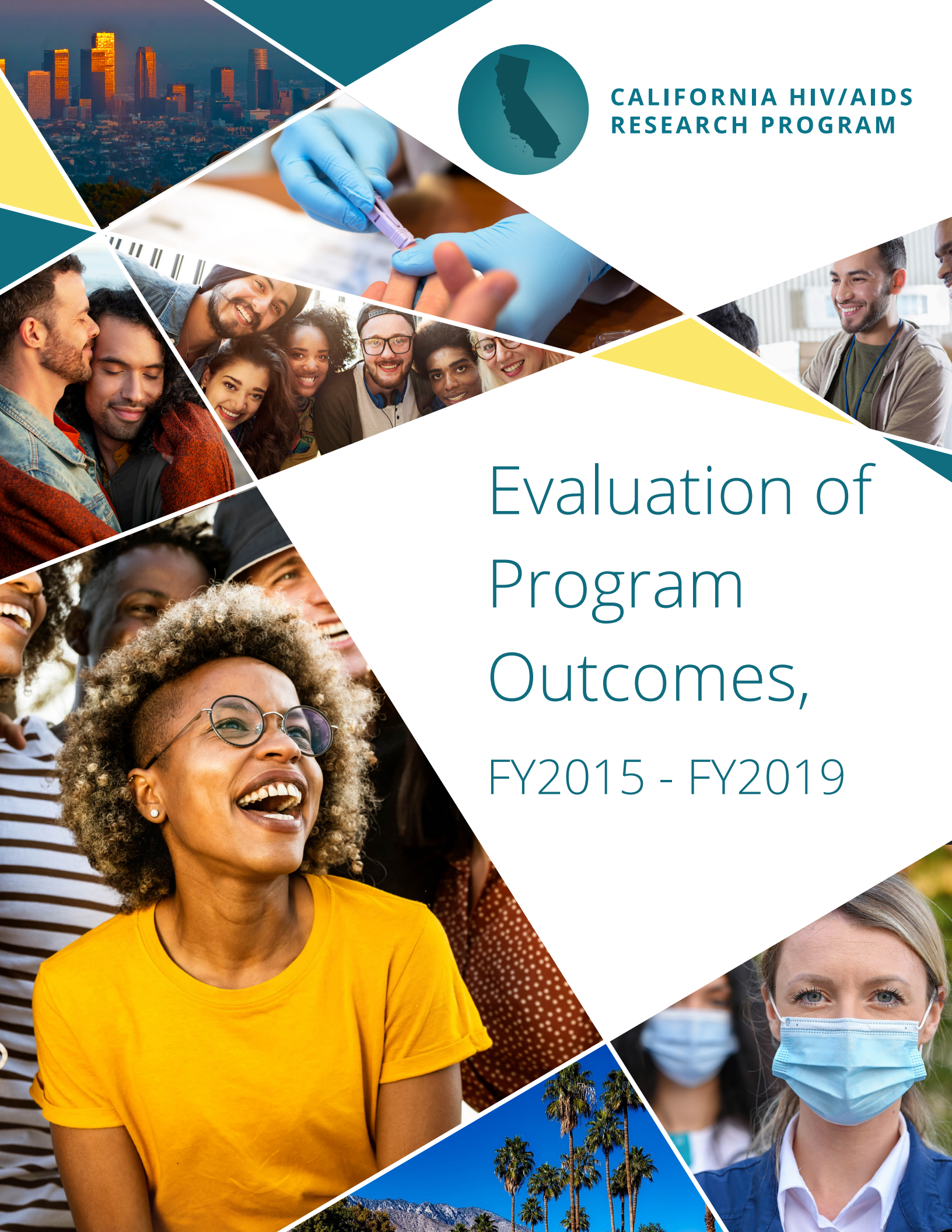

CALIFORNIA HIV/AIDS RESEARCH PROGRAM

Evaluation of Program Outcomes,

FY2015 - FY2019

EXECUTIVE SUMMARY

The California HIV/AIDS Research Program (CHRP) is a publicly funded grantmaking program, administered through the Division of Research and Innovation at the University of California, Office of the President. Since 1983, CHRP has invested over $300 million dollars through over 2,000 research grants to support the development, implementation, evaluation, and dissemination of innovative HIV projects through its stated mission:

> ***"To support scientists in California to develop, evaluate, and disseminate innovative research for (a) eliminating new HIV infections, (b) optimizing treatment uptake and outcomes for all persons living with HIV, and (c) addressing the comorbidities and social determinants that threaten the health and well-being of persons at risk for or living with HIV."***

By design, CHRP funds research that primarily serves communities that are highly impacted by HIV, such as people of color, sexual and gender minorities, and other communities that are experiencing health disparities. The program also preferentially supports students/trainees from groups that are underrepresented in science, and early career investigators, building diversity at the start of the pipeline of research personnel.

In 2021 we conducted an outcome evaluation to assess the degree to which activities reflected our mission, to quantify the programs recent effectiveness, to inform strategic program planning and improvement, and to provide accountability and transparency for our stakeholders. Our Advisory Council oversaw the process, and together we created the programs first ever logic model and defined the research and evaluation "Outputs" and "Outcomes" to be assessed, which included:

Output Indicators

- Advancing research to end the pandemic
- Building diversity and capacity in HIV research
- Engaging, including, and serving

Outcome Indicators

- Sustainable HIV research capacity
- Economic benefit to California
- Evidence-based changes in policies, practices

To quantify outputs and outcomes, we used existing program data, publicly available data, and primary data collected by surveying Program investigators from the past five years (FY15-16 through FY19-20) and the five years before that (FY10-11 through FY14-15) for comparison.

Major **output** findings presented in this report demonstrated that CHRP has improved on all indicators over the study surveillance period by:

- More than doubling (39% to 86%) the number of grants supporting communities highly impacted by HIV;
- Nearly doubling of the average number of students/trainees supported per award (4.2 vs 2.6);
- Nearly doubling the number of pilot awards to early-stage investigators (29% to 50%); and
- Increased diversity among Principal Investigators by demonstrating they are from communities highly impacted by HIV (21% to 28%).

Similar improvements were noted with respect to **outcome** findings through:

- Doubling of the number of peer reviewed scientific publications (254 vs 126) from CHRP funded projects, resulting in 5.7 publications per $1M spent; greater than the national average which is 4.2;
- Approximately two-thirds (67%) of CHRP awardees reported using project findings to securing additional funding through external sources five years later. For these awardees $1 invested by CHRP in pilot awards resulted in $14 secured in leveraged funding from external sources, and $17 in new leveraged funding per $1 invested in UC campuses specifically; and
- A five-fold increase (47 vs 9) in the number of policy briefs developed by CHRP grantees.

Key recommendations from these findings include:

- It is critical that the Program centers the voices of persons and communities who are highly affected by HIV in our work: we must measure the degree to which we do so, and do more;
- Scientific productivity includes reporting back to the community as well as indexed publications: we will continue to refine how we measure this indicator;
- Sustained partnerships will help decrease silos and lead to better health outcomes for our priority communities: will should continue to invest in these;
- Building up the pipeline of future investigators is an essential part of CHRP's mission and is expressly valued by our stakeholders: our funding priorities will continue to reflect this;
- Adopting a complexity science approach led to increased scientific productivity: stay the course;
- Our basic biomedical pilot awards are economic catalysts for California and UC: continue these;
- A nimble fiscal stance allowed us to pivot to SARS-CoV-2 pandemic research: maintain this;
- CHRP's impact on the California HIV epidemic is evident and enduring through health care and policy changes: we should continue to prioritize policy research as the bridge from clinical research to real world change, and share this model with other California programs.

Taken together, these conclusions and the data behind them tell the story of **CHRP as a catalyst for moving science forward** by sponsoring groundbreaking and inclusive HIV research, and our funded research directly serves **highly impacted communities** including people of color and sexual and gender minorities. This work yields **tangible innovations** for the benefit of the whole field, yields **millions of dollars of leveraged research funding** for California, is the on-ramp for new investigators from **communities that are underrepresented in science,** and results in systemic shifts in HIV prevention and care systems. With this evidence in hand, we will convene a group of stakeholders in 2023 to consider how to continue to improve the program's contribution to achieving HIV epidemic control in California and to inform how we might improve our impact over the coming years.

Lisa Loeb Stanga, DrPH MPH
Program Officer
California HIV/AIDS Research Program

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PURPOSE AND INTENDED UTILITY OF CHRP OUTCOME EVLUATION

Goal-Based Evaluation Framework

The main goals of the California HIV/AIDS Research Program (CHRP) are to support the development, implementation, evaluation, and dissemination of innovative research for (a) eliminating new HIV infections, (b) optimizing treatment uptake and outcomes for all persons living with HIV, and (c) addressing the comorbidities and social determinants that threaten the health and well-being of persons at risk for or living with HIV. Each year, CHRP receives $8,753,000 as part of the University of California's unrestricted general fund revenue from the State of California, which we invest in research initiatives to advance HIV prevention and care research, enhance research capacity and excellence, and create training opportunities for the next generation of investigators across the state. To examine the impact of our investments in relation to the program goals, we conducted the present comprehensive program outcome evaluation.

As a public health research program, our goals are expressed as health-related outcomes at the population level. Thus, changes in outcome measures of CHRP's goals would necessarily reflect many more forces than the program alone; we hope to contribute to improvements in society but cannot directly attribute any of those changes to the program itself. Rather, to assess our effectiveness toward our goals, we can measure those things that the program did have direct influence upon. To do this, we created a logic model (see page 8) which shows current inputs and activities, nearer term ***outputs*** (tangible products and capacities that were built directly with CHRP awards), and longer-term ***outcomes*** (changes in larger conditions that take time to solidify) which result from our funded activities.

We drew from an evaluation framework specifically for public health programs from the Centers for Disease Control and Prevention (CDC; Figure 1), to guide our formation of a specific evaluation plan and operationalization of ten program indicators to measure program outputs and outcomes (CDC 1999).

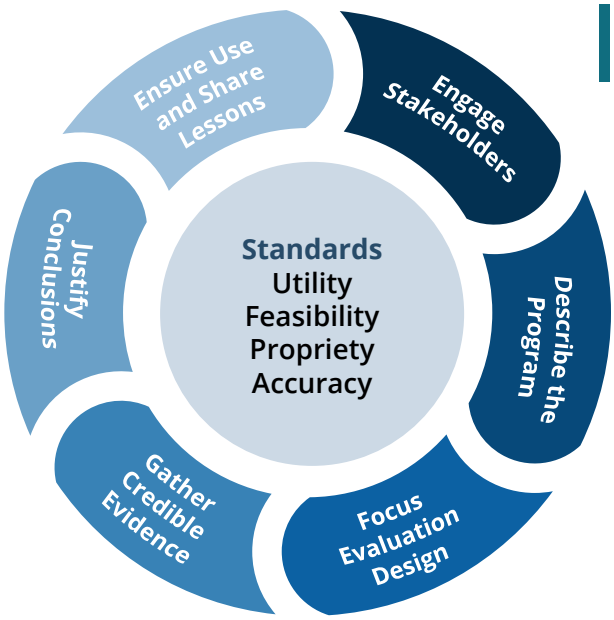
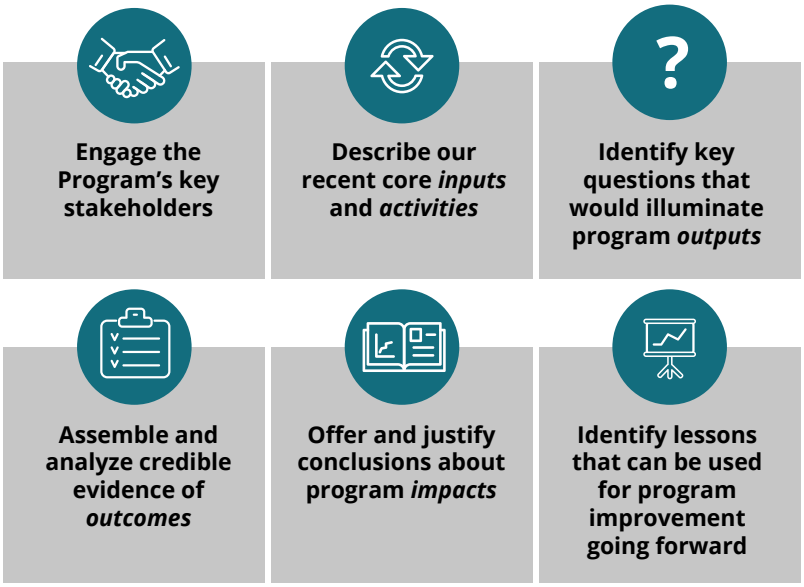


Figure 1: CDC Recommended Framework for Public Health

The six steps we used for the present evaluation were adapted from that framework:



Identifying Key Questions about Program Effectiveness

The CDC framework also specifies standards for selecting effective evaluation indicators, including utility, feasibility, propriety, and accuracy. These standards were applied when creating the plan and selecting indicators to ensure rigor and to retain focus on the key underlying questions: Will this evaluation itself be useful, and thus effective? Are we asking the right questions? Are we measuring the right things, in the right ways? To do this, we engaged in an iterative process with our Advisory Council, which yielded questions we could ask about our effectiveness, and indicators which would be useful, feasible, and accurate for answering those questions.

Timeline of Evaluation Activities Resulting in the Present Report

The evaluation effort was launched in May 2020 when the Advisory Council formed a subcommittee to oversee the process and advise CHRP staff on the formation of the evaluation plan. In July 2020, we created a logic model and developed indicators. In November 2020 we operationalized the indicators, determined data collection methods, and formulated dissemination steps. The final plan was approved by the full Advisory Council in April 2021; data collection and analysis were completed by September 2021, and the report was presented to the Advisory Council in May 2022.

BRIEF DESCRIPTION OF PROGRAM AND CONTEXT

Core Activities

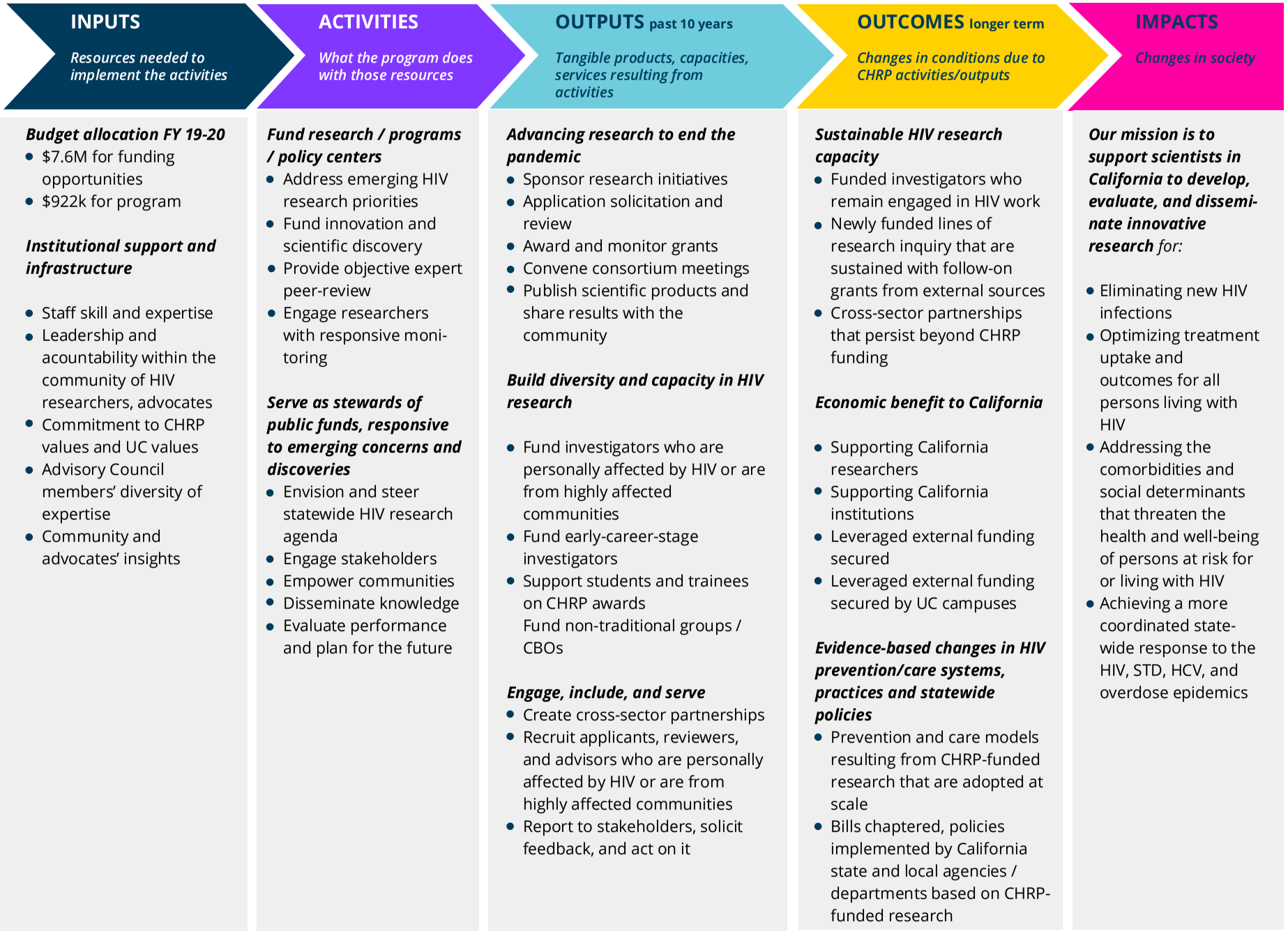
CHRP is a publicly-funded research grantmaking program, administering approximately $7,600,000 per year in direct grant funding to support HIV research in California (and spending the remaining $1,153,000 of our allocated budget on program administration). The Program is one of many within the Research Grants Program Office in the Division of Research and Innovation of the University of California, Office of the President. We monitor the epidemiologic profile of the HIV epidemic in California and the needs that arise within the many micro-epidemics of HIV across the different communities in the state; review current funding available from other sources to address those needs; create funding initiatives to address the most critical or underfunded or newly emerging research needs; cultivate a diverse body of applicants; recruit and train peer reviewers of the highest academic caliber and dedication to the field; enlist and train community members to serve as non-academic reviewers; fund highly meritorious and innovative research proposals; engage with investigators for pro-active and responsive monitoring of scientific and budgetary progress toward goals; disseminate findings; and convene the research community to refine our shared agendas and move science forward.

Logic Model

These core activities are intended to result in tangible products, capacities and services which can be observed in the years following their implementation, such as scientific publications and demonstration projects, which in turn are expected to result in changes in conditions in which HIV science in California is conducted, such as sustained research funding at California institutions, and research-driven policies to improve the lives of people living with or at risk for HIV. The logic model on the following page is a graphic depiction of the relationship between program inputs, activities, outputs, and intended outcomes. The structure of the model is adapted from one funded by the National Institutes of Health (NIH), which can be seen at https://www.niaid.nih.gov/about/assessment-chavi-id (accessed 02June2020).

- **Monitor** the epidemioloic profile of HIV epidemic in California
- **Review** and create funding to address the most critical or underfunded or newly emerging research needs
- **Cultivate** a diverse body of applicants
- **Recruit and train** academic and community reviewers
- **Fund** highly meritorious and innovative research proposals
- **Engage** with investigators for pro-active and responsive monitoring
- **Disseminate** findings
- **Convene** research community to refine shared agendas and move science forward

Figure 2: CHRP Logic Model: Relationship between Program Inputs, Activities, Outputs, Outcomes, and Impacts



CHRP Logic Model version 01 Dec 2021; schematic based in part on https://www.niaid.nih.gov/about/aassessment-chavi-id, accessed 02 June 2020.

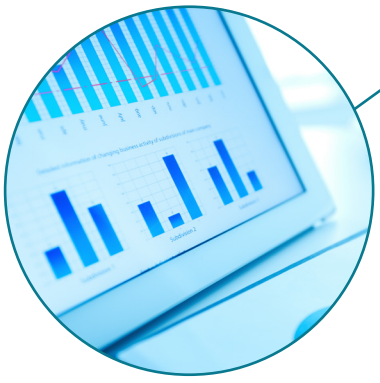
ASSEMBLING THE RELEVANT EVIDENCE: INDICATORS, DATA SOURCES & METHODS

Stakeholder Engagement to Focus Evaluation

As a public health research program, CHRP's work depends upon and seeks to strengthen robust partnerships across multiple sectors, each serving the public good. As we plan our work and evaluate its merit, we enlist our Advisory Council to directly participate in higher-level aspects of our work to ensure that we are accountable to a group of external stakeholders who are experts in the field. Our Advisory Council includes and represents persons at risk for or living with HIV; academic researchers and their institutions; community-based organizations that serve highly affected communities; and public health leaders. With these Council members we designed the present evaluation plan, created the logic model and indicators, and will determine how the results will be used to improve the program going forward.

Time Period of Examination

This evaluation rubric is intended to (a) be appropriate for replication to track trends in outcomes over time, and to (b) adapt as both the program and the HIV research landscape evolve. For this first iteration, we "look back" on the five most recent fiscal years of data, from awards with start dates in FY2015-2016 (July 1, 2015 – June 30, 2016) through and including those with start dates in FY2019-2020 (July 1, 2019 – June 30, 2020). In the University of California financial nomenclature, this period is referred to as FY2016 through FY2020. For purposes of this report, the period is referred to as FY15-16 through FY19-20. For select indicators we also looked at data from the prior five-year time period (awards with start dates between July 1, 2010 and June 30, 2015) to compare changes over time.



Indicators with Definitions and Data Sources

From the green and yellow sections of the logic model (program outputs and program outcomes, respectively) we created six groups of indicators, and operationalized their measurement including term definitions, specific metrics, and data sources. Figure 3 shows the final set of all indicators and the data sources used to address them.

Figure 3: Evaluation Indicators and Data Sources

Output indicators	Program Data	Public Data	Survey Data
Advancing research to end the pandemic			
1. Count of HIV research initiatives sponsored; dollars invested	✓		
2. Count of new research awards funded	✓		
3. Count of scientific products published (indexed in PubMed; presentations; policy briefs)	✓	✓	✓
Building diversity and capacity in HIV research			
4. Percent of funded principal investigators (PIs) who are persoally affected by HIV / from highly affected communities (HACs)			✓
5. Percent of funded PIs who are early-career-stage investigators (basic biomedical pilots only)	✓		✓
6. Mean number of students, trainees, and early-career-stage researchers supported per award			✓
Engaging, including, and serving			
7. Count of cross-sector partnerships created by CHRP awards	✓		✓
8. Percent of peer reviewers enlished who are personally affected by HIV / from HACs			✓
9. Percent of Advisory Council members recruited who are personally affected by HIV / from HACs			✓

Outcome Indicators	Program Data	Public Data	Survey Data
Sustainable HIV research capacity			
10. Percent of funded PIs who remain engaged in HIV work five years after CHRP award		✓	✓
11. Percent of newly funded lines of research inquiry that are sustained with follow-on grants		✓	✓
12. Percent of newly formed cross-sector partnerships that persist beyond CHRP funding			✓
Economic benefit to California			
13. Dollars of leveraged external funding secured after pilot award; per $1 invested	✓	✓	✓
14. Total dollars of leveraged funding secured and mean per award for University of California campuses only	✓	✓	✓
Evidence-based changes in policies, practices			
15. HIV prevention or care systems/practices from CHRP research adopted at scale or paradigms shifted		✓	✓
16. Bills chaptered; policies implemented by state/local agencies from CHRP research		✓	✓

Data Collection Methods

CHRP Internal Program Data ("Program Data")

Selected data (for Indicators 1, 2, 3, 5, 7, 13, and 14) were actively collected by the Program in electronic format via our online grants management database (SmartSimple) which is used to solicit and review applications for grant funding, track scientific and budgetary progress of awards, and report on programmatic fiscal activities. For Indicators 1 and 2 we queried the database for each of the figures reported (count of initiatives; sum of dollars; count of awards); for the remaining five Indicators, we used database query results to supplement survey data (scientific products; early career stage investigators; cross-sector partnerships; economic benefit; economic benefit to UC). These database-dependent strategies are limited by the validity, reliability, and completeness of the underlying data; in this case, CHRP's grants management database is part of a robust system used by multiple grantmaking organizations within UCOP, and as such includes multiple layers of automated data validation and routine auditing.

Publicly Available Data ("Public Data")

For Indicators 3, 10, 11, 13, 14, 15, and 16, we used data from public sources (National Institutes of Health RePorter; amfAR; Bill and Melinda Gates Foundation; and the like) which we accessed on the internet. Data were queried via general internet search or direct query to the outside organizations website, and stored in a spreadsheet for future reference. These internet-dependent strategies are limited by (a) the quality of the underlying data; (b) our ability to discover sources that aren't previously known to us, and, relatedly, (c) detection bias, without knowing the universe of discoverable funding sources, those that we are already aware of may influence which previously unknown sources we do discover. In general, the discovery step would be limited more so by potential censoring (failing to discover) than by misallocation (listing a discovered source of leveraged funding as related to the CHRP award when in truth it was not), which would tend to bias results toward the null (underestimating the impact of the program).

Primary Data Collection ("Survey Data")

For Indicators 4 through 10, an individualized survey was deployed to collect data that was not obtained by the program data and/or internet search strategies. The instrument (included as Appendix Two) was programmed in surveymonkey and sent via name-linked email using the mailchimp platform to all investigators and trainees who received CHRP funding with an award start date in one of the five-year periods of interest. An option to provide anonymous feedback in a non-name linked fashion was also offered. Non-responders received three reminder emails from surveymonkey, then a personal email from CHRP staff, then a phone call as a last effort at recruitment. Recruitment efforts were planned to end once a 66% response rate was achieved, or all recruitment efforts described above were exhausted.

RESULTS

Detailed results for each indicator are presented in the following pages, corresponding to the three ***output*** and three ***outcome*** indicator groups in Figure 3 (which are carried forward from the logic model in Figure 2). Results are presented here for every indicator for the current five-year period, and for the prior five-year period where applicable, with the intention of re-examining these same indicators in five-year increments going forward for trend analysis.

After recruitment efforts were completed, a total of n=42 funded investigators had responded to our survey. For the current five-year period, 21 out of 39 unduplicated investigators (counted only one time if they had received multiple awards during the time period of interest) replied, yielding a response rate of 54% (26% for the more distal comparator period).

Table 1: Survey Response Rate by Evaluation Period

	Current Five Year Period FY15-16 to FY19-20	Prior Period FY10-11 to FY14-15	Total
Unduplicated investigators	39	99	138
Responded to survey	21/39	21/99	42/138 (30%)
Did not respond	60	22	
Unable to contact	17	0	

Building Diversity and Capacity in HIV Research

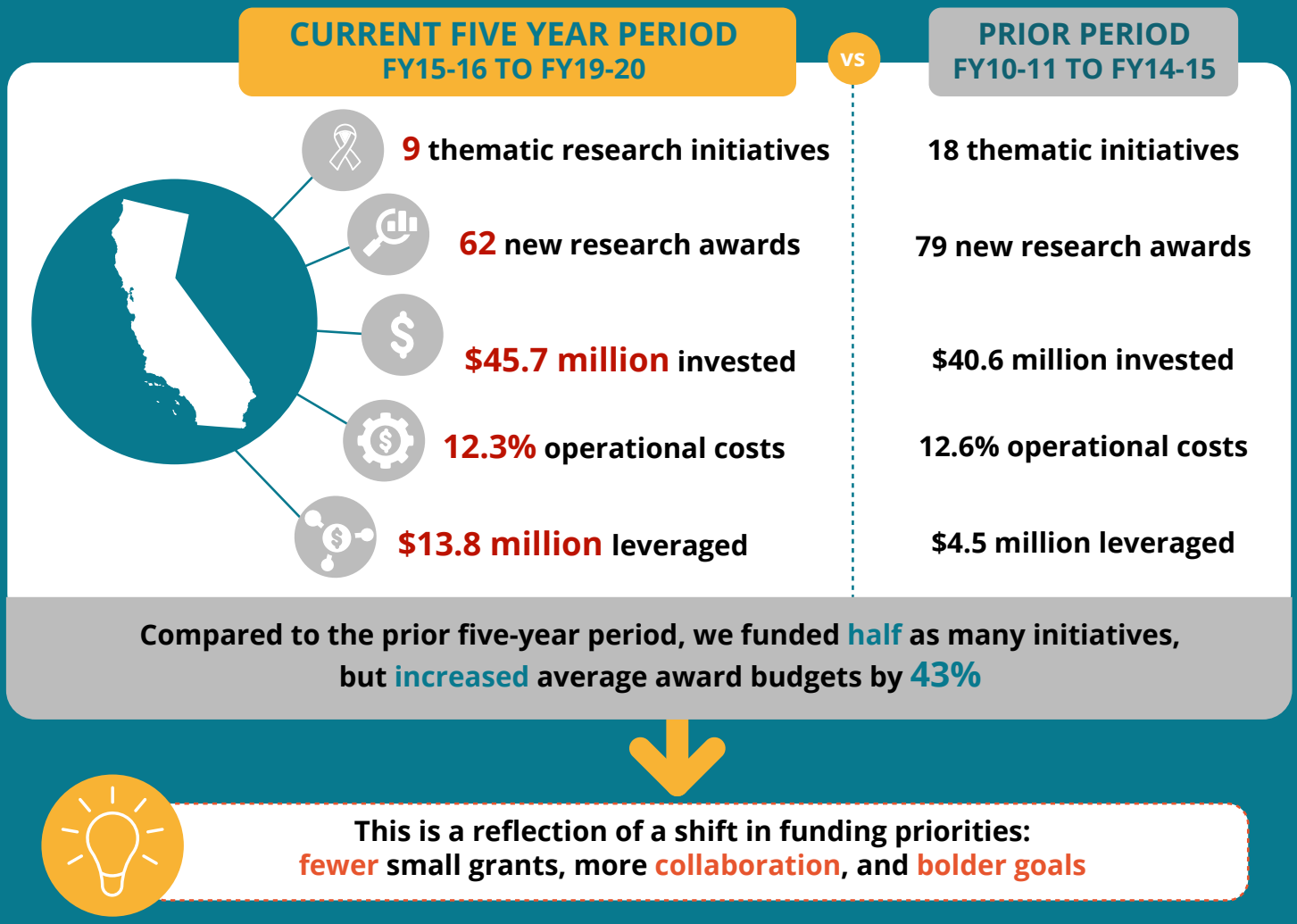
Output Indicators 1 & 2	Current Five Year Period FY15-16 to FY19-20	Prior Period FY10-11 to FY14-15
1. HIV research initiatives sponsored	9	18
Total dollars invested	$40,612,528	$45,662,924
Mean per award	$514,023	$736,499
Proportion of budget used for operational costs	12.6%	12.3%
2. New research awards funded	79	62

Definitions

Indicator 1: For purposes of this evaluation, a "research initiative" refers to a formal commitment to fund investigator-initiated research projects to address a well-defined and critical HIV research need. Each research initiative includes a request for applications, an estimated number of projects to be funded, and an estimated total dollar investment for the initiative. Operational costs are the sum of allocations for program operation, research application solicitation and evaluation, and dissemination.

Indicator 2: A "research award" is an individual grant application that is selected for funding and is subsequently awarded by CHRP – in most instances where a research project had multiple institutional partners, each partner received their own institutional grant, so award counts reflect that.

CHRP RESEARCH INVESTMENTS



Over the five year period of interest (FY15-16 to FY19-20), CHRP sponsored nine thematic funding initiatives (detail in Table 2) totaling $45,662,924 in HIV-related research; on average, we committed about $9.1M per year. Compared to the prior five-year period, we funded half as many initiatives but increased average award budgets by 43%. This is a reflection of a shift in funding priorities: fewer small grants, more large cooperative awards, and larger funding initiatives. We kept operational costs between 12 and 13% of total allocations, lower than the 15% benchmark used by RGPO (see page 12 of the *RGPO Ten Year Report*.)

DOLLARS INVESTED BY THEMATIC AREA, 2015-2019

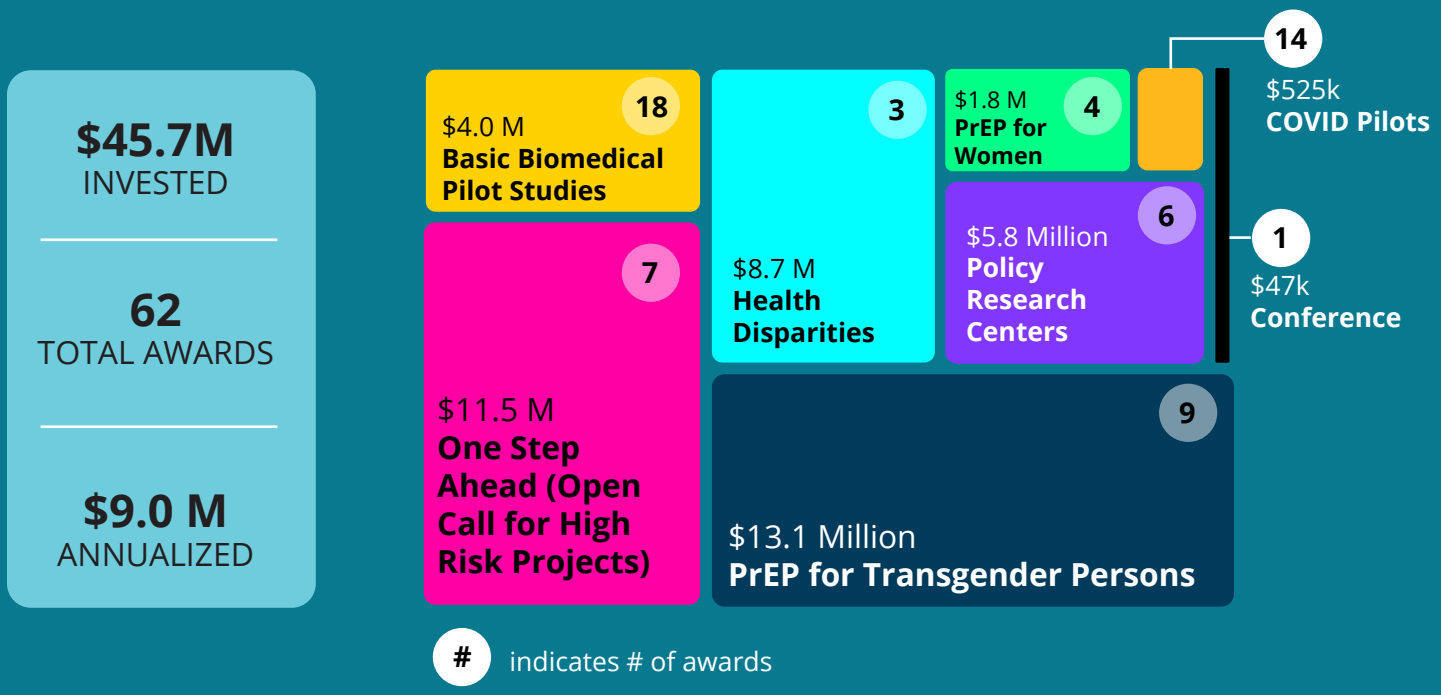


Table 2: Detail for Indicators 1 and 2 - CHRP Research Initiatives, Awards Funded, Dollars Committed per Fiscal Year

Start of Award	Initiative	Awards funded	Dollars Invested	FY Total
FY15-16	PrEP for Women	4	$1,800,00	**$31,249,071**
	Basic Biomedical Pilot Studies	9	$1,744,527	
	Disparities	3	$8,758,009	
	PrEP for Transgender Persons	9	$13,114,732	
	Policy Research Centers	6	$5,831,803	
	Cross-Consortia Conference			
FY17-18	One Step Ahead	7	$11,521,737	**$11,521,737**
FY18-19		0	$0	**$0**
FY19-20	Basic Biomedical Pilots	9	$2,319,833	**$2,844,833**
	COVID-19 Emergency Seed Funding	14	$525,000	
	Total, All Years	**62**		**$45,662,924**
	Mean per year			***$9,092,585***

We assessed the degree to which the projects that CHRP funded addressed the four aspects of the program's mission. We found that in both five-year periods, 100% of awards addressed at least one aspect of the program mission, with none of the four aspects being neglected.

Table 3: CHRP Awards by Mission Aspects Addressed

CHRP Mission: Count of Awards by Mission Aspect Addressed	Current Five Year Period FY15-16 to FY19-20	Prior Period FY10-11 to FY14-15
Number of awards	49*	79
Eliminating new HIV infections	23 (47%)	44 (56%)
Organizing treatment uptake and outcomes for all persons living with HIV	31 (63%)	50 (63%)
Addressing the comorbidities and social determiannts that threaten the health and well-being of persons at risk for or living with HIV	24 (49%)	26 (33%)
Achieve a more coordinated statewide response to the HIV epidemic	10 (20%)	4 (5%)
Awards addressing at least one aspect of CHRP mission	**49 (100%)**	**79 (100%)**

**Excludes n=13 COVID Emergency Seed Awards*

Advancing HIV Research to End the Pandemic

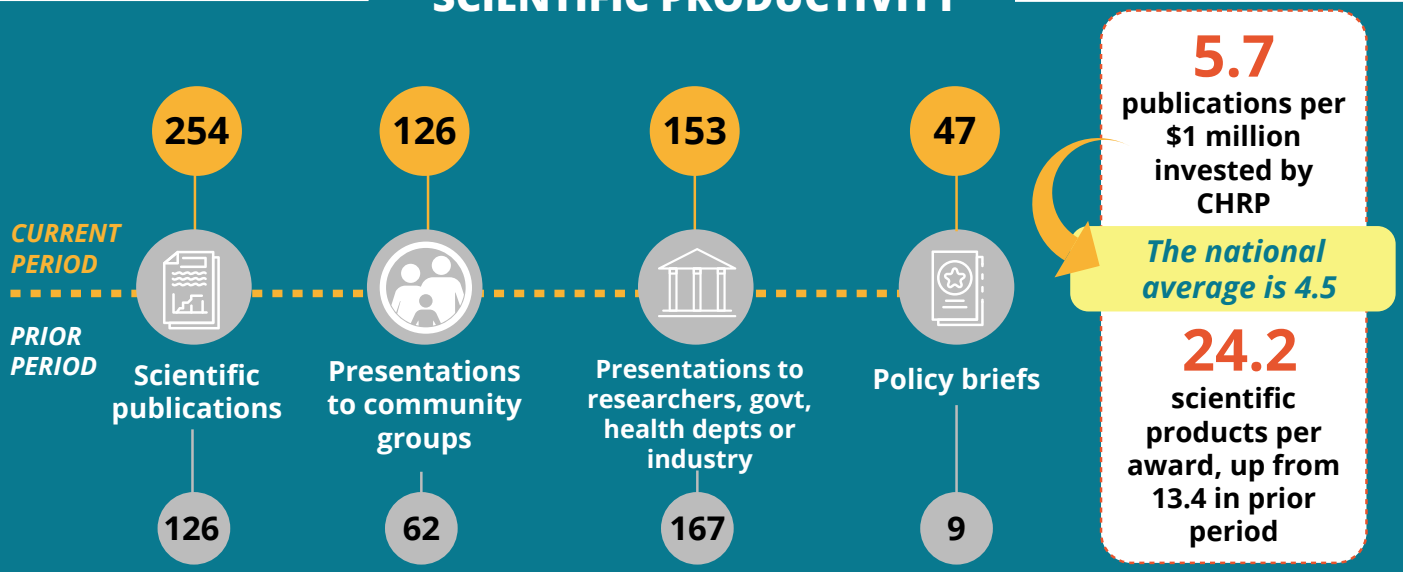
Output Indicator 3	Current Five Year Period FY15-16 to FY19-20	Prior Period FY10-11 to FY14-15
3. Scientific publications indexed in PubMed[a]	254	70
Mean per responding award	10.6	3.0
Mean per $1 million invested	5.7	1.7
Benchmark: national average of indexed publications per $1 million invested[b]	*4.5*	

Definitions

Indicator 3: A "scientific product" is either a publication that is indexed in PubMed ("indexed publications"), a scientific presentation (to a community group, research group, government, public health agency, or industry), or a written report or policy brief for an official public health department or governmental agency.

[a]Data source: For each PI name, we generated a list of all potentially relevant publications indexed in PubMed, and sent the results to the PI who noted for each publication if it was attributable to their CHRP funding source.
[b]Data Source: SciVal.com, accessed 01Oct2019 per RGPO Ten Years in Review, June 2020

SCIENTIFIC PRODUCTIVITY



Using a combination of public and survey data (see data sources in [a-c] above), the responding PIs published 10.6 scientific publications, on average, per CHRP award in the current period, yielding 5.7 scientific publications per $1 million invested by CHRP (triple the prior period and above the national average of 4.5). Using the expanded definition of all scientific productivity (including indexed publications; presentations to community groups, government, health departments, or industry; and written reports and policy briefs for health departments or governmental entities), they released 580 scientific products of all types, or 24.2 scientific products per award in the current period (an increase from 13.4 in the baseline period). Table 4 shows these products by type.

Table 4: Total Scientific Productivity, Including Publications, Presentations, and Policy Briefs

	Current Five Year Period FY15-16 to FY19-20	Prior Period FY10-11 to FY14-15
Scientific publications indexed in PubMed[a]	254	70
Presentations to community groups[c]	126	62
Presentations to researchers, govt, health depts or industry[c]	153	167
Written reports / policy briefs for health depts or govt[c]	47	9
Total scientific productivity	**580**	**308**
Mean products per responding award	24.2	13.4
Mean products per $1 invested	13.0	7.5

a

[c]Data source: Survey data

Building Diversity and Capacity in HIV Research

Output Indicators 4, 5, and 6	Current Five Year Period FY15-16 to FY19-20	Prior Period FY10-11 to FY14-15
4. Funded PIs personally affected by HIV or from highly affected communities	28%	21%
5. Funded PIs who are early-career-stage investigators (basic biomedical pilots only)	50%	29%
6. Students, trainees, and early-career-stage re searchers supported per CHRP award, mean	4.2	2.6

Definitions

Indicator 4: Among funded PIs, count and proportion who identify with a community that is highly affected by HIV or are personally affected by HIV (may include, but not be limited to, those with elevated HIV incidence such as Black or African American, Latinx, transgender, non-binary, immigrant, gay/bi/queer males, homeless, injection drug using, queer youth, people over 50, and more).

Indicator 5: Count of funded principal investigators supported by basic biomedical pilot study awards who are early-career-stage investigators (PI has not received a substantial, independent research grant funding at or similar to the R01 level, nor have they received pilot funding from CHRP in the past).

Indicator 6: Count of potential future researchers (students, trainees, post-doctoral scholars, or early-stage researchers) supported, in whole or in part, on CHRP funded research projects (excluding non-trainee research staff, such as lab technicians, project coordinators, clinical care staff, and the like.)

28%
Investigators who identify with a community that is highly affected by HIV or are personally affected by HIV
up from 21%

50%
Basic biomedical applicants who qualified as early career stage investigators
up from 29%

4.2
Mean number of students, trainees, and early-career-stage investigators per award
up from 2.6

Among the funded investigators who responded to the survey, the proportion who identify with a community that is highly affected by HIV or are personally affected by HIV increased from 21% in the prior five-year period to 28% for the current five-year period. The proportion of basic biomedical applicants who qualified as early career stage investigators increased from 29% in the prior five-year period to 50% in the current five-year period. The mean number of students, trainees, and early-career-stage investigators supported in whole or in part on each CHRP award increased from 2.6 per award in the prior five-year period to 4.2 per award in the current five-year period.

Taking these three indicators together, we sought to dig deeper and examine the reach of our grantmaking stratified by demographic characteristics CHRP-funded scientists (such as race, ethnicity, gender, gender identity, and more), but historically CHRP has not required PIs to report on demographics for themselves or their study teams. This is a key opportunity for improvement, and we are currently changing our policy on this.

We assessed the degree to which our HIV research grants addressed selected California communities that are highly affected by HIV. In the current five-year period, 86% of all awards addressed at least one of the communities in California listed below that are highly affected by HIV, up from 39% in the first five-year period.

California's Highly Affected Communities

Count of Awards by Communities Addressed

	Current Period FY15-16 to F19-20	Prior Period FY10-11 to FY14-15
African Americans	18	23
Other People of Color	19	26
Transgender Persons	20	14
Men who Have Sex with Men	11	23
Women	2	10
Homeless, Criminal Justice Involved, Persons with Substance Use Disorders, Persons with Mental Illness (Unduplicated)	9	4
Awards addressing at least one highly affected community	**42 (86%)**	**31 (39%)**
**Excludes n=13 COVID Emergency Seed Awards*	**N=49* Awards**	**N=79 Awards**

BUILDING DIVERSITY, INCLUSION, AND CAPACITY IN HIV RESEARCH

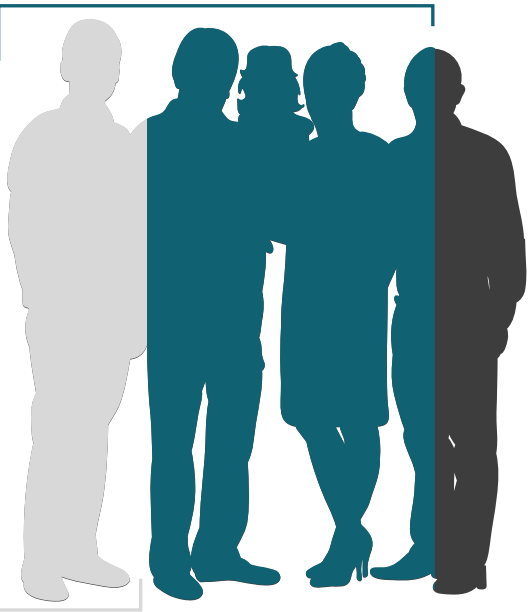
CURRENT PERIOD

86% of funding to priority communities

62
Total awards

PRIOR PERIOD

39% of funding



Engaging, Including and Serving

Output Indicators 7, 8, and 9	Current Five Year Period FY15-16 to FY19	Prior Period FY10-11 to FY14-15
7. Cross-sector partnerships created	29	26
--- Mean per award	1.6	0.9
8. Peer reviewers who were personally affected by HIV / from highly affected communities	40%	(not collected in prior years)
9. Advisory Council members who are personally affected by HIV / from highly affected communities	40%	(not collected in prior years

Of the 29 new cross-sector partnerships that were founded in the current five-year period, ten of them were required to form by the terms of the CHRP award (e.g. the academic PI was required to form a partnership with either a community-based organization, a governmental office such as a Department of Public Health, or an industry partner), but the remaining 19 were not (these partnerships occurred as a result of the CHRP awards but were not required as part of them).

Investigators described some of these partnerships in the survey:

"The award led to the creation of the Ending the Epidemics Coalition and helped us to form much stronger relationships with our government partners," including leaders at the San Francisco Department of Public Health and the California Department of Public Health Office of AIDS. The Ending the Epidemics Coalition coordinated a collaborative process that culminated in the Community Consensus Statement of May 23, 2019, which called for a new statewide initiative to end the HIV, HCV and STI epidemics in California. The Statement stresses the importance of meaningful community involvement and was signed by 160 community-based organizations. **As a result, the California FY2021-2022 State Budget included an additional $13 million to address inequities in access to HIV prevention, fund STI prevention activities, improve access to harm reduction services, and fund diagnosis and treatment of hepatitis C.**

An investigator at UCLA formed a new partnership with the Los Angeles County Department of Public Health (DPH), and they continue to publish results and seek future funding together.

"...new partnerships with several community-based clinics providing care for transgender people in San Francisco and Alameda Counties. These clinics served as implementing partners on the project, and we continue to have ongoing relationships with all of our implementing clinics."

Multiple PIs reported forming new inter-UC partnerships (UCLA:UCSD; UCSD:UCB, etc.).

The "TLC+ Project" notably resulted in partnerships beyond the scope of the project itself: it led to "important and long-lasting partnerships with multiple community-based HIV clinics and agencies, and the county Department of Public Health."

One project strengthened ties among the "San Francisco DPH Surveillance Branch, San Francisco AIDS Foundation, La Clinica de la Raza, and the East Bay AIDS Center."

Three PIs reported new partnerships with the Alameda County DPH, and one formed new partnership with both the San Diego and the Los Angeles DPHs.

A team developed "partnerships with trans and Black gay men in multiple small communities across Los Angeles; the partnerships are still ongoing."

"Newly established partnerships with two community health providers (THE Clinic, APLA Baldwin Hills) for women's PrEP Project."

Two PIs reported new partnerships with NIH intramural researchers due to their CHRP funding.

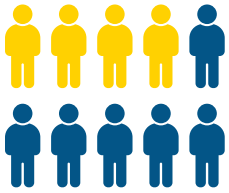
A trainee at a UC campus engaged a private company to jointly develop software to facilitate and enhance drug design; this partnership persisted after the project was completed.

"La Clinica de la Raza, a community-based clinic, who continue to partner with us on research by and for transgender communities in Oakland."

One initiative that was specifically designed to require cross-sector partnerships, the HIV Policy Research Centers Initiative, has demonstrated a uniquely far-reaching impact on HIV science in California.

In our survey, an investigator reported that their "research partnerships with state agencies (e.g., California Department of Public Health, California Office of AIDS) and local health jurisdictions (e.g., Los Angeles County Department of Public Health) have been built over the course of time and across multiple projects [with this CHRP funding]. State and local agencies hold administrative data; the Southern California HIV Policy Research Center (SCHPRC) has the capacity to leverage such data to conduct relevant and timely policy research to inform viable policy proposals. These proposals ultimately benefit state and local agency efforts to address the HIV epidemic. This reciprocity is essential to the success of SCHPRC, and we have worked diligently to maintain partnerships with state and local agencies for this reason."

We asked both peer reviewers and Advisory Council members, "Do you identify with a community that is highly affected by HIV or are you personally affected by HIV? (This may include but not be limited to communities with elevated HIV incidence in California such as Black or African-American, Latinx, transgender or gender non-conforming, non-binary, immigrant, gay/bi/queer males, persons experiencing homelessness, persons who inject drugs, queer youth, people over 50, and more)." This item was added to the post-review questionnaire for one panel of peer reviewers in the last year of the current five-year period; of the ten reviewers, five responded to the questionnaire and two of them (40%) endorsed "yes, I identify as such." Among Advisory Council members, 22 persons had served during the current five-year period (2015 – 2020), and they each were sent a single email with a link to a one-question anonymous survey; ten people responded, and of them four (40%) endorsed "yes, I identify as such". These small sample sizes don't lend themselves to generalizations, but may serve as rough baseline estimates as we seek to track this indicator going forward.



40% Advisory Council members identify with a community that is highly affected by HIV or are personally affected by HIV

Sustainable HIV Research Capacity

Outcome Indicators 10, 11, and 12	Current Five Year Period FY15-16 to FY19	Prior Period FY10-11 to FY14-15
1. HIV Investigators who remain engaged in HIV work five years after CHRP award began	(reportable in next evaluation period)	75%
2. Newly funded lines of research inquiry that are sustained with follow-on grants from external sources	12/18 = 67%	13/23 = 57%
3. Newly formed cross-sector partnerships that persist beyond CHRP funding	83%	38%

Among the principal investigators who responded to the survey and were funded during the prior five-year period, 75% were still engaged in HIV-related work five years later. (The respondents in the current five-year period will be asked after five years have elapsed from their award start date.) Each of the five respondents who stated they have left HIV research were funded on 2009 as basic biomedical trainees, a funding mechanism that CHRP has not utilized since that year. The proportion of newly funded lines of scientific inquiry that were sustained with follow-on funding from external sources increased from 57% during the prior five-year period to 67% during the current five-year period. Among the 27 awards that secured follow-on funding, the most frequently cited source for that funding was NIH (n=16), with some additional funds from PCORI, CDC, HRSA, Howard Hughes Medical Institute, and industry. Of the newly formed cross-sector partnerships, 38% of those in the prior five-year period persisted after the awards ended; 83% of those in the current five-year period were still active at the time of the survey.

83% Newly formed cross-sector partnerships that persist beyond CHRP funding **up from 38%**

67% Newly funded lines of research inquiry that are sustained **up from 57%**

Economic Benefit to California

Outcome Indicators 13 and 14	Current Five Year Period FY15-16 to FY19	Prior Period FY10-11 to FY14-15
13. Leveraged funding secured from non-CHRP sources after CHRP pilot award (basic bio)	$56,901,040	$16,032,580
--- per $1 invested by CHRP	$14	$4
14. For UC Campuses Only: Leveraged funding secured from non-CHRP sources after CHRP pilot award (basic bio)	$45,201,317	$1,218,364
--- per $1 invested by CHRP	$17	$1

CHRP has funded pilot awards for most cycles since the program's founding in 1983. These awards are intended to provide seed funding for highly innovative ideas, to be used for generation of preliminary data to support future applications to continue the line of inquiry. In the current five-year evaluation period CHRP offered pilot funding only for basic biomedical studies; in the prior five-year period we funded basic biomedical, social-behavioral, and clinical pilot studies. For consistency in this analysis, we restricted this item to basic biomedical pilot studies only (no change to the current five-year period, and non-basic biomedical pilots in the prior five-year period were excluded).

Leveraged funding secured from non-CHRP sources after CHRP pilot award (basic bio)

UC Campuses only: Leveraged funding secured from non-CHRP sources after CHRP pilot award (basic bio)

In the prior five-year period, investigators who received these awards and responded to the survey reported securing follow-on funding totaling $4,552,182 (dollar figure obtained via survey responses and verified via NIH RePorter) on an initial total investment of $1,160,000 in their pilot awards; this is a ratio of $4 leveraged for every $1 invested by CHRP, and extrapolates to a total of $16,032,580 in leveraged funding for the $4,008,145 initially invested by CHRP overall. For the current five-year period, survey respondents reported (and we verified via NIH RePorter) $13,794,025 in leveraged funding on an initial investment of $999,999, yielding a leverage ratio of $14 per $1 invested by CHRP and a total of $56,901,040 in secured leveraged funding on the $4,064,360 total CHRP investment.

CHRP is publicly funded and works for the benefit of the people of California, as such we solicit and sponsor both UC-based and non-UC research. Because our program is housed within the University of California system, we also examined leverage ratios for awards made specifically to University of California campuses. This indicator is intended to (a) provide data to UC campus leaders to inform their work and (b) demonstrate the economic benefit of the Program to a single public beneficiary (UC writ large). In the current 5yr period, every $1 invested by CHRP in basic biomedical pilot studies at the UC campuses yielded $17 in follow-on funding. **Thus, our five-year investment in basic biomedical pilot studies at University of California campuses of $2,658,901 yielded $45,201,317 in secured follow-on funding for those campuses from non-UC sources.**

Evidence-based Changes in Systems, Practices, and Statewide Policies

OUTCOME INDICATORS 15 and 16

1. Examples of HIV prevention or care systems / practices from CHRP research that are adopted at scale or shift HIV research paradigms
2. Examples of bills chaptered, policies implemented by state or local agencies based on CHRP research

Indicator 15

HIV prevention and care systems and practices that are adopted at scale or shift paradigms.

CHRP's early-stage investment in innovative ideas has produced tangible outcomes that have shaped HIV science, while engaging the communities they serve. In our survey, we asked the investigators to describe these achievements in their own words, and we share them here to provide a qualitative sense of the value of this work in the diverse voices of our funded investigators. Below are quotes from survey responses demonstrating CHRP-funded innovations that have been adopted at scale or have shifted scientific narratives or paradigms.

CHRP projects at the leading edge of ***public program planning***

"The TLC+ PrEP project directly informed the developed of the Los Angeles County Linkage and Retention Program." (Bendetson 2017, link to publication)

"We used the CHRP funding to develop a model of HIV care (medical care coordination) that we later expanded to 31 HIV clinics in Los Angeles (LA) County. It was shown to be effective at improving viral load and retention in care for at risk patients and continues to be sustained today. LA County invests over $9 million annually for this program. We had a lot of interest from HRSA about this model and presented many times at national meetings." (Garland 2017, link to presentation, and Flash 2019, link to publication)

"Our project highlighted the impact of AIDS conspiracy beliefs on uptake of Pre-Exposure Prophylaxis (PrEP) among Black gay and bisexual men, and the need to improve PrEP delivery to Spanish speaking Latino gay and bisexual men, the focus of our current NIMH R34 grant." (Brooks 2020, Link to NIMH grant)

"We mined data from Google Trends and found that States that expanded Medicaid coverage were more likely to exhibit public interest for PrEP than states that did not expand Medicaid coverage. Additionally, states that were hotspots for new HIV diagnoses were more likely to exhibit public interest for HIV testing searches. The analysis was published in the journal BMC Infectious Diseases, and we developed an accompanying policy brief based on our findings." (Johnson 2021, link to publication)

CHRP projects at the leading edge of

evidence-based innovation

"Our intervention for pre-exposure prophylaxis (PrEP) adherence is one of only five PrEP interventions recommended by CDC and included in the official Compendium of Evidence-Based Interventions and Best Practices for HIV Prevention." (CDC 2022, Link to Compendium)

"We generated the first peer-reviewed publication on data derived from Instagram images to inform HIV prevention programs, which showed a disconnect between prevention programs and users of this social media platform." (Nobles 2020, link to publication)

"Led to the dissemination of an evidence-based intervention for transgender women living with HIV, which is now being adapted into a status-neutral intervention." (Sevelius 2020; link to publication)

"Our work was among the first to demonstrate that acceptability of PrEP could be high among at-risk young MSM of color, and that adherence to PrEP in that group could also be high. We confirmed other suggestive findings that younger patients may require more frequent touchpoints to maintain high PrEP adherence, and that adherence tends to drop off over time." (Myers 2019, link to publication)

CHRP projects at the leading edge of ***community integration***

"I feel our work in initiating PrEP into San Diego was instrumental in seeding PrEP uptake in the community and contributed to declining HIV rates. As a result of our transgender work there was new community advisory boards set up, increased awareness and momentum to improve transgender care in our institution and in the community." (Hoenigl 2016, link to publication; Wei-Ming Watson 2020, link to publication)

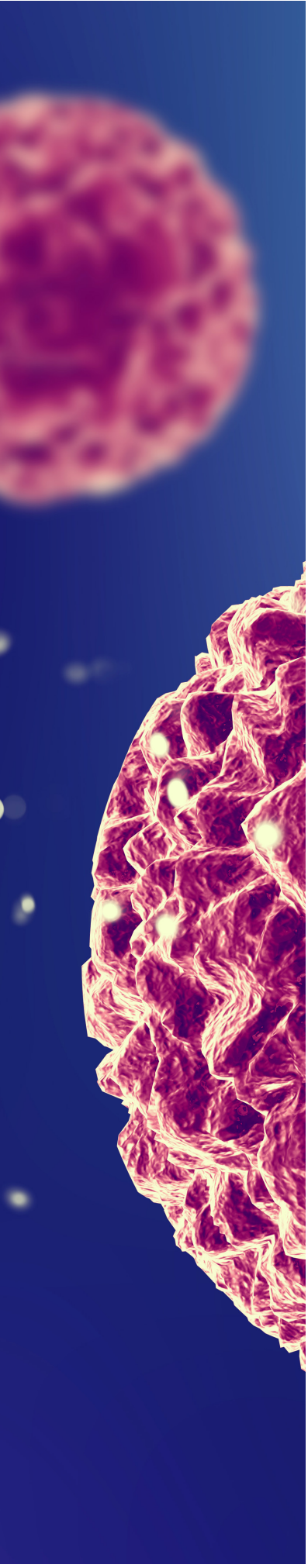
"Our CHRP research helped us to understand HIV prevalence and HIV testing modalities for Latino day laborers; the role of social support, stigma and HIV disclosure among African American and Latino MSM and women with HIV; and effective HIV linkage and retention in a community-based PrEP program for MSM and women of color." (Galvan 2016, link to publication)

CHRP projects at the leading edge of ***translational medicine***

"This work established novel therapeutics called apoA-I mimetic peptides and mitochondrial antioxidants for HIV-related inflammation, immune dysfunction and liver disease. We used a unique translational approach with humanized mice as model of end organ disease that will set the basis for future clinical trials in humans." (Daskou and Kelesidis, 2022, link to publication)

"The CHRP-funded work allowed me to get my foot in the door to study NK cell responses to HIV. At the time, there was little enthusiasm for studying these cells. Times have shifted, and NK cell therapies are currently a major focus in HIV cure strategies." (Nikzad and Blish 2019, link to publication)

"Our work brought PrEP into the HIV and sexual health conversation in Oakland and the East Bay and brought Oakland into the larger California conversation about HIV prevention strategies. We also leveraged our findings to help secure a large program grant from HRSA aimed at retaining Black men living with HIV in care, in part with the goal of maximizing treatment as prevention. This in turn has now been leveraged into an even larger CDC-funded program for HIV prevention among Black men, by linking at-risk men to preventive care and retaining those who are or become HIV-positive." (Myers and Burack 2019, link to publication)



CHRP projects at the leading edge of

biomedical advances and laboratory innovation

"Use of real-time drug level feedback to inform PrEP adherence is now leveraged as a tool to support PrEP uptake, adherence and persistence; it set the stage for long-acting injectable PrEP." (Landovitz 2017, link to publication)

"Techniques for CCR5+ reservoir depletion that were developed in my CHRP-funded work are now being pursued commercially." (Merriam and Hartigan-O'Connor, link to publication)

"Antibody epitope mapping by electron microscopy is extremely routine now and is a primary tool HIV researchers use to define epitopes. We discovered and defined multiple novel epitopes; the protocol I developed for purifying specific trimers has been used to solve structures of other types of trimers." (Lee 2017, link to publication)

"We helped understand the structure of gp41, specifically the portions that have not been able to be crystallized. This is the most important target for vaccine development." (Reichart 2020, link to pre-print)

"Based on our subanalysis of CMV and HIV there is an ACTG trial to suppress CMV in treating HIV patients." (Gianella 2014, link to publication)

"We developed a novel flow cytometry method that quantified fat content of several different types of cells in the liver (hepatocytes, immune cells, endothelial cells, stellate cells) that represents a more accurate assessment of pathogenesis of fatty liver disease at the single cell level. This flow method can also be done in human liver biopsies, and a manuscript is pending."

Indicator 16

Bills chaptered / policies implemented by California state agencies / departments that were originally based on CHRP-funded research.

Between 2015 and 2020, the California HIV Policy Research Centers conducted rapid research projects yielding novel findings on PrEP disparities, HIV criminalization, and health disparities among people living with and at risk for HIV. Leveraging an array of policy research methods, the Centers developed collaborative projects with state agencies, local health jurisdictions, and community-based organizations. These led to expansion of the California health insurance premium payment program, expanded access to PrEP through the patient assistance program and the expansion of PrEP in pharmacies, and led to the creation of the End the Epidemics coalition, which has transformed the way the HIV, HCV, viral hepatitis and drug user communities across California work together and collaborate, leading to more coordination and collaboration between the various issues and is helping to break down silos in the state and local government. Specific policies and bills that resulted from the Centers' efforts include the following:

PrEP-AP

Creation of statewide PrEP Assistance Program (PrEP-AP), which covers all PrEP-related out of pocket costs for those earning less than 500% of federal poverty level (link to CDPH website)

PrEP-AP authorized to provide 30 days of PrEP and PEP regardless of eligibility to support same day initiation (link to infographic explaining how to access PrEP/PEP if uninsured)

PrEP-AP authorized to cover minors under 18 and individuals insured on parent or partners' plan to protect confidentiality (link to CDPH Memo 2020)

AB 2640

Passage of AB 2640, which requires HIV-negative individuals to receive information about PrEP and PEP during HIV post-test counseling (Gipson, Ch. 670, Statutes of 2016)

SB 159

Passage of SB 159, which eliminated prior authorization requirements for PrEP and PEP and authorized pharmacists to furnish the medications without a prescription (Wiener, Ch. 532, Statutes of 2019)

State budget allocation for HIV prevention

State allocated additional $5 million for HIV prevention, with focus on reducing health inequities and addressing barriers to HIV prevention services; and allocated additional $7 million for STD prevention and treatment services, in 2019. (link to APLAHealth press release)

SB 1021

Passage of SB 1021, which extended drug co-pay limits and prescription drug pricing standards put in place in 2015 and prevents health plans from having a standard of care for PrEP that relies on multitablet drug regimens (Wiener, Ch. 787, Statutes of 2018)

Flavored tobacco ban

Out Against Big Tobacco coalition successfully advocated for ban on flavored tobacco products in the City of West Hollywood (link to story in LA Times 2021)

Housing for People Living with HIV

LA County Commission on HIV cited Center findings in letter to Board of Supervisors to prioritize PLWH into housing, resulting in HUD assisting City and County entities to improve collaboration and implementation across systems to meet the housing needs of people living with HIV ("PLWH") (link to Commission website)

CHPRC research cited for budget advocacy

COVID-19 Organizational Health Survey used for state-level budget advocacy; received broad recognition and support from the LGBTQ+ Caucus and other elected officials (link to report)

FY 2021-22 State Budget

CHPRC research was cited in support of FY 2021-22 State Budget signed by Governor Newsom in July, 2021, including an additional $13 million to end the epidemics of HIV, STIs, viral hepatitis and overdose. (link to End the Epidemics press release)

USPSTF Grade A recommendation for PrEP

PrEP brief widely circulated and highlighted in multiple stakeholder convenings; DMHC and CDI released comprehensive guidance on SB 159 and USPSTF Grade A recommendation for PrEP.

SB 239

Passage of SB 239, which modernized the state's discriminatory HIV criminal laws (Wiener, Ch. 537, Statutes of 2017)

SB 110

Contingency Management for Substance Abuse Disorders Fact Sheet was shared with bill sponsor for SB 110 (Wiener, 2021) and disseminated at multiple stakeholder convenings (Vetoed, 2021)

SB 357

Sex trade policy brief cited in letters of support for SB 357 (Wiener, 2021; currently held at the Senate desk)

SB 258

SB 258 (Laird, Ch. 132, Statutes of 2021) on HIV and aging

SB 306

SB 306 (Pan, Ch. 486, Statutes of 2021) expanding STI diagnosis and treatment

AB 789

AB 789 (Low, Ch. 470, Statutes of 2021) detecting and diagnosing hepatitis B and C

AB 1344

AB 1344 (Arambula, Ch. 480, Statutes of 2021) on harm reduction for substance use disorders

INTERPRETATION & APPLYING RESULTS FOR PROGRAM IMPROVEMENT

KEY MESSAGES

Armed with these results, our Advisory Council considered what story the data reported here tell about CHRP. They agreed on six evidence-based conclusions:

1 *CHRP delivered on our commitment to advance highly innovative HIV research to end the epidemic in California*

by allocating 100% of our available grant funding ($45.7M) to awards that directly addressed one or more aspects of our mission. The thematic areas of our grant portfolio centered the needs of communities that are highly impacted by HIV, and lifted up innovations in science to address needs in those communities. We funded 62 new research awards at campuses and community-based organizations across the state; in turn, those projects disseminated on average 24.2 scientific products each (580 total), almost doubling productivity from the prior evaluation period (13.4 per award), and tripling the rate of indexed publications per $1 million invested (1.7 to 5.7).

100%
of availaable grant funding allocted

$45.7 M
in awards that directly addressed one or more aspects of our mission

62
NEW AWARDS

580
SCIENTIFIC PRODUCTS

3X
THE RATE OF INDEXED PUBLICATIONS PER $1 MILLION INVESTED

2 *We invested to advance health in highly affected and minority communities across California, and we built diversity and capacity via the new researchers we supported*

86% of our research grants directly addressed the California communities that are highly impacted by HIV (up from 39% in the prior period), specifically people of color, sexual and gender minorities, persons experiencing homelessness, and other priority populations. To increase diversity among persons in the pipeline of new investigators, we nearly doubled the number of students/trainees supported per award (4.2 vs 2.6 per award, on average), offered diversity supplements to our basic biomedical pilot awards, and nearly doubled the proportion of all pilot awards that were made to early-stage investigators (50%, up from 29%).

86%
of grants addressed California communities highly impacted by HIV
up from 39%

Doubled
the number of students/ trainees supported per award

50%
of all pilot awards to early-stage-investigators
up from 29%

3 *CHRP is an economic incubator for California and for the University of California system*

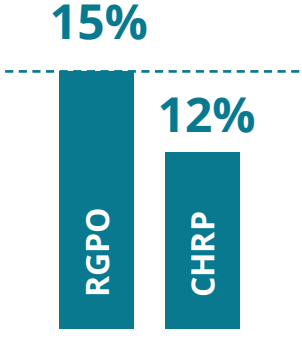
as every dollar invested by CHRP in pilot awards resulted in $14 secured in leveraged funding from external sources. The leverage ratio for University of California campuses specifically was 17:1 – our $2,658,901 investment yielded $45,201,317 in secured follow-on funding for those campuses from non-UC sources. We held our operations costs at 12% of total budget, below the RGPO benchmark of 15%, in both the current and the prior evaluation periods.

FOR EVERY $1 INVESTED:

$14 LEVERAGED FUNDING
$$$$$ $$$$$ $$$

$17 LEVERAGED FUNDING FOR UCs
$$$$$ $$$$$ $$$$$ $$

OPERATIONS BUDGET:

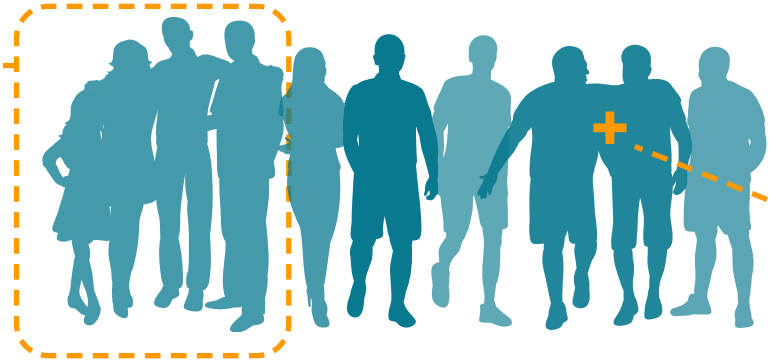


Evaluation of Program Outcomes, FY2015-FY2019

4 We fostered engagement, inclusion, and service

by ensuring that our peer review panels and Advisory Council rosters were enriched for persons who are personally affected by HIV or from communities that are highly affected by HIV (40% of panels and 40% of Council members identified as such). To improve statewide coordination and cooperation among entities, we created 29 new cross-sector partnerships with the express aim of bridging silos between academic researchers, community-based organizations, and public health officials.

40%
of panels & Council members identified as persons who are personally affected by HIV or from communities highly affected by HIV



29
New cross-sector partnerships

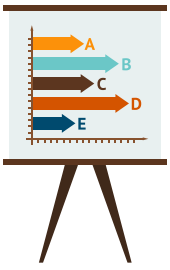
5 Our investments were productive, the partnerships we created were sustained, and the scientific paths we initiated secured follow-on funding.

Survey respondents from the current five-year period reported 254 indexed scientific publications and 126 presentations to community groups; using our expanded definition, these awards yielded 24.2 scientific products per award on average. The majority of CHRP-funded principal investigators and cross-sector partnerships were still engaged and working in HIV five years after their CHRP awards began (75% and 83%, respectively), and the majority (67%) of newly funded lines of research inquiry were sustained with follow-on grants from external sources.

254
Scientific publications

24.2
Scientific products per award on average

126



Community presentations

CONTINUED WORK IN HIV

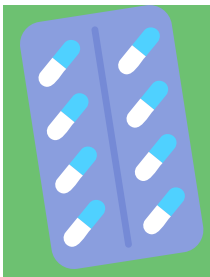
75%
Principal investigtors

83%
Cross-sector partnerships

67%
NEW LINES OF RESEARCH SUSTAINED FUNDING

6 *Our impact is evident in dozens of evidence-based HIV prevention and care systems and practices that our funded research brought to fruition,*

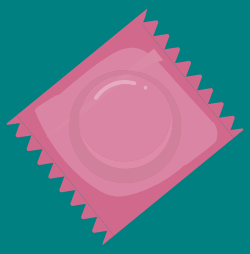
INCLUDING



Same-day initiation of PrEP and starter packs

Pharmacist provision of PrEP

PrEP Assistance Program



STD prevention and treatment services

PrEP access for minors

HIV specialists as primary care providers

Taken together, these conclusions and the data behind them tell the story of CHRP as a catalyst for moving science forward by sponsoring groundbreaking and inclusive HIV research, and our funded research directly serves highly impacted communities including people of color and sexual and gender minorities. This work yields tangible innovations for the benefit of the whole field, yields millions of dollars of leveraged research funding for California, is the on-ramp for new investigators from communities that are underrepresented in science, and results in systemic shifts in HIV prevention and care systems.

LESSONS LEARNED

It is critical that CHRP centers the voices of persons and communities who are highly affected by HIV in our work; we must measure the degree to which we do so, and do more.

Prior to this evaluation we did not assess the degree to which our funded investigators were personally affected by HIV or from highly affected communities. On the suggestion of our Advisory Council we added this item to the survey, and were pleased to find that 28% of respondents in the current five-year period identified as such. Although this was an increase from the prior five-year period, we had not tried to intervene on this and thus the change cannot be attributed to our own actions. This presents an opportunity for improvement: in future funding initiatives, CHRP will consider how we might prioritize and incentivize increased representation of persons who are affected by HIV or from communities that are highly affected. Similarly, we did not track this for peer reviewers or members of our Advisory Council; we do now, and we commit to reporting on this metric in the next evaluation period.

Scientific productivity includes reporting back to the community as well as indexed publications.

For this evaluation, we expanded our definition of scientific productivity beyond publications indexed in PubMed to include presentations to community groups and public health leaders, policy briefs, and written reports for health departments, to reflect the value of researchers engaging across these sectors. At 12 publications and 12 presentations per award, on average, these productivity achievements by these grantees demonstrate that the results of CHRP-funded research are being shared with our scientific, community, and public health stakeholders. We should continue to improve and refine how we measure this indicator.

Sustained partnerships will help decrease silos and lead to better health outcomes for our priority communities; we should continue to invest in these.

The proportion of cross-sector partnerships which appear to be sustained after their CHRP-funded research ends was 83% for the present five-year period, but likely not a true reflection of sustainability of these partnerships as some of that work is still ongoing. By contrast, 38% of these partnerships from the prior five-year period were sustained, and the truth likely lies somewhere between. The more recent partnerships were mainly funded by awards that required such partnerships; this was a strategic decision, aimed at decreasing silos between researchers and other sectors, and increasing inter-collaboratory accountability. This strategy remains important to CHRP's funding priorities and practices, and informed our decision to fund new multi-sector partnerships in upcoming funding cycles, including public health jurisdictions as funding partners, in hopes of creating change that persists beyond the research funding.

Building up the pipeline of future investigators is an essential part of CHRP's mission and is expressly valued by our stakeholders; continue this work.

In the current period, we changed our grantmaking methods to increase the proportion of basic biomedical pilot studies that went to early-career-stage investigators as compared to established investigators. Specifically, we enumerated this goal in the Call for Applications to be accountable; we implemented targeted outreach and technical assistance for ESI applicants in order to broaden our reach into the population; and we formalized review guidance and scoring for peer reviewers that reflected this priority. The data herein show an increase in representation of early-stage investigators after we made these changes. Because increasing representation of these investigators is important to maintain a robust pipeline of future investigators, we will consider using these grantmaking methods in CHRP's future funding priorities and initiatives.

Adopting the complexity science approach led to increased scientific productivity; stay the course.

We found the tripling in scientific productivity of our grantees to be remarkable (from 1.7 indexed publications per $1 million invested in the prior period to 5.7 in the current period). We believe this was in part due to our shift away from smaller grants supporting post-doctoral training and social-behavioral pilot studies (having fewer aims and yielding fewer publications), to complex collaboratives (with multiple aims and yielding multiple publications). We had made this shift strategically, to support the "complexity science approach" which includes biological, personal, social, and structural determinants of HIV infection risk and associated morbidity (see CHRP Strategic Directions, www.californiaaidsresearch.org). If indexed publications remain a high priority outcome, this strategy should continue.

Our basic biomedical pilot awards are economic catalysts for California and for UC; continue these.

The success of our basic biomedical pilot studies, as measured by leveraged funding, clearly demonstrates the outsize impact of this $2,000,000 initiative, returning $14 for every $1 invested ($17:1 for UC campuses).

Being fiscally nimble paid off; continue this stance.

In the past, CHRP grant funding budget was encumbered for up to five years beyond the active budget year, which explains how we could on average commit more than $9,000,000 per year when our grant funding budget was about $7,600,000 each year. To remedy this, we launched almost zero new grant commitments in two of the five years of the present analysis, which has helped CHRP to be increasingly nimble and responsive to changes in the scientific landscape. Because of this shift, we were able to fund 13 SARS-CoV-2 research projects mere months after the virus was discovered.

Changes in desired outcomes require changes in the data we collect.

Our legacy data systems did not track counts of students, trainees, and early-career-stage researchers who were supported on each CHRP award, so we asked each PI to report these data on our survey. This imposed a reporting burden on the survey respondents, and introduced potential bias into the outcome measure, both important potential limitations for these findings. To improve this, we have added these fields to our new grantmaking database and CHRP will track and report on these outcomes systematically going forward.

CHRP's impact on the California HIV epidemic is evident and enduring through health care and policy changes; continue to prioritize policy research as the bridge from clinical research to real world change.

The state-wide implementation and funding for multiple evidence-based HIV prevention and care systems based on CHRP-funded research, including bills chaptered and scientific paradigms shifted, is a tangible result of these efforts at the outcomes level. Although the science of HIV prevention and care continues to shift, these changes will endure and continue to benefit Californians who are living with or at risk for acquiring HIV. Moreover, CHRP can share the theory and practice of our policy research rubric with other similar programs across California, and build capacity for others to leverage this successful model.

LIMITATIONS

It is important to consider some potential limitations to this evaluation effort. First, although the data collection for program and internet data occurred without complication, the 30% response rate (RR) for the survey fell quite short of our goal of 66% (42 responses out of the N=136 eligible investigators). In retrospect, we determined our goal based on prior survey experience of clinical populations, rather than seeking an evidence-based goal with physician and scientist populations. A meta-analysis of response rates among 49 studies using web-based surveys of physician specialists reported a mean response rate of 40% (Cook 2000), and more recent analyses suggest a 35% response rate for physicians to online surveys as a reasonable benchmark (Cunningham 2015). When stratified by award period, our response rate of 54% for the current five-year period, which is the most salient for this report, could be considered better than expected (and a somewhat lower rate [26%] for the prior, more distal period is to be expected). Thus our achieved rate for the recent period is within the norm, which adds validity to our data capture methods. For future evaluation efforts, a review of the literature suggests that a concurrent mailed hard-copy of the survey and an incentive as small as $10 per respondent (or to a non-profit organization of their choosing) should be considered as part of the survey strategy (Cunningham 2015).

Sensitivity analysis demonstrated that eligible investigators who held senior leadership posts at their institution (department chair; organized research unit chair; clinical chief) were less likely to respond to the survey than those who did not (25% RR vs 37% RR, respectively, current period only), potentially biasing responses toward early-career-stage investigator responses and away from the natural mean. Investigators who have received multiple CHRP awards in their careers were only slightly more likely to respond than those who had received only one CHRP award ever (38% RR vs 34% RR, respectively, current period only), potentially minimizing social desirability bias (wherein persons benefitting the most from CHRP funding opportunities may be less likely to endorse items that would be less favorable for the program).

We would have liked to report on our reach to and inclusion of persons from communities that are highly affected by HIV (especially those of racial, ethnic, sexual, and gender minorities) among our applicants and funded investigators. However, as noted under outcome indicators 4, 5, and 6, PIs were not required to report on demographics for themselves or their study teams in the past, so these data are not available, which is a limitation of these analyses. This is a key opportunity for improvement, and we are revising our policies on collection of demographic data for applicants, investigators, and study team members, with respect for their privacy and autonomy.

Although we were prepared to address multiple potential sources of bias in the survey (including non-response and social desirability biases); we did not anticipate a global infectious disease pandemic. The sample was enriched for investigators who were working on the front lines during the initial SARS-CoV-2 months, as many are infectious disease physician scientists, and these extraordinary burdens upon them may have affected both quantitative response rates and qualitative responses. We did anticipate that researchers who have secured the most external funding and conversely those who are least in need of securing outside funding (e.g., chairs of academic departments with full salary funding) might be less likely to respond to the survey than others. Each of these non-response types could bias the results either downward (thus underestimating mean leveraged funding, for example) or upward (thus overestimating mean leveraged funding). To partially address this for ***output*** data, we use enhanced recruitment strategies, including contacting non-responders by phone to request a five-minute telephone interview to secure the data, or to refer us to other staff who could answer on their behalf. If secured,

these responses did not receive different weighting, they only received targeted recruitment to attempt to decrease non-response bias from these categories of investigators.

DISSEMINATION OF EVALUTION RESULTS

These results and the lessons learned from them will directly inform the next cycle of strategic planning for CHRP, for purposes of program improvement. Separately, program staff will communicate and disseminate these results with a broad variety of stakeholders, with highest priority going to the survey respondents, our Advisory Council, University of California leadership that the program reports to, leadership at public health agencies working in HIV and associated syndemics, and members of the legislature who are familiar with our work. A distilled list of results with infographics will be shared via email with the larger community of investigators and administrators who subscribe to our mailing list, and will be posted on the CHRP website. Each of these will have a clear channel identified which readers could use to communicate suggestions for program improvement to us after reading the evaluation results. Taken together, this strategy of reaching multiple audiences via tailored modes of communication, each with a clear communication channel back to program staff, is designed to enhance program improvement over the longer term.

PROGRAM IMPROVEMENT

The present report summarizes our efforts toward collecting relevant data and offering conclusions about the effectiveness of the program. With this evidence in hand, we will convene a group of stakeholders who will consider how the findings reflect on our current programmatic activities, and what changes we might make to program goals, objectives, and activities in light of these results. The meeting will include all members of our program implementation team, our Advisory Council (which includes representation from key California academic HIV research programs, non-profit service providers, and advocacy organizations), leadership from the Research Grants Program Office (RGPO) at the University of California Office of the President, the California Office of AIDS, local Departments of Public Health, other grantmaking organizations with knowledge of the HIV field and of the needs of the people of California, and invited legislators. After the meeting, and with guidance and input from the Advisory Council, staff will create a revised strategic plan, which will reflect the input of this diverse group of interested stakeholders, the results of the program evaluation, and the emerging landscape of HIV research needs for California.

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