were just over $403,600, bringing the overall 2018 total to $3,321,124.

In terms of education level, eighty-nine percent of full-time TGen staff holds a college degree and fifty-three percent holds an advanced degree.

2018 full-time positions filled (new and replacements) included:

- Administrative Assistant
- Bioinformatician
- Bioinformatician, Associate
- Desktop Support Specialist
- Engineer, DevOps
- Engineer, Sr HPC
- Genetic Counselor/Clinical Research Coordinator
- Liaison, Executive Outreach and Development
- Manager, Accounting
- Manager, Operations & Conflicts of Interest
- Manager, Sr Project
- Attorney
- Post-Doc Fellow
- Professor
- Professor, Research
- Purchasing Assistant
- Research Associate
- Research Associate II
- Research Associate III
- Research Technician
- Science Writer
- Staff Scientist
- Vice President, Scientific Computing

Appendix A

Appendix A - Publications

1. Differential Response of Glioma Stem Cells to Arsenic Trioxide Therapy Is Regulated by MNK1 and mRNA Translation. Bell JB, Eckerdt F, **Dhruv HD**, Finlay D, **Peng S**, Kim S, Kroczynska B, Beauchamp EM, Alley K, Clymer J, Goldman S, Cheng SY, James CD, Nakano I, Horbinski C, Mazar AP, Vuori K, Kumthekar P, Raizer J, **Berens ME**, Platanias LC. *Mol Cancer Res*. 2018 Jan;16(1):32-46.

2. Tumor-Treating Fields: A Fourth Modality in Cancer Treatment. Mun EJ, Babiker HM, Weinberg U, Kirson ED, **Von Hoff DD**. *Clin Cancer Res*. 2018 Jan 15;24(2):266-275.

3. Identification of satellite cells from anole lizard skeletal muscle and demonstration of expanded musculoskeletal potential. Palade J, Djordjevic D, **Hutchins ED**, George RM, Cornelius JA, Rawls A, Ho JWK, Kusumi K, Wilson-Rawls J., Dev Biol. 2018 Jan 15;433(2):344-356.

4. Dating the *Cryptococcus gattii* Dispersal to the North American Pacific Northwest. Roe CC, **Bowers J**, Oltean H, DeBess E, Dufresne PJ, McBurney S, Overy DP, Wanke B, Lysen C, Chiller T, Meyer W, Thompson III GR, Lockhart SR, Hepp CM, **Engelthaler DM**. 10.1128/*mSphere*.00499-17, Jan. 17, 2018.

5. Phase 1 trials of PEGylated recombinant human hyaluronidase PH20 in patients with advanced solid tumours. Infante JR, Korn RL, Rosen LS, LoRusso P, Dychter SS, Zhu J, Maneval DC, Jiang P, Shepard HM, Frost G, **Von Hoff DD**, Borad MJ, Ramanathan RK. *Br J Cancer*. 2018 Jan;118(2):153-161.

6. Prospective Feasibility Trial for Genomics-Informed Treatment in Recurrent and Progressive Glioblastoma. **Byron SA**, Tran NL, **Halperin RF**, Phillips JJ, Kuhn JG, de Groot JF, Colman H, Ligon KL, Wen PY, Cloughesy TF, Mellinghoff IK, Butowski NA, Taylor JW, Clarke JL, Chang SM, Berger MS, Molinaro AM, Maggiora GM, Peng S, Nasser S, **Liang WS**, **Trent JM**, **Berens ME**, Carpten JD, Craig DW, Prados MD. *Clin Cancer Res*. 2018 Jan 15;24(2):295-305.

7. Reversible LSD1 inhibition with HCI-2509 induces the p53 gene expression signature and disrupts the MYCN signature in high-risk neuroblastoma cells. Gupta S, Doyle K, Mosbruger TL, Butterfield A, Weston A, Ast A, **Kaadige M**, Verma A, **Sharma S**. *Oncotarget*. 2018 Jan 6;9(11):9907-9924.

8. African Lineage Brucella melitensis Isolates from Omani Livestock. Foster JT, Walker FM, Rannals BD, Hussain MH, Drees KP, Tiller RV, Hoffmaster AR, Al-Rawahi A, **Keim P**, Saqib M. *Front Microbiol*. 2018 Jan 15;8:2702.

9. Recommendations of the Global Multiple System Atrophy Research Roadmap Meeting. Walsh RR, Krismer F, Galpern WR, Wenning GK, Low PA, Halliday G, Koroshetz WJ, Holton J, Quinn NP, Rascol O, Shaw LM, Eidelberg D, Bower P, Cummings JL, Abler V, Biedenharn J, Bitan G, Brooks DJ, Brundin P, Fernandez H, Fortier P, Freeman R, Gasser T, Hewitt A, Höglinger GU, **Huentelman MJ**, Jensen PH, Jeromin A, Kang UJ, Kaufmann H, Kellerman L, Khurana V, Klockgether T, Kim WS, Langer C, LeWitt P, Masliah E, Meissner W, Melki R, Ostrowitzki S, Piantadosi S, Poewe W, Robertson D, Roemer C, Schenk D, Schlossmacher M, Schmahmann JD, Seppi K, Shih L, Siderowf A, Stebbins GT, Stefanova N, Tsuji S, Sutton S, Zhang J. *Neurology*. 2018 Jan 9;90(2):74-82.

10. De Novo Missense Mutations in DHX30 Impair Global Translation and Cause a Neurodevelopmental Disorder. Lessel D, Schob C, Küry S, Reijnders MRF, Harel T, Eldomery MK, Coban-Akdemir Z, Denecke J, Edvardson S, Colin E, Stegmann APA, Gerkes EH, Tessarech M, Bonneau D, Barth M, Besnard T, Cogné B, Revah-Politi A, Strom TM, Rosenfeld JA, Yang Y, Posey JE, Immken L, Oundjian N, Helbig KL, Meeks N, Zegar K, Morton J, The Ddd Study, Schieving JH, Claasen A, **Huentelman M**, **Narayanan V**, **Ramsey K**; C4RCD Research Group, Brunner HG, Elpeleg O, Mercier S, Bézieau S, Kubisch C, Kleefstra T, Kindler S, Lupski JR, Kreienkamp HJ. *Am J Hum Genet*. 2018 Jan 4;102(1):196.

11. Phase I dose escalation study of NMS-1286937, an orally available Polo-Like Kinase 1 inhibitor, in patients with advanced or metastatic solid tumors. Weiss GJ, Jameson G, **Von Hoff DD**, Valsasina B, Davite C, Di Giulio C, Fiorentini F, Alzani R, Carpinelli P, Di Sanzo A, Galvani A, Isacchi A, Ramanathan RK. *Invest New Drugs*. 2018 Feb;36(1):85-95.

12. HSF1 Is Essential for Myeloma Cell Survival and A Promising Therapeutic Target. Fok JHL, Hedayat S, Zhang L, Aronson LI, Mirabella F, Pawlyn C, Bright MD, Wardell CP, **Keats JJ**, De Billy E, Rye CS, Chessum NEA, Jones K, Morgan GJ, Eccles SA, Workman P, Davies FE. *Clin Cancer Res*. 2018 Feb 1.

13. Identification of Driver Mutations in Rare Cancers: The Role of SMARCA4 in Small Cell Carcinoma of the Ovary, Hypercalcemic Type (SCCOHT). **Lang JD**, **Hendricks WPD**. *Methods Mol Biol*. February 9, 2018;1706:367-379.

14. RNA Interference to Knock Down Gene Expression. **Han H**. *Methods Mol Biol*. Feb. 9, 2018;1706:293-302.

15. Whole Exome Library Construction for Next Generation Sequencing. **Liang WS**, Stephenson K, **Adkins J**, Christofferson A, **Helland A**, **Cuyugan L**, **Keats JJ**. *Methods Mol Biol*. Feb. 9, 2018;1706:163-174.

16. Whole Genome Library Construction for Next Generation Sequencing. **Keats JJ**, **Cuyugan L**, **Adkins J**, **Liang WS**. *Methods Mol Biol*. Feb. 9, 2018;1706:151-161.

17. The Emerging Role of Long Noncoding RNAs in Human Disease. **DiStefano JK**. *Methods Mol Biol*. Feb. 9, 2018;1706:91-110.

18. Development of Targeted Therapies Based on Gene Modification. Benson TM, Leti F, **DiStefano JK**. *Methods Mol Biol*. Feb. 9, 2018;1706:39-51.

19. Methods for CpG Methylation Array Profiling Via Bisulfite Conversion. Leti F, Llaci L, Malenica I, **DiStefano JK**. *Methods Mol Biol*. Feb. 9, 2018;1706:233-254.

20. miRNA Quantification Method Using Quantitative Polymerase Chain Reaction in Conjunction with C q Method. Leti F, **DiStefano JK**. *Methods Mol Biol*. Feb. 9, 2018;1706:257-265.

21. Identification of Disease Susceptibility Alleles in the Next Generation Sequencing Era. **DiStefano JK**, Kingsley CB. *Methods Mol Biol*. Feb. 9, 2018;1706:3-16.

22. A recurrent de novo missense mutation in UBTF causes developmental neuroregression. Toro C, Hori RT, Malicdan MCV, Tifft CJ, Goldstein A, Gahl WA, Adams DR, Harper F, Wolfe LA, Xiao J, Khan MM, Tian J, Hope KA, Reiter LT, Tremblay MG, Moss T, Franks AL, **Balak C**; **C4RCD Research Group**, LeDoux MS. *Hum Mol Genet*. 2018 Feb 15;27(4):691-705.

23. Phase I Study of LY2940680, a Smo Antagonist, in Patients with Advanced Cancer Including Treatment-Naïve and Previously Treated Basal Cell Carcinoma. Bendell J, Andre V, Ho A, Kudchadkar R, Migden M, Infante J, Tiu RV, Pitou C, Tucker T, Brail L, **Von Hoff D**. *Clinical Cancer Research*. Epub 2018 Feb 26.

24. Oral Capecitabine Achieves Response in Metastatic Eccrine Carcinoma. Larson K, **Babiker HM**, Kovoor A, Liau J, Eldersveld J, Elquza E. *Case Rep Oncol Med*. 2018 Mar 1;2018

25. Females have the survival advantage in glioblastoma. Ostrom QT, Rubin JB, Lathia JD, **Berens ME**, Barnholtz-Sloan JS. *Neuro Oncol*. 2018 Mar 27;20(4):576-577.

26. When the Ends Are Really the Beginnings: Targeting Telomerase for Treatment of GBM. Bollam SR, **Berens ME**, **Dhruv HD**. *Curr Neurol Neurosci Rep*. 2018 Mar 10;18(4):15.

27. Complete Genome Sequence of the Environmental Burkholderia pseudomallei Sequence Type 131 Isolate MSHR1435, Associated with a Chronic Melioidosis Infection. Sahl JW, Mayo M, Price EP, Sarovich DS, Kaestli M, Pearson T, Williamson CHD, Nottingham R, Sheridan K, Wagner DM, Currie BJ, **Keim P**. *Genome Announc*. 2018 Mar 15;6(11).

28. Summarizing performance for genome scale measurement of miRNA: reference samples and metrics. Pine PS, Lund SP, Parsons JR, Vang LK, Mahabal AA, Cinquini L, Kelly SC, Kincaid H, Crichton DJ, Spira A, Liu G, Gower AC, Pass HI, Goparaju C, Dubinett SM, Krysan K, Stass SA, Kukuruga D, **Van Keuren-Jensen K**, Courtright-Lim A, Thompson KL, Rosenzweig BA, Sorbara L, Srivastava S, Salit ML. *BMC Genomics*. 2018 Mar 6;19(1):180.

29. A Bayesian approach to determine the composition of heterogeneous cancer tissue. Katiyar A, Mohanty A, Hua J, Chao S, Lopes R, Datta A, **Bittner ML**. *BMC Bioinformatics*. 2018 Mar 21;19(Suppl 3):90.

30. Comparison of phasing strategies for whole human genomes. Choi Y, Chan AP, Kirkness E, Telenti A, **Schork NJ**. *PLoS Genet*. 2018 Apr 5;14(4):e1007308.

31. Ponatinib Shows Potent Antitumor Activity in Small Cell Carcinoma of the Ovary Hypercalcemic Type (SCCOHT) through Multikinase Inhibition. **Lang JD**, **Hendricks WPD**, Orlando KA, Yin H, Kiefer J, **Ramos P**, Sharma R, **Pirrotte P**, Raupach EA, Sereduk C, Tang N, **Liang WS**, Washington M, Facista SJ, Zismann VL, Cousins EM, Major MB, Wang Y, Karnezis AN, **Sekulic A**, Hass R, Vanderhyden BC, Nair P, Weissman BE, Huntsman DG, **Trent JM**. *Clin Cancer Res*. 2018 Apr 15;24(8):1932-1943.

32. CCL20 is up-regulated in non-alcoholic fatty liver disease fibrosis and is produced by hepatic stellate cells in response to fatty acid loading. Chu X, Jin Q, Chen H, Wood GC, Petrick A, Strodel W, Gabrielsen J, Benotti P, Mirshahi T, Carey DJ, Still CD, **DiStefano JK**, Gerhard GS. *J Transl Med*. 2018 Apr 24;16(1):108.

33. Phenotype Classification Using Moment Features of Single-Cell Data. Sima C, Hua J, **Bittner ML**, Kim S, Dougherty ER. *Cancer Inform*. 2018 Apr 23;17:1176935118771701.

34. Evaluation of commercially available small RNASeq library preparation kits using low input RNA. **Yeri A**, **Courtright A**, Danielson K, **Hutchins E**, **Alsop E**, **Carlson E**, **Hsieh M**, Ziegler O, Das A, Shah RV, Rozowsky J, Das S, **Van Keuren-Jensen K**. *BMC Genomics* 19:331.

35. Sex-specific glioma genome-wide association study identifies new risk locus at 3p21.31 in females, and finds sex-differences in risk at 8q24.21. Ostrom QT, Kinnersley B, Wrensch MR, Eckel-Passow JE, Armstrong G, Rice T, Chen Y, Wiencke JK, McCoy LS, Hansen HM, Amos CI, Bernstein JL, Claus EB, Il'yasova D, Johansen C, Lachance DH, Lai RK, Merrell RT, Olson SH, Sadetzki S, Schildkraut JM, Shete S, Rubin JB, Lathia JD, **Berens ME**, Andersson U, Rajaraman P, Chanock SJ, Linet MS, Wang Z, Yeager M; GliomaScan consortium, Houlston RS, Jenkins RB, Melin B, Bondy ML, Barnholtz-Sloan JS. *Sci Rep*. 2018 May 9;8(1):7352.

36. Evaluation of pre-analytical factors affecting plasma DNA analysis. Markus H, Contente-Cuomo T, Farooq M, **Liang WS**, Borad MJ, Sivakumar S, Gollins S, Tran NL, **Dhruv HD**, **Berens ME**, Bryce A, **Sekulic A**, Ribas A, **Trent JM**, LoRusso PM, **Murtaza M**. *Sci Rep*. 2018 May 9;8(1):7375.

37. An anatomic transcriptional atlas of human glioblastoma. Puchalski RB, Shah N, Miller J, Dalley R, Nomura SR, Yoon JG, Smith KA, Lankerovich M, Bertagnolli D, Bickley K, Boe AF, Brouner K, Butler S, Caldejon S, Chapin M, Datta S, Dee N, Desta T, Dolbeare T, Dotson N, Ebbert A, Feng D, Feng X, Fisher M, Gee G, Goldy J, Gourley L, Gregor BW, Gu G, Hejazinia N, Hohmann J, Hothi P, Howard R, Joines K, Kriedberg A, Kuan L, Lau C, Lee F, Lee H, Lemon T, Long F, Mastan N, Mott E, Murthy C, Ngo K, Olson E, Reding M, Riley Z, Rosen D, Sandman D, Shapovalova N, Slaughterbeck CR, Sodt A, Stockdale G, Szafer A, Wakeman W, Wohnoutka PE, White SJ, Marsh D, Rostomily RC, Ng L, Dang C, Jones A, Keogh B, Gittleman HR, Barnholtz-Sloan JS, Cimino PJ, Uppin MS, Keene CD, Farrokhi FR, Lathia JD, **Berens ME**, Iavarone A, Bernard A, Lein E, Phillips JW, Rostad SW, Cobbs C, Hawrylycz MJ, Foltz GD. *Science*. 2018 May 11;360(6389):660-663.

38. Circular RNA expression and regulatory network prediction in posterior cingulate astrocytes in elderly subjects. Sekar S, Cuyugan L, Adkins J, Geiger P, **Liang WS**. *BMC Genomics*. 2018 May 9;19(1):340.

39. Effective discovery of rare variants by pooled target capture sequencing: A comparative analysis with individually indexed target capture sequencing. Ryu S, Han J, Norden-Krichmar TM, **Schork NJ**, Suh Y. *Mutat Res*. 2018 May;809:24-31.

40. The big data revolution and human genetics. **Schork NJ**. *Hum Mol Genet*. 2018 May ;27(R1):R1.

41. Improved Subtyping of Staphylococcus aureus Clonal Complex 8 Strains Based on Whole-Genome Phylogenetic Analysis. **Bowers JR**, Driebe EM, Albrecht V, McDougal LK, Granade M, Roe CC, Lemmer D, Rasheed JK, **Engelthaler DM**, **Keim P**, Limbago BM. *mSphere*. 2018 May 2;3(3).

42. Associations of MAP2K3 Gene Variants With Superior Memory in SuperAgers. **Huentelman MJ**, **Piras IS**, **Siniard AL**, **De Both MD**, **Richholt RF**, **Balak CD**, Jamshidi P, Bigio EH, Weintraub S, Loyer ET, Mesulam MM, Geula C, Rogalski EJ. *Front Aging Neurosci*. 2018 May 29;10:155.

43. Big data collision: the internet of things, wearable devices and genomics in the study of neurological traits and disease. **Talboom JS**, **Huentelman MJ**. *Hum Mol Genet*. 2018 May 1;27(R1):R35-R39.

44. A Recurrent De Novo PACS2 Heterozygous Missense Variant Causes Neonatal-Onset Developmental Epileptic Encephalopathy, Facial Dysmorphism, and Cerebellar Dysgenesis. Olson HE, Jean-Marçais N, Yang E, Heron D, Tatton-Brown K, van der Zwaag PA, Bijlsma EK, Krock BL, Backer E, Kamsteeg EJ, Sinnema M, Reijnders MRF, Bearden D, Begtrup A, Telegrafi A, Lunsing RJ, Burglen L, Lesca G, Cho MT, Smith LA, Sheidley BR, Moufawad El Achkar C, Pearl PL, Poduri A, Skraban CM, Tarpinian J, Nesbitt AI, Fransen van de Putte DE, Ruivenkamp CAL, Rump P, Chatron N, Sabatier I, De Bellescize J, Guibaud L, Sweetser DA, Waxler JL, Wierenga KJ; DDD Study, Donadieu J, **Narayanan V**, **Ramsey KM**; **C4RCD Research Group**, Nava C, Rivière JB, Vitobello A, Tran Mau-Them F, Philippe C, Bruel AL, Duffourd Y, Thomas L, Lelieveld SH, Schuurs-Hoeijmakers J, Brunner HG, Keren B, Thevenon J, Faivre L, Thomas G, Thauvin-Robinet C. *Am J Hum Genet*. 2018 May 3;102(5):995-1007.

45. Breast Cancer Family History and Contralateral Breast Cancer Risk in Young Women: An Update From the Women's Environmental Cancer and Radiation Epidemiology Study. Reiner AS, Sisti J, John EM, Lynch CF, Brooks JD, Mellemkjær L, Boice JD, Knight JA, Concannon P, Capanu M, Tischkowitz M, Robson M, Liang X, Woods M, Conti DV, **Duggan D**, Shore R, Stram DO, Thomas DC, Malone KE, Bernstein L; WECARE Study Collaborative Group, Bernstein JL. *J Clin Oncol*. 2018 May 20;36(15):1513-1520.

46. HSF1 Is Essential for Myeloma Cell Survival and A Promising Therapeutic Target. Fok JHL, Hedayat S, Zhang L, Aronson LI, Mirabella F, Pawlyn C, Bright MD, Wardell CP, **Keats JJ**, De Billy E, Rye CS, Chessum NEA, Jones K, Morgan GJ, Eccles SA, Workman P, Davies FE. *Clin Cancer Res*. 2018 May 15;24(10):2395-2407.

47. Dynamics of multiple resistance mechanisms in plasma DNA during EGFR-targeted therapies in non-small cell lung cancer. Tsui DWY, **Murtaza M**, Wong ASC, Rueda OM, Smith CG, Chandrananda D, Soo RA, Lim HL, Goh BC, Caldas C, Forshew T, Gale D, Liu W, Morris J, Marass F, Eisen T, Chin TM, Rosenfeld N. EMBO Mol Med. 2018 Jun; 10(6). pii: e7945. doi: 10.15252/emmm.201707945.

48. Personalized medicine: motivation, challenges, and progress. Goetz LH, **Schork NJ**. *Fertil Steril*. 2018 Jun;109(6):952-963.

49. Safety, pharmacokinetics, and preliminary efficacy of E6201 in patients with advanced solid tumours, including melanoma: results of a phase 1 study. Tibes R, Borad MJ, Dutcus CE, Reyderman L, Feit K, Eisen A, Verbel DA, **Von Hoff DD**. *Br J Cancer*. 2018 Jun;118(12):1580-1585.

50. Transcriptome response of human skeletal muscle to divergent exercise stimuli. Dickinson JM, D'Lugos AC, Naymik MA, Siniard AL, Wolfe AJ, Curtis DR, **Huentelman MJ**, Carroll CC. *J Appl Physiol (1985)*. 2018 Jun 1;124(6):1529-1540.

51. Influence of a single nucleotide polymorphism (SNP) and DNA hybridization on the drying patterns of micro droplets. Hurth C, **Contente-Cuomo T**, **Murtaza M**, Zenhausern F. *J Nanomed*. 2018 Jun 4, 2:1010.

52. Genomic Dissection of Bipolar Disorder and Schizophrenia, Including 28 Subphenotypes.

53. Bipolar Disorder and Schizophrenia Working Group of the Psychiatric Genomics Consortium. Electronic address: douglas.ruderfer@vanderbilt.edu; Bipolar Disorder and Schizophrenia Working Group of the Psychiatric Genomics Consortium. *Cell*. 2018 Jun 14;173(7):1705-1715.e16.

54. Plasma Circulating Extracellular RNAs in Left Ventricular Remodeling Post-Myocardial Infarction. Danielson KM, Shah R, Yeri A, Liu X, Camacho Garcia F, Silverman M, Tanriverdi K, Das A, Xiao C, Jerosch-Herold M, Heydari B, Abbasi S, **Van Keuren-Jensen K**, Freedman JE, Wang YE, Rosenzweig A, Kwong RY, Das S. *EBioMedicine*. 2018 Jun;32:172-181.

55. The PKC-β selective inhibitor, Enzastaurin, impairs memory in middle-aged rats. **Willeman MN**, Mennenga SE, **Siniard AL**, **Corneveaux JJ**, **De Both M**, Hewitt LT, Tsang CWS, Caselli J, Braden BB, Bimonte-Nelson HA, **Huentelman MJ**. *PLoS One*. 2018 Jun 5;13(6):e0198256.

56. Analysis of shared heritability in common disorders of the brain. Brainstorm Consortium, Anttila V, Bulik-Sullivan B, Finucane HK, Walters RK, Bras J, et. al. *Science*. 2018 Jun 22;360(6395).

57. De novo mutations of the ATP6V1A gene cause developmental encephalopathy with epilepsy. Fassio A, Esposito A, Kato M, Saitsu H, Mei D, Marini C, Conti V, Nakashima M, Okamoto N, Olmez Turker A, Albuz B, Semerci Gündüz CN, Yanagihara K, Belmonte E, Maragliano L, **Ramsey K**, Balak C, Siniard A, **Narayanan V**; **C4RCD Research Group**, Ohba C, Shiina M, Ogata K, Matsumoto N, Benfenati F, Guerrini R. *Brain*. 2018 Jun 1;141(6):1703-1718.

58. Metagenomic Characterization of Antibiotic Resistance Genes in Full-Scale Reclaimed Water Distribution Systems and Corresponding Potable Systems. Garner E, Chen C, Xia K, **Bowers J**, **Engelthaler DM**, McLain J, Edwards MA, Pruden A. *Environ Sci Technol*. 2018 Jun 5;52(11):6113-6125.

59. Novel Common Genetic Susceptibility Loci for Colorectal Cancer. Schmit SL, Edlund CK, Schumacher FR, Gong J, Harrison TA, Huyghe JR, Qu C, Melas M, Van Den Berg DJ, Wang H, Tring S, Plummer SJ, Albanes D, Alonso MH, Amos CI, Anton K, Aragaki AK, Arndt V, Barry EL, Berndt SI, Bezieau S, Bien S, Bloomer A, Boehm J, Boutron-Ruault MC, Brenner H, Brezina S, Buchanan DD, Butterbach K, Caan BJ, Campbell PT, Carlson CS, Castelao JE, Chan AT, Chang-Claude J, Chanock SJ, Cheng I, Cheng YW, Chin LS, Church JM, Church T, Coetzee GA, Cotterchio M, Cruz Correa M, Curtis KR, **Duggan D**, Easton DF, English D, Feskens EJM, Fischer R, FitzGerald LM, Fortini BK, Fritsche LG, Fuchs CS, Gago-Dominguez M, Gala M, Gallinger SJ, Gauderman WJ, Giles GG, Giovannucci EL, Gogarten SM, Gonzalez-Villalpando C, Gonzalez-Villalpando EM, Grady WM, Greenson JK, Gsur A, Gunter M, Haiman CA, Hampe J, Harlid S, Harju JF, Hayes RB, Hofer P, Hoffmeister M, Hopper JL, Huang SC, Huerta JM, Hudson TJ, Hunter DJ, Idos GE, Iwasaki M, Jackson RD, Jacobs EJ, Jee SH, Jenkins MA, Jia WH, Jiao S, Joshi AD, Kolonel LN, Kono S, Kooperberg C, Krogh V, Kuehn T, Küry S, LaCroix A, Laurie CA, Lejbkowicz F, Lemire M, Lenz HJ, Levine D, Li CI, Li L, Lieb W, Lin Y, Lindor NM, Liu YR, Loupakis F, Lu Y, Luh F, Ma J, Mancao C, Manion FJ, Markowitz SD, Martin V, Matsuda K, Matsuo K, McDonnell KJ, McNeil CE, Milne R, Molina AJ, Mukherjee B, Murphy N, Newcomb PA, Offit K, Omichessan H, Palli D, Cotoré JPP, Pérez-Mayoral J, Pharoah PD, Potter JD, Qu C, Raskin L, Rennert G, Rennert HS, Riggs BM, Schafmayer C, Schoen RE, Sellers TA, Seminara D, Severi G, Shi W, Shibata D, Shu XO, Siegel EM, Slattery ML, Southey M, Stadler ZK, Stern MC, Stintzing S, Taverna D, Thibodeau SN, Thomas DC, Trichopoulou A, Tsugane S, Ulrich CM, van Duijnhoven FJB, van Guelpan B, Vijai J, Virtamo J, Weinstein SJ, White E, Win AK, Wolk A, Woods M, Wu AH, Wu K, Xiang YB, Yen Y, Zanke BW, Zeng YX, Zhang B, Zubair N, Kweon SS, Figueiredo JC, Zheng W, Marchand LL, Lindblom A, Moreno V, Peters U, Casey G, Hsu L, Conti DV, Gruber SB. *J Natl Cancer Inst*. 2018 Jun 16.

60. A Guide to Single-Cell Transcriptomics in Adult Rodent Brain: The Medium Spiny Neuron Transcriptome Revisited. Ho H, Both M, Siniard A, Sharma S, Notwell JH, Wallace M, Leone DP, Nguyen A, Zhao E, Lee H, Zwilling D, Thompson KR, Braithwaite SP, **Huentelman M**, Portmann T. *Front Cell Neurosci*. 2018 Jun 15; 12: 159.

61. Efficacy of BGJ398, a Fibroblast Growth Factor Receptor 1-3 Inhibitor, in Patients with Previously Treated Advanced Urothelial Carcinoma with FGFR3 Alterations. Pal SK, Rosenberg JE, Hoffman-Censits JH, Berger R, Quinn DI, Galsky MD, Wolf J, Dittrich C, Keam B, Delord JP, Schellens JHM, Gravis G, Medioni J, Maroto P, Sriuranpong V, Charoentum C, Burris HA, Grünwald V, Petrylak D, Vaishampayan U, Gez E, De Giorgi U, Lee JL, Voortman J, Gupta S, **Sharma S**, Mortazavi A, Vaughn DJ, Isaacs R, Parker K, Chen X, Yu K, Porter D, Graus Porta D, Bajorin DF. *Cancer Discov*. 2018 Jul; 8(7): 812-821.

62. Predictors of adverse psychological experiences surrounding genome-wide profiling for disease risk. Broady KM, Ormond KE, Topol EJ, **Schork NJ**, Bloss CS. *J Community Genet*. 2018 Jul;9(3):217-225.

63. Pixantrone: novel mode of action and clinical readouts. Minotti G, **Han H**, Cattan V, Egorov A, Bertoni F. *Expert Rev Hematol*. 2018 Jul; 11(7): 587-596.

64. Anal Carcinoma, Version 2.2018, NCCN Clinical Practice Guidelines in Oncology. Benson AB 3rd, Venook AP, Al-Hawary MM, Cederquist L, Chen YJ, Ciombor KK, Cohen S, Cooper HS, Deming D, Engstrom PF, Grem JL, Grothey A, Hochster HS, Hoffe S, Hunt S, Kamel A, Kirilcuk N, Krishnamurthi S, Messersmith WA, Meyerhardt J, Mulcahy MF, Murphy JD, Nurkin S, Saltz L, **Sharma S**, Shibata D, Skibber JM, Sofocleous CT, Stoffel EM, Stotsky-Himelfarb E, Willett CG, Wuthrick E, Gregory KM, Freedman-Cass DA. *J Natl Compr Canc Netw*. 2018 Jul; 16(7): 852-871.

65. Rectal Cancer, Version 2.2018, NCCN Clinical Practice Guidelines in Oncology. Benson AB 3rd, Venook AP, Al-Hawary MM, Cederquist L, Chen YJ, Ciombor KK, Cohen S, Cooper HS, Deming D, Engstrom PF, Grem JL, Grothey A, Hochster HS, Hoffe S, Hunt S, Kamel A, Kirilcuk N, Krishnamurthi S, Messersmith WA, Meyerhardt J, Mulcahy MF, Murphy JD, Nurkin S, Saltz L, **Sharma S**, Shibata D, Skibber JM, Sofocleous CT, Stoffel EM, Stotsky-Himelfarb E, Willett CG, Wuthrick E, Gregory KM, Gurski L, Freedman-Cass DA. *J Natl Compr Canc Netw*. 2018 Jul; 16(7): 874-901.

66. Network Rewiring in Cancer: Applications to Melanoma Cell Lines and the Cancer Genome Atlas Patients. Ding KF, Finlay D, Yin H, **Hendricks WPD**, Sereduk C, Kiefer J, **Sekulic A**, LoRusso PM, Vuori K, **Trent JM**, **Schork NJ**. *Front Genet*. 2018 Jul 10;9:228.

67. Coinfections identified from metagenomic analysis of cervical lymph nodes from tularemia patients. Birdsell DN, Özsürekci Y, Rawat A, Aycan AE, Mitchell CL, Sahl JW, Johansson A, Colman RE, Schupp JM, Ceyhan M, **Keim PS**, Wagner DM. *BMC Infect Dis*. 2018 Jul 11;18(1):319.

68. Transcriptomic Profiling of Obesity-Related Nonalcoholic Steatohepatitis Reveals a Core Set of Fibrosis-Specific Genes. Gerhard GS, Legendre C, Still CD, Chu X, Petrick A, **DiStefano JK**. *J Endocr Soc*. 2018 Jun 5;2(7):710-726. doi: 10.1210/js.2018-00122. eCollection 2018 Jul 1.

69. De novo variants in GREB1L are associated with non-syndromic inner ear malformations and deafness. Schrauwen I, Kari E, Mattox J, Llaci L, Smeeton J, Naymik M, Raible DW, Knowles JA, Crump JG, **Huentelman MJ**, Friedman RA. *Hum Genet*. 2018 Jul;137(6-7):459-470.

70. Differentially methylated loci in NAFLD cirrhosis are associated with key signaling pathways. Gerhard GS, Malenica I, Llaci L, Chu X, Petrick AT, Still CD, **DiStefano JK**. *Clin Epigenetics*. 2018 Jul 13;10(1):93.

71. A novel FBXO28 frameshift mutation in a child with developmental delay, dysmorphic features, and intractable epilepsy: A second gene that may contribute to the 1q41-q42 deletion phenotype. Balak C, Belnap N, **Ramsey K**, Joss S, Devriendt K, Naymik M, Jepsen W, Siniard AL, **Szelinger S**, Parker ME, Richholt R, Izatt T, LaFleur M, Terraf P, Llaci L, De Both M, Piras IS, **Rangasamy S**, Schrauwen I, Craig DW, **Huentelman M**, **Narayanan V**. *Am J Med Genet*. 2018 Jul; 176(7): 1549-1558.

72. Neonatal epileptic encephalopathy caused by de novo GNAO1 mutation misdiagnosed as atypical Rett syndrome: Cautions in interpretation of genomic test results. Gerald B, **Ramsey K**, Belnap N, **Szelinger S**, Siniard AL, Balak C, Russell M, Richholt R, De Both M, Claasen AM, Schrauwen I, **Huentelman MJ**, Craig DW, **Rangasamy S**, **Narayanan V**. *Semin Pediatr Neurol*. 2018 Jul;26:28-32.

73. Multiscale Analysis of Independent Alzheimer's Cohorts Finds Disruption of Molecular, Genetic, and Clinical Networks by Human Herpesvirus. Readhead B, Haure-Mirande JV, Funk CC, Richards MA, Shannon P, Haroutunian V, Sano M, **Liang WS**, Beckmann ND, Price ND, **Reiman EM**, Schadt EE, Ehrlich ME, Gandy S, Dudley JT. *Neuron*. 2018 Jul 11; 99(1):64-82.

74. Pembrolizumab in advanced gastrointestinal malignancies with defective dna mismatch repair: A case series. Stenehjem DD, Cavalieri CC, Swanson E, Solomon B, Whisenant J, Tran D, Weis J, Gilcrease GW, **Sharma S**, Garrido-Laguna I. *J Immunotherapy Precision Oncology*. 1(1): 1-6.

75. Randomized clinical trials and personalized medicine: A commentary on deaton and cartwright. **Schork NJ**. *Soc Sci Med*. 2018 Aug;210:71-73.

76. The Role of Long Non-Coding RNAs (lncRNAs) in the Development and Progression of Fibrosis Associated with Nonalcoholic Fatty Liver Disease (NAFLD). Hanson A, Wilhelmsen D, **DiStefano JK**. *Noncoding RNA*. 2018 Aug 21;4(3).

77. Mixed infections are associated with poor treatment outcomes among newly diagnosed tuberculosis patients independent of pre-treatment heteroresistance. Shin SS, Modongo C , Baik Y, Allender C, Lemmer D, Colman RE, **Engelthaler DM**, Warren RM, Zetola NM. *J Infect Dis*. 2018 Aug 4.

78. Escherichia coli ST131-H22 as a Foodborne Uropathogen. Liu CM, Stegger M, Aziz M, Johnson TJ, Waits K, Nordstrom L, Gauld L, Weaver B, Rolland D, Statham S, Horwinski J, Sariya S, Davis GS, Sokurenko E, **Keim P**, Johnson JR, Price LB. *MBio*. 2018 Aug 28;9(4).

79. Performance Standards for Biological Threat Agent Assays for Department of Defense Applications. Beck L, Coates SG, Gee J, Hadfield T, Jackson P, **Keim P**, Lindler L, Olson V, Ostlund E, Roberto F, Samuel J, **Sharma S**, Tallent S, Wagner DM. *J AOAC Int*. 2018 Aug 22.

80. Finding useful biomarkers for Parkinson's disease. Chen-Plotkin AS, Albin R, Alcalay R, Babcock D, Bajaj V, Bowman D, Buko A, Cedarbaum J, Chelsky D, Cookson MR, Dawson TM, Dewey R, Foroud T, Frasier M, German D, Gwinn K, Huang X, Kopil C, Kremer T, Lasch S, Marek K, Marto JA, Merchant K, Mollenhauer B, Naito A, Potashkin J, Reimer A, Rosenthal LS, Saunders-Pullman R, Scherzer CR, Sherer T, Singleton A, Sutherland M, Thiele I, van der Brug M, **Van Keuren-Jensen K**, Vaillancourt D, Walt D, West A, Zhang J. *Sci Transl Med*. 2018 Aug 15;10(454).

81. The Effects of Synthetically Modified Natural Compounds on ABC Transporters. Dantzic D, Noel P, Merien F, Liu DX, Lu J, **Han H**, McKeage MJ, Li Y. *Pharmaceutics*. 2018 Aug 9;10(3).

82. A Phase Ib/II Study of the JAK1 Inhibitor, Itacitinib, plus nab-Paclitaxel and Gemcitabine in Advanced Solid Tumors. Beatty GL, Shahda S, Beck T, Uppal N, Cohen SJ, Donehower R, Gabayan AE, Assad A, Switzky J, Zhen H, **Von Hoff DD**. *Oncologist*. 2018 Aug 16. 2017-0665.

83. Phase 0 Trial of AZD1775 in First-Recurrence Glioblastoma Patients. Sanai N, Li J, Boerner J, Stark K, Wu J, Kim S, Derogatis A, Mehta S, **Dhruv HD**, Heilbrun LK, **Berens ME**, LoRusso PM. *Clin Cancer Res*. 2018 Aug 15;24(16):3820-3828.

84. Andecaliximab/GS-5745 Alone and Combined with mFOLFOX6 in Advanced Gastric and Gastroesophageal Junction Adenocarcinoma: Results from a Phase I Study. Shah MA, Starodub A, **Sharma S**, Berlin J, Patel M, Wainberg ZA, Chaves J, Gordon M, Windsor K, Brachmann CB, Huang X, Vosganian G, Maltzman JD, Smith V, Silverman JA, Lenz HJ, Bendell JC. Clin Cancer Res. 2018 Aug 15; 24(16): 3829-3837.

85. Sex-specific gene and pathway modeling of inherited glioma risk. Ostrom QT, Coleman W, Huang W, Rubin JB, Lathia JD, **Berens ME**, Speyer G, Liao P, Wrensch MR, Eckel-Passow JE, Armstrong G, Rice T, Wiencke JK, McCoy LS, Hansen HM, Amos CI, Bernstein JL, Claus EB, Houlston RS, Il'yasova D, Jenkins RB, Johansen C, Lachance DH, Lai RK, Merrell RT, Olson SH, Sadetzki S, Schildkraut JM, Shete S, Andersson U, Rajaraman P, Chanock SJ, Linet MS, Wang Z, Yeager M; GliomaScan consortium, Melin B, Bondy ML, Barnholtz-Sloan JS. *Neuro Oncol*. 2018 Aug 14.

86. Comprehensive genomic profiling of Hodgkin lymphoma reveals recurrently mutated genes and increased mutation burden. **Liang WS**, Vergilio J, Salhia B, Huang HJ, Oki Y, Garrido-Laguna I, Park H, Westin JR, Meric-Bernstam F, Fabrizio D, Miller VA, Stephens PJ, Fanale MA, Ross JS, Janku F (2018) *The Oncologist*, Aug 14.

87. De novo variant in KIF26B is associated with pontocerebellar hypoplasia with infantile spinal muscular atrophy. Wojcik MH, Okada K, Prabhu SP, Nowakowski DW, **Ramsey K**, Balak C, **Rangasamy S**, Brownstein CA, Schmitz-Abe K, Cohen JS, Fatemi A, Shi J, Grant EP, **Narayanan V**, Ho HH, Agrawal PB. *Am J Med Genet A*. 2018 Aug 27.

88. The Role of Long Non-Coding RNAs (lncRNAs) in the Development and Progression of Fibrosis Associated with Nonalcoholic Fatty Liver Disease (NAFLD). Hanson A, Wilhelmsen D, **DiStefano JK**. *Noncoding RNA*. 2018 Aug 21;4(3).

89. Microbial Ecology and Water Chemistry Impact Regrowth of Opportunistic Pathogens in Full-Scale Reclaimed Water Distribution Systems. Garner E, McLain J, **Bowers J**, **Engelthaler DM**, Edwards MA, Pruden A. *Environ Sci Technol*. 2018 Aug 21;52(16):9056-9068.

90. Therapeutic Targeting of KDM1A/LSD1 in Ewing Sarcoma with SP-2509 Engages the Endoplasmic Reticulum Stress Response. Pishas KI, Drenberg CD, Taslim C, Theisen ER, Johnson KM, Saund RS, Pop IL, Crompton BD, Lawlor ER, Tirode F, Mora J, Delattre O, Beckerle MC, Callen DF, **Sharma S**, Lessnick SL. *Mol Cancer Ther*. 2018 Sep; 17(9): 1902-1916.

91. Transcriptomic and morphophysiological evidence for a specialized human cortical GABAergic cell type. Boldog E, Bakken TE, Hodge RD, Novotny M, Aevermann BD, Baka J, Bordé S, Close JL, Diez-Fuertes F, Ding SL, Faragó N, Kocsis ÁK, Kovács B, Maltzer Z, McCorrison JM, Miller JA, Molnár G, Oláh G, Ozsvár A, Rózsa M, Shehata SI, Smith KA, Sunkin SM, Tran DN, Venepally P, Wall A, Puskás LG, Barzó P, Steemers FJ, **Schork NJ**, Scheuermann RH, Lasken RS, Lein ES, Tamás G. *Nat Neurosci*. 2018 Sep;21(9):1185-1195.

92. Genetic risks and clinical rewards. Schork AJ, Schork MA, **Schork NJ**. *Nat Genet*. 2018 Sep;50(9):1210-1211.

93. Exome-wide analysis of bi-allelic alterations identifies a Lynch phenotype in The Cancer Genome Atlas. Buckley AR, Ideker T, Carter H, Harismendy O, **Schork NJ**. *Genome Med*. 2018 Sep 14;10(1):69.

94. Development of High-Throughput Screening Assays for Inhibitors of ETS Transcription Factors. Currie SL, Warner SL, Vankayalapati H, Liu X, **Sharma S**, Bearss DJ, Graves BJ. *SLAS Discov*. 2018 Sep 11:2472555218798571.

95. Histone deacetylase inhibitors synergizes with catalytic inhibitors of EZH2 to exhibit anti-tumor activity in small cell carcinoma of the ovary, hypercalcemic type. Wang Y, Chen SY, Colborne S, Lambert G, Shin CY, Dos Santos N, Orlando KA, **Lang JD**, **Hendricks WPD**, Bally MB, Karnezis AN, Hass R, Underhill TM, Morin GB, **Trent JM**, Weissman BE, Huntsman DG. *Mol Cancer Ther*. 2018 Sep 19.

96. Somatic inactivating PTPRJ mutations and dysregulated pathways identified in canine malignant melanoma by integrated comparative genomic analysis. **Hendricks WPD**, Zismann V, Sivaprakasam K, Legendre C, Poorman K, Tembe W, Perdigones N, Kiefer J, **Liang W**, DeLuca V, Stark M, Ruhe A, Froman R, Duesbery NS, Washington M, Aldrich J, Neff MW, **Huentelman MJ**, Hayward N, Brown K, Thamm D, Post G, Khanna C, Davis B, Breen M, **Sekulic A**, **Trent JM**. *PLoS Genet*. 2018 Sep 6;14(9)

97. Botulinum Neurotoxin-Producing Bacteria. Isn't It Time that We Called a Species a Species? Smith T, Williamson CHD, Hill K, Sahl J, **Keim P**. *MBio*. 2018 Sep 25;9(5).

98. E6201, an intravenous MEK1 inhibitor, achieves an exceptional response in BRAF V600E-mutated metastatic malignant melanoma with brain metastases. **Babiker HM**, **Byron SA**, **Hendricks WPD**, Elmquist WF, Gampa G, Vondrak J, Aldrich J, Cuyugan L, Adkins J, De Luca V, Tibes R, Borad MJ, Marceau K, Myers TJ, Paradiso LJ, **Liang WS**, Korn RL, Cridebring D, **Von Hoff DD**, Carpten JD, Craig DW, **Trent JM**, Gordon MS. *Invest New Drugs*. 2018 Sep 28.

99. Phase I Study of CC-486 Alone and in Combination with Carboplatin or nab-Paclitaxel in Patients with Relapsed or Refractory Solid Tumors. **Von Hoff DD**, Rasco DW, Heath EI, Munster PN, Schellens JHM, Isambert N, Tourneau CL, O'Neil B, Mathijssen RHJ, Lopez-Martin JA, Edenfield WJ, Martin M, LoRusso PM, Bray GL, DiMartino J, Nguyen A, Liu K, Laille E, Bendell JC. *Clin Cancer Res*. 2018 Sep 1;24(17):4072-4080.

100. Exome-wide analysis of bi-allelic alterations identifies a Lynch phenotype in The Cancer Genome Atlas. Buckley AR, Ideker T, Carter H, Harismendy O, **Schork NJ**. *Genome Med*. 2018 Sep 14;10(1):69.

101. Comprehensive multi-center assessment of small RNA-seq methods for quantitative miRNA profiling. Giraldez MD, Spengler RM, Etheridge A, Godoy PM, Barczak AJ, Srinivasan S, De Hoff PL, Tanriverdi K, Courtright A, Lu S, Khoory J, Rubio R, Baxter D, Driedonks TAP, Buermans HPJ, Nolte-'t Hoen ENM, Jiang H, Wang K, Ghiran I, Wang YE, **Van Keuren-Jensen K**, Freedman JE, Woodruff PG, Laurent LC, Erle DJ, Galas DJ, Tewari M. *Nat Biotechnol*. 2018 Sep;36(8):746-757.

102. The human brainome: network analysis identifies HSPA2 as a novel Alzheimer’s disease target. Petyuk VA, Chang R, Ramirez-Restrepo M, Beckmann ND, Henrion MYR, Piehowski PD, Zhu K, Wang S, Clarke J, **Huentelman MJ**, Xie F, Andreev V, Engel A, Guettoche T, Navarro L, De Jager P, Schneider JA, Morris CM, McKeith IG, Perry RH, Lovestone S, Woltjer RL, Beach TG, Sue LI, Serrano GE, Lieberman AP, Albin RL, Ferrer I, Mash DC, Hulette CM, Ervin JF, **Reiman EM**, Hardy JA, Bennett DA, Schadt E, Smith RD, Myers AJ. *Brain*. 2018 Sep 1;141(9):2721-2739.

103. Angiopoietin-like 8 (ANGPTL8) expression is regulated by miR-143-3p in human hepatocytes. **DiStefano JK**. *Gene*. 2018 Sep 24;681:1-6.

104. RNA-Seq of newly diagnosed patients in the PADIMAC study leads to a bortezomib/lenalidomide decision signature. Chapman MA, Sive J, Ambrose J, Roddie C, Counsell N, Lach A, Abbasian M, Popat R, Cavenagh JD, Oakervee H, Streetly MJ, Schey S, Koh M, Willis F, Virchis AE, Crowe J, Quinn MF, Cook G, Crawley CR, Pratt G, Cook M, Braganza N, Adedayo T, Smith P, Clifton-Hadley L, Owen RG, Sonneveld P, **Keats JJ**, Herrero J, Yong K. *Blood*. 2018 Sep 4.

105. Host Genetic Control of the Oral Microbiome in Health and Disease. Gomez A, Espinoza JL, Harkins DM, Leong P, Saffery R, Bockmann M, Torralba M, Kuelbs C, Kodukula R, Inman J, Hughes T, Craig JM, **Highlander SK**, Jones MB, Dupont CL, Nelson KE. *Cell Host Microbe*. 2017 Sep 13;22(3):269-278.e3.

106. Genomic profiles of low-grade murine gliomas evolve during progression to glioblastoma. Vitucci M, Irvin DM, McNeill RS, Schmid RS, Simon JM, **Dhruv HD**, Siegel MB, Werneke AM, Bash RE, Kim S, **Berens ME**, Miller CR. *Neuro Oncol*. 2017 Sep 1;19(9):1237-1247.

107. Genetically elevated high-density lipoprotein cholesterol through the cholesteryl ester transfer protein gene does not associate with risk of Alzheimer's disease. Peloso GM, van der Lee SJ; International Genomics of Alzheimer's Project (IGAP), Destefano AL, Seshardi S. Alzheimers Dement (Amst). 2018 Sep 22;10:595-598.

108. Applying polygenic risk scoring for psychiatric disorders to a large family with bipolar disorder and major depressive disorder. de Jong S, Diniz MJA, Saloma A, Gadelha A, Santoro ML, Ota VK, Noto C; Major Depressive Disorder and Bipolar Disorder Working Groups of the Psychiatric Genomics Consortium, Curtis C, Newhouse SJ, Patel H, Hall LS, O Reilly PF, Belangero SI, Bressan RA, Breen G. *Commun Biol*. 2018 Oct 8;1:163.

109. Proteomic analysis of four Clostridium botulinum strains identifies proteins that link biological responses to proteomic signatures. Deatherage Kaiser BL, Hill KK, Smith TJ, Williamson CHD, **Keim P**, Sahl JW, Wahl KL. *PLoS One*. 2018 Oct 15;13(10):e0205586.

110. Sirtuin 3 attenuates amyloid-β induced neuronal hypometabolism. Yin J, Li S, Nielsen M, Carcione T, **Liang WS**, Shi J. *Aging* (Albany NY). 2018 Oct 23;10(10):2874-2883.

111. Parallel Accumulation of Tumor Hyaluronan, Collagen, and Other Drivers of Tumor Progression.

112. Li X, Shepard HM, Cowell JA, Zhao C, Osgood RJ, Rosengren S, Blouw B, Garrovillo SA, Pagel MD, Whatcott CJ, **Han H**, **Von Hoff DD**, Taverna DM, LaBarre MJ, Maneval DC, Thompson CB.

113. *Clin Cancer Res*. 2018 Oct 1;24(19):4798-4807.

114. Phase I/II study of everolimus combined with mFOLFOX-6 and bevacizumab for first-line treatment of metastatic colorectal cancer. Weldon Gilcrease G, Stenehjem DD, Wade ML, Weis J, McGregor K, Whisenant J, Boucher KM, Thorne K, Orgain Nmy, Garrido-Laguna I, **Sharma S**. *Invest New Drugs*. 2018 Oct 10. Doi: 10.1007/s10637-018-0645-2. [Epub ahead of print]

115. Phenotypic characterization and whole genome analysis of extended-spectrum beta-lactamase-producing bacteria isolated from dogs in Germany. Boehmer T, Vogler AJ, Thomas A, Sauer S, Hergenroether M, Straubinger RK, Birdsell D, **Keim P**, Sahl JW, Williamson CHD, Riehm JM.

116. *PLoS One*. 2018 Oct 26;13(10):e0206252.

117. A Chemical Biology Approach to Model Pontocerebellar Hypoplasia Type 1B (PCH1B). François-Moutal L, Jahanbakhsh S, Nelson ADL, Ray D, Scott DD, Hennefarth MR, Moutal A, Perez-Miller S, Ambrose AJ, Al-Shamari A, Coursodon P, Meechoovet B, Reiman R, Lyons E, Beilstein M, Chapman E, Morris QD, **Van Keuren-Jensen K**, Hughes TR, Khanna R, Koehler C, Jen J, Gokhale V, Khanna M. *ACS Chem Biol*. 2018 Oct 19;13(10):3000-3010.

118. Variants affecting diverse domains of MEPE are associated with two distinct bone disorders, a craniofacial bone defect and otosclerosis. Schrauwen I, Valgaeren H, Tomas-Roca L, Sommen M, Altunoglu U, Wesdorp M, Beyens M, Fransen E, Nasir A, Vandeweyer G, Schepers A, Rahmoun M, van Beusekom E, **Huentelman MJ**, Offeciers E, Dhooghe I, Huber A, Van de Heyning P, Zanetti D, De Leenheer EMR, Gilissen C, Hoischen A, Cremers CW, Verbist B, de Brouwer APM, Padberg GW, Pennings R, Kayserili H, Kremer H, Van Camp G, van Bokhoven H. *Genet Med*. 2018 Oct 5.

119. A Recurrent De Novo PACS2 Heterozygous Missense Variant Causes Neonatal-Onset Developmental Epileptic Encephalopathy, Facial Dysmorphism, and Cerebellar Dysgenesis. Olson HE, Jean-Marçais N, Yang E, Heron D, Tatton-Brown K, van der Zwaag PA, Bijlsma EK, Krock BL, Backer E, Kamsteeg EJ, Sinnema M, Reijnders MRF, Bearden D, Begtrup A, Telegrafi A, Lunsing RJ, Burglen L, Lesca G, Cho MT, Smith LA, Sheidley BR, El Achkar CM, Pearl PL, Poduri A, Skraban CM, Tarpinian J, Nesbitt AI, Fransen van de Putte DE, Ruivenkamp CAL, Rump P, Chatron N, Sabatier I, De Bellescize J, Guibaud L, Sweetser DA, Waxler JL, Wierenga KJ; DDD Study, Donadieu J, **Narayanan V**, **Ramsey KM**; **C4RCD Research Group**, Nava C, Rivière JB, Vitobello A, Mau-Them FT, Philippe C, Bruel AL, Duffourd Y, Thomas L, Lelieveld SH, Schuurs-Hoeijmakers J, Brunner HG, Keren B, Thevenon J, Faivre L, Thomas G, Thauvin-Robinet C. *Am J Hum Genet*. 2018 Oct 4;103(4):631.

120. Integrating standardized whole genome sequence analysis with a global Mycobacterium tuberculosis antibiotic resistance knowledgebase. Ezewudo M, Borens A, Chiner-Oms Á, Miotto P, Chindelevitch L, Starks AM, Hanna D, Liwski R, Zignol M, Gilpin C, Niemann S, Kohl TA, Warren RM, Crook D, Gagneux S, Hoffner S, Rodrigues C, Comas I, **Engelthaler DM**, Alland D, Rigouts L, Lange C, Dheda K, Hasan R, McNerney R, Cirillo DM, Schito M, Rodwell TC, Posey J. *Sci Rep*. 2018 Oct 18;8(1):15382.

121. Flucytosine resistance in Cryptococcus gattii is indirectly mediated by the FCY2-FCY1-FUR1 pathway. Vu K, Thompson GR 3rd, Roe CC, Sykes JE, Dreibe EM, Lockhart SR, Meyer W, **Engelthaler DM**, Gelli A. *Med Mycol*. 2018 Oct 1;56(7):857-867.

122. PDZ-RhoGEF Is a Signaling Effector for TROY-Induced Glioblastoma Cell Invasion and Survival. Ding Z, **Dhruv H**, Kwiatkowska-Piwowarczyk A, Ruggieri R, Kloss J, Symons M, **Pirrotte P**, Eschbacher JM, Tran NL, Loftus JC. *Neoplasia*. 2018 Oct;20(10):1045-1058.

123. Corrigendum: Comparative pan-genomic analyses of Orientia tsutsugamushi reveal an exceptional model of bacterial evolution driving genomic diversity. Fleshman A, Mullins K, Sahl J, Hepp C, Nieto N, Wiggins K, Hornstra H, Kelly D, Chan TC, Phetsouvanh R, Dittrich S, Panyanivong P, Paris D, Newton P, Richards A, **Pearson T**. *Microb Genom*. 2018 Oct;4(10).

124. First-in-Human Phase I Study of MBC-11, a Novel Bone-Targeted Cytarabine-Etidronate Conjugate in Patients with Cancer-Induced Bone Disease. Zinnen SP, Karpeisky A, **Von Hoff DD**, Plekhova L, Alexandrov A. *Oncologist*. 2018 Nov 9.

125. Accelerating the Drug Delivery Pipeline for Acute and Chronic Pancreatitis: Summary of the Working Group on Drug Development and Trials in Recurrent Acute Pancreatitis at the National Institute of Diabetes and Digestive and Kidney Diseases Workshop. Lowe ME, Goodman MT, Coté GA, Glesby MJ, Haupt M, **Schork NJ**, Singh VK, Andersen DK, Pandol SJ, Uc A, Whitcomb DC. *Pancreas*. 2018 Nov/Dec;47(10):1193-1199.

126. Detecting significant genotype-phenotype association rules in bipolar disorder: market research meets complex genetics. Breuer R, Mattheisen M, Frank J, Krumm B, Treutlein J, Kassem L, Strohmaier J, Herms S, Mühleisen TW, Degenhardt F, Cichon S, Nöthen MM, Karypis G, Kelsoe J, Greenwood T, Nievergelt C, Shilling P, Shekhtman T, Edenberg H, Craig D, **Szelinger S**, Nurnberger J, Gershon E, Alliey-Rodriguez N, Zandi P, Goes F, **Schork N**, Smith E, Koller D, Zhang P, Badner J, Berrettini W, Bloss C, Byerley W, Coryell W, Foroud T, Guo Y, Hipolito M, Keating B, Lawson W, Liu C, Mahon P, McInnis M, Murray S, Nwulia E, Potash J, Rice J, Scheftner W, Zöllner S, McMahon FJ, Rietschel M, Schulze TG. *Int J Bipolar Disord*. 2018 Nov 11; 6(1): 24.

127. Minimal information for studies of extracellular vesicles 2018 (MISEV2018): a position statement of the International Society for Extracellular Vesicles and update of the MISEV2014 guidelines.

128. Théry C, Witwer KW, Aikawa E, Alcaraz MJ, Anderson JD, **et. al**. *J Extracell Vesicles*. 2018 Nov 23;7(1):1535750.

129. Efficient region-based test strategy uncovers genetic risk factors for functional outcome in bipolar disorder. Budde M, Friedrichs S, Alliey-Rodriguez N, Ament S, Badner JA, Berrettini WH, Bloss CS, Byerley W, Cichon S, Comes AL, Coryell W, Craig DW, Degenhardt F, Edenberg HJ, Foroud T, Forstner AJ, Frank J, Gershon ES, Goes FS, Greenwood TA, Guo Y, Hipolito M, Hood L, Keating BJ, Koller DL, Lawson WB, Liu C, Mahon PB, McInnis MG, McMahon FJ, Meier SM, Mühleisen TW, Murray SS, Nievergelt CM, Nurnberger JI Jr, Nwulia EA, Potash JB, Quarless D, Rice J, Roach JC, Scheftner WA, **Schork NJ**, Shekhtman T, Shilling PD, Smith EN, Streit F, Strohmaier J, **Szelinger S**, Treutlein J, Witt SH, Zandi PP, Zhang P, Zöllner S, Bickeböller H, Falkai PG, Kelsoe JR, Nöthen MM, Rietschel M, Schulze TG, Malzahn D. *Eur Neuropsychopharmacol*. 2018 Nov 29.

130. Genome Analyses of >200,000 Individuals Identify 58 Loci for Chronic Inflammation and Highlight Pathways that Link Inflammation and Complex Disorders. Ligthart S, Vaez A, Võsa U, et al. *Am J Hum Genet*. 2018 Nov 1; 103(5): 691-706.

131. Evaluating the long-term persistence of Bacillus spores on common surfaces. Enger KS, Mitchell J, Murali B, Birdsell DN, **Keim P**, Gurian PL, Wagner DM. *Microb Biotechnol*. 2018 Nov;11(6):1048-1059.

132. Developing Inclusivity and Exclusivity Panels for Testing Diagnostic and Detection Tools Targeting Burkholderia pseudomallei, the Causative Agent of Melioidosis. Williamson CHD, Wagner DM, **Keim P**, Sahl JW. *J AOAC Int*. 2018 Nov 1;101(6):1920-1926.

133. Burkholderia pseudomallei distribution in Australasia is linked to paleogeographic and anthropogenic history. Baker AL, **Pearson T**, Sahl JW, Hepp C, Price EP, Sarovich DS, Mayo M, Tuanyok A, Currie BJ, **Keim P**, Warner J. *PLoS One*. 2018 Nov 5;13(11):e0206845.

134. Phylogenetic analysis of West Nile Virus in Maricopa County, Arizona: Evidence for dynamic behavior of strains in two major lineages in the American Southwest. Hepp CM, Cocking JH, Valentine M, Young SJ, Damian D, Samuels-Crow KE, Sheridan K, Fofanov VY, Furstenau TN, Busch JD, Erickson DE, Lancione RC, Smith K, Will J, Townsend J, **Keim PS**, **Engelthaler DM**. *PLoS One*. 2018 Nov 26;13(11):e0205801.

135. A mouse model of binge alcohol consumption and Burkholderia infection. Jimenez V Jr, Moreno R, Settles E, Currie BJ, **Keim P**, Monroy FP. *PLoS One*. 2018 Nov 28;13(11):e0208061.

136. Plant-Derived Exosomal MicroRNAs Shape the Gut Microbiota. Teng Y, Ren Y, Sayed M, Hu X, Lei C, Kumar A, Hutchins E, Mu J, Deng Z, Luo C, Sundaram K, Sriwastva MK, Zhang L, Hsieh M, Reiman R, Haribabu B, Yan J, Jala VR, Miller DM, **Van Keuren-Jensen K**, Merchant ML, McClain CJ, Park JW, Egilmez NK, Zhang HG. *Cell Host Microbe*. 2018 Nov 14;24(5):637-652.e8.

137. Seizure-Induced Arc mRNA Expression Thresholds in Rat Hippocampus and Perirhinal Cortex. Chawla MK, Gray DT, Nguyen C, Dhaliwal H, Zempare M, Okuno H, **Huentelman MJ**, Barnes CA. *Front Syst Neurosci*. 2018 Nov 1;12:53.

138. Refining the phenotype associated with GNB1 mutations: Clinical data on 18 newly identified patients and review of the literature. Hemati P, Revah-Politi A, Bassan H, Petrovski S, Bilancia CG, **Ramsey K**, Griffin NG, Bier L, Cho MT, Rosello M, Lynch SA, Colombo S, Weber A, Haug M, Heinzen EL, Sands TT, **Narayanan V**, Primiano M, Aggarwal VS, Millan F, Sattler-Holtrop SG, Caro-Llopis A, Pillar N, Baker J, Freedman R, Kroes HY, Sacharow S, Stong N, Lapunzina P, Schneider MC, Mendelsohn NJ, Singleton A, Loik Ramey V, Wou K, Kuzminsky A, Monfort S, Weiss M, Doyle S, Iglesias A, Martinez F, Mckenzie F, Orellana C, van Gassen KLI, Palomares M, Bazak L, Lee A, Bircher A, Basel-Vanagaite L, Hafström M, Houge G; C4RCD Research Group; DDD study, Goldstein DB, Anyane-Yeboa K. *Am J Med Genet A*. 2018 Nov;176(11):2259-2275.

139. Short-term safety of mTOR inhibitors in infants and very young children with tuberous sclerosis complex (TSC): Multicentre clinical experience. Krueger DA, Capal JK, Curatolo P, Devinsky O, Ess K, Tzadok M, Koenig MK, **Narayanan V**, Ramos F, Jozwiak S, de Vries P, Jansen AC, Wong M, Mowat D, Lawson J, Bruns S, Franz DN; TSCure Research Group. *Eur J Paediatr Neurol*. 2018 Nov;22(6):1066-1073.

140. Amyloid-β Increases Tau by Mediating Sirtuin 3 in Alzheimer's Disease. Yin J, Han P, Song M, Nielsen M, Beach TG, Serrano GE, **Liang WS**, Caselli RJ, Shi J. *Mol Neurobiol*. 2018 Nov;55(11):8592-8601.

141. Visualization-assisted binning of metagenome assemblies reveals potential new pathogenic profiles in idiopathic travelers' diarrhea. Zhu Q, Dupont CL, Jones MB, Pham KM, Jiang ZD, DuPont HL, **Highlander SK**. *Microbiome*. 2018 Nov 8;6(1):201.

142. Mixed Mycobacterium tuberculosis-Strain Infections Are Associated With Poor Treatment Outcomes Among Patients With Newly Diagnosed Tuberculosis, Independent of Pretreatment Heteroresistance. Shin SS, Modongo C, Baik Y, Allender C, Lemmer D, Colman RE, **Engelthaler DM**, Warren RM, Zetola NM. *J Infect Dis*. 2018 Nov 5;218(12):1974-1982.

143. Timing the Origin of Cryptococcus gattii sensu stricto, Southeastern United States. Lockhart SR, Roe CC, **Engelthaler DM**. *Emerg Infect Dis*. 2018 Nov;24(11):2095-2097.

144. RNA-seq of newly diagnosed patients in the PADIMAC study leads to a bortezomib/lenalidomide decision signature. Chapman MA, Sive J, Ambrose J, Roddie C, Counsell N, Lach A, Abbasian M, Popat R, Cavenagh JD, Oakervee H, Streetly MJ, Schey S, Koh M, Willis F, Virchis AE, Crowe J, Quinn MF, Cook G, Crawley CR, Pratt G, Cook M, Braganza N, Adedayo T, Smith P, Clifton-Hadley L, Owen RG, Sonneveld P, **Keats JJ**, Herrero J, Yong K. *Blood*. 2018 Nov 15;132(20):2154-2165.

145. Report: NIA workshop on translating genetic variants associated with longevity into drug targets. **Schork NJ**, Raghavachari N; Workshop Speakers and Participants. *Geroscience*. 2018 Dec;40(5-6):523-538.

146. Single-nucleus and single-cell transcriptomes compared in matched cortical cell types. Bakken TE, Hodge RD, Miller JA, Yao Z, Nguyen TN, Aevermann B, Barkan E, Bertagnolli D, Casper T, Dee N, Garren E, Goldy J, Graybuck LT, Kroll M, Lasken RS, Lathia K, Parry S, Rimorin C, Scheuermann RH, **Schork NJ**, Shehata SI, Tieu M, Phillips JW, Bernard A, Smith KA, Zeng H, Lein ES, Tasic B. *PLoS One*. 2018 Dec 26;13(12):e0209648.

147. Clinically Relevant and Minimally Invasive Tumor Surveillance of Pediatric Diffuse Midline Gliomas Using Patient-Derived Liquid Biopsy. Panditharatna E, Kilburn LB, Aboian MS, Kambhampati M, Gordish-Dressman H, Magge SN, Gupta N, Myseros JS, Hwang EI, Kline C, Crawford JR, Warren KE, Cha S, Liang WS, **Berens ME**, Packer RJ, Resnick AC, Prados M, Mueller S, Nazarian J. *Clin Cancer Res*. 2018 Dec 1;24(23):5850-5859.

148. LRP10 in α-synucleinopathies. Kia DA, Sabir MS, Ahmed S, Trinh J, Bandres-Ciga S; **International Parkinson's Disease Genomics Consortium**. *Lancet Neurol*. 2018 Dec; 17(12): 1032.

149. The proneural gene ASCL1 governs the transcriptional subgroup affiliation in glioblastoma stem cells by directly repressing the mesenchymal gene NDRG1. Narayanan A, Gagliardi F, Gallotti AL, Mazzoleni S, Cominelli M, Fagnocchi L, Pala M, **Piras IS**, Zordan P, Moretta N, Tratta E, Brugnara G, Altabella L, Bozzuto G, Gorombei P, Molinari A, Padua RA, Bulfone A, Politi LS, Falini A, Castellano A, Mortini P, Zippo A, Poliani PL, Galli R. *Cell Death Differ*. 2018 Dec 11. doi: 10.1038/s41418-018-0248-7. [Epub ahead of print]

150. Harnessing Genetic Complexity to Enhance Translatability of Alzheimer's Disease Mouse Models: A Path toward Precision Medicine. Neuner SM, Heuer SE, **Huentelman MJ**, O'Connell KMS, Kaczorowski CC. *Neuron*. 2018 Dec 27. pii: S0896-6273(18)31049-3.

151. Peripheral biomarkers in schizophrenia: A meta-analysis of microarray gene-expression datasets. **Piras IS**, Manchia M, **Huentelman MJ**, Pinna F, Zai CC, Kennedy JL, Carpiniello B. *Int J Neuropsychopharmacol*. 2018 Dec 20.

152. CXCL4L1 Promoter Polymorphisms Are Associated with Improved Renal Function in Type 1 Diabetes. Armbrust T, Millis MP, Alvarez ML, Saremi A, **DiStefano JK**, Nourbakhsh M. *J Immunol*. 2018 Dec 28.

153. Single cell dissection of plasma cell heterogeneity in symptomatic and asymptomatic myeloma. Ledergor G, Weiner A, Zada M, Wang SY, Cohen YC, Gatt ME, Snir N, Magen H, Koren-Michowitz M, Herzog-Tzarfati K, Keren-Shaul H, Bornstein C, Rotkopf R, Yofe I, David E, Yellapantula V, Kay S, Salai M, Ben Yehuda D, Nagler A, Shvidel L, Orr-Urtreger A, Halpern KB, Itzkovitz S, Landgren O, San-Miguel J, Paiva B, **Keats JJ**, Papaemmanuil E, Avivi I, Barbash GI, Tanay A, Amit I. *Nat Med*. 2018 Dec;24(12):1867-1876.

154. Bcl-2 inhibitors enhance FGFR inhibitor-induced mitochondrial-dependent cell death in FGFR2 mutant endometrial cancer. Packer LM, Stehbens SJ, Bonazzi VF, Gunter J, Ju RJ, Ward M, Gartside M, **Byron S**, Pollock PM. *Mol Oncol*. 2018 Dec 8.

155. Targeting nuclear ß-catenin as therapy for post-myeloproliferative neoplasm secondary AML. Saenz DT, Fiskus W, Manshouri T, Mill CP, Qian Y, Raina K, Rajapakshe K, Coarfa C, Soldi R, Bose P, Borthakur G, Kadia TM, Khoury JD, Masarova L, Nowak AJ, Sun B, Saenz DN, Kornblau SM, Horrigan S, **Sharma S**, Qiu P, Crews CM, Verstovsek S, Bhalla KN. *Leukemia*. 2018 Dec 21.

156. Identification of therapeutic targets in chordoma through comprehensive genomic and transcriptomic analyses. **Liang WS**, Dardis C, **Helland A**, **Sekar S**, **Adkins J**, **Cuyugan L**, **Enriquez D**, **Byron S**, Little AS. *Cold Spring Harb Mol Case Stud*. 2018 Dec 17; 4(6). pii: a003418. doi: 10.1101/mcs.a003418.

Appendix B

2018 Grant Submissions

PI	Type	Sub/Prime	Sponsor	Title	Date Submitted
Han, Haiyong	R41/SBIR	Sub to Caerus Discovery	NIH	Development of sFRP2 antibodies for treatment of pancreatic cancer	1/5/18
Hendricks, William	G01	Sub to Mayo	MRA	Dissecting the role of hTERT across melanoma subtypes: Exploiting a cancer hallmark for novel targeted treatments	1/9/18
Sharma, Sunil and Trent, Jeffrey	G01	Prime	MRA	Clinically Directed Strategies to Sensitize Acral Melanoma to Immunotherapy	1/9/18
Berens, Michael	G01	Sub to Cleveland Clinic	American Brain Tumor Association	Leveraging sex-specific differences for a personalized medicine approach to GBM	1/10/18
Engelthaler, Dave	R21/R33	Prime	NIH	Screening targeted pharmaceutical libraries to identify novel therapeutics against Coccidioides, a eukaryotic fungal pathogen	1/11/18
Trent, Jeff	P20 SPOREs	Sub to University of New Mexico	NIH	"Molecular Mechanisms of Cancer Disparities in Hispanics and American Indians: From Discovery of Genomic and Environmental Etiologies to Clinical and Community Translation"	1/18/18
Jensen, Kendall	R21/R33	Sub/Mass General	NIH	Selective extracellular vesicle enrichment for monitoring the central nervous system	1/22/18
Schork, Nicholas	U19	Sub/California Pacific Medical Center	NIH	LONGEVITY CONSORTIUM	1/24/18
Keats, Jonathan	G01	Sub/COH	Rising Tide Foundation	Repurposing Leflunomide to Delay Progression of Smoldering Multiple Myeloma	1/26/18
Ramsey, Keri	G01	Prime	Global Genes	Incorporating Latino families in the rare disease community at the C4RCD.	1/29/18
Huetleman, Matthew	R01	Sub/ ASU	NIH	RIPK1 as a trigger of neurodegenraton in Alzheimer's disease	2/5/18
Pirrotte, Patrick	R01	sub/SJHMC	NIH	Targeting the PERK kinase in LKB1-deficient non-small cell lung cancer	2/5/18
Han, Haiyong	R01	sub to ASU	NIH/NCI	Detection of Immunotherapy for Pancreatic Cancer	2/5/18
Banovich, Nicholas	R01	Prime	NIH	Combining genome, function, and phenotype to define the cell type specific gene regulatory architecture of idiopathic pulmonary fibrosis	2/5/18
Keats, Jonathan	G01	Prime	MMRF	Sequencing of Blood/Liquid Biopsies	2/9/18
Lang, Jessica	K99/R00	Prime	NIH	Characterization of the role of super-enhancers in ovarian cancer treatment response	2/12/18
Murtaza, Muhammed	UH2/UH3	Prime	NIH	Treatment monitoring in early and locally advanced breast cancer using circulating tumor DNA analysis	2/14/18
Berens, Michael	R21	sub Yale	NIH	Elucidation of Biomarkers to Predict PARP Inhibitor response in pediatric IDH1/2-mutant Glioma Trial	2/16/18
Berens, Michael	R21	Sub/Yale	NIH	Elucidation of Biomarkers to Predict PARP Inhibitor Response in an Adult Phase I/II IDH1/2-mutant Glioma Trial	2/20/18
Pirrotte, Patrick	P01	Sub/UofAZ	NIH	Perimenopause in Brain Aging and Alzheimer's Disease	02/28/18
Huentelman, Matthew	R01	Sub/Uof AZ	NIH	Identifying a pathogenic fibroblast subpopulation to target for protection against cadiac fibrosis	3/5/18
Dhruv, Harshil	R01	Sub/Mayo AZ	NIH	Role of protease activated receptors in spinal cord injury and repair	3/5/18
Berens, Michael	R01	Sub/Cleveland Clinic (Case Western)	NIH	Sex-specific differences in the tumor microenvironment alter glioblastoma growth	3/13/18
Piras, Ignazio	G01	Prime	Brain & Behavior Research Foundation	Multiomic profiling of patients with childhood Attention Deficit Hyperactivity Disorder	3/13/18
Banovich, Nicholas	G01	Sub/Prime	Vanderbilt/Doris Duke Foundation	Mechanisms of Disease Initiation and Propagation in Pulmonary Fibroses	3/15/18
Han, Haiyong	R01	Sub to COH	NIH	CF33-hNIS-anti-PD-L1, a novel chimeric immuno-oncolytic orthopoxvirus for the detection and treatment of pancreatic cancer peritoneal carcinomatosis	03/15/18
Huentelman, Matthew	R01	Sub/Univ of Miami	NIH	STEMBRAIN Toolkit: Autopsy confirmed cell lines as a rapid model system for neurologic disease	03/29/18
Keats, Jonathan	G01	Sub/COH	Briskin Foundation	COH Briskin Funds	03/30/18
Farooq, Maria	F01	Prime	Cholangiocrcinoma Foundation	Developing a blood test to detect FGRF2 fusions in circulating tumor RNA in patients with cholangiocarcinoma	04/01/18

PI	Type	Sub/Prime	Sponsor	Title	Date Submitted
Berens, Michael	G01	Sub to Yale University	V Foundation	Elucidation of Biomarkers to Predict PARP Inhibitor Response in a Pediatric IDH1/2-mutant Glioma Trial	04/02/18
Altin, John	G01	Prime	BSWRI	High-resolution digital monitoring of the T cell response to a tumor vaccine	04/05/18
Dhruv, Harshil	G01	Prime	BSWRI	Development and Validation of in silico Systems Biology Tool, "Dr. Insight", for Prediction of Combination Therapies	04/05/18
Hendricks, William	R41	Sub/ACI	NIH	Development of STAMP, a Molecular Prognostic Test for Canine Lymphoma	04/05/18
Berens, Michael	R41/R42	Sub to Reglagene	NIH	Drug Targeting of Mutant hTERT Promoters in GBM	04/05/18
Banovich, Nicholas	G01	Prime	BSWRI	Identifying novel gene regulatory changes driving treatment response and resistance in NSCLC	04/05/18
Altin, John	G01	Prime	BSWRI	Applying a novel, highly-multiplexed proteomics assay to predict alloimmunity	04/05/18
Bild, Andrea	G01	Prime	BSWRI	Tailoring therapy for patients with ABCB1 promoter fusions in progressive chemoresistant breast cancer	04/05/18
Han, Haiyong	G01	Prime	BSWRI	"Elucidating the role of Th17 cell derived IL-36γ in anti-tumor immunity in pancreatic cancer"	04/05/18
Von Hoff, Daniel	G01	Prime	BSWRI	Super-enhancer associated microRNA networks in pancreatic cancer	04/05/18
Peng, Sen	G01	Prime	BSWRI	Single cell sequencing to uncover high-fat diet (exosome) impact on colon cancer	04/05/18
Byron, Sara	G01	Sub/Yale	Rising Tide Foundation	Phase 2 Study of the PARP Inhibitor Olaparib in IDH1/2-mutant solid tumors	04/09/18
Liang, Winnie	G01	Sub/ASU	ASU	Can we use peripheral monocytes to predict brain inflammation in Alzheimer's disease?	04/16/18
Ignazio, Piras	G01	Prime	Alz Assoc.	Genetic risk factors for AD in a unique populaton isolate from Sardina	04/16/18
Ignazio, Piras	G01	sub Univ of Caliari, Italy	Foundation of Sardina	Early identification of schizophrenia by means of serum biomarkers? Predictive power of Neuronal Pentraxin 2 (NPTX2) in a sample of Sardinian schizophrenic patitnes.	04/16/18
Rangasamy, Sampath	G01	sub Uof NMx	ADA	Microglia-vascular interaction in alteration of blood-retinal barrier in diabetic retinopaty	04/16/18
Berens, Michael	G01	Sub to Yale University	Cure Search	Exploiting Mutant IDH 1/2-induced DNA Repair Defects in Pediatric Glioma	04/17/18
Engelthaler, Dave	G01	Sub AZDHS	FDA	Whole Genome Sequencing for State Food Testing Laboratories	04/17/18
Engelthaler, Dave	G01	Prime	Critical Path Institute	Integration of the UVP and ASAP pipelines into ReSeqTB through cloud-based implementation	04/23/18
Huentlman, Matthew	R01	Sub UofAz	NIH	Biomarkers for prediction and treatment of cognitive impairment in patients	04/30/18
DiStefano, Johanna	R01	Prime	NIH	Epigenetic markers of severity in nonalcoholic fatty liver disease	5/1/18
Huentlman, Matthew	G01	Prime	AARC	Tgen FY 19 AAC projects	05/11/18
Lang, Jessica	G01	Prime	Rivkin Center for Ovarian Cancer	Characterization of the Role of Super-enhancers in Ovarian Cancer Treatment Response	05/10/18
Piras, Ignazio	G01	Sub/ San Raffaele Hospital	Italy Dept. of Health	A novel pharmacological tool for depression: a translational multi model approach investigating MT1 receptor	05/21/18
Byron, Sara	G01	Sub/COH	Curing Kids Cancer	A Feasibility Study of Selecting Personalized Molecularly Guided Therapy for Pediatric Patients with Relapsed and/or Refractory Acute Myeloid Leukemia	05/21/18
Skerget, Sheri	G01	Prime	Multiple Myeloma Research Foundation	Proteogenomic analysis of specific RAS variants in myeloma	05/25/18
Engelthaler, Dave	G01	Sub Yale	USAID --> Vital Strategies --> Yale	Moldova TB Sequencing Project	05/24/18
Pirrotte, Patrick	R01	Sub SJHMC	NIH	Immune mechanisms of rejection in human lung allografts	05/22/18
Dhruv, Harshil	G01	Prime	DoD	Targets and Vulnerabilities of Breast Tumors Metastatic to Brain	05/30/18
Pirrotte, Patrick	G01	Prime	CKC	Assessing the therapeutic vulnerability of GFIb-driven medulloblastomas	06/01/18

PI	Type	Sub/Prime	Sponsor	Title	Date Submitted
Huentelman, Matthew	R01	Sub UofA	NIH	NPTX2: Preserving memory circuits in normative aging and Alzheimer's disease	06/05/18
Jensen, Kendall	R01	Sub COH	NIH	Cellular and Molecular Technologies: Super-Resolution Imaging of HER2-Resistance	06/05/18
Liang, Winnie	U01	Sub COH	NIH	Enhancing Precision Prevention through Family Informative Genetic Testing (FIT)	06/05/18
DiStefano, Johanna	R01	Prime	NIH	Profiling extracellular vesicle cargo in obesity and type 2 diabetes	06/05/18
Jensen, Kendall	R01 Supplement	Sub UofAz	NIH	RNA Dysregulation in Neurodegeneration	06/08/18
Duggan, David	G01	Sub COH	BCRF	The Association Between Epigenetic and Genetic Biomarkers of Aging Chemotherapy Toxicity in Older Patients with Breast Cancer	06/13/18
Huentelman, Matthew	R01	Sub/ Northwestern	NIH	"Cognitively intact elderly with pathologically diagnosed Alzheimer's disease: Neuroprotection/Resilience"	06/13/18
Jensen, Kendall	R01	sub COH	NIH	Robust isolation an rgorous molecular characterization of extracellular vesicles from panreatic cancer	06/13/18
Jensen, Kendall	R01	sub Ymir genomics	NIH	"Validation of a Rapid, Low-cost, Method for the Isolation of Urinary Extracellular Vesicles for Prostate Cancer Biomarker Discovery"	06/13/18
Pirrotte, Patrick	R21	sub UCSD	NIH	The Role of the G-CSF Receptor in Pediatric Medulloblastoma Pathogenesis	06/19/18
Altin, John	G01	sub NAU	DTRA	Identification of Burkholderia pseudomallei epitopes that stimulate adaptive T-cell responses during infection or in response to vaccination	06/15/18
Altin, John	G01	sub NAU	DTRA	Identification of Francisella tularensis epitopes that stimulate adaptive responses during vaccination or in response to infection	06/15/18
Engelthaler, Dave	G01	Prime	CDC	A Web Interface and Database for Customizable Resistome Characterization Applying Targeted Sequencing (ResCATS)	06/18/18
Highlander, Sarah	R21	sub LA BioMed	NIH	Analysis of the mouse mammary and gut microbiomes in immunocompetent versus immunocompromised mice	06/18/18
Engelthaler, Dave	U19	sub NAU	NIH	Southwest Genomic Center for Infectious Diseases	06/22/18
Han, Haiyong	R21	Prime	NIH	Targeting SE networks in pancreatic cancer	06/19/18
Berens, Michael	R01	Sub to UNC	NIH	"(PQ3) Dissecting the role of host genetics on glioblastoma evolution and treatment response using genetically-engineered mouse models and the Collaborative Cross."	06/29/18
Sharma, Sunil	G01	Prime	AACR/ Lusgarten Foundation/ SU2C	Targeting Innate Immune Response in PDAC	07/01/18
Engelthaler, Dave	R01	Sub ASU	NIH	Biophysical Identification of Common Pathogens from Periprosthetic Joint Infections	07/05/18
Huentelman, Matthew	R01	Sub Northwestern	NIH	Exceptional Cognitive Aging: Neuropsychologic, Anatomic and Pathologic	07/06/18
Huentelman, Matthew	R01	sub UofAz	NIH	Mechanism of 5HT2AR Regulation by Egr3	07/05/18
Trent, Jeff and Keats, Jonathan	OT	Prime	NIH	TGen: The Southwestern All of Us Genome Center	07/12/18
Altin, John	G01	Sub Baylor	NIH	Tuberculosis Lung-Challenge Models for Vaccine and Immunomodulator Development	8/15/18
Huentelman, Matthew	R01	Sub/ASU	NIH	Identifying the role of RIPK1 in Alzheimer's disease	8/8/18
Jensen, Kendall	G01	Prime	MJFox	Mechanisms of alpha-synuclein (aSYN) transmission: Are different forms of aSYN from control and PD patients taken up into iPSC-derived DA i-neurons from PD patients?	8/20/18
Jensen, Kendall	G01	Prime	MJFox	Extracellular vesicles from urine are enriched in brain transcripts and have potential as noninvasive biomarkers	8/20/18
Jensen, Kendall	G01	Prime	MJFox	Enrichment of brain-derived extracellular vesicles from plasma	8/20/18
Lang, Jessica	G01	Prime	DoD	Super-Enhancers in High-Grade Serous Ovarian Cancer: Mediators of Chemotherapy Response?	8/22/18
Han, Haiyong	R43/STTR	Sub/Caerus Discovery	NIH	Development of sFRP2 antibodies for treatment of pancreatic cancer	9/5/18
Han, Haiyong	R43/STTR	Sub/Mitchell Woods Pharmaceuticals	NIH	Targeting GPR55 Signaling in Chemotherapy and Immunotherapy of Pancreatic Cancer	9/6/18

PI	Type	Sub/Prime	Sponsor	Title	Date Submitted
Altin, John	U54	Sub NAU	SHERC (Southwest Health Equity Research Collaborative)	High-throughput characterization of health disparities related to viral infections	9/7/18
Engelthaler, Dave	R01	Sub Yale	NIH	Host and pathogen correlates of treatment response and mortality for HIV-associated MDR-TB	9/7/18
Engelthaler, Dave	R01	Sub Albert Einstein College of Medicine	NIH	Emergence of bedaquiline and clofazimine resistance after interruption of drug-resistant TB therapy in a high HIV prevalence setting	9/7/18
Jensen, Kendall	U01	Prime	NIH	Large scale exRNAs analysis to support biomarker discovery in Parkinson's disease and related disorder	9/6/18
Szelinger, Szabi	G01	Prime	AISNAF	Gene exxpression profiing and pathway analysis of BPAn patients with pathoegenic WDR45 variation	9/15/18
Engelthaler, Dave	R24	Sub C-Path	NIH	Relational Sequence Mycobacterium tuberculosis (ReSeqTB) Data Platform: A standardized bioinformatics platform for assessing globally representative clinically relevant MTB genetic polymorphisms.	9/25/18
Liang, Winnie	G01	Prime	Arizona Recycling Coalition	Arizona Recycling Coalition project	9/15/18
Banovich, Nicholas	G01	Partnering PI	DoD	Integrated molecular pathogenesis of pulmonary fibrosis	9/20/18
Jensen, Kendall	G01	Partnering PI	DoD	Genotypic and phenotypic examination of disease pathogenesis in C9orf72 FTD	9/20/18
Huentlman, Matthew	G01	Sub Mayo	DoD	A Multidisciplinary Translational Approach to Investigate the Mechanisms, Predictors, and Prevention of Persistent Post Traumatic Headache	9/20/18
Pirrotte, Patrick	G01	sub COH	DoD	IND-Enabling Studies for a Potential First-in-Class Therapy Targeting Neuroblastoma	9/20/18
Pirrotte, Patrick	G01	sub COH	DoD	IND-Enabling Studies of a Potential First-in-Class Therapy Targeting Neuroblastoma	9/26/18
Von Hoff, Daniel	G01	Sub to COH	DoD	Discovery of immune biomarkers that predict response to a novel chimeric immune-oncolytic virus expressing anti-PD-L1 in patients with peritoneal carcinomatosis	9/26/18
Rangasamy, Sampath	R01	Prime	NIH	Role of mTOR signaling in MeCP2 related disorders	10/5/18
DiStefano, Johanna	R01	Prime	NIH/NIDDK	Circulating protein and RNA signatures associated with nonalcoholic fatty liver disease and type 2 diabetes in obese Latino youth	10/5/18
Engelthaler, David	G01	Sub Critical Path Institute (C-Path)	FLINN	Prevent HAARM	10/8/18
Trent, Jeff	G01	Sub to COH	M2Gen	What are the treatment response predictive biomarkers and optimal combination treatment strategies for immune checkpoint inhibitors?	10/12/18
Trent, Jeff	G01	University of New Mexico	M2Gen	Addressing Cancer Disparities and Facilitating ORIEN Precision Medicine in Collaboration with American Indian Nations	10/12/18
Lewis, Candace	K99/00	Prime	NIH	Decoding Mental Health: Host DNA Methylation as a Mechanism of Microbiome Influence on Neuroconnectivity	10/12/18
Han, Haiyong	R01	Sub to ASU	NIH	Nanoplamonic Quantification of Tumor-Derived Extracellular Vesicles	10/15/18
Pirrotte, Patrick	G01	sub Baylor	DoD	Linking Neurophysiological Biomarkers and robotic exoskeleton gait training with outcomes after spinal cord injury	10/15/18
Lewis, Candace	G01	Sub Duke	NIH	Novel method for high frequency molecular biomarker collection	10/18/18
Szelinger, Szabolcs	G01	Prime	Orphan disease center	Gene Expresion profiling and pathway analysis in female and male patients with BPAN	10/19/18
Jensen, Kendall	UG3/UH3	Sub Mass-MULTI-PI	NIH	Molecular dissection and imaging of extracellular vesicles to define their orgin and targets	10/23/18
Jensen, Kendall	UG3/UH3	Sub UCSD	NIH	Development and application of a scalable workflow for immunomagnetic seperation of exRNA carrier subclasses and molecular analysis fo their cargo.	10/23/18
Jensen, Kendall	UG3/UH3	Sub UCSF	NIH	PRISM: Purification of exRNA by immuno-capture and Sorting using microfluidc	10/23/18
Jensen, Kendall	R01	Sub Ymir	NIH	Validation of a Rapid, Low-cost, Method for the Fractionation and Characterization of Distinct exRNA Populations from Biofluids	10/23/18
Jensen,Kendall	R01 Supp	Sub UCLA	NIH	AcoustoFluidic Separation (AFS) for Rigor and Reproducibiity of Aliva and Biofluids Exosome Isolation and Purfification	10/29/18

PI	Type	Sub/Prime	Sponsor	Title	Date Submitted
Huentelman, Matt	U24	Prime	NIH	Integrated Genome Sequencing and Data Resource Center in Support of the Gabriella Miller Kids First Pediatric Research Program	10/31/18
Banovich, Nick	Sub to ASU	R01	NIH	"Networks of interacting germline and somatic variants, modified by genetic sex, drive tumor etiology and outcome"	10/30/18
DiStefano, Johanna	R01 Supp	Prime	NIH/NINDS	Epigenetic markers of severity in nonalcoholic fatty liver disease	11/1/18
Berens, Michael	R35	Prime	NIH/NCI	Glioblastoma: Escape without a trace	11/2/18
Jensen,Kendall	UG3/UH3	Sub UCLA	NIH	Acoustofluidic Technology for Exosome Isolation and Purification: Translational Application for Liquid Biopsy for HPV-Oropharyngeal Cancer Detection	11/6/18
Engelthaler, Dave	R21	Sub to ASU	NIH	Innovative Isolation, Concentration and Characterization of Healthcare Associated Infection Pathogens	11/16/18
Schork, Nicholas	UH2/UH3	Prime	NIH	Integrative Omics to enhance therapeutics development for healthy aging	11/14/18
Dhruv, Harshil	U01	Sub to PVAMU	NIH	Mapping Spatial and Molecular Heterogeneity of Glioblastoma to MR Imaging for Precision Cancer Care	11/23/18
Murtaza, Muhammed	U01	Prime	NIH	Pre-analytical factors affecting ctDNA analysis in early stage breast cancer	11/28/18
Jensen, Kendall	G01	Sub/PVAM	MJFF	Pathway-guided biomarker discovery for neurodegenerative diseases	12/1/18
Engelthaler, Dave	R21	Sub Johns Hopkins Univ	NIH	Epidemiology of Group A Streptococcus on Navajo Nation - a Collaborative Approach to Quantifying and Understanding Health Disparities	12/1/18
Engelthaler, Dave	G01	Sub NAU	NSF	Research Inclusive STEM experiences-CCRISE	12/11/18
Von Hoff, Daniel	G01	Sub to COH	PanCan Action Network	Revoking Pancreatic Cancer's Immune Privilege	12/21/18
Haiyong, Han	G01	Sub to ASU	PanCan Action Network	Disrupting Desmoplasia in Pancreatic Cancer	12/21/18
Han, Haiyong	G01	Prime	PanCan Action Network	GPR55 Antagonists in Chemotherapy and Immunotherapy of Pancreatic Cancer	12/21/18