



Health Disparities Advisory Council
Report to the Senior Vice President for Health Sciences Office
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A Summary of Opportunities to Promote Health Equity at the University of Arizona

University of Arizona Health Disparities Advisory Council Report

A Summary of Opportunities to Promote Health Equity at the University of Arizona presented to Dr. Skip G.N. Garcia,
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1. Background, Definitions, Unmet Needs – Health Care Disparities

Despite dramatic advances over the past few decades in biomedical science, clinical diagnostics, novel therapeutics, and emerging health care delivery reforms, inequalities exist in terms of health care access, quality and outcomes across population groups and regions in the United States and around the world. Generically, in systems, processes or interventions, when truly significant differences in outcomes for a given group or constituency occur, despite a common strategic approach, this is termed a disparity. As such, over the past decade, with healthcare increasingly under the microscope, coupled with simultaneous shifts in healthcare policy, a key emerging unmet need has been the recognition of significant healthcare disparities in the United States and around the world.

To more fully understand healthcare disparities from the perspective of attempting to provide solutions, it is useful to understand the types of disparities that exist, ask what groups are affected, where the disparities are occurring, and what the range of “mechanistic” factors that may be driving the disparity is. To aid in this analysis, it is useful to first characterize healthcare in terms of (1) the “natural history” of healthcare delivery across an individual's life span; (2) the spectrum of the “focus of care,” i.e. from prevention to end-of-life care; and (3) the range of mechanistic factors that affect healthcare and its outcomes. These definitions are outlined in Appendix 1. Utilizing this framework for analysis, clear areas of unmet needs associated with disparities become readily evident. Considering the geographic regions and populations involved (socioeconomic, ethnic, racial), a full picture of disparities emerges. *This approach is not intended to provide detailed solutions at this juncture, but to create a contextual framework that the University of Arizona may utilize to arrive at solutions and ultimately at Health Care Equity.*

2. Overview of National and Arizona Disparities

- For the first time in **human** history, more people are dying from **non-communicable diseases** (diabetes, heart disease and stroke, cancer, pulmonary disease) than from all infectious diseases combined¹.
- For the first time in **Arizona** history, the life expectancy of Arizona’s children is **lower** than for Arizona parents. The average age of onset for all non-communicable diseases in Arizona and globally is dropping even as the state is aging and becoming more diverse. This not only places an enormous burden on Arizona families and communities, but also on social services and governmental institutions^{2,3,4,5}.
- Although the **median age of death remained stable from 2008 to 2012 for Arizonans** overall at 77 years of age, the percent of deaths before expected years of life were reached increased for Arizonans overall from 52.4% to 55%; for Latinos, the increase was from 67.6% to 68.4%; for Native Americans, the increase was from 76.5% to 78.7%. These data demonstrate that approximately half of all deaths in Arizona occur before life expectancy is reached. **Specifically, for Latinos, nearly 7 in 10 die prematurely and for Native Americans, nearly 8 in 10 die prematurely**^{5,6}.

Background. Individuals from racial and ethnic minorities are disproportionately affected by many health conditions that presently plague our country, and are more likely to be medically underserved in the current healthcare system.¹ These health disparities are well-documented, continue to increase, and are at risk of continuing. In some cases, such as recent immigrants in the US less than five years and the undocumented, the threat of even greater disparities is escalated under the Affordable Care Act of 2010 and in states that opt not to expand Medicaid. Disparities among people from racial and ethnic minorities can be described as differences in prevalence rates, health outcomes, quality of healthcare, and access to healthcare services^{7,8} and will serve as our working definition.

National. Racial and ethnic minority groups, a number of immigrant groups from various countries now settled in the U.S., and other vulnerable populations such as the seriously mentally ill⁹, experience many barriers in healthcare access ranging from financial, systemic, language to cultural barriers. Inequities in social determinants of health¹⁰ (like substandard housing and lack of infrastructure in poor urban and rural neighborhoods where many racial/ethnic minority groups live) have led to communities that are economically and educationally disenfranchised, unsafe, and have diminished social networks¹¹. This is especially true of communities along the Arizona-Sonora border. According to U.S. census data (2013), the US population is estimated at 316,128,839; 63% were non-Hispanic White, 16.9% identified as Hispano/Latino, 1.2% were Native American or Alaska Natives and 13.1% identified as Blacks or African Americans¹². It is believed that these data disproportionately underrepresent vulnerable populations like the Latino migrant community

because they tend to not engage in community surveys as much as other groups. Moreover, available data on morbidity, mortality, and other health statistics reveals low performance of racial and ethnic minority populations compared to their white counterparts on a range of health predictors and outcome indicators (such as infant mortality, life expectancy, prevalence of chronic disease and insurance coverage). The table summarizes select data from the CDC Disparities and Inequities Report¹³.

CDC Disparities & Inequities Report (2013)

		Men	Women	White	Black	Asian	Native American	Hispanic
No insurance	% , ages 18-65	24.1	18.8	16.1	26.2	17.3	33.5	41.0
Smoking	%	8.9	8.4	10.2	5.0	3.0	13.6	7.7
Binge drinking	%	24.6	12.5	21.1	14.2	10.3	18.2	17.7
Suicide	per 100,000	--	--	15.2	5.2	6.2	15.6	5.3
MVA deaths	per 100,000	16.8	6.8	12.1	12.0	5.1	25.2	10.4
Infant mortality	per 1000 live births	7.2	6.0	5.5	12.7	4.5	8.4	5.6
Homicides	per 100,000	8.7	2.4	2.6	19.9	2.2	9.0	6.6
Drug induced deaths	per 100,000	16.1	10.2	16.6	8.9	2.1	17.1	5.5
CAD deaths	per 100,000	155.8	86.2	117.7	141.3	67.3	92.0	86.5
Stroke Deaths	per 100,000	39.7	37.8	37.8	55.7	31.6	29.8	29.5
Diabetes Dx	%	7.0	6.7	6.0	10.9	7.4	--	9.0
HIV	per 100,000	33.3	9.7	9.2	86.0	8.1	13.3	31.1
TB	per 100,000	4.5	2.7	0.9	7.0	22.4	6.4	6.5
HTN	%	30.5	28.6	28.6	41.3	--	--	27.7
BP control	%	42.7	55.5	52.6	42.5	--	--	34.4
Child Obesity	%	--	--	16.0	21.0	--	--	25.0
Preterm births	%	--	--	10.8	17.1	10.7	13.6	11.8

In addition to the excess burden associated with increased mortality and morbidity caused by health disparities, there is also an enormous financial impact on our healthcare system. According to a report in 2009, more than 30% of direct healthcare costs faced by African Americans, Hispanics and other minority populations are due to health inequities¹⁴. Moreover, the total cost associated with health disparities in the US is approximately \$1.24 trillion over a three-year period.

State of Arizona. The national profile of health disparities reflects what is happening at the state and local levels. According to U.S. census data (2012), the population of Arizona is estimated at 6,551,149; 57.1% were non-Hispanic White, 30.2% identified as Hispanic/Latino, 5.3% were Native American and 4.5% identified as Blacks or African Americans¹⁵. The population is rapidly aging, especially among minority groups. The table below (Figure 2A-2) displays mortality for all causes of death by race/ethnicity and year (2002, 2007 & 2012). Note, that African Americans and Native Americans report higher mortality rates compared to the other groups¹⁶.

Figure 2A-2
Age-adjusted Mortality Rates^a for all Causes by Race/Ethnicity and Year, Arizona Residents, 2002, 2007, and 2012

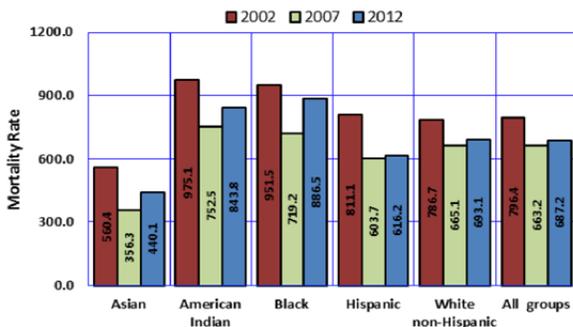


Figure 2B-2
Age-adjusted Mortality Rates^a for the Five Leading Causes of Death for Both Genders by Race/Ethnicity, Arizona, 2012

Rank	Asian or Pacific Islander	American Indian or Alaska Native	Black or African American	Hispanic or Latino	White non-Hispanic
1	Cancer 100.5	Diseases of heart 122.7	Diseases of heart 190.5	Cancer 127.2	Cancer 155.6
2	Diseases of heart 87.9	Cancer 100.8	Cancer 180.1	Diseases of heart 123.4	Diseases of heart 150.0
3	Alzheimer's disease 31.3	Unintentional injury 94.8	Stroke 56.0	Diabetes 40.8	Chronic lower respiratory diseases 49.4
4	Stroke 38.9	Diabetes 80.2	Diabetes 49.4	Stroke 35.5	Unintentional injury 43.3
5	Diabetes 27.6	Chronic liver disease and cirrhosis 59.2	Alzheimer's Disease 38.5	Unintentional injury 33.9	Alzheimer's Disease 31.6

According to the latest report published by the Arizona Department of Health Services¹⁵, cancer, heart diseases, Alzheimer's disease, stroke, unintentional injury, diabetes, chronic liver disease and cirrhosis, and chronic lower respiratory diseases are the top causes of death in 2012 in Arizona. Heart diseases were the leading cause of death

among Native Americans and African Americans. Hispanic/Latinos, Asians, and non-Hispanic Whites more commonly died from cancer. The table (Table 2B-2) above provides additional comparisons of age-adjusted mortality rates for all leading causes of death by race and ethnic groups in Arizona.

As noted in the adjacent figure, (premature death by race and ethnicity), Native Americans are younger at time of death compared to other racial and ethnic groups, followed by African Americans at 74% and Hispano/Latino at 68%. Non-Hispanic Whites, on the other hand, are experiencing death much later in life.

The U.S. has embarked on a mission to reduce the growing health disparities gap by undertaking new powerful initiatives like the National Partnership for Action to End Health Disparities (NPA). The NPA established a roadmap “for eliminating health disparities through cooperative and strategic actions,”¹⁷ making it incumbent upon academic institutions such as the University of Arizona to join the public/private partnerships endeavoring to promote this global imperative and address the widening gap.

This is an opportunity for the health sciences in particular to engage multiple professionals across campus in an effort to align with the strategic roadmap established by the NPA. Reductions in health disparities would not only have an enormous positive societal impact, but also lead to tremendous financial cost savings within our healthcare system.

3. Vision, Mission, Goals

The University of Arizona is ideally suited to become a premier academic institution leading research initiatives to promote health equity and wellness within all communities regardless of race, ethnicity, gender, geography, environment or socioeconomic status.

As a vehicle for this vision, we propose the development of an interprofessional **Arizona Center for Health Equity (ACHE)** at the University of Arizona.

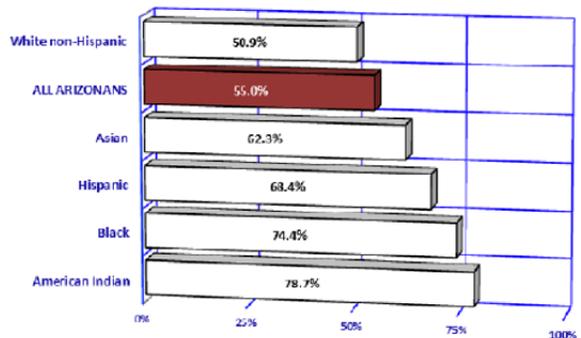
The mission of this center would be to improve the health and wellness of communities of all races, ethnicities and genders through innovative research, educational programs, leadership development, improved access to healthcare, and community partnerships.

We propose the following goals of this initiative which would be facilitated by a center for health equity:

- To advance understanding of the determinants of the quality and equity of health and healthcare
- To design and evaluate interventions to improve the quality and equity of health and health care with communities
- To foster interprofessional research and educational collaborations to improve health and to promote wellness and healthy lifestyles
- To partner with and engage at risk communities in an effort to build collective capacity to improve their quality and equity of health and healthcare
- To recruit and mentor healthcare professionals and research scientists from racial and ethnic minority groups and socio-economically disadvantaged groups
- To support evidence-based translational research into clinical and community-based practice, programs and policy in an effort to reduce health disparities in morbidity, mortality and cost

We propose these goals in partnership with the unique needs, beliefs and values of the culturally diverse communities of the Southwest should be achieved while being respectful of diversity, culture, community values and beliefs. This initiative should be designed to serve the needs of populations unique to the Southwest; however, it is expected that

Percent of Deaths before Expected⁵ Years of Life Reached by Race/Ethnicity, Arizona, 2012



research and policy findings would have widespread applicability nationally and globally.

4. Health Disparity Resources and Initiatives within the University of Arizona

Currently, the University of Arizona has substantial resources and research strengths in health disparities. UA is in an ideal geographical location to partner with diverse underserved populations, including Hispanic/Latinos, Native Americans and Tribal Nations, rural and underinsured populations, and the elderly. The presence of four health professional colleges within the Arizona Health Sciences Center (Colleges of Medicine, Nursing, Public Health and Pharmacy) is also an important asset, in addition to the close proximity to important disciplines on the main campus. Examples of additional notable programs and resources include:

- Arizona Cancer Center
- Arizona Center for Integrative Medicine
- Arizona Center on Aging
- Arizona Initiative for Accelerated Biomedical Innovation (AIABI)
- Arizona Prevention Research Center
- Arizona Telemedicine Program
- BIO5 Institute
- Cancer Health Disparities Institute
- Canyon Ranch Center for Prevention and Health
- Center for American Indian Resilience
- Center for Health Outcomes and PharmacoEconomics (HOPE Center)
- Center for Rural Health
- Center of Excellence in Women’s Health
- Hispanic Center of Excellence
- McKnight Brain Institute
- Native American Research and Training Center
- Respiratory Center
- Southern Arizona Limb Salvage Alliance (SALSA)
- Southwest Environmental Health Sciences Center
- Summer Institute for Medical Ignorance (SIMI)
- Tech Launch Arizona (TLA)
- University of Arizona Arthritis Center

There are currently many active and successful research programs in health disparities/health equity at UA, including 46 actively-funded grants totaling over \$26,000,000. This figure underrepresents the amount of funding and active projects since it does not include foundations and partnerships funding. The general categories covered are summarized below:

- | | |
|-------------------------------|----|
| • Community and Border Health | 12 |
| • Native American Health | 11 |
| • Cancer | 4 |
| • Workforce Diversity | 4 |
| • Diabetes Mellitus | 3 |
| • Cardiovascular Disease | 3 |
| • Stroke | 3 |
| • Aging | 1 |
| • Respiratory Diseases | 1 |
| • Other | 4 |

Many opportunities for growth and development would substantially foster research in health equity at UA. Investigators are actively engaged in projects addressing disparities within specific populations in a collaborative fashion.

Nonetheless, efforts for the most part are undertaken within the confines of their discipline. A more interprofessional and collective approach would leverage expertise among other resources available within the health sciences at UA and other campus researchers, creating synergies and collective action. There is a recognized need to enhance research infrastructure outside of the immediate Tucson/UA area (e.g. Phoenix). Leadership is needed to identify and facilitate collaborative opportunities across colleges, departments, and divisions. In addition, faculty members need incentives to work collaboratively on program grants, protected research time, and seed funding to provide pilot data for promising grants. For example, if a grant RFA for a P60 Center of Excellence in Health Disparities is issued by the National Institute of Minority Health and Health Disparities (NIMHD), a competitive grant submission from UA would require demonstration of multidisciplinary team science in health disparities, as well as promising pilot data for research projects. Currently there is insufficient infrastructural support for these types of initiatives.

5. Education and Training

Through its role as a leading academic institution, UA is well-poised to provide education and training that will raise public and provider awareness of racial/ethnic disparities in care, improve the capacity and number of healthcare professionals with underserved communities, and increase the knowledge base on causes and interventions to reduce disparities. These initiatives are fully encompassed with the UA “Never Settle” strategic plan, which emphasizes diversity and involvement of all students in research.

A number of active current programs throughout the UA campus highlight our current resources and future potential to be a leading academic institution in training/education in health equity and disparities research with a uniquely diverse workforce.

- The Commitment to Underserved People (CUP) program was established in 1979 through the committed action of a small but determined number of medical students who wanted to make a difference in the healthcare of the underserved. With the encouragement and active mentorship of Dr. Steve Spencer, a faculty member in the Department of Family and Community Medicine, the medical students developed the necessary clinical and administrative skills to "run a clinic" with a faculty preceptor. From this grassroots beginning CUP has evolved into a substantial program involving over 90% of all students in the first two years of medical school. Most will continue their participation throughout their medical school career. CUP provides students the opportunity for service learning with medically underserved populations. Through CUP, medical students gain insight into how socioeconomic and cultural factors impact health and access to healthcare. This program highlights the collaborative approach to educating with communities experiencing health disparities. Collaborative education is 360-degree learning; students learn from the community and faculty, the community learns from students and the faculty, and the faculty learn from communities and students.
- The Arizona Telemedicine Program (ATP) extends to approximately 200 communities throughout the state of Arizona and in the Four Corners Region. The ATP has a well-established statewide state of the art telecommunications network with hubs in Tucson, Phoenix, and Flagstaff. The network serves to increase access to clinical services and patient and health professional education programs to ameliorate disparities in care in both urban and rural settings. Examples of innovations include bundling of services to improve access to and coordination of breast cancer care, development of new medical curricula for undergraduate and postgraduate medical and interprofessional education, and community based patient centered education. These efforts have improved the reach of academic clinical care to diverse communities throughout the state. A number of important programs have been established to achieve diversity in our workforce. For example, in the College of Nursing, the Graduate Assistantships in Areas of Greatest Need (GAANN) program provides training for Native American and Hispanic doctoral students; there are 5 trainees currently in the program. Other programs focused on diversity include the Hispanic Center of Excellence, the Cancer Health Disparities Institute and the Rural Health Professions Program.
- The Focusing Research on the Border Area (FRONTERA) Summer Internship provides undergraduate and graduate students with opportunities to prepare for medical school, hands-on research experience, and an increased understanding of public health disparities in the U.S.-Mexico Border Region.

Current formal didactic training and education in health equity and health disparities includes (see supplemental table for expanded listings by department):

- 55 formal courses across all campuses
 - Public Health 18 courses
 - Nursing 8 courses
 - Family and Community Medicine 8 courses
 - Anthropology 6 courses
 - Medicine 5 courses
 - Mexican American Studies 5 courses
 - Africana Studies 1 course
 - Epidemiology 1 course
 - Gerontology 1 course
 - Human Services 1 course
 - Pharmacy 1 course
- Approximately 10 hours of the UA COM-Tucson curriculum including education in inequities in clinical care, and social determinants of care

However, the University faces some challenges to training and education in health disparities. Few healthcare professionals are fluent in the languages and cultures of the underrepresented minorities whom they serve. This serves not only as a barrier to care, but also reduces opportunities for underrepresented minorities to benefit from available clinical trial programs. There is a need to recruit and retain members of racial/ethnic minority groups in the healthcare workforce and to develop provider training programs and tools in cross-cultural education. Another need is to train scientists to investigate factors contributing to health disparities and the impact of interventions aimed at eliminating them. We propose ongoing efforts to 1) develop a workforce that represents the unique and rich diversity of the state of Arizona; 2) enhance cross-curricular content on health disparities that highlights disparities and promotes researching potential solutions; and 3) provide leadership development opportunities for staff, students, trainees and faculty from underrepresented racial/ethnic minorities.

In summary, there are numerous potential opportunities to advance our training and education missions. There exists a rich racial/ethnic, socioeconomic, and demographic diversity in Arizona which offers a unique pool from which to draw trainees. Collaborations with community colleges and high schools should be augmented to increase minorities' interest in science and healthcare. Partnerships and collaborations with local groups could provide an additional source of trainees.

To accomplish the above goals, we need to:

- Provide administrative and monetary support for submission of interprofessional T32 and other training grants focused on recruiting outstanding trainees from underrepresented populations.
- Provide seed grants for proposals focused on health disparity education, diseases or conditions that disproportionately affect underserved populations, and/or research to identify strategies to reduce disparities in care.
- Initially build on programs with established expertise in health equity/health disparities (e.g., Latina cancer, diabetes, or aging/geriatrics).
- Develop a multidisciplinary health disparities training pathway and curricula that spans all campuses.

A successful program enhancing education and mentorship in health disparities will result in successful funding of training and early career grants (T-series and K-series), conversion of seed grants into R01 or equivalent grants, and successful completion of training of underrepresented scientists and health professionals as measured by graduation rates and recruitment into the professions for which they were trained.

6. Partnerships and Collaborations

Health disparities cannot be addressed successfully by any one single entity. Health inequities are the result of social determinants. Successful solutions must engage and emerge from each sector. As the only academic health center in the state of Arizona and one of the few health sciences centers in the United States with Colleges of Medicine, Nursing, Pharmacy and Public Health on the same campus, the Arizona Health Sciences Center is uniquely poised to serve as a

bridge and catalyst for achievement and innovation. Recognizing that traditional academic approaches have sought partnerships in an effort to seek funding or to seek study subjects, UA is seeking partnerships to co-develop concrete solutions to benefit Arizona's population, our number one priority as a land-grant institution.

Partnerships and collaborations offer opportunities not only for funding to conduct research but also to engage and involve key stakeholders (e.g. community members and organization) in the research. The supplemental table provides a detailed list of potential partners/collaborators for health disparities research including:

- 1) **Academic Institutions** (e.g. Arizona State University, Northern Arizona University)
- 2) **National or Local Foundations or Associations** (e.g. American Public Health Association, American Heart Association)
- 3) **State and Governmental Agencies** (e.g. National Institutes of Health, Centers for Disease Control, Departments of Health)
- 4) **Communities and Community Organizations** (e.g. Arizona Community Health Outreach Workers, Hispanic Chamber of Commerce)
- 5) **Regional Healthcare Providers** (e.g. St. Elizabeth's, community health centers)
- 6) **Industry Organizations** (biomedical device and pharmaceutical companies)
- 7) **Media Outlets** (e.g. radio and television stations, social media)

Examples of highly successful research community partnerships:

- The ENCASA (Elders and Caregiver Assistance and Support At-home) Community Advisory Council consists of members of the Mexican American community who, since the year 2000, have influenced the design, data collection, recruitment of participants, analysis and dissemination of studies conducted by Dr. Janice D. Crist, RN, PhD. Dr. Crist's successful research community partnerships have included several intramural studies and two NIH-funded model testing and intervention studies, focused on the under-utilization of post-hospital care for Mexican American elders and their family caregivers.
- Dr. Marylyn Morris McEwen's program of research focuses on decreasing health disparities among persons of Mexican origin who reside in the U.S.-Mexico border region. Within the past two decades she has conducted successful community-based NIH-funded studies in which community health workers or *promotoras de salud* have contributed to culturally tailoring diabetes self-management and social support interventions, intervention delivery and recruitment of participants. In her current R01 community members were recruited to form a Family Action Board for refining and expanding an individual-level diabetes intervention to a family-level intervention.
- *iVida!* (Ana Maria Lopez, MD, MPH, PI) has been continuously funded since 1996 through the Susan G. Komen Foundation and the Border Health Commission to deliver patient and health professional education via fully interactive telecommunications technology and videostreaming—live or delayed. *iVida!*'s content is guided by a statewide Community Partnership Group (CPG) which includes patients, families, and health professionals in both urban and rural settings. The partner sessions—patient/family and health professional—serve to facilitate patient-clinician communication and improve dissemination of health information to support the health of communities.

Our approach to equity directly targets the social determinants of health:

- Equity from the start of life: potential partners include governmental and community health agencies focused on prenatal, natal, and postnatal programs across the lifespan that involve nutrition, safety and education.
- Equity in living environment: urban and rural settings each face unique health challenges for the most vulnerable. Lack of healthcare infrastructure in rural settings contributes to disparities. Rural development and urban planning is needed including adequate housing, safety, paved streets, electricity, sanitation, safe water; retail planning to include access to healthy foods, control of alcohol and tobacco outlets, and approaches to ameliorating the digital divide.
- Equity in work: potential partners would address physical and psychosocial workplace hazards and address policies that promote a healthy wage. Partnerships with the Arizona Area Health Education Centers (AzaHEC) Regional office contribute to the health professions pipeline.
- Equity in a social safety net: potential partners include governmental agencies responsible for public sector support, as well as bi-national and tribal partnerships that address population health unique to the Arizona-

Mexico border region and tribal communities.

- Equity in access to health care: potential partners include health care agencies providing care to uninsured and underinsured rural and urban populations, and the elderly, as well as healthcare systems utilizing telemedicine technologies that facilitate access to care. The Affordable Care Act provides a unique opportunity to study the impact of this social experiment on health disparities, including innovative, high-value, team-based models of care.
- Equity in markets: businesses may promote health equity or disparities. Engaging grocery stores, pharmacies, retail outlets, and gas stations may prove to be successful partnerships in co-delivering health messages and interventions.
- Equity in gender: maternal and child health are inextricably linked. Potential partners would support wage equity, child care, sexual and reproductive health, and education for women as well contribute to sex and gender health disparities
- Health equity as a guide to policy decisions: multiple examples exist to demonstrate healthcare solutions in the policy (not the healthcare) sector. Examples include use of car seats, seat belts, and helmets, and banning the use of tobacco in restaurants. Partnerships with professional organizations have generated position and white papers to address health disparities and health equity.

7. Technology and Device Approaches

Economic and policy approaches to addressing disparities are novel approaches that the University of Arizona is uniquely poised to develop. A dramatic and accelerating push is underway at the University of Arizona to creatively mix discoveries and new technologies with unmet needs to develop practical diagnostic and therapeutic solutions for healthcare. For example, the Arizona Initiative for Accelerated Biomedical Innovation is specifically chartered as a creativity engine to foster these developments. With the realization that the world is becoming digital, that individuals are becoming personally empowered and that the cell phone is the “medical device of the future,” a dramatic convergence of technology, healthcare and individual access is occurring. While disparities may exist at the personal level, it is a striking fact that nearly 98% of individuals in the world now have direct access to a mobile network.¹⁹ Important advances are occurring in electronics, particularly as relates to form factor. Flexible, stretchable and even biodegradable electronics, novel patches, skin-based monitors and other personal forms are being developed at the University of Arizona and partner units. These systems will allow the individual, even in the most rural and socioeconomically disadvantaged group to develop connectivity to the health care system via personal monitoring or telemetric means. Integrating personal digital devices with the cell phone and/or the web will break the barrier of lack of access, effectively connecting one as a “node” in a growing digital health architecture. On the diagnostic side, advances in paper microfluidics are another example of expensive devices that may be made widely available for determination of drug levels, biomarkers or other parameters being followed at the cost of pennies a day. Further, advances in robotics, wearables, telemetrics and healthcare-at-a-distance conceivably will allow the development of inexpensive robotic systems that may be placed in areas of need, in communities without access to care, allowing advanced high quality care to be dispensed. The idea that technology can help advance health equity should not be discounted because of preconceived notions about an insurmountable “digital divide.” Rather, development toward this aim can be coordinated and advanced.

To advance these developments, efforts under way via the Arizona Initiative for Accelerated Biomedical Innovation and Tech Launch Arizona should be fostered. These groups not only provide the opportunity for solution development but are vital means for engaging university students, faculty and personnel in these efforts. Further, they provide the opportunity for obtaining grants, generating intellectual property, and the creation of startups. These may generate additional return to the University via SBIR/STTR mechanisms as well as royalties and other means.

8. Executive Summary Recommendations

We recommend development of an Arizona Center for Health Equity (ACHE) to foster 1) interprofessional research to improve health, 2) education and training in health equity and disparities, and 3) diversity in the workforce and the possibility for novel technological solutions as well. This center would provide the vehicle needed to optimize our synergies and collective action. A closer look at the resources and initiatives currently deployed at our institution

provides the groundwork for how an ACHE can advance health disparities research across all campuses at UA. While the importance of strategic faculty hiring cannot be overstated, an overview of our existing pool of expertise, our active research among Latino, Native American, and other minority populations, our expertise in aging/geriatrics, and our growing interprofessional teams, suggests that a significant, unmet need is a resource that connects researchers who are doing work within self-contained research groups. Such a resource could provide opportunities to coordinate and enhance research under strategic aims.

An ACHE could serve as both the meeting ground and the launch site for centers, research projects and community outreach activities that address health disparities. In addition to being its own entity, an ACHE should serve as a collaborative and resource-sharing space for existing units such as the HOPE Center and the Cancer Health Disparities Institute, which could enter the fold as member or affiliated units. Just as importantly, an ACHE could support the establishment of new centers that would fill gaps in our health disparities research portfolio, such as a Rural Health Center of Excellence and a Border Health Center of Excellence.

Development of such a center, which would include subsections focusing on Epidemiology, Comparative Effectiveness Research, Health Care Research, Genetic Research, Technology and Device Solutions, Basic Sciences, Population Health Research and Community Translation (Figure 4) would create, in a single center, the answer to a nationwide initiative recently launched by the American Associations of Medical Colleges (AAMC)¹⁸. It would uniquely position the University of Arizona to be a regional and global leader both as a self-contained unit and as an organized team ready to collaborate with sister units, nationally and internationally.

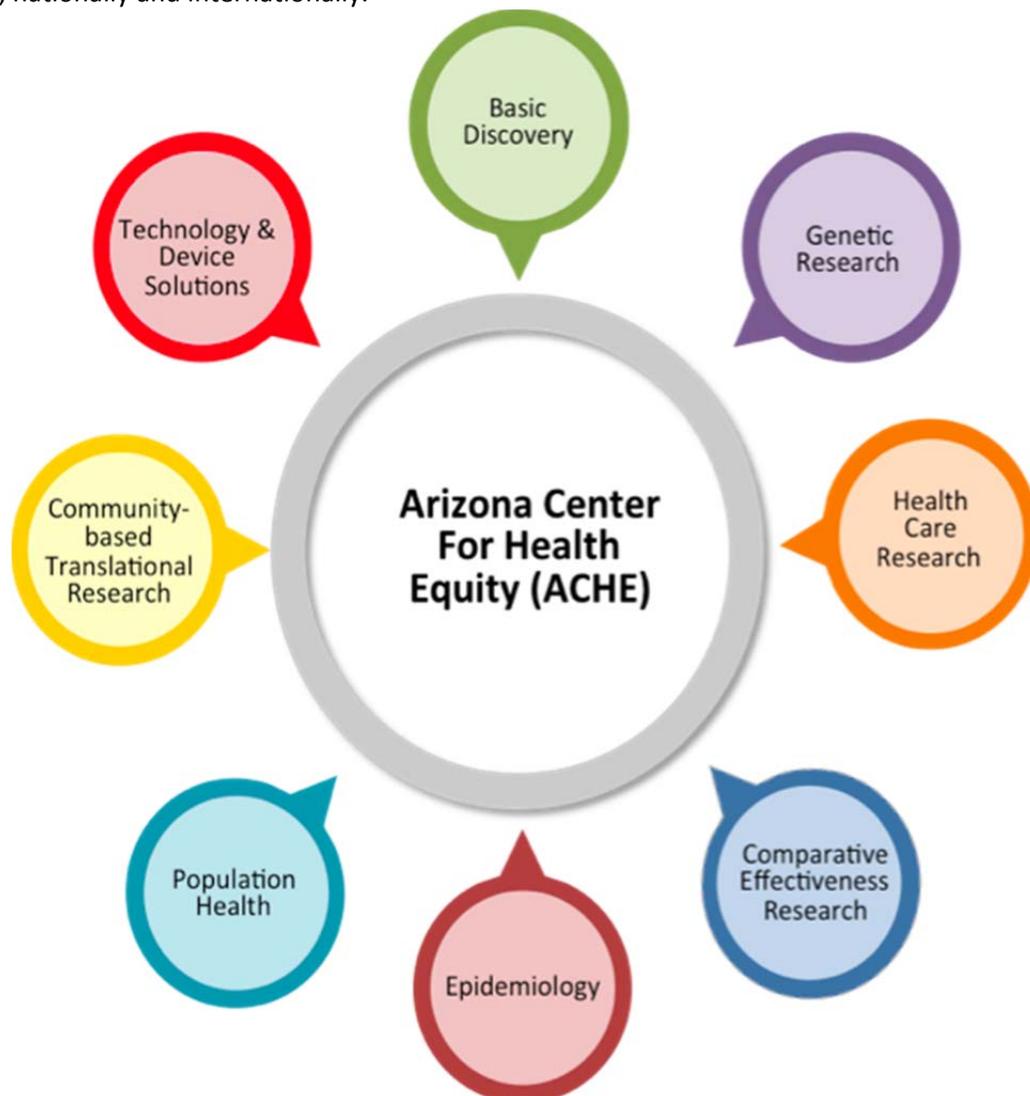


Figure. A Proposed Arizona Center for Health Equity will serve to amalgamate eight key areas of inquiry throughout the University of Arizona.

In the interest of seeing UA health disparities research take a statewide and regional approach, with applicability nationally and internationally, an ACHE should have a Tucson, Phoenix, and rural campus presence, thereby providing access to more population groups across our entire region. The following areas have been identified as high yield and/or promising areas for focus for health disparities and diversity initiatives at UA:

- Non-communicable diseases:
 - Cancer
 - Diabetes Mellitus
 - Cardiovascular Disease and Stroke
 - Respiratory Diseases
 - Substance Abuse and Mental Health
- High risk populations: Hispanic/Latinos, Native Americans, Aging Populations
- High yield geographical regions: Border and rural health
- Opportunities to capitalize on cross-cutting (multidisciplinary, collaborative) expertise in precision health, bioinformatics, and global health

Over the next twelve months, it is recommended that an internal leadership team be convened to review the above recommendations and, as a vehicle to facilitate implementation, to launch development of an Arizona Center for Health Equity. There exist a number of short, medium and long-term benefits to ACHE:

- Expanded interprofessional faculty recruitment
- Expanded disparities/equity publications with enhanced impact
- Expanded mentoring opportunities of next-generation leaders
- Expanded relationships with regional health partners (Supplemental Table)
- Expanded relationship with cross-border neighbors (Tribal Nations, Mexico, Latin America, Caribbean)
- Expanded synergies with interprofessional centers of excellence (Cancer, Diabetes, Pulmonary, Cardiovascular, Arthritis, and Aging)
- Expanded funding opportunities (Federal, Foundation, Industry)
- Reduced healthcare costs associated with health disparities

Measurable short and long-term goals for the ACHE should include successful grant applications in the following areas:

- The leading Center for Health Equity in the United States based on original publications in high impact journals
- An NIH-funded National Institute of Minority Health and Health Disparities (NIMHD) P60 Center of Excellence grant
- A National Institute of Aging (NIA)–funded Claude D. Pepper Older Americans Independence Center (OAICs) (P30)
- Resource Centers for Minority Aging Research (RCMAR) grants
- Conference grants and participation in (or sponsorship of) relevant symposia
- Grants for diversifying the workforce (increasing minority health professionals and scientists)
- Grants for trainees in health disparities
- Increased philanthropic support for the center’s mission
- Development of novel technologies to address defined aspects of disparities
- Generation of intellectual property
- An extensive portfolio of publications addressing health disparities
- NIH funded T32 and K grant awards

The following resources would assist in the development of an ACHE:

- Appointment of an ACHE executive leadership committee
- Immediate infrastructure and administrative support with interim placeholder leadership
- Strategic recruitment of an ACHE director and staff
- Seed funding for promising pilot projects, especially those leading to K awards or participation in T32 grants
- Formal mentoring program for trainees and junior faculty interested in disparities work

Our goal is to create an ACHE for positive change. Ideally, this would allow UA to have the capacity to make a

transformational impact on health disparities research nationally and promote health equity in partnership with our community. This summary is intended to serve as a brief summary of resources and strengths that can be pooled to create a center. It is also intended to serve as a work in progress with the ultimate goal to improve the health of all citizens of the Southwest and beyond.

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Appendix 1

Definitions: Natural History of Healthcare, Focus of Health Care and Mechanistic Factors that affect Health Care

Natural History of Health Care – “Lifespan Perspective”

One context that is useful to provide a lens into healthcare disparities is the “natural history” of health care potentially available to an individual or family over a typical lifespan. From that perspective, for an individual, the following stages of care may be identified: pre-conception and prenatal, obstetric, neonatal, infant, toddler and juvenile, adolescent, young adult, mature adult and middle-aged, aging and elderly, and end-of-life. While each of these life stages involves multiple aspects from prevention and diagnosis to acute and chronic care, it is useful to cite a few examples of the types of issues that must be examined from a disparities perspective. For the stage of preconception counseling and prenatal care, this is an area where issues such as socioeconomic and geographic status, access to healthcare, ability to purchase nutritional supplements and adequate nutritional counseling, issues of drug use, and genetic counseling all are very disparate between specific groups in the United States. For the mature adult, regional, ethnic and socioeconomic differences underplay access to care, type of care provided and treatment outcomes in the area of diabetes and obesity. Finally, in end-of-life care the ability to place patients in chronic care facilities, hospice or assisted-living facilities varies widely and is a clear focus of disparity.

Focus of Health Care – “Prevention to End-of-Life”

A second useful context is the nature and type of care provided. From this perspective the traditional, classic, lay view of healthcare is the acute care provided when one is ill, by the physician or the emergency room. As healthcare professionals, in an evolving world of expanding perspective and focus, with an appreciation for a spectrum of care, ultimately aimed at well care rather than sick care, a wide range of care is now understood. As such, these recognized categories of care include: well care and prevention, informed health (the emerging concerned and digital health group), normal healthcare maintenance (well patient visits), acute care for common illnesses, acute care for major or traumatic illnesses, repetitive care for chronic illnesses, chronic hospital care and recovering hospital care typically for chronic illnesses, end-stage disease care (often involving hospitalizations, e.g. NYHA stage IV heart failure or advanced malignancy, hospice, end-of-life and palliative care). To provide examples in this context, clearly the classic example of well patient care and routine visits to the physician differs dramatically in different regions of the country between different ethnic groups with varying socioeconomic status. Oftentimes the poor and disadvantaged groups are never seen by physicians when they are "well," only when ill, with the emergency room being the physician to the poor. In contradistinction, those with benefits, access to care or being financially sound may typically see a physician on a more regular basis, paying for care, the extreme being subscribers to boutique or "concierge care." Similarly, end of life provides another solid example. Those who can afford the significant expenses, when faced with a loved one with a terminal illness or with an aged parent, typically manage to shoulder this burden, providing a personal health attendant or residence in a skilled nursing facility with personal attention. For various unfortunate groups and for those without the financial means, oftentimes no form of care is available. For certain ethnic groups the family may step in to provide this function, though for other groups and for the non-classical family situation, no means may exist.

Mechanistic Factors That Affect Health Care and Its Outcomes

A third context for examining health care disparities is that of understanding underlying operative mechanisms for determinants of individual health. If one reflects on this it becomes clear that this covers a very broad range from the molecular and genetic up to the societal level as a whole. Useful categories therefore would include:

- Personal – biological, i.e. genetic, epigenetic, infectious, inflammatory, malignant, toxic and environmental
- Personal – socio-cultural, i.e. education, family status, economic status, personal beliefs and preferences, behaviors, race, ethnicity and culture
- Family issues – structure – extended vs. nuclear, parent status - working vs. stay-at-home, latchkey kids, multiple siblings vs. single child, multiple generations at home, interaction with extended family, family support, overall family health status and activity
- Larger ethnic group – group practices and attitudes towards health and healthcare, socio-cultural status, access to care, education and continuing education, beliefs and religious practices
- Community-at-large – regional factors, setting – urban vs. suburban vs. rural, physical presence of healthcare facilities socio-economic level, attitudes to health care, community connectedness

This degree of mechanistic dissection, from the micro to the macro, from the biologic to the sociologic, economic and the geographic will provide a useful tool for further understanding disparities, allowing greater insight as to the nature and types of solutions that may be effective.

Supplemental Table: Health Disparities Courses Offered at UA by Department

ANTHROPOLOGY	Biological Anthropology
AFRICANA STUDIES	Rethinking Race and Health in the United States
FAMILY AND COMMUNITY MEDICINE	Practice of Community-Oriented Medicine in Rural Areas Indian Health Service (IHS) Community-Oriented Family Practice: USA and Industrialized Nations Family Medicine, Native American Health Services & Care Family Medicine, Border Healthcare Epidemiology and Applied Preventative Medicine with the Indian Health Service CUP (Commitment to Underserved People) Nutrition in a Biocultural Context
EPIDEMIOLOGY	Changing Health Policy: Cultural Understanding & Epi Analysis
GERONTOLOGY	Cross-Cultural Aspects of Aging and Health
HUMAN SERVICES	Human Services: Multicultural Perspective
MEDICINE	Cultural Competence in Health Care Global Health: Clinical & Community Care Clinical Research in Minority Health Issues Native American Medicine and Cardiology Rural Health Professions Program
MEXICAN AMERICAN STUDIES	American Indian Medicine and Wellness Latino Health Disparities Mexican Traditional Medicine: An Overview of Indigenous Curing Cultures Advanced Research and Models of Minority Health Racial and Ethnic Health Disparities: A Comparative Approach
NURSING	Diverse Populations: Theories and Methods for Examining Health Disparities Community-based Interventions Theories of Health Promotion and Risk Reduction in Nursing Health of Rural and Underserved Populations Research Methods for Community-Based Interventions Managing the Consequences of Chronic Illness Issues in Gerontological Health Issues in Frail Elder Care
PUBLIC HEALTH	Health Disparities & Minority Health Latino Health Disparities Service Learning in Native American Health Public Health for Community Wellness Multicultural Health Beliefs Cultural Competence for MCH Care Sociocultural and Behavioral Aspects of Public Health Current Issues in Indian Health Policy Practice of Community-Oriented Medicine in Rural Areas Community Based Participatory Action Research to Decrease Health Disparities United States Mexico Border Health Policy American Indian Health Policy

	Community Based Research Methods Rural Health Policy and Management Practicum Practice of Community-Oriented Medicine in Rural Areas Health Care for the Homeless Public Health & Rural Policy Analysis Nutrition and Physical Activity in a Biocultural Context
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Supplemental Table: Community Partners and Collaborators for Health Disparities Research at UA

Government & State	Foundations and Associations	Communities and Community Organizations	Health Care Providers	Academic Institutions	Industry	Media
Centers for Disease Control (CDC)	American Public Health Association (APHA)	Tribal Nations and Tribal Council Foundations	University of Arizona Health Network (UAHN)	Arizona State University (ASU)	Pharmaceutical and Biomedical	National and Local TV Broadcasting Channels
National Institutes of Health (NIH)	American Medical Association (AMA)	Hispanic Chamber of Commerce	Community Health Centers (19 AACHC in Arizona)	Northern Arizona University (NAU)	IT Companies	Radio Stations
Patient Centered Outcomes Research Institute (PCORI)	American Nursing Association (ANA)	YMCA/YWCA	Arizona Hospitals	Community Colleges	AZ-Sonora Produce Industry	Newspapers and Magazines
Military and Veterans' Administration	American Cancer Society (ACS)	Arizona Community Health Outreach Workers (AzCHOW)	Indian Health Service	K-12 Schools		Social Media Platforms / Networking
Arizona County Health Departments	American Heart Association (AHA)	4-H Clubs	St. Elizabeth's Health Center	STEM Programs		
Area Health Education Centers (AHEC)	American Diabetic Association (ADA)	Lutheran Social Service		Keys Program		
Arizona Department of Health Services	Robert Wood Johnson Foundation	Catholic Community Services of Southern AZ		Head Start		
Healthcare Infection Society (HIS)	Regional Medical Societies (Pima, Maricopa, etc)	Jewish Family & Children's Services of Southern AZ		Med-Start		
Well Woman Health Check Program	American College of Physicians (ACP)	Parks and Recreation				
Arizona County Health Departments	American Lung Association	Senior Centers				
United States Department of Agriculture (USDA)	Arizona Nurses Association	Libraries				
Agency for Healthcare Research and Quality's (AHRQ)	Arizona Pharmacists Association	Council on Aging				
Institute of Medicine (IOM)	American Academy of Nursing	Wingspan (LGBTQ) Center				
US-Mexico Border Health Commission	Casey Foundation	Grocery Chains				
Arizona Health Care Cost Containment System (AHCCCS)	W. K. Kellogg Foundation	Regional Churches				
Arizona Alliance for Community Health Centers (AACHC)	Susan G. Komen Foundation	Community Centers				
Department of Defense	Zuckerman Family Foundation	The Promotora Institute				
Arizona Hospital and Healthcare Association						