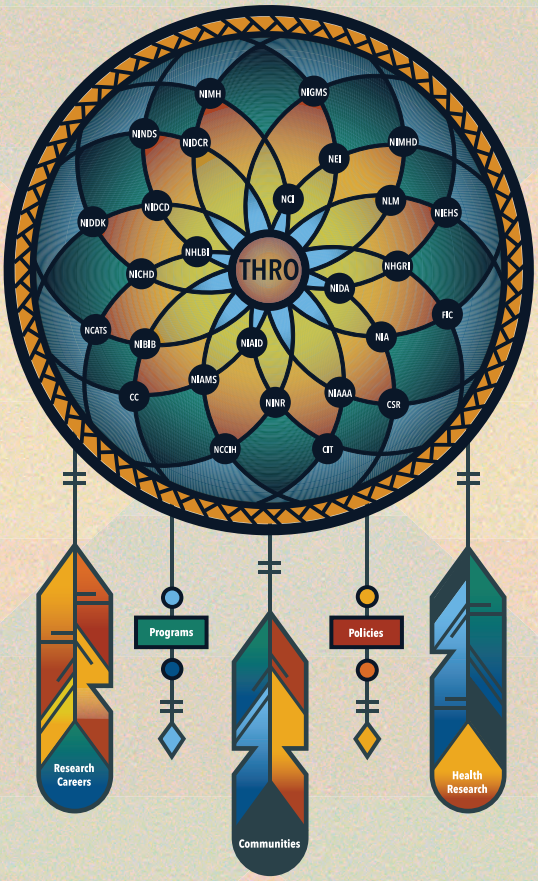
NIH Tribal Health Research Office

American Indian/Alaska Native Health Research FY 2015



A Quantitative Portfolio Analysis of Research Funded by the NIH

About NIH

The National Institutes of Health (NIH) is composed of 27 Institutes and Centers, each having its own research agenda to pursue knowledge that improves the health and wellness of the nation.

Through a total agency appropriation of $30.3 billion in Fiscal Year (FY) 2015, NIH leadership, including the Office of the Director, plays an active role in shaping the agency's research planning, activities, and outlook.

Research efforts related to American Indian/Alaska Native communities are coordinated by the Tribal Health Research Office. This office resides in the Division of Program Coordination, Planning, and Strategic Initiatives, part of the NIH Office of the Director responsible for identifying, reporting on, and helping to support important areas of scientific research that deserve special emphasis or would benefit from increased coordination.

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Executive Summary

According to 2015 U.S. Census Bureau data, more than 5.3 million people identify as partly or completely American Indian or Alaska Native (AI/AN). These populations experience higher rates of suicide, diabetes, certain cancers, substance use and misuse, and other conditions when compared to the nation.[1] The National Institutes of Health (NIH) pursues knowledge to help reduce health disparities experienced by AI/AN populations.

NIH leadership requested an analysis of how its research portfolio aligns with the health experiences of AI/AN populations to inform a strategic plan to improve AI/AN health. This initial report will establish a necessary baseline for the agency to monitor and adjust its investment to best serve AI/AN communities. The agency and its Tribal Advisory Committee (TAC) asked the following questions:

What is the NIH's investment in AI/AN research, and how is it focused (e.g., health, workforce, infrastructure)?

What type of research is awarded, where is it conducted, and who performs it?

How does the investment align with mortality due to diseases among AI/AN populations?

What is the NIH's investment in research on botanicals, substance use and misuse, historical trauma, suicide prevention, and environmental health?

To guide its efforts, the agency constructed an analysis framework involving methods to query agency databases, select and deselect projects to include in the analysis, categorize the research, and validate the preliminary categorizations with an internal panel of experts. The project selection process is key to interpreting the numbers in this report because it aims to avoid over-reporting. Importantly, the agency identified 258 (~40%) more research projects than were ultimately categorized as AI/AN research but excluded them because they were not specific to AI/AN populations (see Table A). Rather, this report analyzes the research projects that have a significant focus on the AI/AN population. It is important to note that because of the conservative methodology in project selection, this summary of NIH investments will not capture all projects that benefit AI/AN communities.

1 U.S. Department of Health and Human Services (HHS). *Trends in Indian Health, 2014 Edition* [2007–2009 data]. https://www.ihs.gov/dps/includes/themes/newihstheme/display_objects/documents/Trends2014Book508.pdf. The Indian Health Service publishes AI/AN rates that have been adjusted to compensate for misreporting of AI/AN race on state death certificates. As a result, data in *Trends in Indian Health, 2014 Edition*, may be different from data in the National Vital Statistics Report.

The following summarizes NIH investments:

- The NIH's investment in AI/AN research fell into three broad categories: health research (66.2%), workforce development (13.7%), and infrastructure and community outreach (20.1%).
- The NIH provided $158.2 million (0.5% of the NIH budget) in FY 2015 to support 373 research projects focused on AI/AN health or resource needs. Six Institutes provided approximately 80 percent of the funding:[2]
    - National Institute of General Medical Sciences
    - National Institute on Minority Health and Health Disparities
    - National Institute of Diabetes and Digestive and Kidney Diseases
    - National Cancer Institute
    - National Institute of Environmental Health Sciences
    - National Institute on Drug Abuse
- Investigator-initiated research and other research projects (categorized as R01s), research-related programs (S06s), research program projects and centers (P20s, P60s), and specialized center-cooperative agreements (U54s) accounted for 58 percent of the research and funding.
- Funding went to 37 states, the District of Columbia, and one foreign site. About 80 percent of dollars were awarded to 12 of these 37 states, typically going to colleges, universities, and medical centers. There were 287 principal investigators who worked on the 373 research projects; nearly all had a terminal degree (e.g., Ph.D., M.D., D.O., D.D.S., or combination).
- In relative terms, the NIH investment aligned with several leading causes of death for AI/AN populations: cancer (#2), diabetes (#5), nephritis (#10), and Alzheimer's disease (#11). However, the investment was lower for other high-ranking causes of death in AI/AN populations: heart disease (#1), unintentional injuries (#3), and chronic liver disease and cirrhosis (#4) (see Table F).
- NIH's investment in other specific categories was as follows: substance (both alcohol and drug) use and misuse ($24.9 million), historical trauma ($7.1 million), suicide prevention ($2.2 million), and environmental health ($13.1 million). Funded research on historical trauma focused on identifying it as a risk factor that contributes to certain outcomes. Additionally, funded research focused on building resilience to overcome the effects of historical trauma.

2 This analysis does not include proportional funding for AI/AN health research.

During the analysis, the NIH could not fully address some questions due to unavailable or incomplete data. For example, the NIH does not require investigators to specify their gender, ethnicity, or race, so the data were incomplete. As mentioned previously, the NIH excluded many projects from analysis that were not sufficiently focused on AI/AN populations. Many efforts involved AI/AN populations, but they were among other minority populations where the focus was on diversity and not specifically on AI/AN populations. Future efforts may want to revisit the data.

A limitation of this analysis — The purpose of this analysis was to quantify specific categories of research supported by the NIH that were directly focused on improving the health of AI/AN individuals and communities. Most of the $30.3 million NIH research investment in FY 2015 was relevant to AI/AN people. For purposes of this analysis, we excluded studies that were only generally applicable to minority populations, and instead we attempted to identify research that was conducted in the context of AI/AN populations and communities. A limitation of this type of reductionist approach is that by placing specific labels on each project, the holistic context in which a disease or condition is experienced by the community can be lost. We acknowledge that limitation. The primary intent was to provide a profile of what topics are funded, which units of the NIH fund and how, who, and where they fund so that support can be better coordinated across the NIH and tracked over time.

Introduction

In 2015, the NIH established the Tribal Health Research Office (THRO) to coordinate tribal health research-related activities across the agency. The THRO fulfills an important coordinating and planning role as it works with NIH Institutes and Centers (ICs) to leverage resources, develop initiatives, and formulate and implement a strategic plan to support tribal health research.

According to the Indian Health Service,[3] AI/AN persons have long experienced lower health status when compared with other Americans, indicated by lower life expectancy and disproportionate disease burden. Diseases of the heart and cancer are the leading causes of death in the AI/AN population. Other causes of mortality are disproportionately high when compared to national data (see textbox to the right), and disparities are more pronounced when adjusted for age and misreporting on death certificates. The Indian Health Service suggests that lower life expectancy and the disproportionate disease burden may result from a combination of disproportionate poverty, inadequate education, discrimination in the delivery of health services, and cultural differences.

This analysis summarizes the NIH investment in research relating to AI/AN populations in FY 2015 differently than related reports and data. Annually, the NIH (1) releases its *Report on American Indian and Alaska Native Activities*[4] and (2) categorizes online research data through its RePORT website.[5] The *Report on American Indian and Alaska Native Activities* provides highlights from NIH's AI/AN portfolio, including outreach to tribes; research opportunities provided to AI/AN students; research to study health disparities experienced by AI/AN groups; and prevention activities intended to reduce the burdens of suicide, alcohol misuse, and substance use and misuse. The annual report on AI/AN activities draws from grants, contracts, and intramural data in RePORT. The website provides official funding

AI/AN Mortality Disparity Rates Compared to the U.S. Population[3]

Alcohol-related — **520%** greater

Tuberculosis — **450%** greater

Chronic liver disease and cirrhosis — **368%** greater

Diabetes mellitus — **177%** greater

Unintentional injuries — **141%** greater

Poisoning — **118%** greater

Suicide — **60%** greater

Pneumonia and influenza — **37%** greater

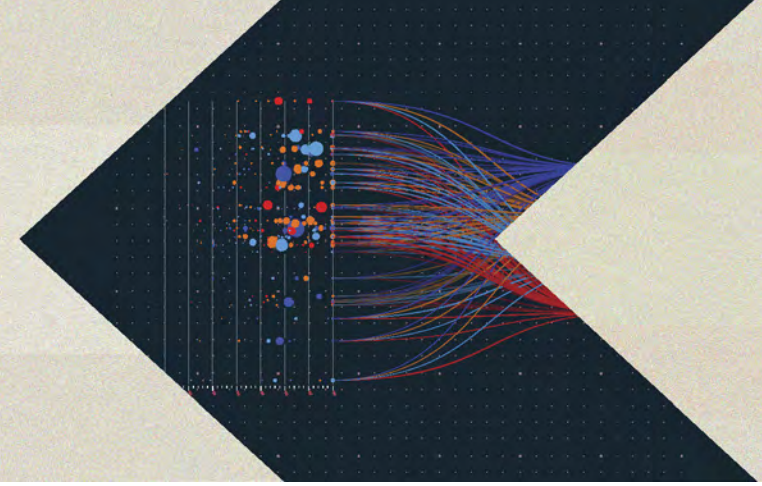
3 HHS. *Trends in Indian Health, 2014 Edition.* https://www.ihs.gov/dps/includes/themes/newihstheme/display_objects/documents/Trends2014Book508.pdf.

4 National Institute on Minority Health and Health Disparities. *NIH FY 2015 Report on American Indian and Alaska Native Activities.* https://dpcpsi.nih.gov/sites/default/files/NIH%20FY%202015%20AIAN%20Activities.pdf.

5 RePORT, NIH website. https://report.nih.gov/categorical_spending.aspx.

information on 265 research areas of interest that meet established definitions of NIH research. One category pertains to AI/AN activities. Any research grant, contract, or intramural research project that satisfies the definition of the AI/AN category according to text-mining software is included in the RePORT AI/AN data set. These resources describe for government officials, advocates, researchers, lawmakers, and other stakeholders the extent and focus of NIH research related to these populations.

This analysis uses the RePORT data set with additional information returned from agency systems. In total, the agency's text searches and manual coding identified 373 projects that specifically address AI/AN health and other needs (n = 373 projects) from other research; this included projects that mentioned tribal populations but were not focused specifically on improving their health or increasing availability of scientific or other resources. This analysis discusses only the 373 projects focused on specific AI/AN health and resource needs using FY 2015 funding.



Methods

The Division of Program Coordination, Planning, and Strategic Initiatives' Office of Portfolio Analysis (OPA) developed a method to evaluate the portfolio and to respond to the NIH Tribal Advisory Committee and others' interests. The methods are as follow:

Data Extraction

- OPA extracted[6] FY 2015 awarded projects (and subprojects) from the NIH's grants database (IMPACII) using text searches based on 46 Research Condition and Disease Classification (RCDC) concepts[7] relating to AI/AN health research. Multiple searches ensured a more complete set of projects.[8]
- The NIH also included 52 Native American Research Centers for Health (NARCH) projects funded in FY 2015. These are not fully recorded in NIH's grants system because, while funded by the NIH, they were awarded by the Indian Health Service.
- A further quality check involved querying *iSearch* using 569 tribal names[9] and including published data for the AI/AN category on the NIH RePORT website.
- These combined efforts returned 631 records, which were subject to further coding prior to analysis.[10]

Analysis and Coding

- The NIH OPA manually coded the 631 records to identify those focusing on AI/AN populations. Projects were included as AI/AN research if any part of the project focused on AI/AN populations or research needs. An internal panel of experts[11] confirmed the results, identifying 373 projects as AI/AN research for further analysis and excluding projects that were not specific to AI/AN populations (Table A).
- The 373 projects were next coded by whether they addressed AI/AN health needs, workforce development, or infrastructure and community outreach. Additional coding categorized the projects into areas of disease or research emphasis (e.g., cancer, heart disease).
- The selection matrix in Table A describes the criteria used to include, exclude, and otherwise categorize the research projects into mutually exclusive categories of health research, workforce development, or infrastructure and community outreach.

6 Note that the Office performed more than one data extraction to obtain a complete set of records. These methods do not describe the iterative steps.
7 RCDC concepts used: Alaska Indian, Alaska Native, Alaska native reservation, Alaskan Indian, Alaskan Native, Alaskan Native American, American Indian, American Indian and Alaska Native, Caribbean natives, Eastern Pequot Tribal Nation of Connecticut, Fond du Lac Tribal and Community College, Indigenous, Indigenous medicine, Indigenous population, Leech Lake Tribal College, Native Alaskan, Native American Healer, Native American reservation, Native American sign language, Native Americans, Native ASL, Native born American, Native elder, Native Hawaiian or Other Pacific Islander, Native People, Native youth, Native-Born, Northern Native American, Tribal board, Tribal college, Tribal communities, Tribal community, Tribal Council, Tribal Elders, Tribal group, Tribal health, Tribal institution, Tribal leader, Tribal medicine, Tribal member, Tribal Nation, Tribal organization, Tribal reservation, Tribal School, Tribal university, Urban Native American
8 As a note for future queries, *iSearch* has a wider range of search options (research plans, etc.), so it will likely return more matches than QVR if repeating the query.
9 According to the Bureau of Indian Affairs, there are 567 federally recognized tribes. This analysis, however, also included the Sheep Ranch Rancheria of Me-Wuk Indians (former name of the California Valley Miwok Tribe) and the Shoshone Tribe of the Wind River Reservation.
10 The query was written broadly to ensure no projects were missed. Analysts expected that results would include false positives (e.g., projects involving native Hawaiians or other Pacific Islanders). This was initially done in case a project required a broader definition of native groups.
11 Due to time constraints, the panel of experts confirmed all but the final set of 35 AI/AN projects added from RePORT.

Table A. Selection matrix for AI/AN research projects

	Inclusion Criteria	Exclusion Criteria
Awardee and Award Mechanism	▸ NIH awardee ▸ Grants (including Cooperative Agreements) ▸ Subprojects ▸ Contracts ▸ Intramural ▸ NARCH	▸ Non-NIH awardee (e.g., award provided by the Centers for Disease Control and Prevention)
Health Research	▸ Focus is specifically on AI/AN health disparities or other needs ▸ AI/AN subjects the focus of intervention, prevention, research ▸ Specimen or sample collected from AI/AN communities to address AI/AN health needs ▸ Data extracted from or created for an AI/AN community or tribe to address AI/AN health needs	▸ AI/AN areas under study but not focus of the research ▸ AI/AN coincidental part of study population, no special recruitment (e.g., efforts to study a state's population) ▸ "All groups" being recruited ▸ Use of AI/AN specimens or samples but not looking at Native American health issues ▸ Use of environmental samples from an Indian Reservation (e.g., smoked salmon)
Workforce Development	▸ Training, mentoring, or curriculum focused largely or specifically on AI/AN populations ▸ Trainee recruitment focused largely on or specifically on AI/AN populations ▸ Symposium or conference at tribal college or addressing AI/AN issues	▸ AI/AN mentioned as one of several partners or populations for a training award. ▸ AI/AN not targeted for recruitment but may have enrollees; general focus on underrepresented minorities ▸ Conference not specifically focused on AI/AN research or needs
Infrastructure and Community Outreach	▸ Community outreach or education directed specifically for tribal populations ▸ Dissemination research among Native Americans ▸ Cultural competency research ▸ Projects to enhance AI/AN recruitment efforts ▸ Infrastructure development (e.g., development of analytical methods) in tribal colleges and universities ▸ Bioinformatics cores, data management, and other efforts at AI/AN facilities or communities	▸ Dissemination, education, and outreach to underrepresented minorities in general ▸ Disease or condition screening for minorities in general, of which AI/AN may be a part but not recruitment focus ▸ Disease prevention modalities (community based or population based) that target underrepresented populations but not AI/AN specifically ▸ Research at institution with large AI/AN population but AI/AN is not the research focus
False positives	N/A	▸ No reference to or mention of AI/AN ▸ False word triggers, such as "Apache" software ▸ Research conducted by an AI/AN researcher but not on a topic specific to Native Americans ▸ Research involving only Native Hawaiians

Population and Leading Causes of Death Statistics

- This analysis uses 2015 population estimates from the American Community Survey found on the U.S. Census Bureau site: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_DP05&src=pt

- Deaths and percentage of total deaths for the 10 leading causes of death by race in the United States were obtained from the Centers for Disease Control and Prevention's (CDC) 2014 *National Vital Statistics Reports:*[12] https://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_05.pdf

Data Limitations and Interpretation

During the analysis, the NIH recognized that some data were unavailable, incomplete, or open to interpretation:

- **Investigator gender and race data**[13] — The NIH asks but does not require investigators to specify their gender or race. Approximately 80 percent of applicants reported their gender, and 64 percent reported their race as either white or AI/AN. (The remainder reported other races or withheld the information.) Data should be interpreted cautiously, as they are incomplete.

- **Awarded dollars** — This report shows dollars only for the institution that received the award; downstream funding sites were not analyzed.

- **AI/AN Research Project Data Set** — The threshold for categorizing data as AI/AN research depended on inclusion criteria specific to this analysis. The RePORT website lists 408 non-NARCH projects for FY 2015 as AI/AN research according to the process described at https://report.nih.gov/rcdc/process.aspx. Of these 408 projects, the NIH excluded 102 (25%) based on the selection matrix. In addition, text searches returned an additional set of 223 projects for consideration, 67 of which were coded as AI/AN research.

12 The agency used mortality data and rankings from the National Center for Health Statistics (NCHS) within the CDC, but other sources of mortality data and other burden measures exist. For example, the Indian Health Service releases age-adjusted mortality disparity rates for AI/ANs living in the Indian Health Service area. These rates are adjusted to compensate for misreporting of AI/AN race on state death certificates. This analysis compared NIH funding to data on the leading causes of death. The agency relied on NCHS data because the CDC cautions against the use of age-adjusted death rates to rank causes of death. See https://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_05.pdf, page 2.

13 The agency places strict limitations on public access to individual gender and race data. The query was designed to limit information extracted to those reporting as AI/AN, white, and all others including "missing" grouped into third category.

What is the NIH's investment in AI/AN research, and how is it focused?

An internal panel of experts found 373 records that specifically focused on AI/AN populations in health research, workforce development, and infrastructure and community outreach.

Seventeen of the NIH's 27 ICs and the Office of the Director provided $158.2 million for the 373 AI/AN research projects. Figure 1 summarizes the NIH's research investment by the areas of emphasis in health research, workforce development, or infrastructure and community outreach, as defined below:

- **Health Research** includes research that specifically focuses on AI/AN health disparities; recruits AI/AN participants; or uses specimens, samples, or data collected from AI/AN participants or communities to address their heath needs.
- **Workforce Development** includes the following activities or efforts specifically or largely focused on AI/AN populations or at tribal colleges or universities: training or trainee recruitment, mentoring, curriculum development, symposia, or conferences.
- **Infrastructure and Community Outreach** includes community outreach; education; research recruitment; research dissemination; cultural competency research; infrastructure development and efforts to develop analytical methods; bioinformatics cores; data management; and other capabilities in AI/AN facilities, communities, or populations.

Key Points

- The NIH invested $158.2 million in FY 2015 to support 373 research projects specifically focused on AI/AN health or resource needs.
- Approximately 70 percent of the projects and funding pertained to AI/AN health research, with less dedicated to infrastructure and community outreach and workforce development.
- Six NIH ICs funded most of the AI/AN research projects.
- The largest funder of AI/AN research was the National Institute of General Medical Sciences, which administered 25 percent of the funding.
- Umbrella funding opportunities (e.g., NARCH) resulted in 25 percent of the funded AI/AN projects. Most funding for AI/AN research did not result from these types of opportunities.
- Investigator-initiated research and other research projects (categorized as R01s), NARCH (S06), research program projects and centers (P20), and specialized center-cooperative agreements (U54) accounted for more than 50 percent of the research and funding.

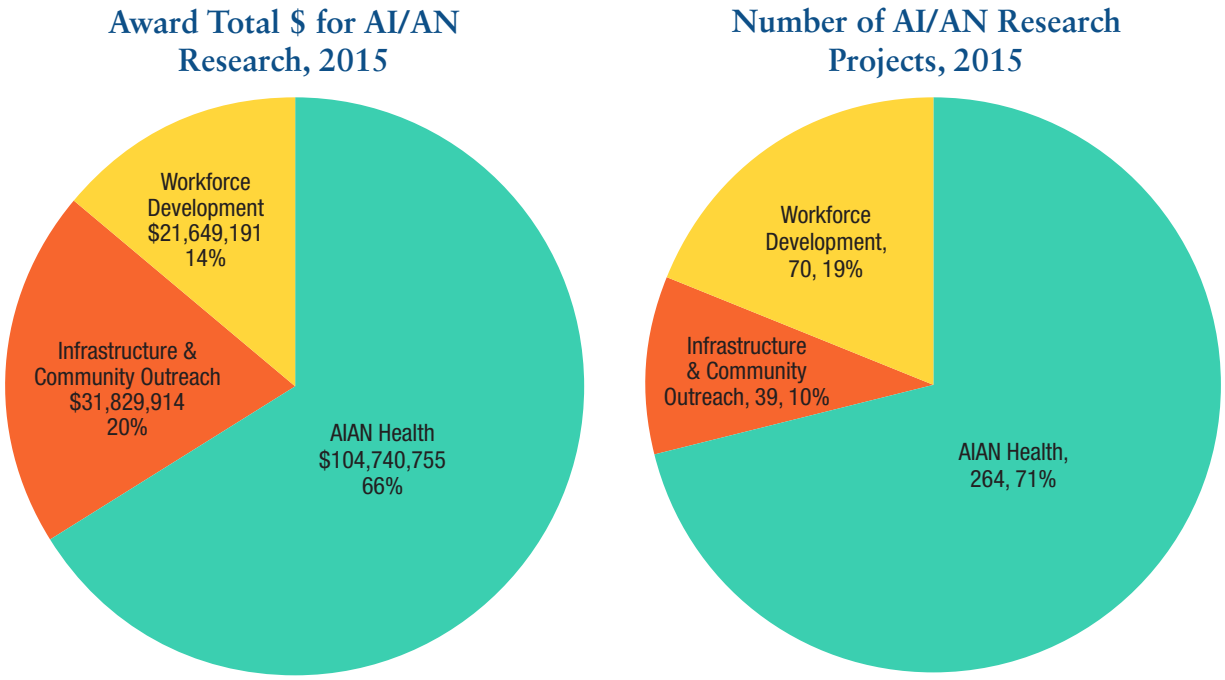


Figure 1. Awarded dollars and projects for AI/AN research, 2015

Institutes with the largest funding obligations for the 373 projects were:

- National Institute of General Medical Sciences
- National Institute on Minority Health and Health Disparities
- National Institute of Diabetes and Digestive and Kidney Diseases
- National Cancer Institute
- National Institute of Environmental Health Sciences
- National Institute on Drug Abuse

The most common single project category for AI/AN research is projects that are investigator-initiated or in response to a funding opportunity announcement (e.g., Intervention Research to Improve Native American Health [IRINAH]), followed by activities to strengthen capability in ethnic minority institutions (NARCH), research program projects and centers (e.g., Institutional Development Award [IDeA] Networks of Biomedical Research Excellence [INBRE]), and cooperative agreements for specialized centers (e.g., Comprehensive Partnerships to Advance Cancer Health Equity [CPACHE]). Figures 2 and 3 depict these project categories.

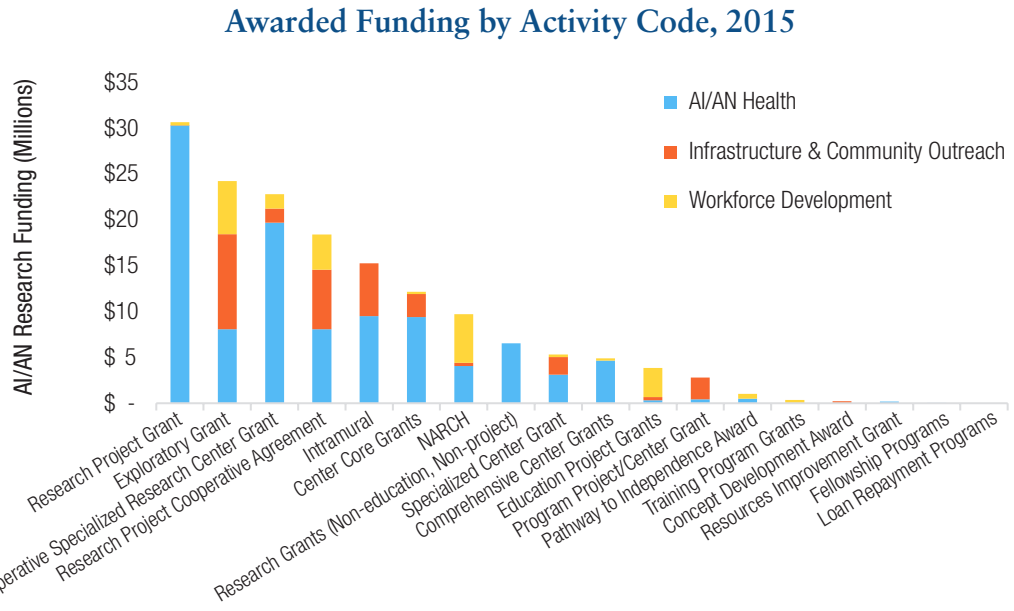


Figure 2. Awarded funding by activity code and research emphasis

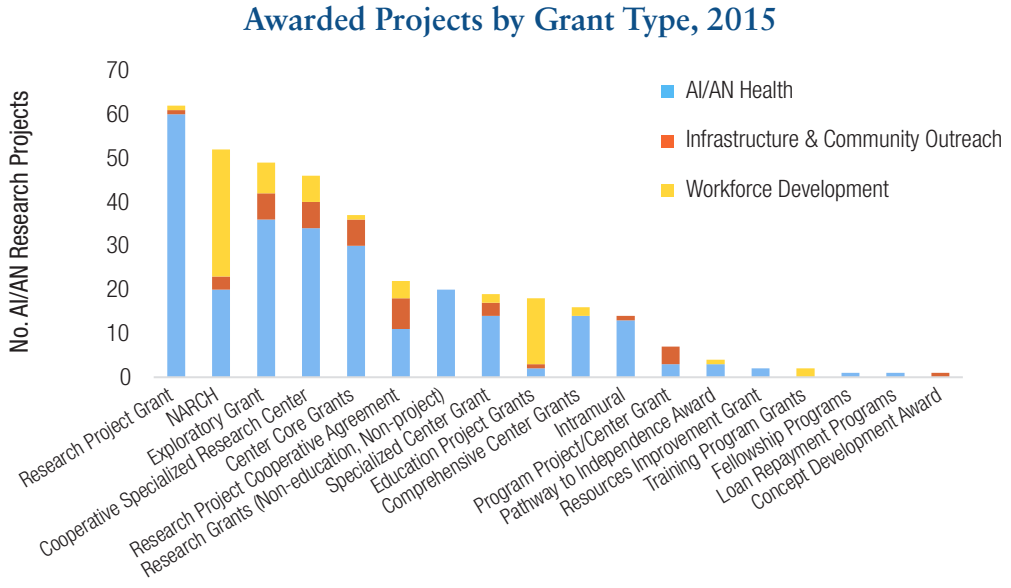


Figure 3. Awarded projects by activity code and research emphasis

Table B provides information about the activity codes used in support of the 373 AI/AN research projects and $158.2 million in FY 2015 funding. The analysis also found that slightly more than a quarter (n = 105) of the 373 projects responded to one of three umbrella funding opportunities, namely NARCH, IRINAH, and INBRE.[14]

Table B. FY2015 AI/AN Research Dollars and Projects by Grant Type and Research Area*

Grant Type	AI/AN Health		Infrastructure & Community Outreach		Workforce Development		Grand Total	
	No. Projects	Research Funding	No. Projects	Research Funding	No. Projects	Research Funding	No. Projects	Research Funding
Research Project Grant (R01)	60	$30,267,985	1	$9,510	1	$337,234	62	$30,614,729
NARCH	20	$4,053,572	3	$331,105	29	$5,301,405	52	$9,686,082
Exploratory Grant	36	$8,074,698	6	$10,342,949	7	$5,788,889	49	$24,206,536
Cooperative Specialized Research Center Grant	34	$19,683,091	6	$1,535,635	6	$1,547,514	46	$22,766,240
Center Core Grants	30	$9,374,932	6	$2,507,452	1	$245,166	37	$12,127,550
Research Project Cooperative Agreement	11	$8,056,329	7	$6,478,917	4	$3,831,293	22	$18,366,539
Research Grants†	20	$6,526,408	—	—	—	—	20	$6,526,408
Specialized Center Grant	14	$3,097,311	3	$1,914,900	2	$310,994	19	$5,323,205
Education Project Grants	2	$309,778	1	$357,802	15	$3,178,765	18	$3,846,345
Comprehensive Center Grants	14	$4,657,370	—	—	2	$244,407	16	$4,901,777
Intramural	13	$9,473,853	1	$5,776,905	—	—	14	$15,250,758
Program Project/Center Grant†	3	$439,418	4	$2,368,043	—	—	7	$2,807,461
Pathway to Independence Award	3	$501,838	—	—	1	$518,455	4	$1,020,293
Resources Improvement Grant	2	$190,309	—	—	—	—	2	$190,309
Training Program Grants	—	—	—	—	2	$345,069	2	$345,069
Fellowship Programs	1	$33,863	—	—	—	—	1	$33,863
Loan Repayment Programs	1	$0	—	—	—	—	1	$0
Concept Development Award	—	—	1	$206,696	—	—	1	$206,696
Total	**264**	**$104,740,755**	**39**	**$31,829,914**	**70**	**$21,649,191**	**373**	**$158,219,860**

*This analysis includes all Activity Codes as reported from the NIH's grants database (IMPACII).

†Excludes Exploratory Grants, Center Core Grants, Cooperative Agreements, and Research Program Projects and Centers.

14 Number of projects: NARCH n = 52, IRINAH n = 21, INBRE n = 8

Where is the research awarded, and who performs it?

Thirty-seven states, the District of Columbia, and one foreign site (South Africa[15]) received NIH funding to support the 373 AI/AN research projects. Twelve states (Table C) received slightly more than 80 percent of the $158.2 million funding. All but California, Kansas, and North Dakota had a major research site (more than six projects at an individual site).

Table D shows that 71 percent of the 373 AI/AN research projects were conducted in institutions of higher education, such as health science centers, medical centers, and medical colleges. The remaining 30 percent of research takes place in other settings, such as community and service organizations, research organizations, independent hospitals, and the NIH Intramural Research Program[16] (see Figure 4). The breakdown of the 373 AI/AN research projects is as follows:

- $109.9 million (69.5%) funded 265 projects that took place in 65 institutions of higher education. In effect, 71 percent of AI/AN research projects occurred in universities, colleges, and medical centers.
- $16.0 million (10.1%) funded 58 projects that took place in 26 health or community service organizations, such as health or educational consortia, tribes, and tribal councils.
- $15.3 million (9.6%) funded 14 projects that were conducted by the NIH Intramural Research Program.
- $13.4 million (8.5%) funded 26 projects that were conducted by nine research organizations, such as the Rand Corporation, Sanford Research, and Scripps Research Institute.

Key Points

- Twelve states received 80 percent of the $158.2 million in AI/AN research funding, with Arizona receiving 20 percent (nearly $32 million) of the funding.
- Approximately 70 percent of funding was awarded to institutions of higher education (e.g., medical schools and health sciences centers), and approximately 10 percent was awarded to health or community service organizations, including tribes. The remaining 20 percent was split between other types of organizations and the NIH intramural research program in Arizona.
- There were 287 distinct principal investigators who worked on the 373 research projects.
- Data on principal investigator gender and race were incomplete. Based on the available data, 12 percent were AI/AN, 52 percent were white, and the remainder were other races or not reported.
- Forty-five percent of principal investigators reported that they were female, 37 percent reported that they were male, and 18 percent did not report their gender.
- Nearly all principal investigators had a doctorate or medical degree.

- $3.7 million (2.3%) funded 10 projects that took place in eight organizations, including hospitals and other settings.

15 The cooperative agreement (grant) to a South African university involves American Indians in the Northern Plains. This analysis attributes all funding to South Africa and not the U.S. domestic site(s) partnering in the research.

16 This analysis identifies the institution of the research grantee. There may be distribution of research dollars from a grantee to community, tribal, or other research partners.

Table C. States with the highest percentage of funding or projects awarded, FY 2015

States with 80% of Total Funding, 2015	Funding, 2015 millions of $ (%)	No. AI/AN Research Projects (%)	Major Research Sites*
Arizona	$31.9 (20.2%)	66 (17.7%)	University of Arizona, Northern Arizona University, and NIH Intramural Phoenix Epidemiology and Clinical Research Branch
Washington	$14.5 (9.2%)	45 (12.1%)	University of Washington and Washington State University
Oklahoma	$14.1 (9.0%)	34 (9.1%)	University of Oklahoma Health Sciences Center
Alaska	$11.9 (7.5%)	22 (5.9%)	University of Alaska Fairbanks
South Dakota	$9.6 (6.1%)	18 (4.8%)	Sanford Research
New Mexico	$8.4 (5.3%)	27 (7.2%)	University of New Mexico Health Sciences Center
Colorado	$7.8 (5.0%)	23 (6.2%)	University of Colorado Denver
California	$7.0 (4.4%)	16 (4.3%)	—
Montana	$6.9 (4.4%)	16 (4.3%)	Montana State University – Bozeman
Kansas	$6.2 (3.9%)	9 (2.4%)	—
Maryland	$6.2 (3.9%)	13 (3.5%)	Johns Hopkins University
North Dakota	$3.9 (2.5%)	4 (1.1%)	—
Totals†	**$128.5 (81.5%)**	**293 (78.6%)**	

*Includes out-of-state collaborators and partner research sites.

†Due to rounding errors, totals may not add up precisely.

Table D. Distribution of FY2015 AI/AN research dollars and projects by type of institution

Institution Type	No of Projects	% of Projects	Award Total $	% of Award Total $
Institution of Higher Education	265	71.0%	$109,895,741	69.5%
Other Health, Human Resources, Environment/Community Service Organization	58	15.5%	$15,980,436	10.1%
Research Organization	26	7.0%	$13,435,763	8.5%
Government — NIH Intramural Program	14	3.8%	$15,250,758	9.6%
Independent Hospital	4	1.1%	$1,392,295	0.9%
Education Organization Other Than Higher Education	3	0.8%	$1,260,410	0.8%
Other	3	0.8%	$1,004,457	0.6%
Total	**373**	**100.0%**	**$158,219,860**	**100.0%**

Administering Institutions Receiving AI/AN Research Funding, 2015

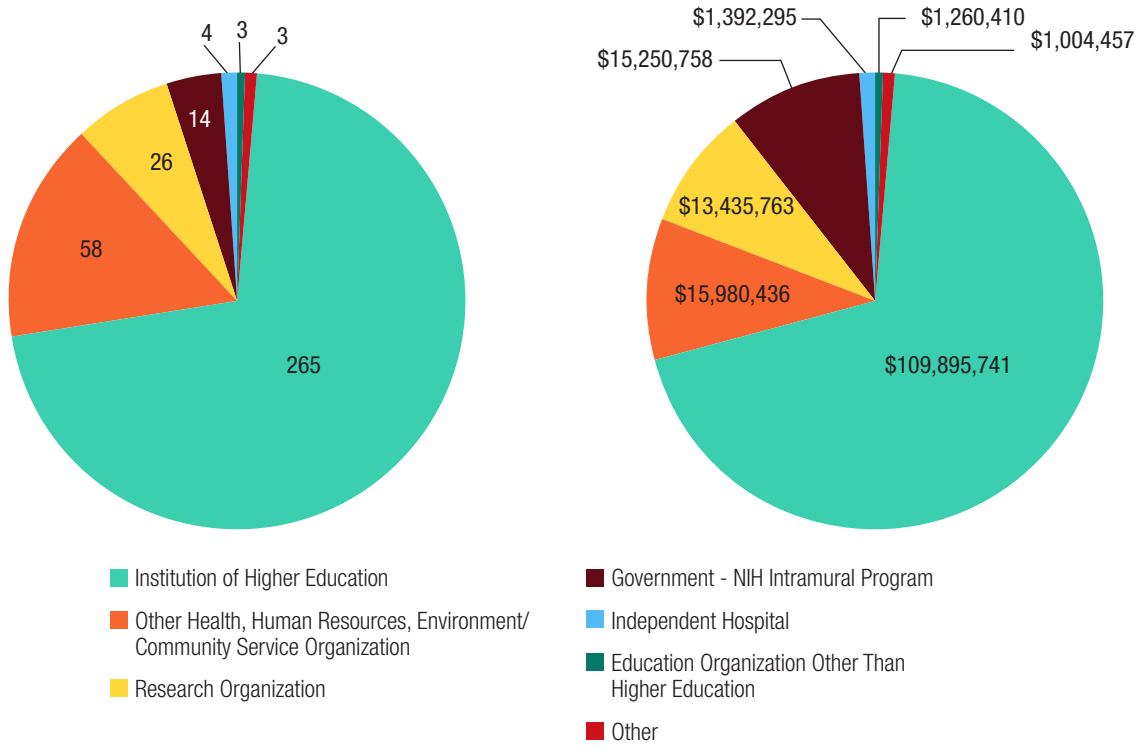


Figure 4. AI/AN research projects and funding by type of organization

Although response bias should be considered when drawing conclusions about the gender or race of the investigators, the available data suggest that few AI/AN researchers led AI/AN research projects. There were 287 principal investigators who worked on the 373 projects; the NIH analyzed data on 277 of them. Based on the available information, 34 (12.3%) identified as AI/AN and 144 (52.0%) identified as white, with the rest reporting as other races or withheld the information. Forty-five percent of these investigators were female, 37 percent were male, and 18 percent reported as other or withheld a response. In these initial analyses, demographic information about investigators leading subprojects was not reported.

How does the investment align with mortality due to diseases among AI/AN populations?

According to the *National Vital Statistics Report* from the CDC, "Deaths: Leading Causes for 2014,"[17] the leading causes of death for AI/AN populations (Table E) were:

1. Diseases of the heart
2. Malignant neoplasms
3. Accidents (unintentional injuries)
4. Chronic liver disease and cirrhosis
5. Diabetes mellitus
6. Chronic lower respiratory diseases
7. Cerebrovascular diseases
8. Intentional self-harm (suicide)
9. Influenza and pneumonia
10. Nephritis, nephrotic syndrome, and nephrosis
11. Alzheimer's disease
12. Septicemia
13. Assault (homicide)

Of NIH AI/AN-focused funding, 46.1 percent ($72.9 million) aligned with leading causes of death in AI/AN populations, directly addressing heart disease, cancer, accidents, diabetes, or other major causes of mortality. We did not attempt to correlate the level of research relative to measures of morbidity or other burdens of disease.

It is important to emphasize that the NIH funds many more projects to understand leading causes of mortality, but those projects are not specifically focused on AI/AN populations. In addition, it is very likely that AI/AN populations benefit from the knowledge gained from other research activities on heart disease, cancer, diabetes, and other conditions, even though they are not specifically focused on AI/AN populations.

17 See https://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_05.pdf, page 2.

Table E. Deaths and percentage of total deaths for the 10 leading causes of death, by race: United States, 2014

Cause of Death (based on ICD–10)	White			Black			American Indian or Alaska Native			Asian or Pacific Islander		
	Rank†	No. deaths	% of total deaths	Rank†	No. deaths	% of total deaths	Rank†	No. deaths	% of total deaths	Rank†	No. deaths	% of total deaths
All causes	—	2,237,880	100.0	—	308,960	100.0	—	18,008	100.0	—	61,570	100.0
Diseases of heart (I00–I09, I11, I13, I20–I51)	1	524,695	23.4	1	73,095	23.7	1	3,288	18.3	2	13,270	21.6
Malignant neoplasms (C00–C97)	2	502,933	22.5	2	69,090	22.4	2	3,153	17.5	1	16,524	26.8
Chronic lower respiratory diseases (J40–J47)	3	134,541	6.0	6	9,934	3.2	6	788	4.4	7	1,838	3.0
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	4	117,151	5.2	4	14,135	4.6	3	1,996	11.1	4	2,646	4.3
Cerebrovascular diseases (I60–I69)	5	111,035	5.0	3	17,088	5.5	7	649	3.6	3	4,331	7.0
Alzheimer's disease (G30)	6	84,990	3.8	9	6,567	2.1	11	304	1.7	8	1,680	2.7
Diabetes mellitus (E10–E14)	7	59,741	2.7	5	13,435	4.3	5	945	5.2	5	2,367	3.8
Influenza and pneumonia (J09–J18)	8	47,293	2.1	11	5,611	1.8	9	412	2.3	6	1,911	3.1
Intentional self-harm (suicide) (*U03, X60–X84, Y87.0)	9	38,723	1.7	16	2,426	0.8	8	489	2.7	10	1,188	1.9
Nephritis, nephrotic syndrome, and nephrosis (N00–N07, N17–N19, N25–N27)	10	37,976	1.7	7	8,586	2.8	10	338	1.9	9	1,246	2.0
Chrnoic liver disease and cirrhosis (K70, K73–K74)	11	35,508	1.5	15	3,103	1.0	4	951	5.3	14	608	1.0
Septicemia (A40–A41)	12	31,512	1.4	10	6,386	2.1	12	289	1.6	12	753	1.2
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	19	7,397	0.3	8	7,903	2.6	13	264	1.5	19	308	0.5

Source: Reproduced from the CDC 2014 *National Vital Statistics Reports*, page 12, Table D. https://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_05.pdf. Data for races other than white and black should be interpreted with caution because of misreporting of race on death certificates.

*Cause-of-death code is not included in the International Classification of Diseases, Tenth Revision (ICD–10).

† Based on number of deaths. Ranks above 10 are provided for informational purposes when a cause is among the top 10 for at least one of the groups being compared.

What is the NIH's investment in substance use and misuse (both alcohol and drugs), historical trauma, suicide prevention, and environmental health?

The TAC expressed an interest in specific research areas due to their importance to AI/AN health, well-being, and surroundings. Table F shows more specific data below.

Key Point

- In response to specific questions from the TAC, the NIH found that 117 of the 373 projects ($45.9 million) focus on botanicals research, historical trauma, suicide prevention, substance use or misuse, and the environment.

Table F. Number of projects and dollars for specific areas of research, FY 2015

Areas of Research	No. AI/AN Projects*	% of Total AI/AN Research Projects	AI/AN Research Dollars*, 2015	% of AI/AN Research Funding
Substances (e.g., misuse)	60	16.1%	$ 24,994,081	15.8%
Environmental†	39	10.5%	$ 13,116,807	8.3%
Historical Trauma	17	4.6%	$ 7,137,269	4.5%
Suicide Prevention	7	1.9%	$ 2,220,874	1.4%
Total*	**117**	**31.4%**	**$ 45,854,837**	**29.0%**
Total AI/AN projects	**373**	**—**	**$ 158,219,860**	**—**

* Six projects fell into more than one category. Dollars and numbers of projects are counted within each relevant category (area of research). Projects and dollars do not sum to totals because some projects are counted in more than one category, but double-counting has been removed from the totals.

† Environmental health research

Concluding Observations

This analysis examined how the NIH's research portfolio aligns with the health experiences and cultural context of AI/AN populations. In addition, the research projects returned from the system queries had varying levels of emphasis on AI/AN populations and their needs, which required review by an expert panel to protect against over-counting. This report provides an accurate — but conservative — analysis of research projects funded in FY 2015 that are specifically focused on AI/AN populations and their health and resource needs.

The results led to several observations worth considering for future analyses or emphasis during a strategic planning effort:

- Although most AI/AN research was funded by six NIH ICs, 11 others had investments in this area (not including two additional Institutes that provide NARCH funding through the National Institute of General Medical Sciences). The NIH may want to draw on expertise from all the ICs for future efforts in this area and consider expenditures for AI/AN research as a proportion of the overall research budget of smaller Institutes.
- NARCH and three other umbrella funding opportunities accounted for a quarter of the work focused on AI/AN populations or health needs. Future efforts may want to assess whether additional targeted opportunities are needed to increase emphasis on AI/AN-specific research.
- With 287 principal investigators focused on the AI/AN research, there did not appear to be a "deep bench" of AI/AN researchers. NIH analysis of principal investigator self-identified demographics supports the importance of future efforts to enhance existing training programs and support for new AI/AN investigators.
- Most funding was awarded to universities, medical schools, and other institutions of higher education, but 10 percent also was awarded to health or community service organizations and tribes. Future portfolio analysis efforts may want to assess the distribution of postaward funding (e.g., subcontracts, consultation) to other types of entities, such as tribes, and consider whether community-based approaches with direct awards are needed.
- NIH awards in suicide prevention, substance use, historical trauma, and environmental health research focused on AI/AN populations. A future effort may want to consider the NIH's emphasis in these areas, particularly suicide and substance misuse, due to the considerable need for prevention and treatment interventions.

Although a conservative view of research benefiting AI/AN populations, this analysis is a helpful step toward more fully understanding NIH's investment in AI/AN-focused health research, where it is awarded, the principal investigators, and how the research aligns with mortality data and special interest areas. The results also provide insight into some possible next steps for future analyses or strategic planning efforts.

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