A. AZiCATS SPECIFIC AIMS, VISION, MISSION. Dramatic disparities in access to quality health care, health insurance coverage, and health outcomes, disproportionately impact US Latinos, American Indians (AI), those living in rural areas, the elderly, and children (1). With one of the highest poverty rates in the country, health disparities are a particular concern for Arizona’s (AZ) special populations: 30% of AZ’s ~6.4 million population are Latino (6th highest US percentage), 4.5% are AI (3rd largest in US) (Figure 1A), combined with a substantial and rapidly growing geriatric population (15.4%) and a US ranking of 49th in child health (2). AZ also has a vast geography (113,998 square miles, 6th largest in the US), encompassing urban, rural, and border areas and shares a 389-mile long border with Mexico. The University of Arizona (UA) created AZiCATS, AriZona Institute for Clinical and Translational Science, with a mission to effectively address the unprecedented levels of health disparities among AZ’s unique populations through clinical and translational research (CTR). AZiCATS has created a border state academic consortium (Figure 1B) to provide novel methods and strategies to diversify the region’s biomedical translational workforce with an emphasis on recruitment and advancement of Latino and AI scholars. The AZiCATS CTSA hub will provide the CTSA Network with unique strategies to integrate CTR, population health, team science and precision health approaches in urban, rural, and border health settings. The AZiCATS clinical research home serves as the single point of entry and organizational component overseeing UA CTR integration. We will provide infrastructure and resources to serve investigators and health scholar trainees across the T1 to T4 spectrum with research-appropriate resources and unique training experiences across multiple CTR venues. Our collaborative CTR enterprise will energize scientists, clinicians, community partners, state and local health systems, tribes, and citizens to produce concrete solutions for AZ’s vexing health challenges. Thus, driven by significant scientific merit and societal need, AZiCATS addresses the challenging obligation to impact border region health through research into biological and social determinants of health and dissemination of knowledge promoting health equity among AZ’s vulnerable populations. Capturing this passionate vision, AZiCATS Specific Aims are to:

- **Specific Aim #1:** Support rural, urban and border Latino communities to participate in CTR that will have positive and sustainable impact on the health of their communities.
- **Specific Aim #2:** Achieve meaningful engagement and participation of key AI leaders and scientists in high impact, community-health relevant CTR.
- **Specific Aim #3:** Recruit, train and integrate Latino and AI translational health science scholars and community collaborators to accelerate creation of knowledge that reduces health disparities and inequities.
- **Specific Aim #4:** Recruit health science scholars to focus on AZ’s health disparities among aging and pediatric populations, and deploy population health strategies within a state-wide health improvement plan.
- **Specific Aim #5:** Nurture team-science approaches that include quality, safety and cost-effectiveness with creation of dynamic research teams that fulfill AZiCATS objectives to promote health equity through research and education.
- **Specific Aim #6:** Implement and disseminate (using regional and national networks) novel research and education advances (e.g., healthcare systems, tele-research, bioethics, regulatory science) specific to vulnerable populations in the border state region.

Figure 1. Panel A. AZ map highlighting the predominance of Latino and American Indian representation in the vast AZ geography (113,000 sq. miles). Panel B reflects the novel AZiCATS AZ and border state consortium designed to expand CTR training (BLAISER).
B. OVERALL AZiCATS STRATEGY. Overview: AZiCATS leverages the unique strengths of UA, a land-grant institution, and the UA’s Arizona Health Sciences Center (UAHSC) (5 health science colleges, 28 centers and institutes). Strong Latino leadership, strengths in pediatric and geriatric research, and a long history of successful engagement with Latino and AI AZ communities, will each serve to enhance achievement of AZiCATS’ strategic goals. We will implement innovative AZ-wide programs that encourage and nurture rural, urban, and border regional populations to participate in community-based CTR activities to positively impact health in sustainable ways. These efforts dovetail with novel border region recruitment strategies and tiered curricula designed to recruit, train, mentor and successfully embed a new generation of CTR health scholars into the regions CTR workforce with a focus upon Latino and AI investigators. AZiCATS will integrate a statewide group of diverse public and private partner organizations including the new Banner Health-UA partnership that provides personal health information and expanded infrastructure for ~3 million Arizonans.

B1. AZiCATS Executive Leadership and Initiatives to Achieve AZiCATS Goals. The AZiCATS leadership team is exceptional with each member administratively gifted and nationally recognized as academic leaders. Combined with significant effort commitments, this leadership prowess assures that AZiCATS strategic goals will be met. The AZiCATS Principal Investigator (PI) is Joe G.N. Garcia, MD, a highly respected physician-scientist and elected member of the Institute of Medicine. He is responsible for implementation and oversight of all AZiCATS programs, a role greatly enhanced by his position as UA Senior Vice President (SVP) for Health Sciences. Dr. Garcia has broad pan-institutional authority for all UAHSC Colleges (Medicine-Tucson & Phoenix, Pharmacy, Nursing, Public Health) and Institutes/Centers including the UA’s NCI-designated Cancer Center. Table 2 details AZiCATS Co-PIs Kenneth S. Ramos, MD, PhD and Charles B. Cairns, MD, both accomplished physician-scientists, and additional recent UAHSC leadership recruits.

Table 2. UAHSC Recruit

<table>
<thead>
<tr>
<th>Kenneth S. Ramos, MD, PhD</th>
<th>Charles Cairns, MD</th>
<th>Sally Reel, RN, PhD</th>
<th>Jason X-J. Yuan, MD, PhD</th>
<th>Francisco Moreno, MD</th>
<th>Yves Lussier, MD</th>
<th>Elizabeth Calhoun, PhD, Med</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate Vice President (AVP) for Precision Science. Leads focus on Latino &amp; Native American admixture influence on complex disorders. Director, Center for Applied Genetics and Genomic Medicine.</td>
<td>APV for Clinical Research. Oversees efforts to enhance UAHSC clinical research and leads centralized UAHSC-wide research support infrastructure.</td>
<td>AVP for Inter-professional Education and Community Engagement. Provides leadership for inter-professional and community efforts across the UAHSC</td>
<td>AVP for Translational Sciences. Enhances translational and training efforts across the AZiCATS network.</td>
<td>AVP for Diversity and Inclusion. Oversees major UAHSC federal grants on workforce development ranging from pre-health professions to early-career faculty development.</td>
<td>AVP for Information Sciences, oversees UAHSC-wide informatics team and leads AZiCATS informatics initiatives.</td>
<td>AVP for Population Science and Discovery. Oversees integration of population health efforts, and Director of UAHSC Center for Population Science &amp; Discovery.</td>
</tr>
</tbody>
</table>

B2. Recent UAHSC accomplishments relevant to this AZiCATS application include establishment of:

- Institutionally-funded KL2-like clinical scientists career development award program (8 funded, July 2014)
- An institutionally funded Informatics Pilot Project program for UAHSC scientists (3 funded, Nov, 2014).
- Tiered UAHSC educational offerings (August, 2014) (Certificate, Masters, PhD) (Figure 2)
C. AZiCATS VISION AND STRATEGIC GOALS. Overview: In 2009, UA began to transform its CTR enterprise by creating the Clinical and Translational Sciences Institute (CTSI). Furthering this transformation, in January 2014, CTSI was reconceived as AZiCATS with a finely tuned mission to effectively address health disparities in ethnically diverse and fast-growing AZ communities. With its border state collaborators, AZiCATS seeks to increase community-based CTR and to diversify the region’s CTR workforce.

C1. AZiCATS Vision for Workforce Development. Leveraging existing training efforts, AZiCATS will drive the expansion of a diverse CTR regional workforce enriched in Latino and AI scholars via a novel **AZCATS regional consortium (Figure 1B)** that includes: UA, Northern Arizona University (NAU), Arizona State University (ASU), New Mexico State University (NMSU), the University of Texas at El Paso (UTEP) (with Colleges of Pharmacy and Nursing), Texas Tech University School of Medicine (SOM) in El Paso (TTSOM-EPI), University of Texas Health Science Center at San Antonio (UTHSCSA), and the University of Texas Rio Grande Valley SOM (UTRGV-SOM). AZiCATS mentoring resources (ex. R25 PRIDE targeting junior faculty) will ensure that more advanced AZiCATS health science scholars will successfully compete in challenging academic environments (TL1 & KL2 modules). Integrating leadership and career development across the entire CTR spectrum, AZiCATS provides regional transformation to fully develop CTR scientists and will employ the “Any Door is the Right Door” (ADRD) approach to meet specific trainee career development trajectories.

**C1a. High School, Undergraduate and Health Professional Workforce Development.** High school and college graduation rates for Latino and AI students remain very low but are positively affected by summer research programs that serve to retain many students in the pipeline. UA provides exposure to biomedical research with several programs supporting medical student exposure to research (TL1 module, Table 3). However, programs focused on increasing Latino and AI student exposure to CTR remain sparse. AZiCATS will expand this CTR pipeline via the BLAISER program: Border Latino and American Indian Summer Exposure to Research. A border region consortium (AZ-NM-TX) of undergraduate institutions (UA, NAU, ASU, NMSU, UTEP) and medical, nursing and pharmacy school partners (UA COM-T, UA COM-P, TTSOM-EP, UTHSCSA, UTRGV-SOM, UTEP’s CON & COP) will work together to recruit AI and Latino students. BLAISER will provide a highly mentored summer research experience in Tucson with emphasis on exposure to border health disparities research with longitudinal student follow-up and long distance mentorship (see KL2 and TL1 module for details) facilitated through distance technology and robust commercial grade video conferencing and social networking services of the Arizona Telemedicine Program (ATP). This allows students to be close to home (an important cultural element in AI and Latino communities) while interacting with mentors and fellow students. We will maintain a customized Twitter stream and sponsor AZiCATS LinkedIn and Google+ web accounts. BLAISER students will present at the annual AZ Rural Health Conference (in August) where border health is uniformly on the agenda. We anticipate funding 25-30 undergraduate and health professional students per year with expansion to 50 students/year. We offer an opportunity to extend the summer CTR experience to a mentored year of border health disparity-related research. Five Latino or AI “AZiCATS Scholars” will be selected yearly to develop close-knit mentoring relationships with successful role models who will inspire them to pursue doctoral degrees in the biomedical sciences. BLAISER efforts dovetail well with our MD/PhD program (led by AZiCATS Co-PI, K. Ramos) and ongoing programs at AZiCATS partner institutions.

**C1b. ADRD and Tiered Educational Offerings.** Congruent with successful pathways to stream AI students into science, we embraces an ADRD approach that will weave a web of success by allowing Latino and AI CTR trainees to select the most appropriate training goals from a menu of tiered educational offerings (Figure 2) including a Certificate in Health Disparities Informatics and a PhD in Clinical Translational Sciences (see KL2 and TL1 modules). We have also created a novel Training in Regulatory Science pathway which will be offered in partnership with the Tucson-based Critical Path Institute (C-Path) for early to mid-career professionals and students interested in regulatory science as a career (FDA’s Critical Path Initiative). AZiCATS and C-Path scientists will develop the curriculum for a Certificate in Regulatory Science and make externships/internships available to AZiCATS trainees for advanced training in regulatory science competencies (Network module, Section D). As we have targeted at least 50% of our KL2 and TL1 trainees to be Latino or AI, our flexible ADRD approach is necessary as absences for family matters or to support family finances are real challenges for these trainees. For our nascent investigators who are often demoralized by the complexities of human subject research, AZiCATS will serve as a central research home, where via the AZiCATS...
Investigator Portal with the Research Management Data Mart, investigators have access to a dedicated concierge service that is a “one-stop-shop” for UA CTR educational opportunities and real time answers to questions (REM module, Section C1). This detailed inventory of CTR educational and career development opportunities includes those available at UA (e.g., our degree-granting programs, seminars, journal clubs) and through the national CTSA Network. We will embed trainees within interdisciplinary teams (TSB module, Section C) and ensure they obtain the critical skills to address diverse regional community needs through CTR.

Figure 2. AZiCATS Approach to Impact the Training and Career Development Pipeline.

C1c. AZiCATS Mentorship. AZiCATS CTR mentors (physician scientists, social scientists, ethicists, economists, experts in business and management) were carefully selected on the basis of their diversity, their success in mentorship, and success in funded scientific inquiry (TL1 module, Table 5). We will enhance access to team mentoring that aligns with NCATS core CTR education competencies for trainees.

C1d. Clinical Research Staff Development. Please refer to REM module, Section C9 for a detailed description of CTR nurse and coordinator staff training programs including the AZiCATS CTR Boot Camp.

C2. AZiCATS Vision for Creating Shared CTSA Environments.

C2a. Shared AZiCATS CTSA Hub Environment. AZiCATS will facilitate transdisciplinary team science, improve CTR training and disseminate new CTR tools and methods within UA, across AZ and among our regional partners. We will utilize multiple social media tools and a robust website to increase awareness of AZiCATS educational programs and disseminate information across our border region (Figure 3). We will synergize with UTEP’s BUILD mentoring efforts and lead centralization of IRB reviews for each partner institution.

C2b. AZiCATS Interactions with Other CTSA Hubs. AZiCATS is significantly advantaged by strong connectedness of its leadership with other CTSA hubs (Figure 3) (see letters). AZiCATS leaders enjoy multiple collaborations with the Colorado CTSA hub around the PACT community engagement boot camp (in C-TRIP module) and BLAISER interactions with the highly successful URM-focused program (in TL1 module). AZiCATS PI, Dr. Garcia, is an External Advisory Board (EAB) member of established CTSA hubs: Colorado, Oregon Health Sciences, U. Southern California as well as Michigan where collaborations involve strategies for optimizing biospecimen collections (Network module). The North Carolina CTSA hub leverages strong relationships with AZiCATS Co-PI, C. Cairns, and KL2 Lead, M. Kraft, an external EAB member with collaborations around AHEC and population health programs. Substantial Duke CTSA hub collaborations exist in research IT (Research Mart), clinical trials infrastructure, regulatory affairs training, and clinical trial implementation and management. KL-2 Leader, M. Kraft, was until recently the Co-PI of the Duke CTSA hub. In addition, the UTHSCSA CTSA hub is an essential regional consortium member and is led by Robert Clark MD, a long time colleague of Dr. Garcia’s. Finally, AZiCATS Translational Biomedical Informatics module has established strategic data warehouse collaborations with CTSA hubs at Harvard, the University of Pittsburgh and Ohio State University to advance clinical trial accrual across the CTSA Network (Figure 3).

C2c. Creating AZiCATS Value for the CTSA Network. We believe that the CTSA Network would be incomplete without a CTSA hub that addresses the health needs of the diverse and growing populations along the >1500 mile AZ-NM-TX border region. The AZiCATS CTSA hub brings unique value to the National CTSA Network via its expansion of the Latino and AI CTR workforce and innovative approaches to significantly increase the CTR participation among AZ’s ‘at risk’ populations (Latino, AI, older adults, children). Our CTSA hub can uniquely address many of the ethical issues related to research with AI tribes and serve as a CTSA Network resource fostering communication and engagement and develop mechanisms for AI and Latino communities to meaningfully participate in research design, conduct, analyses and dissemination. AZiCATS looks forward to integration with the CTSA Network-wide efforts for cohort identification for NIH multi-site clinical trials. We will expand URM recruitment into CTR protocols in border and rural communities (ex. telemedicine tools for URM research recruitment) and develop best practices for CTR training of Latino and AI scientists and research staff. Additional CTSA Network resources include population-specific KL2 and TL1 curricula, the availability of biobanked materials and genomic & genetic databases from diverse populations, and bioethics training that is uniquely sensitive to Latino and AI communities. The creation of an AZiCATS regulatory science career pathway (Network and KL2 modules) is a highly innovative AZiCATS deliverable. Thus, AZi-
CATS, with its array of unique tools and resources, is fully committed to active participation in the CTSA Network and to adoption/implementation of Network best practices and standards to advance CTR and training.


C3a. Engagement of Local Community Partners. Als and Latinos are less well studied than other groups, especially in non-cancer, mental health and aging-associated conditions (3). Although science has been advanced when these communities have been studied, the communities have not received tangible benefit. We will provide multiple and overlapping avenues for urban, border, and rural community participation and input into the research process. These efforts are advantaged by our mutually beneficial existing partnerships with AZ’s diverse community-based stakeholders. These include Latino and AI community-based organizations, schools, government entities, industry and health care providers including Federally Qualified Health Centers (FQHCs) (Figure 3). AZiCATS-driven statewide collaborations will energize scientists, community partners, tribes, and citizens to produce solutions for AZ’s vexing health challenges. AI-specific challenges include the need for tribal shared oversight of CTR, control over publications, and involvement in study planning and design, especially if tribes perceive the proposed research as stigmatizing. AZiCATS will endeavor to transform the relationship of UA’s scientific community with AI tribes. In partnership with UAHSC’s Native American Research and Training Center (NARTC), we will develop recruitment and retention toolkits to enroll AI participants nationwide and adopt formal MOUs for managing and sharing AI study data. We will co-develop training programs for Tribal Councils to allow them to operate their own research regulatory processes and train indigenous community health workers as research team members via “research training boot camps” delivered on tribal community sites (REM module, Section C9). In partnership with the AZ Hispanic Center of Excellence (funded through HRSA, the State, philanthropy, and the Office of the SVP for Health Sciences), we will also increase the number of Latino physicians, enhance Latino health research and improve cultural competency of health-care services for Latino communities.

To accelerate AZiCATS goals, a state-wide External Management Board for Research and Community Engagement (EMBRACE) (Administrative module, Table 2) will meet quarterly to serve as a statewide collaborative of community-based organizations, hospitals, and rural and border healthcare provider networks including FQHCs. EMBRACE will leverage the well established infrastructure and bi-directional relationships of UAHSC’s Arizona Rural Telemedicine Network (Figure 3). EMBRACE is charged to assist AZiCATS with community-based education and training and advancing CTR investigator understanding of the unique concerns and ethical considerations of conducting research with communities, thereby bridging the gap between the university and community. Relationship building with community stakeholders, tribal councils, Latino business leaders, patients, and family caregivers will be critical to galvanize enrollment of Latinos and Als, as well as geriatric and pediatric populations, in research studies. Another significant AZiCATS advantage is UAHSC’s Arizona Area Health Education Centers (AzAHEC). With five regional centers serving all 15 AZ counties, AzAHEC engages communities in developing integrated, sustainable health professions workforce education programs and increasing access in AZ’s rural and underserved communities by improving the sup-

Figure 3. Critical AZiCATS Partnerships within the National CTSA Network Umbrella. Letters of support are provided for each partner shown. CTSA Informatics hub includes University of Pittsburgh (Mike Becich), Ohio State University (Philip Payne), and Harvard University (Zak Kohane).
ply, quality, diversity and distribution of the health professions workforce. **RACER (Regional AZiCATS Centers for Excellence in Research)** is a collaborative effort by AZiCATS and AzAHEC to increase community engagement and CTR (C-TRIP module, Section C). The centers will accelerate identification of opportunities for in-depth community engagement around CTR with AzAHEC campuses in Yuma, Nogales, Tucson, Phoenix and Flagstaff serving as “RACER hubs” that are linked with AZiCATS through tele-research (Network module, Section B), thus forming the “spokes” that create a connecting “wheel” for smooth dissemination of information needed to optimize care throughout AZ. Further strengthening our opportunity to actively engage underserved populations are the meaningful relationships with AZ healthcare delivery systems. UA’s new healthcare partner, **Banner Health Network (BHN)**, is a national leader in healthcare models oriented toward population health. In Flagstaff, we have partnered with **Northern Arizona Healthcare** and **North Country FQHC** (data sharing and biobanking agreements in place) that serves a diverse population (25% AI). Between BHN, the UA Health Plan, and North Country Health Plan, over 225,000 Latino and 45,000 AI unique patients are served.

**C3b. Engagement of AZ’s Academic Partners.** State and regional academic partners will form the foundation of AZiCATS plans to create a diverse translational research workforce in AZ and in the border region (Figure 3). A key AZiCATS partner is **NAU** with a number of important training programs targeting Latino and AI students. AZiCATS leverages the UA/NAU research relationship to extend statewide research networks and build on collaborative research opportunities with tribal communities. Outstanding collaborative examples are the **Partnership for Native American Cancer Prevention (NACP)** and the **Center for American Indian Resiliency**. NAU has significant strength in community-based research with the Navajo and Hopi tribes with talented AZiCATS mentors with expertise in AZ health disparities. Reciprocally, AZiCATS will provide summer training experiences and mentors for students in NAU’s **Bridges** program, mentor NAU faculty in T1-T4 research and, where appropriate, provide assistance and advice for Latino ad AI tribal faculty KL2 applications.

**Arizona State University (ASU)** is another important AZiCATS link, sharing a focus on mobile health applications that serve as tools for population health management. This is facilitated by relationships with ASU’s **BioDesign Institute** and the **Center for Sustainable Health (CSH)** in the School for Biological and Health Systems Engineering. Additional AZiCATS academic partners include the **Translational Genomics Research Institute (TGen)**, a research organization focused on developing early diagnostics and using genetic information to predict development of disease, monitor disease activity and develop targeted therapies. TGen provides an outstanding Phoenix-based venue for BLAISER training in biotechnology with exposure to world-renowned bioengineers, geneticists, clinicians, molecular biologists, and computational biologists. The **Critical Path Institute (C-Path)** was jointly founded in 2005 by UA and the FDA and brings FDA, industry, and AZiCATS scientists together to improve the path for rapid development of innovative drugs, diagnostic tests and devices. AZiCATS links to C-Path include collaborations on the development of translational clinical biomarkers, creation of an international neonatal consortium, regulatory science training, data standards and big data initiatives. C-Path’s ability to provide leadership in the area of regulatory science education and training will substantially strengthen this area of the CTSA Network portfolio (Network module, Section D).

**C3c. Engagement of Regional Academic Partners.** Key regional AZiCATS partners include NMSU, UTEP, TTSOM- El Paso, UTHSCSA, and the UT Rio Grande Valley SOM (Figure 2). Each institution has ongoing programs in sync with the AZiCATS goals and are all extensively involved in **BLAISER**. A powerful example is **UTEP** which recently was awarded a $22.6 million NIH grant (only 10 awarded) to create the **BUILDing SCHOLARS (Building Infrastructure Leading to Diversity: Southwest Consortium of Health-Oriented Education Leaders and Research Scholars)** program, a 19 institution consortium including UA. BUILDing SCHOLARS will train and provide scholarships for the next generation of URM biomedical and socio-behavioral scientists and engineers from regional high schools. BUILDing SCHOLARS will participate in an intensive, pre-college boot camp to hone fundamental academic skills and will take special research-intensive courses and participate in mentored research projects. **UA will serve as a key regional site** for the conduct of summer research by 2-3 BUILD scholars per summer. In addition to BUILD, the AZiCATS BLAISER program is a natural linkage between UTEP and UA and destined to expand the number of UTEP students in all health sciences (including pharmacy and nursing) to be mentored for a summer experience. The BLAISER program will encourage Latinos and AI students to stay in biomedical research careers by creating a strong AZ-NM-TX border consortium in an area of high poverty and stark health disparities.

**C4. AZiCATS Vision for CTR in Special Populations.**

**C4a. Focus on Latino Populations.** AZiCATS participants are passionate about the application of CTR to address the dramatic disparities in health outcomes disproportionately impacting the 2 million Latinos residing in urban, rural and border AZ settings. AZiCATS contains a wide variety of T1-T4 programs designed to create “omic”- and population-based knowledge to better understand complex disorders that affect Latinos. Programmatic research efforts in child and adult asthma, critical illnesses such as sepsis and ARDS, triple
negative breast cancer, and the staggering obesity/metabolic syndrome/Type 2 diabetes that exist in Latino populations, are but a few examples. Finally, we will build novel community- and population-based approaches leveraging our state-wide health plan and AzAHEC communities along the AZ-NM-TX-Mexico border, to provide novel methods and strategies that address pertinent disparities while increasing the number of Latinos and AIs living within border state regions that enter biomedical workforce.

C4b. Focus on AI Populations. AZ’s diverse population includes over 285,000 AIs residing within 21 federally recognized tribal nations. Through broad-based community efforts, AZiCATS will advance the nurturing of ongoing relationships with Native tribes and work to more quickly secure IRB and site approvals. AZiCATS has created the Native American Health Research Advisory Council (NAHRAC, see letters), a statewide coalition to operationalize practices and procedures for the inclusion of tribes in the research process as defined by new policies adopted by an AZ-wide Tribal consultation between AZ universities and Tribal leadership. NAHRAC is a subcommittee of EMBRACE, the AZiCATS community board, and will be chaired by Mr. Chester Antone, a Council Member of the Tohono O’odham Nation, Chairman of the CDC Tribal Technical Advisory Group (TTAG), bringing his years of experience as a member of the DHHS Tribal Health Research Advisory Council, and as a cultural and spiritual leader to lead this important community engagement process (see letter). AZiCATS will continue to identify representatives from each of AZ’s 21 tribes to participate as ad hoc IRB members when protocols involving that tribe are under review. AZiCATS is an early adopter of requirements that Native Americans to be included as voting members of the IRB. Issues such as publication review, site access, and use of genetic materials remain key challenges to the academic community as well as the tribes. We will address these issues in a truly collaborative way that not only improves the research experience of our investigators and research participants but also engages the tribal communities in beneficial and positive ways. Teshia Solomon PhD, NARTC Director, author of a highly acclaimed book focused on working with Al/AN to conduct health research (4), will serve as AZiCATS liaison with NAHRAC to establish a standing advisory committee trained in CTR activities and human subject protections.

C4c. Focus on Geriatric Populations. AZ has one of the fastest growing rates of aging baby boomers. The growth of the 65 and over population, including marked expansion of AZ’s Latino and AI elder population increases the demand for research into health-related solutions for older adults. In October 2014, AZiCATS established the AZ Resilience and Aging for Clinical and Translational Science (ARA-CATS) program. ARA-CATS is built on the foundation of 2 prestigious statewide geriatric education programs. The HRSA/Reynolds funded Arizona Geriatric Education Center provides education and training to healthcare professionals in the special health care needs of seniors. The AFAR-funded Medical Student Training in Aging Research program encourages medical students, particularly budding researchers, to consider careers in academic geriatrics. These programs provide the framework for ARA-CATS to develop a state-wide infrastructure for expanding translational research and mentored translational science training in aging that links with community stakeholders. A key ARA-CATS strategy is to achieve successful aging by fostering resilience – the ability to meet and recover from setback – a promising strategy to increase the healthspan and overall health at reduced cost. The ARA-CATS Collaboratorium, led by UAHSC’s highly regarded AZ Center on Aging (ACOA), brings together leaders in the field of resilience and aging research, with the aim to understand resilience across the lifespan continuum. This spectrum flows through biological mechanisms, immune aging and rejuvenation, and healthy brain aging to the treatment and prevention of geriatric syndromes and aging-related diseases. Abundant interdisciplinary research and training programs exist in this framework, including an outstanding wearable biosensor program. AZ is also home to highly concentrated areas of senior citizens in the Tucson and Phoenix areas who have participated extensively in research studies. A good example is the NIA-sponsored Arizona Alzheimer’s Disease Center (P30) and NINDS U24 Brain and Body Donation Program, in which 900 individuals are annually assessed, followed to autopsy, and provide an extraordinary number of high-quality tissue samples for researchers inside and outside AZ. Finally, deeply integrated into AZiCATS focus on aging is the Evelyn F. McKnight Brain Institute, led by Carol Barnes PhD, the 2013 recipient of the Gerald Prize, the Society for Neuroscience’s highest honor. The McKnight Institute conducts large-scale recordings of brain activity, single-cell imaging methods, whole-brain imaging and brain mapping to address cognitive health issues and to understand the aging brain.

C4d. Focus on Child Health. In AZ, Latino children represent the largest proportion of K-12 students (43%) and AI newborns have unacceptably high infant mortality rates (5). AZ has a very high fertility rate compared to the rest of the US with a high proportion (22%) of newborns born to poverty (National: 19%) (5). With an overall goal to develop researchers trained in the complexities of translational research involving pregnant women, their newborn infants, and children of all ages, the AZiCATS child health efforts will leverage pediatric clinical research efforts occurring in the two major AZ markets of Phoenix and Tucson. AZiCATS will partner with Phoenix Children’s Hospital in Phoenix, the fifth largest city in the country, and with Banner-UA Dia-
AUHSC Bioethics Board comprised of bioethicist scholars, academic-based and community research-ers (Wayne Morgan MD, David Beyda MD, Teshia Solomon PhD, Francisco Moreno MD) will develop a comprehensive bioethics training program through AZiCATS that will serve as a resource to adequately protect the safety, rights, and interests of individuals and communities, while facilitating the efficient and expanded involvement of these communities in the development of research processes and best practices. These educational and practice resources will impact all health research efforts at UA, our regional border consortium, and other CTSA network partners, serving the needs of the continuum of developing AZiCATS researchers (TL1-KL2), partnering communities, and staff. Key components of the bioethics training (10) include: research on educational methods (adequacy of methods, tailoring style and scope); identifying and resolving ethical issues; incorporating participant views (values, preferences); how to assess ethical challenges derived from competing priorities; role, history, and basic operating principles of Data Safety Monitoring (Boards); bioethics and regulatory science; guidelines for relationships with sovereign tribal nations; effective communication with the Latino community; and protection of vulnerable populations including elders with dementia. Representative members of partnering communities will also be asked to participate on this Board.

C6. AZiCATS Vision to Improve/Streamline Methods/Processes with a Focus on Quality. The innovative AZiCATS centralized portal approach (REM module, Section C3) is designed to quickly detect gaps or needs of study protocols for all clinical research projects and to rapidly connect investigators with needed expertise and resources. This resource will be complemented by those of the Mentoring, Engagement and Resources in Translational Science (MERITS) Office described in detail in the TSB module, Section B. The portal and MERIT increase efficiency by enabling rapid and parallel clinical, scientific and regulatory review. The portal also allows a streamlined process of site start-up activity, budget and contract negotiations, thus allowing sites to become active participants in a study much faster than by traditional means. These web-based approaches improve continuity of study and site information within project teams and increase satisfaction levels by establishing a single point of contact within AZiCATS with respect to regulatory and contract activities. The standardized approach to AZiCATS workflows for CTR enables tracking and quality assurance at each of discrete workflow steps (REM module, Figure 5). Key quality indicators will be implemented across studies and compared against prior trials to measure performance over time. AZiCATS recognizes that increased quality, reduced waste, and transparent processes are hallmarks of successful translational research organizations. We will develop structured process improvement strategies and create process improvement teams comprised of evaluation engineering professionals, TEAM-PIE, experienced in LEAN application. They will conduct large-scale CTR evaluations to remove obstacles to efficiency and process improvement.

D. TRACK RECORD IN CTR. Overview: AZiCATS leverages UA as a research-intensive, AAU University (#19 NSF ranking). The UAHSC is AZ’s only academic medical center (5 health science colleges, 28 centers and institutes) and conducts the vast majority of UA’s NIH-funded research ($76M NIH, $550M total) (Table 3) with impactful CTR to improve health for AZ’s “at risk” vulnerable populations. The TSB module details unique UAHSC strengths in CTR with five clusters of scientific and technological innovation providing team-science.
training venues and novel technologies that can power providers and nascent scientists towards addressing a CTR focus on geriatric, pediatric, Latino and AI populations.

D1. UAHSC-AZiCATS Contributions to Clinical and Translational Research (CTR).

Systems Biology Approaches in Critical Illness Disparities: Acute Respiratory Distress Syndrome (ARDS), a devastating systemic inflammatory lung injury, is an example of serious health care disparities for Latinos, African Americans and the elderly (greater risk, higher mortality). To identify novel mechanistic targets and clinical therapies, the UA ARDS group (led by JGN Garcia) utilized a systems biology approach with genomic signatures in pre-clinical ARDS models, SNP discovery of identified genes, SNP function assessment in vivo, and candidate gene and biomarker identification. The ARDS group identified a new candidate gene as nicotinamide phosphoribosyltransferase (NAMPT) and demonstrated NAMPT as a novel biomarker in ARDS. They defined NAMPT promoter SNPs to be significantly associated with ARDS susceptibility and ARDS mortality (11; 12) and elucidated the functionality of these SNPs in vivo. They next determined that extracellular NAMPT is an essential participant in ARDS/ventilator-induced lung injury (VILI) via novel ligation of the Toll-like receptor 4 producing inflammatory lung injury via NFkB transcriptional activities. Therapeutic targeting revealed that reductions in extracellular NAMPT availability (neutralizing antibodies, siRNAs, small molecule inhibitors, NAMPT+/− mice) dramatically attenuated ARDS/VILI severity in mice (13). These findings led to a NIH STTR grant to develop novel TLR4 antagonists and a humanized monoclonal antibody against NAMPT to prevent VILI (Aqualung Therapeutics, founder JGN Garcia) with Phase I/Phase II clinical trials soon underway.

Cardiac Resuscitation Innovation. Prior CTR team science collaborations in cardiopulmonary resuscitation (CPR) involving UA cardiologists, emergency physicians, and basic scientists led to demonstration that: i) continuous chest compressions, rather than the conventional interruptions for ventilations, significantly improved coronary artery and cerebral perfusion (14-20); ii) prompt initiation of CPR, not ventilations, impacted survival from cardiac arrest (21); iii) continuous uninterrupted CPR initiated promptly by a bystander was fundamental to a successful full neurological recovery (22-26). These seminal pre-clinical and clinical findings led to a recent highly successful observational study in a unique statewide partnership with the AZ Department of Health Services (ADHS) (27) evaluating minimally interrupted cardiac resuscitation (MICR) to individuals in the community suffering cardiac arrest (28; 29). The successful outcome stimulated the prompt move to expand the MICR method as a public health protocol in the state’s two largest metropolitan areas resulted in a near tripling in survival to hospital discharge of patients with cardiac arrest (30). Recent high-impact investigations include methods that allow generalization of these findings to underserved populations (31-38). Another recent UA CPR group innovation included a 3-year AZ study strategy to utilize 9-1-1 dispatchers to provide AHA-recommended CPR instruction (bundled approach of guideline-based protocols, interactive training materials, data collection continuous quality improvement program), which increased numbers of bystanders performing CPR and a 40% increase in survival rates. These highly lauded efforts were supported by The Emergency Medicine-AEMRC Clinical Trials Network which includes SwNETT, a hub within the NIH funded NETT, a national network of 17 hubs engaged in neurological clinical trials via a U13 mechanism (NIGMS).

Device Engineering to Salvage End Stage Heart Disease Patients: UA’s strength in cardiovascular translation innovation has brought forth several clinical innovations that are in use today. This includes the worlds only FDA-approved, CMS-reimbursed Total Artificial Heart (TAH); the standard of care for end-stage biventricular heart failure, that was developed by successful UA technology “start-up” SynCardia Inc. (Marvin Slepian MD). Other firsts include original biodegradable stents that evolved as “Polymeric Endoluminal Paving”, a biodegradable endo-arterial support, barrier and local drug delivery system. This formed the basis for the first biodegradable scaffold in clinical use today (ABSORB, Abbott BVS). Also emerging from this biomaterial research is the first synthetic vascular sealant (PEG-lactide based) approved by the FDA—the Mynx (Access Closure/Cardinal Health). Robotic catheter-based intervention emerged from UA research, commercialized as the Magellan System (Hansen Medical) and utilized in electrophysiology (EP), and peripheral vascular therapeutics. The novel combination of polymeric biomaterials with electronics has yielded novel constructs of “stretchable electronics,” configured as one stop rapid diagnose/treat EP balloon catheter (39), commercialized by Medtronic, wide field cardiac array for mapping (40), and a piezoelectric polymeric power generator – for the first time successfully capturing cardiac and lung motion to recharge and power a cardiac pacemaker (41). Device innovation and engineering has been amplified and enhanced at UA with the establishment of ACABI, a center to catalyze invention and translation. We have been active in the expanding field of wearable health, with a head impact indicator (marketed by Reebok) and a vital sign motion skin patch and “tattoo” system in use today being commercialized. This work has expanded to development of completely biodegradable electronics of transient internal and external sensors for broad biomedical use (42).

Team Science in UA’s NCI-Designated Cancer Center (UACC). UACC contains robust, federally funded multidisciplinary programs (faculty from 8 UA colleges, $35M in 2014) with CTR teams that include the Thera-
peutic Development Program (TDP) (29 faculty with expertise in medicinal chemistry, pharmacology and medical oncology) that was responsible for the clinical and preclinical testing of three locally developed cytotoxic agents to cure cancer (quorloxac, imexon, PX-12). Another drug discovery advance is tafamelanotide, a 13 amino acid melanotropin peptide used as “first in humans” clinical trials for cancer melanoma, now in clinical trials for erythropoietic protoporphyria and vitiligo (Robert Dorr, Victor Hruby). Another strong UACC team (20 faculty) is the Medical Imaging Program with the NIH-funded Center for Gamma-Ray Imaging creating cutting edge imaging modalities and formulating rigorous mathematical approaches to the assessment and optimization of image quality, and developing numerous innovative photon-imaging systems (Harrison Barrett, SPIE Gold Medal recipient, National Academy of Engineering member). In the area of Single-Photon Emission Computed Tomography or SPECT Imaging and Parallel Computing, NIH-supported researchers are developing new computational methods for assessing and improving image quality. The Cancer Imaging Program (CIP) a group of 23 scientists with expertise in non-invasive MRI, CT, image based biomarkers and optical endoscopic imaging systems is working to improve precision oncology including development and clinical validation of a real-time multispectral confocal micro-endoscope for in vivo diagnosis of ovarian cancer.

D2. AZICATS Development of a CTR Workforce. AZICATS institutions have numerous programs with region-wide reach for development of the biomedical workforce across the high school to junior faculty continuum (TL1 module, Tables 2 & 3). In July 2014, AZICATS established a Career Development Award program following KL2 guidelines (UAHSC-CDA) to provide CTR training and funding support ($75,000/year for two years) for 8 junior faculty from 5 COM departments (42 applications). Aligned with AZICATS goals, AzAHEC programs recently successfully launched a community engagement/CTR pilot grant program (22 applications, 5 awarded). AzAHEC offers interprofessional fellowships in rural clinical outcomes and comparative effectiveness research (R-21, R-18, R25). Within AZICATS, three UA R25 awards and a NAU R25 award exist including the newly funded AZ PRIDE-25 Advanced Health Disparities Training Program (PIs- JGN Garcia, F Moreno) that will provide strong mentorship (via KL2 and TL1 mentors) for Latino and AI junior faculty.

D3. AZICATS Collaboration & Engagement in CTR. An excellent example of AZICATS collaborative efforts in promoting CTR includes the recently renewed NCI Partnership for Native American Cancer Prevention (NACP) award shared by UACC and NAU (NAU Co-PI is Provost L. Huenneke, EXCEL member) to bring prevention, community outreach and biomedical research training to AZ’s AI communities. The NACP partnership works with AZ’s Hopi Tribe, Tohono O’odham Nation and Navajo Nation to address the rising tide of cancer in AIs. NACP’s efforts have resulted in tribal-approved research projects and continuing educational curricula at both universities. One former NAU undergrad and NACP student is Monica Yellowhair, PhD, a Navajo translational scientist at the UACC, who studies effects of uranium on DNA repair, a legacy of uranium mining and milling on Navajo Nation land during the Cold War.

Another example of AZICATS CTR collaboration, team science and community engagement is the Laboratory for Metabolic Disease Prevention and Treatment located with the Pima County Health Department in a UA Medical Center–South Campus building. This multi-college research enterprise fosters interdisciplinary CTR, education and community engagement aimed at understanding, preventing, and controlling metabolic and other lifestyle-related chronic disease. Current CTR projects that engage community partners include: diet and physical activity intervention to ovarian cancer survivors, and community-based tobacco cessation training for chiropractors, acupuncturists, massage therapists. Close collaboration exists between Laboratory researchers and Banner-UA clinical programs housed in the same building: the Diabetes Prevention and Education Center, offering comprehensive diabetes care, the Abrams Family Medicine Center, offering comprehensive primary care, and the Clinical Weight Loss medical obesity treatment program. Myra Muramoto MD, KL2 Mentor Lead, is Collaboratory founding PI and a physician-scientist with her clinical practice in these programs serving low-income Latino population, including rural and border patients. CTR activities involve patients and community members with access to free classes on diabetes self-management, nutrition and healthy lifestyles (in English and Spanish), support groups, and cooking demonstrations.

D4. AZICATS CTR Track Record in Integration. GeriMetrics is an interdisciplinary research program that uses sophisticated remote monitors and algorithms to measure gait, balance, total physical activity, and other biometric parameters in common and devastating geriatric syndromes including falls, frailty, dementia and other neurodegenerative diseases. Born out of the AZ Center on Aging in partnership with UA Engineering, and with statewide partnerships with Banner Health and ASU, GeriMetrics seeks to improve risk stratification for falls and outcomes while providing objective measurements of frailty. It is supported by several SBIR and STTR (now phase II) trials. The Biology and Resilience Program connects over 35 UA aging and resilience researchers who study immune aging, immune rejuvenation, salivary gland physiology, neurology/neurogenesis, pain pharmacology, cellular stress and resilience, protein folding, women’s health, menopause bone health, polypharmacy, virology, and respiratory health. Six working teams with more than $24M in
NIH funding, comprehensively evaluate how quality of life can be improved explicitly including older Latino and AI subjects.

The AZ Alzheimer’s Consortium (led by EXCEL member, Eric Reiman, MD) includes the NIA-sponsored AZ Alzheimer’s Disease (AD) Center and is a leading model of statewide collaboration in AD research. The NIH-, state-, and AZ Universities-supported Consortium capitalizes on the complementary strengths of about 150 researchers from UA and ASU in brain imaging, genomics, and neuropathology research. The Consortium has generated landmark findings in a) the unusually early detection and tracking of AD, b) the accelerated evaluation of AD prevention therapies c) the study of normal brain aging (UA’s McKnight Brain Institute), d) the discovery of AD-related genetic and non-genetic risk factors and molecular mechanisms (TGen, Banner Sun Health Research Institute), and e) the NIA- and NINDS-supported Brain and Body Donation Program providing data and biological samples. The Consortium also includes extensive outreach services for patients and family caregivers from the Latino and AI communities and encourages participation of Latino and AI research subjects in its longitudinal research cohorts. The Consortium annually follows a large cohort of >90 year olds.

D5. AZiCATS CTR Track in Methods/Processes. In the past year, we closely examined how the UA provides resources for CTR investigators as well as provider and patient communities throughout AZ. Feedback indicated suboptimal integration of resources, ease of access to infrastructure, and the ability to connect with collaborators. In February 2014, AZiCATS engaged Huron Consulting Group (led by Beverly Ginsburg Cooper PhD) to conduct a detailed “gap analysis” of UAHSC CTR and clinical trials infrastructure. Project objectives included assessment of current CTR and clinical trial business practices surrounding the “lifecycle” of protocol management, streamline and standardize workflows for clinical trial study teams, provide key metrics and reliable data for decision-making and external reporting. A key goal was to maximize utilization of the OnCore clinical trials management system software including integration with the Epic electronic health record (EHR) system to minimize redundancies and mitigate risk. Based upon Huron’s assessment and reinforcing the imperative for AZiCATS to join the national CTSA Network, UAHSC leaders enacted a comprehensive series of initiatives to position AZiCATS for success as a high performing CTR institution by implementing the following:

- A centralized, UAHSC research administration unit and standardized set of policies, procedures, and workflows for all clinical research staff and study teams. These workflows streamline clinical research operations, reduce redundancies, and facilitate study team workload management.
- Developed metrics, reports and other analytics to meet the priority needs of leadership, disease teams, and study staff. Provided PIs and study staff improved access to regulatory, protocol and subject information.
- Expanded training programs for clinical research staff to consistently and effectively use OnCore (with particular emphasis on research participant calendars and billing compliance).

E. AZiCATS INTEGRATION OF HEALTH CARE & CTR.

E1. Historical Overview of UA’s Healthcare Organization: The UA academic health enterprise (UAHSC Colleges, UA healthcare delivery system) is overseen by the AZ Board of Regents (ABOR) and was reorganized in 2010 into the UA Health Network (UAHN). In January 2015, ABOR, recognizing the changing academic healthcare landscape and outdated UAHN facilities, completed a transformative transaction with Banner Health, a highly successful US healthcare system with 25 hospitals in seven states (10 AZ hospitals). Banner will acquire UAHN (January 31, 2015) and serve as UA’s sole clinical delivery system. This transaction allows AZiCATS to partner with an integrated AZ-wide health system providing substantial continuity and stability in an otherwise fragile health care landscape. Banner Health-UA provides AZiCATS access to protected health information (PHI) of ~3 million diverse AZ patients and an expanded informatics capacity. The Banner–UA partnership creates substantial funds to support sustained excellence of UAHSC academic missions.

E2. Banner Health-UA Medical Center (BUMC) in Tucson and Phoenix. The epicenter for AZiCATS resides in Tucson (Figure 2), the site for 4 of 5 health science colleges, and 28 centers and institutes. BUMC has two Tucson hospitals, the 495-bed BUMC-T hospital on the University campus, and the 277-bed BUMC-South Campus hospital, located six miles southwest of the UAHSC. These two premier safety net hospitals, with 26 residency programs, and 38 fellowships, provide healthcare for over 25% of all southern AZ residents with over 25,000 admissions per year, and over 450,000 outpatient visits. The majority of the South Campus facilities primarily serve Latino and AI patients. On the UAHSC campus are the BUMC Diamond Children’s Medical Center (home for AZiCATS child health research and training) and multiple clinic sites including the NCI-designated Comprehensive UA Cancer Center (UACC). The BUMC-Good Samaritan hospital is BUMC’s flagship academic hospital in Phoenix (733-beds, 8 residency programs, 10 fellowships) with UA COM–P as its academic home. The Banner Alzheimer’s Institute (BAI) is a leading destination for Alzheimer’s care and includes an NIH-funded imaging research center for early detection, tracking, and prevention of AD ($50 million NIH funding). The NIA- and NINDS-supported Banner Sun Health Research Institute explores factors con-
contributing to healthy aging and is home to a world-renowned Brain and Body Donation Program with core data and biological samples. Study cohort identification proceeds through the i2b2 warehouse (Section D) that comprises the UAHN subset of the Banner Health warehouse. UAHSC and Banner Information Officers are investigating federated queries for rapid deployment and integration of the respective warehouses.

E3. Coordination and Synergy with AZiCATS Healthcare Delivery Partners. AZiCATS success will be defined by the acceleration of scientific discoveries and the translation of CTR findings into clinical solutions that are adopted by targeted special AZ populations. AZiCATS has leveraged meaningful partnerships with multiple healthcare organizations (Figure 3) to promote impactful CTR and to provide a training venue for AZiCATS scholars. The new Banner-UA affiliation with a health plan that encompasses 3 million individuals, including a significant representation of rural and underserved Latino and Al populations (see C-TRIP module) offers a fully integrated, coordinated program of support to AZiCATS investigators. AZiCATS has created important partnerships with several regional health centers (Yuma, Phoenix, Flagstaff) and key AZ FQHCs including El Rio (Tucson), Mariposa (Nogales), North Country (Flagstaff), and the Regional Border Health Center (Yuma). These form the basis for RACER sites of AZiCATS community research engagement. We have a strong collaboration with Pima County Health Department Director, Francisco Garcia MD, a physician scientist who will Co-Chair EMBRACE, AZiCATS’ state-wide community engagement board (see letters of support).

E4. AZiCATS Clinical Environments for Recruitment of CTR Subjects. The AZiCATS federated approach to advancing CTR will co-locate research and clinical personnel in care delivery sites. The UA/Banner EHR system (Epic™ and Cerner™) will alert both clinical and study personnel of eligible study patients based on upcoming clinic appointments. The Epic (MyChart) and the Banner Health (MyBanner) patient portals will be integrated with AZiCATS NOW (novel operational web), a web-based study registry. Searchable by disease condition, treatment, and study site locations, AZiCATS NOW is an app for web and mobile phone applications that provides access to information on both current AZiCATS studies in the repository and active national studies. To service specific remote regions of AZ, the app features a distance access function with the ability to maintain interactive function even when internet access is unreliable. The mobile phone app and a modified version of the clinical trials website will have versions appropriate for patients and potential participants. Healthcare workers and providers will have access to clinical trial information while connected and offline with the ability to communicate the information to potential study participants. AZiCATS NOW and other unique tools in development will inform providers and patients of opportunities to participate in CTR studies for patient recruitment and provider engagement within the UA/Banner Health system and in community health centers, RACER AHEC sites and Tribal locations. AZiCATS NOW will be translated into Spanish and other languages as appropriate. Using the ATP, an AZiCATS database will be created to allow people to enter information in a secure system about themselves (including contact information) and the type of research in which they would be interested. This registry can then be accessed by investigators to 1) directly recruit people for clinical trials; 2) provide information regarding available populations for research (preparatory to research) for grant/proposal purposes; or 3) plan for Patient-Centered Research and/or Community Based Participatory Research by seeing the type of research in which the public is interested, partnering with them, and developing novel research protocols to address community’s needs (similar to patientslikeme®) with the advantage of immediate access to AZiCATS researchers. Patients will be made aware of this registry through personnel in kiosks at hospitals and clinics enrolling patients into the database/registry. The UAHSC Research Office will monitor traffic and match people with AZiCATS researchers with interests in the area of research identified thereby providing access to patients interested in research without requiring travel to a participating institution. We await participation in CTSA Network-wide efforts at cohort identification for NIH multi-site clinical trials.

F. DIVERSE CTR WORKFORCE DEVELOPMENT. Overview: The AZiCATS hub is committed to expansion of the AZ CTR workforce including increasing Latinos and ALs. We have outlined strategies to expand a culturally literate healthcare workforce in the AZ-NM-TX border region (Section C). AZiCATS will eliminate potential barriers associated with CTR career entry, transitions, and advancement and transform the CTR workforce in the border region. Table 3 details AZiCATS CTR workforce demographics and highlights UA’s successful increase in URM PhDs in biomedical and other STEM fields. URMIs comprise 31% of all biomedical PhDs at UA (compared with 12.6% nationally) (43). AZiCATS will assist partner institutions with URM recruitment. We endeavor to recruit an AI AZiCATS leader to assist in recruitment of diverse research faculty and trainees.

F1. Integrating Latinos into the CTR Workforce. The passion that AZiCATS exhibits for increasing the Latino and AI pipeline into AZ’s CTR workforce is obvious throughout this proposal. BLAISER will recruit Latinos, provide CTR opportunities and offer the possibility for Latino trainees to pursue tiered educational opportunities including novel Certificates in Health Disparities Informatics and Regulatory Science. CTR training may occur in RACER sites that foster community engagement in heavily Latino communities (Yuma, Nogales,
Flagstaff, Phoenix, Tucson) in partnership with local FQHCs (C-TRIP module). These will be attractive to Latino trainees and address barriers while enhancing Latino CTR participation.

F2. AZiCATS: Addressing Barriers to AI Integration into AZ's CTR Workforce. A barrier to CTR involving AZ AI communities is their mistrust of biological research, a situation created by culturally-inappropriate researcher behavior and exacerbated by breaches of ethical research conduct. Consequently, Native peoples are increasingly absent in molecular and genomic studies that potentially produce novel therapies for the disorders that disproportionately afflict these populations. Illustrative is the northern AZ Havasupai tribe lawsuit and settlement with ASU for improper use of tribal DNA in genetic research. AZIs are now even more wary of genetic research (44). Directly addressing this critical barrier, we are expanding the pool of AI healthcare providers and biomedical researchers to build a cadre of AI investigators who are culturally competent and can address cultural and spiritual barriers to research. Complementing these efforts, the AZ Indians to Medicine Program (INMED) program will identify 100 UA AI students interested in health careers and invest in relationships with teachers, tribal education departments, AZ AHEC personnel, and others who support students in their local tribal communities. AZiCATS and INMED partners include the InterTribal Council of AZ and AZ American Indian Pathways Into Health Coalition (see letters). Our AZ INMED Advisory Board, comprised of representatives of Tohono O’odham Nation, Pascua Yaqui Tribe, San Carlos Apache Tribe, and the AZ AI Pathways Into Health Coalition, will oversee the relevance and impact of the AZ INMED program. We will also identify AI students to participate in BLAISER and have created collaborations with Navajo Technical University (letter of support from President Elmer Guy) with campuses located on the Navajo Reservation with ~2000 students (90% AI). AZiCATS’ methods are designed to build infrastructure through knowledge sharing as a means of strengthening tribal sovereignty and preserving cultural integrity while enabling development of their own biobanks and IRB boards, a strategy responsive to community needs that assures ethical integrity.

F3. Tracking diversity of CTR workforce for 10 years. This function will be built based on an existing COM-T student and faculty records system embedded with business intelligence tools to collect administrative, student, and faculty information, report statistics for seeing trends and make decisions on strategy success or changes. We are adding professional career tracking for alumni of AZiCATS summer programs. This centralized process will allow for integration of AZiCATS (and partners) data into a single database with system capabilities to: 1) integrate all current pipeline and training program databases in one location; 2) operationalize Salesforce, a permanent contact management system, for tracking trainees and alumni; 3) develop customized dashboards within UAccess Analytics for automated queries of the data warehouse; and 4) avail an integrated student application system to populate the trainee/scholar data warehouse. Simple dashboards with archive capabilities will provide historical data about diversity of the translational workforce and allow us to track the diversity of our fellows and research faculty members.

G. SUMMARY AND DELIVERABLES. The AZiCATS efforts exist in an institutional atmosphere of tremendous excitement about CTR with many dynamic activities underway that impact CTR and training efforts including those that target health disparities in AZ’s unique populations. We recognize that reducing health disparities will require extended periods of sustained, effective intervention. However, we firmly believe, that we are strategically poised to capitalize on CTSA funding that will result in meaningful improvements in quality of life among disadvantaged communities, reductions in the frequency of Emergency Room visits, improved adherence to recommended therapies, reported increases in access to healthcare, and improvement in other health indicators, metrics of success that advance CTSA Network health equity efforts.

H. Letters of Institutional Support. An extensive list of letters of support is provided from UA leaders, AZiCATS regional partner institutions, government officials, community leaders, and AZiCATS Board members.
REFERENCES


27. Vadeboncoeur T, Bobrow BJ, Clark L, Kern KB, Sanders AB, Berg RA, and Ewy GA. The Save Hearts in Arizona Registry and Education (SHARE) program: who is performing CPR and where are they doing it? Resuscitation, 75, 68-75. 2007. PMID:17467867.
32. Eisenberg MS, Bobrow BJ, and Rea T. Fulfilling the promise of "anyone, anywhere" to perform CPR. JAMA, 311, 1197-1198. 2014. PMID:24668098.


