



**Population Health/Health Outcomes Advisory Council  
Report to the Vice President's Office**

**March 31, 2014**

**SWOTT Analysis and Recommendations for  
Enhancing the Research Program in Population Health/  
Health Outcomes**

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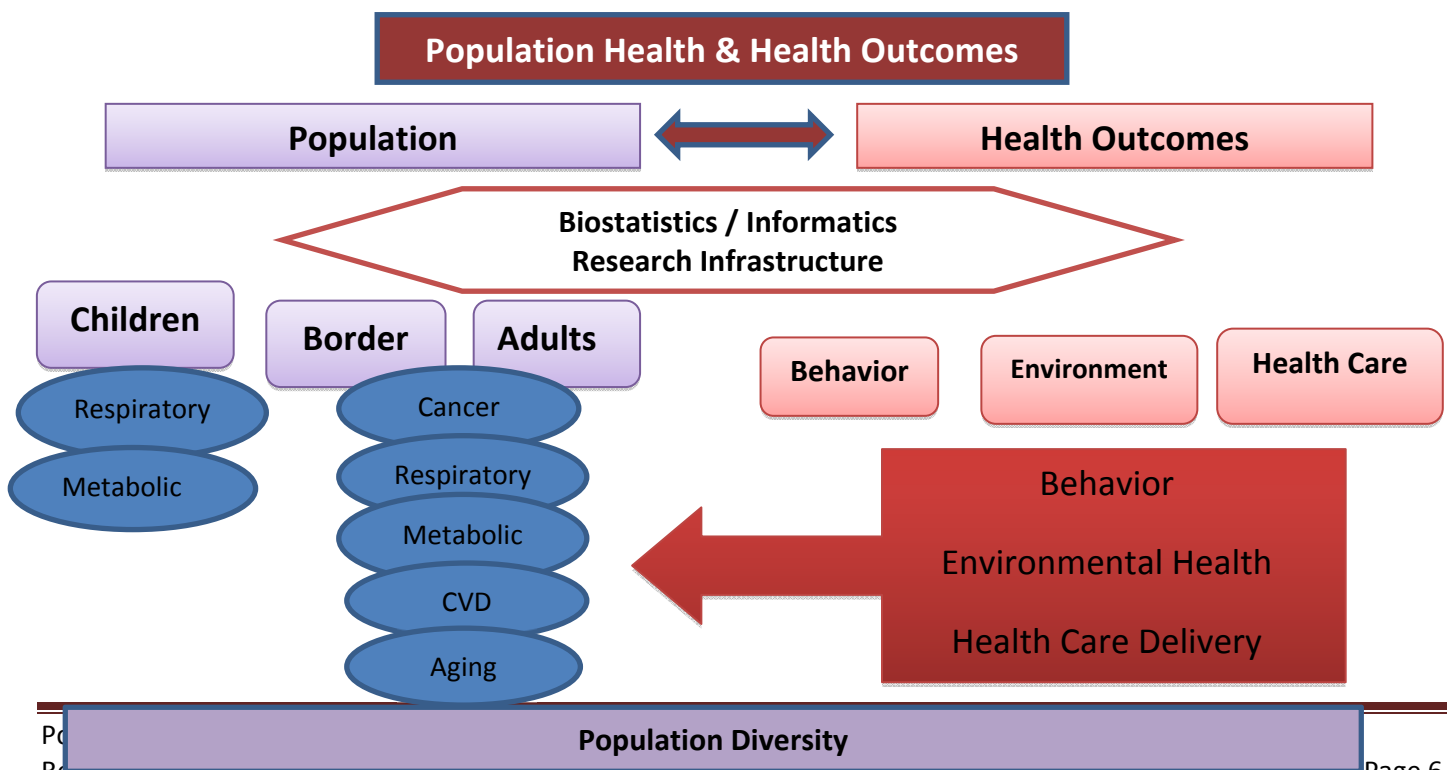
# A. Overview

## A.1. Introduction

Population health research has the goal of understanding, preventing, and controlling disease and promoting health by employing interventions to inform clinical and policy-based decision-making and by building knowledge about health outcomes within a particular social and political context. Measured health outcomes are ideally built on an understanding of global disease and health care processes as well as built on a locally situated understanding of health and well-being, and may include physiologic measures, clinical events, socio-cultural, environmental or economic measures, clinical effectiveness and safety, as well as patient-reported quality-of-life, perception of health, and patient experience with health care.

Outcomes research is the study of the end results of medical care including – the effect of the health care process on the health and wellbeing of patients and populations. It spans a broad spectrum of issues from studies evaluating the effectiveness of a particular medical or surgical procedure to examinations of the impact of insurance status or reimbursement policies, or economic and environmental change on the outcomes of care. It also ranges from the development and use of tools to measure health status to analyses of the best practices for dissemination of health-relevant findings from the results of outcomes research, including dissemination within clinical practice to impact patient care, dissemination to policy makers to impact evidence-based policy, as well as direct communications to physicians or to consumers of health care, with the ultimate goal of supporting behavior changes which result in reduced burden of disease or increased health.

For the purpose of developing a white paper on population health and health outcomes research, in which the University of Arizona has excellence, we are defining populations based on our areas of research strength, and on our mission to improve the health of our diverse local and regional populations. We are considering disease specific areas in which available talent, expertise and resources, if targeted for supplemental funding and capacity-building, would position us for high impact science. We are also examining a number of factors that affect health outcomes, such as behavior, environment, and health care delivery. Finally, we examine strengths and needs in research infrastructure and bioinformatics/biotechnology, which impact all of the above.



## **A.2. Process**

The Population Health and Health Outcomes Advisory Council had five Council meetings, and 4-5 meetings of each of 6 subcommittees (Diseases, Behavioral and Emotional Health, Border Health, Research Infrastructure, Bioinformatics and Biostatistics, Health Care Delivery). The Eller Think Tank was used as part of the SWOTT analysis process. Committee co-chairs then met with the AHSC Vice President and his staff.

Priorities were based on the following criteria:

- Opportunity for a unique role for the UA in population health and health outcomes research based on importance of the research area to health outcomes in diverse populations of the southwestern US
- Current research strength and funding in population health and health outcomes in the area
- Current clinical strengths and access to clinical populations
- National funding opportunities and trends
- Synergy with other priority research areas

## **A.3. Outcomes**

The Council found research and programmatic strengths and opportunities in cancer, respiratory diseases, obesity/metabolic disease, and cardiovascular disease, as well as in the areas of aging and border health. Strengths and opportunities were also identified in behavioral health, environmental health, and health care delivery, which are important areas of research, and are also highly related to successful research in the other areas. Additionally, recommendations were made for the development of bioinformatics and technology, and in biostatistics, and for the research infrastructure as a whole, and made some overarching recommendations.

**Initial priorities** for population health and health outcomes were identified as:

- 1) The development of a **Center for Research in Obesity and Obesity Related Disease, with a special emphasis on Hispanic and Native American populations**, and
- 2) The development of a **Center for Border Health Research**.

The Population Health/Health Outcomes Advisory Council established two **Task Forces**, each charged with refining an operational plan for one of these areas.

Recommendations for Bioinformatics and Biostatistics, for Health Care Delivery, and for Research Infrastructure had, as expected, significant overlap with those from the other three Committees, and will be considered by the VP's office separately.

## B. BACKGROUND & SIGNIFICANCE (SWOT)

### B.1. The committee found strengths and opportunities in the following disease specific areas and populations

**B.1 (a) Cancer:** The University of Arizona Cancer Center (UACC) is one of 41 NCI-designated Comprehensive Cancer Centers and the only one with its base in Arizona. UACC membership includes full-time faculty from the Colleges of Engineering, Medicine, Optical Sciences, Pharmacy, Public Health, Nursing, Science, and Social and Behavioral Sciences. The basic, translational and clinical research missions of UACC are fulfilled through its four scientific programs: Cancer Biology, Cancer Imaging, Cancer Prevention and Control (CPC) and Therapeutic Development. CPC is widely acknowledged as one of the preeminent cancer prevention programs among all the NCI-designated Comprehensive Cancer Centers. CPC currently has 31 Members who are extramurally funded as PIs. In 2013 their the combined research and training grant support was ~\$11 million. The CPC team published 150 peer-reviewed scientific articles in 2013 alone.

The Supportive Care for Healing program is a signature UACC clinical research-based program that provides a holistic integrated approach to patients for the duration of their care, i.e. from the time of diagnosis and active treatment through long-term care to a permanent cure, long-term surveillance or survivorship and palliative care. Oncology specialists of the Supportive Care for Healing team include psychiatrists, primary care physicians (PCP), palliative care physicians, social workers and nurses.

Other distinguishing features of UACC include a strong focus on cancer health disparities and skin cancer, embodied by ABOR approved Cancer Health Disparities Institute and Skin Cancer Institute with their academic homes in UACC. These institutes are conducting translational research within communities as well as providing dissemination of cancer education, e.g. the long-time, high reach Vida! Program which disseminates cancer education.

Cognizant of its mission to serve the entire population of Arizona, UACC has embarked on a major expansion into the Phoenix metropolitan area. The twin strategic pillars of this expansion are a long-term affiliation agreement with Dignity-St. Joseph's Hospital and Medical Center (SJHMC) and the building of a 200,000 ft<sup>2</sup> outpatient and clinical research facility on the Phoenix Biomedical Campus that will open in September of 2015. An ambitious, detailed, \$70 million plan, fully funded by Dignity-SJHMC, to recruit >70 oncology specialists and physician-scientists is under way and on schedule. A major asset of Dignity-SJHMC is its Accountable Care Organization (ACO), the Arizona Care Network (ACN), a joint venture with Abrazo Health. Current membership of the ACN includes over 400 (and growing) primary care physicians. A further resource for population health research is the Maricopa Integrated Health System (MIHS) with its hospital and 11 community based FQHCs. We have made relatively little use of this resource.

#### **Strengths**

- The rich diverse ethnicity of urban and rural populations of Arizona with large underserved populations
- The rich diverse CPC faculty with many funded PhD and physician scientists in population health research
- Successful track history of completion of large cancer prevention and intervention studies conducted across state with biorepositories of samples from these studies potentially available for future research studies.
- Statewide connections of CPC faculty, including highly regarded Federally Qualified Health Centers (FQHCs), e.g. El Rio in Tucson, North Country HealthCare in Flagstaff, AZ and Mariposa in Nogales; and Native American tribes through UACC's Native American Cancer Partnership NCI U54 grant



- The new long term affiliation with a major healthcare system, Dignity-SJHMC, in metropolitan Phoenix
- The Dignity-Abrazo ACO, the Arizona Care Network (ACNACN), and the primary care population of the 400+ primary care physicians that belong to ACN
- MIHS and its 11 FQHCs in the Phoenix metropolitan area
- Arizona Telemedicine Program's VIDA! Program, an electronic multi-site multi-community electronic support group education program for breast cancer survivors.
- Statewide Telemedicine Program which manages the Arizona Rural Telemedicine Network that links these urban and rural clinical partners for clinical services, research and administration.

### **Weaknesses**

- Insufficient nationally recognized faculty for full exploitation of the opportunities in certain key areas
  - 1) Outcomes research
  - 2) Health care policy and economics
  - 3) Behavioral science
- Inadequate numbers of staff to furnish research faculty needs
  - 1) Nurses and research technicians
  - 2) Data management / Biostatistics
  - 3) Administration
- Rural outreach has not been a priority for clinical departments.
- Lack of leadership and priority setting by senior administration.
- Few faculty incentives to participate in multidisciplinary research.

### **Opportunities**

CPC faculty members are justifiably renowned for cutting edge research in many areas of population health and cancer prevention. Examples include epidemiology and molecular epidemiology; lifestyle and other risk factors for cancer; nutritional science; tobacco cessation; chemoprevention; and the early detection of cancer. What has in general been lacking is research on effective ways to translate the findings from this rich body of research into effective clinical and public health practice. Tantalizing opportunities to effect this translation and take an excellent program to the outstanding level exist in Dignity-Abrazo's ACN and the FQHCs of our state. In this context, two particular needs have been voiced on multiple occasions by the ACN and FQHCs and are given as examples of how we could proceed (there are many other potential projects):

- Involving PCP in the holistic care of cancer patients. Much of the survivorship and long-term care of cancer patients should be provided in the PC setting but typically is not. The research question is how can the PCP be effectively involved in the long-term care of cancer patients?
- Resolving confusion around common methods for cancer screening, including mammography, PSA testing and colorectal cancer screening. Research questions are how can our screening "experts" convey balanced recommendations to PCs and how can screening rates by consensus methods be improved?

#### Other potential opportunities:

- Partnering with Dignity Care to target brain tumor research. Brain cancer has been identified by NCI as a recalcitrant cancer. Dignity sees over 1200 new cases annually. With our expertise and focus in neuroscience and imaging it seems a natural signature area and could be expended to include brain metastasis research.
- Establishment of cancer cohort recruited from patients attending UACC clinics into patient registry and tissue banks. Data would include standardized questionnaires & measurements, in addition to being able to link these samples and baseline information with clinical data from EPIC. Such registries & tissue banks have been developed within a couple of disease groups as general 'proof of concept'. More efficient recruitment could be attained across the clinics.
- Partnerships with CALS Plant Science efforts for expansion of the Phase 0-II trial funding to include bio-designed / bred plants for chemoprevention, cancer risk reduction.

### **Threats**

- Because of inadequate resources, there is a risk of garnering a reputation for “helicopter research”, i.e. initial enthusiasm and over-promising, not following through, and therefore not being welcomed back. This is particularly prominent with our Native American communities.
- Some of our competitors have deep pockets
- Johns Hopkins has a greater presence and is better known than the University of Arizona at several Indian Health Service facilities on the Navajo Reservation.
- We spent several years developing excellent relationships at Mountain Park, an FQHC on Baseline in south Phoenix only for Mayo Scottsdale to come in, fund several full time staff positions there, benefit from our careful groundwork and shut us out. Not only is Mountain Park now satisfying Mayo’s pressing need to demonstrate that it provides care to at least a few underserved and uninsured patients, but it has also provided many patient samples, including DNA, for the Mayo Rochester Biobank.
- Need for senior leadership with a clear vision and strategic plan for how the ongoing expansion of the Cancer Center in Phoenix will meet the scientific mission of the NCI designated Comprehensive Cancer Center in Tucson without detracting from the history of excellence for which the UA is recognized. While the recruitment of a new director will certainly help to address these needs, the protracted search and the failure to act more proactively in the interim has created a significant threat to efforts in Phoenix that will only result in the need for more money to attract talent.
- An additional threat is the significant decline in cancer patients and market share in the Tucson.
- For the past decade, senior leadership has discouraged basic and clinical research in departments in areas not specifically designated as research pillars, such as cancer. This narrowed focus of interest on research produced a significant withering of research in a broad swathe of clinical departments.
- Lack of a patient-centric approach to patient healthcare. Need to rethink our culture of patient care, and think of patients as partners in care rather than think of patients as users of services. Patients need ownership and empowerment of their own health.

**B.1 (b) Respiratory Diseases:** UA has a strong history of respiratory and sleep-related research and faculty who are internationally renowned in this area. The Arizona Respiratory Center (ARC) is the organizing unit for faculty from medicine, public health, nursing, pharmacy, BIO5, and agriculture and life sciences. Between 2012 and 2013, the ARC averaged \$7 million in grant funding a year, which did not include support from charitable donations or industry partnerships. Currently, the ARC serves as a clinical center in each of the two major asthma research networks: the NHLBI funded AsthmaNet and the American Lung Association funded Asthma Clinical Research Centers. Sleep research contributions from ARC include the largest NHLBI funded community-based epidemiological study for sleep health (Sleep Heart Health Study); a community-based pediatric cohort (Tucson Children’s Assessment of Sleep Apnea Study) and the Apnea Positive Pressure Long-term Efficacy Study (APPLES). These networks conduct clinical trials in both pediatric and adult asthma and sleep and provide clinical research infrastructure that can be used to support growth in research. In addition, the ARC has recently hired two new clinician researchers who could benefit from additional mentorship in clinical research related to adult lung disease. This clinical research expertise can be combined with the ARC’s world renowned expertise in longitudinal cohort studies to establish clinical research cohorts.

#### **Strengths**

- Internationally renowned faculty
- Strong infrastructure and expertise in basic, clinical and epidemiologic research.
- Strong clinical practices and relationships with the community
- Existence of clinical centers in each of the national asthma research networks
- Vibrant clinical sleep services with over 2,200 unique visits that offers much opportunity for clinical-translational research

### Weaknesses:

- Lack of senior level biostatistician in the area of clinical/behavioral trials in respiratory disease
- Lack of mid-level faculty in behavioral trials in respiratory disease (adherence, psychosocial issues)
- Lack of senior faculty in clinical/comparative effectiveness/behavioral trials in COPD
- Lack of senior faculty in clinical/comparative effectiveness/behavioral trials in adult asthma
- Lack of mid-level faculty in psychometrics and instrument development
- Lack of junior to mid-level faculty with expertise in sleep
- Respiratory research faculty spread across the AHSC making collaborations more difficult
- Limited space for growing clinical research
- Limited staff for assistance with grant submission
- Reliance on IDCs and difficult process of negotiation with other Colleges/Units

### Opportunities

- We recommend building on the strengths listed above, particularly in the areas of asthma, COPD, and sleep. These strengths can be combined with the existing ARC expertise in basic science as well as University expertise in community based research, behavioral trials, environmental health, and health disparities to complete the spectrum of translational research (bench to bedside to community). The opportunity to build on these strengths is tremendous and could have a major return on investment.
- Use of the new EPIC system for health outcomes research related to respiratory disease.
- Use University's strong connections to the community/patients to be competitive for PCORI applications.
- Unique opportunity for an interdisciplinary sleep research institute that is housed in the ARC. Sleep is cross-cutting in nature, and there exists an opportunity for promoting population health and well-being through healthy sleep behaviors and the identification and treatment of sleep disorders. This is aided by a critical mass of sleep researchers from various disciplines at the University of Arizona with over 10 sleep researchers who will bring in \$3 million in direct costs this year from NIH and PCORI alone.
- Create multi-community electronic support groups for patients with COPD or Asthma.

### Threats

- Increasing clinical pressure on physician faculty.
- Limited ability to do outcomes research because of slow implementation of research modules within EPIC. The ability to do "real-time" research within the electronic medical record is critical for health outcomes research and must be addressed, not just the ability to "store" data.
- Limited space threatens ability to bring faculty together and decreases collaboration. Faculty are well-positioned to consider relocation to a more supportive research environment
- Lack of a dedicated sleep research laboratory with the ability to perform 24-hour controlled experiments of sleep and wakefulness
- Competition for faculty and research dollars from other institutions which provide more infrastructure

**B. 1 (c) Obesity and related metabolic disease/comorbidities:** Obesity or overweight now affects 2 of 3 Americans. Children and Hispanics represent groups with the largest increases in obesity over the past 10 years. Obesity is triggering higher rates of numerous obesity-driven metabolic diseases including but not limited to diabetes, high blood pressure, heart disease, osteoporosis, cancer, and is also associated with lower quality of life and poorer mental health. Effective programming to arrest this epidemic through primary prevention and treatment of obesity is a public health priority.

### Strengths:

- Investigator expertise in the following obesity/metabolic disease areas that include:

- Childhood obesity, community-based obesity interventions, bariatric obesity care, cancer-associated obesity, diabetes, sleep, respiratory/asthma and obesity, healthy aging and obesity.
- Substantial portfolio of obesity-related peer-reviewed manuscripts in the area of obesity
  - Senior investigators with a track record of NIH and USDA funding related to treatment and prevention of obesity and related disease. Grants have addressed:
    - Obesity and cancer ; Obesity prevention in overweight youth; Obesity interventions in adults
    - Group office visits for diabetes; Dietary and physical activity assessment methods
    - Nutrition education in medical school; Childcare center delivered behavioral interventions
  - Growing expertise in innovative models of inter-professional, team based care (Clinical Weight Loss Program)
  - Expertise in both traditional and novel models of primary care-based obesity treatment.
  - Expertise in cultural competence in patient-provider communication
  - Training grant in obesity
    - USDA Obesity Fellowship (original and repeat funding)
  - Young investigators (junior faculty and post-docs) establishing a research focus on treatment and prevention of obesity and related disease
    - Foundation funding (American Diabetes Foundation) ;
    - Industry (California Walnut, Del Monte, etc)
  - Collaboratory for Metabolic Disease Prevention and Treatment – multi-college collaboration that is co-locating faculty with expertise and research program spanning T1 to T4 research (see the appendix for strengths specifically related to Collaboratory)
  - Established UAHN Clinical Service Programs treating obesity: (serve as hypothesis generating labs, resource for recruitment of research participants, sources of observational pilot data)
    - Clinical Weight Loss obesity treatment program – physician-directed medical weight loss for patients with severe obesity, employee-based, now expanding services
    - UAHN Bariatric surgery program
  - Canyon Ranch Center for Prevention & Health Promotion (CRPHP) at the COPH (MEZCOPH) has a pilot-grant program, with focused support of obesity-related pilot projects in support of future R01 applications
  - Existing research projects that focus on preventing and intervening on environmental, social, and individual behavioral factors related to obesity and metabolic disease.
    - Epidemiological/Environmental research studying the association between arsenic & diabetes risk
    - Exercise, weight loss intervention in obese people with asthma
    - Use of growth monitoring to prevent excess early life growth in infants of WIC mothers
  - Strong campus-wide focus on Food and Agricultural Studies, including researchers located in the Southwest Center, Geography, and Anthropology as well as the College of Agricultural and Life Sciences
  - Existing partnerships / space for obesity/metabolic research
    - Collaboratory (phlebotomy, anthropometrics, body composition, lifestyle behavior assessment, etc)
    - YMCA ; local schools; CATS; Sleep laboratory; Imaging labs/ research equipment (MRI, etc)
    - State and local government agencies (ADHS, Pima county, city)
  - Outreach and Services that enhance opportunities for research in the community
    - MEZCOPH Outreach Efforts through CRCPHP
    - Healthy2BMe! Camp for youth to promote obesity prevention thru healthy eating and activity
    - COM – Youth Sports Center
    - CALS Center for Physical Activity and Nutrition
    - CALS Cooperative Extension, community outreach & education programs on obesity prevention
    - CALS Expanded Food and Nutrition Education Program – community-based education and outreach on obesity/related topics
    - CALS UA Nutrition Network – SNAP-Ed provides nutrition education for persons on SNAP [Supplemental Nutrition Assistance Program, i.e. food stamps]

- Arizona Telemedicine Program, with numerous community outreach and education programs on obesity and diabetes. At the leading edge in the use of technology, such as webinars, for community education.
- Established collaborative relationships with Native American tribes where obesity and obesity related disease are major public health issues
  - obesity and diabetes are major public health issues being addressed
- Established programs in service, research and/or education serving priority populations with high prevalence of obesity/related metabolic disease:
  - Native American Tribes - FCM Native American Research and Training Center (NARTC)-Youth Diabetes Camp and youth cardiovascular risk research
  - Persons with Developmental Disabilities – FCM University Center of Excellence on Development Disabilities (UCEDD)-wellness interventions with IDD youth
  - Persons with serious mental illness – FCM Camp Wellness – a day-camp model wellness program for persons with serious mental illness
  - Mexican American Studies and the Binational Migration Institute (BMI), which studies health-related issues along the border in collaboration with scholars working in COPH
  - FCM primary care clinics serving high proportion of Medicaid patients
  - FCM mobile health program – serving low-income, rural and uninsured populations
  - SIROW (Southwest Institute for Research on Women), including programs on working Poor Moms and Minors Project (MOMS) and Project Change (a K-12 outreach program dealing with cyber-bullying and other issues that might lead to body image and weight-related issues
- COPH Prevention Research Center (PRC) has investigator expertise in community-based participatory research approaches to diabetes and obesity
- Obesity investigators have established collaborative relationships with key external community partners/stakeholders:
  - Pima County; Arizona Department of Health Services; Pima Community College; Maricopa Community College; Northern Arizona University; YMCA; Activate Tucson; Federally Qualified Healthcare Centers

**Weaknesses:**

- Need to replace aging critical equipment for obesity research (DEXA) as well as coordinate access, expand usage of other imaging technology into obesity-behavioral research
- Very limited faculty NIDDK funding (required to apply for NIH Obesity Center Grant)
- Obesity/related metabolic disease researchers are spread across campus, many are unaware of each other’s work and potential to collaborate
- Limited collaboration between basic and clinical researchers
- Potential lack of “critical mass” of clinical faculty researchers working in obesity
- Lack of ability to utilize EPIC for clinical research or population-based research
- Lack of EPIC capacity to support clinical intervention research
- Lack of a clear “pipeline” to develop new obesity researchers, especially physician researchers
- Lack of IDC return to investigators in Collaboratory to expand/grow obesity programs
- Lack of a CTSA is a major weakness
- Lack of clear processes, authority and accountability for granting access to Epic for anyone who is not a UAHN employee – barrier to collaboration across colleges in for both patient care and research
- Underutilization of the 70 community Arizona Telemedicine Program network for community education.

**Opportunities:**

- Have made a start on the critical mass of researchers, research and education programs, and research infrastructure necessary to be competitive for an obesity center grant

- Collaboratory sets new model for focused research that moves investigators out of college-specific silos to shared space
- Changes in national health care policy – opportunities for health services research and dissemination and implementation research
- ACA – preventive services are covered
- CMS now covers intensive behavioral therapy for obesity in primary care
- New pharmacotherapies for obesity treatment – opportunities for research in adjunctive behavioral treatment, treatment matching (phenotype/genomics)
- PCORI is a new potential funding stream for obesity research
- Obesity is a high priority area for funding, is very much associated with health disparities
- Obesity is a topic with much general population interest & potential for philanthropic support
- Partnerships with Pima County Health Department (PCHD) for policy-related obesity-prevention research
- Available expertise to develop effective soft and hardware platforms for delivery of obesity-prevention research across a wide geographic area
- Expertise and experience with Hispanic and NA populations; CBPR
- Experience and expertise with employer-sponsored and worksite-based obesity intervention programs
- PRC funded by CDC provides supplemental funds for partnering research –several focused on obesity
- Pima County Health Department is moving to become an accredited health department and needs academic partnership
- Could take advantage of UA strengths in respiratory sciences for research in the areas of obesity and physical activity and their relationships to asthma and sleep disorders.
- Could take advantage of campus expertise in Food and Agricultural Studies to expand the study of the relationship between food production systems (and locally sourced food) and health outcomes related to Obesity (e.g., the School of Geography and Development’s TUSD School Garden Program)
- Growing international research and policy interest in alternative dietary approaches to obesity and metabolic disease other than the traditional low-fat diet

#### **Threats:**

- ASU Obesity Solutions Initiative (partnering with Mayo Clinic, funded by \$10 million strategic investment fund established for ASU by Virginia G. Piper Charitable Trust)
- MD Anderson Cancer Center has established presence in Phoenix (Partnered with Banner Health) MD Andersen, TX has Center for Energy Balance in Cancer Prevention and Survivorship
- Increasing pressure for clinical productivity on physician faculty who want to do translational research
- Competition for new faculty by other obesity research programs at other major academic health centers that have better developed research infrastructure, faculty support, post-doc support
- Competition for patients locally/in-state by other obesity programs backed by other hospitals/health systems
- Faculty, staff, leadership turnover and loss to competitors

#### **Trends:**

- Dramatic increase in obesity in the US from 1990 through 2010. Now more than 1/3 of US adults (35.7%) are obese, 17% of all children and adolescents
- Obesity rates even higher among Hispanics, Mexican Americans
- Global obesity rates are also rapidly increasing
- Obesity is recognized as a chronic disease and need a chronic disease approach to prevention and treatment
- Obesity increasingly recognized as an inflammatory condition with etiological links to other chronic diseases
- Obesity epidemic continues to attract much attention from healthcare system, public and private payers, public health officials, and consumers/general public

- Growing international research and policy interest in alternative dietary approaches to obesity and metabolic disease treatment other than the traditional low-fat diet
- The association of obesity with disease incidence and outcomes continues to expand

**B. 1 (d) Cardiovascular Diseases:** Cardiovascular disease is the #1 killer of adult men and women in the United States, and disproportionately affects underserved and minority populations. The UA is uniquely situated to make enormous contributions to the understanding of population health and health outcomes, particularly in the elderly, Hispanic and Native American communities. In addition, we sit on the verge of an exponential increase in the number of patients with adult congenital heart disease. Arizona, with its strong history of pediatric cardiology, has ready access to a large number of these patients as they reach adulthood. However, outside of resuscitation science and our Native American clinical cardiology service, the Cardiovascular Division and Sarver Heart Center have few resources devoted to this important area of research at present.

### Strengths

- Cardiovascular medicine outcomes are readily tracked through a number of national voluntary and obligatory clinical databases. Currently Cardiovascular Medicine participates in a number of these databases, and there is intention to begin participating in more over the next 12 months. This quality and outcomes tracking infrastructure allows access to the national databases for purposes of research queries as well as investigation of local data.
- Our multiple practice sites, including University Hospital, South Campus and the VA, allow us to draw on a diverse patient population.
- Cardiovascular medicine lends itself well to longitudinal outcomes study, as we often have more than just clinical data on patients. There is imaging data, and the ability to look at longitudinal proteomic, biomarker and metabolomics contributors to health outcomes.
- Have developed collaborations with the ADHS, COM-Phx, COM-Tucson, the statewide Arizona Emergency Medicine Research Center, and the Sarver Heart Center that has led to a quadrupling of survival from Out-of-Hospital Cardiac Arrest (“Sudden Cardiac Death”). This dramatic improvement in health outcomes, as well as the model that has led to is, has been published and widely recognized.

### Weaknesses

- The view of local health and health outcomes provided by the relatively crude national database structure that we currently access is not sufficiently granular and most patient characteristics and outcomes of interest are not tracked with the necessary accuracy in these databases.
- There is no existing internal patient database or tracking structure in cardiology on which to draw for questions regarding population health and health outcomes.
- 21st century population health outcomes research should incorporate genetic, proteomic, biomarker and metabolomics information. UA does not have an infrastructure to collect, house or analyze these samples.
- While the Epic implementation promises to provide some crude clinical data for outcomes, the reality of launching an EMR results in pushing research questions to the back of the queries, often for years. The information contained in this structure is often insufficiently granular as well as frequently inaccurate and difficult to access.
- The absence of a dedicated research-oriented database with both longitudinal clinical information and biobanking of blood prevents rapid analysis of relevant population level questions and outcomes.
- The limited staff in cardiovascular medicine at present means a relatively small number of patient visits, which will lengthen the time required for database development. It is expected this will begin to change with recruitment into key positions in the next year.
- Cardiovascular medicine has no senior faculty with specific expertise in cardiovascular epidemiology or population health. There may be resources on campus with which to partner, of which I am not yet aware.

- There is insufficient biostatistics and informatics infrastructure to allow successful de novo proposals to be generated or projects completed by our current largely inexperienced faculty. While Dr. Sweitzer has done several larger HF population analyses, these drew heavily on existing bioinformatics and biostatistical infrastructure at the University of Wisconsin and University of Pennsylvania (collaborators) that does not currently exist within the College of Medicine at Arizona.
- Insufficient clinical trials infrastructure available to cardiology at present for the longitudinal visits often required for this type of study, if a level of detail beyond that available in the EMR is desired.
- Recruitment in strategic areas, such as adult congenital heart disease, preventive cardiology and chronic disease management, is planned, but not yet begun.

### Opportunities

- Dr. Sweitzer's recruitment as Director of the Sarver Heart Center will result in the beginning of infrastructure development, particularly in clinical trials facilities, biobanking, and database development.
- Faculty Recruitment in genomics, proteomics & metabolomics is planned in the next 1-2 years.
- Dr. Sweitzer's intention is to build a highly collaborative section in cardiology, which will provide opportunity to partner with many groups on campus interested in cardiovascular outcomes.
- Discussions have already begun with the center for integrative medicine to explore the possibility of studying the impact of environments and/or lifestyle behaviors, such as meditation, on CVD outcomes.

### Threats

- The enormous amount of work to be done in building clinical cardiology and translational research in cardiovascular diseases will dilute efforts toward improved population health research in this area unless someone with a dedicated focus on this area is recruited to the faculty.

**B. 1 (e) Aging:** As a "supra" specialty, aging is a cross-cutting and coalescing topic, relevant to most areas of research, and highly interdisciplinary, with exploding socio-demographic significance. The cost of providing health care for one person aged 65 or older is three to five times higher than the cost for someone < 65. A majority of Medicare spending is concentrated among 10% of beneficiaries who accounted for 60% of Medicare spending (top 10% \$55,763, compared to average overall, \$9,702.) Pima County is home to 209,742 individuals who are age 60+ (21.4% of total population); 151,293 are 65+; and 19,895 are 85+ years of age (US Census 2013). 35% of Pima County's 65+ population (52,953) have income below 200% of federal poverty level. Our challenges are four-fold, we must: 1) better understand the basic biology of aging; 2) better promote health and self-care and prevent chronic disease and disability in healthy seniors; 3) develop high value models of care for high-cost elders with complex multi-morbidity, reducing unnecessary utilization and associated costs, and improving quality of life and independence utilizing low-cost technologies such as telemonitoring and body-worn sensors; and 4) educate and train all health care providers in senior care, using best practices, including interprofessional educations for team-based care.

### Strengths

- The University of Arizona Center on Aging (ACOA), hosted by the College of Medicine, and led by co-Directors Mindy J. Fain, MD (Dept. of Medicine) and Janko Nikolich-Zugich, MD, PhD (Dept. of Immunobiology), is a statewide Board of Regents Center of Excellence which is affiliated with the Division of Geriatrics, General Internal Medicine and Palliative Medicine, ImmunoBiology and research partners across colleges and across the state, with grants totaling \$16.8M (NIH and HRSA grants and contracts, SENS Foundation, AFAR, Flinn Foundation, Hearst Foundations and Donald W. Reynolds Foundation), focusing on: 1) the biology of aging, 2) prevention of aging-related conditions and diseases and promotion of resilience and function, 3) building and measuring the effectiveness of geriatric models of care across the aging continuum, and 4) creation and evaluation of interprofessional and sub-specialty education and training in geriatrics.



- The GeriMetrics Program led by Jane Mohler, in collaboration with iCAMP, Bijan Najafi, in collaboration with the College of Engineering, applies innovative biomedical technology to solve common geriatric problems with a focus on fall prevention, cognition, pressure sores and frailty/resilience. Funding includes a National Institute of Health (STTR) – Phase II, NIA R42AG032748 (\$1.3 million) characterizing frailty and fall risk using remote biometric tools (Mohler); four supplemental pilot grants are underway on HR variability and frailty, upper extremity measurement of frailty, pulmonary measures of frailty, and HIV and frailty.
- A statewide Flinn foundation grant to establish ‘Arizona Aging and Cognitive Collaborative’ (Najafi, Sabbagh, Mohler, Coons) in collaboration with UA and ASU Engineering and Banner Health.
- ACOA are national leaders (Fain and Mohler) in developing and implementing innovative, interprofessional high value models of aging care, including: a comprehensive SAVAHCS TeleHealth program managing over 700 veterans with advanced heart failure, lung disease, diabetes, PTSD, obesity, and depression and developing care protocols which are used across VAMCs nationally; and a collaborative geriatric-orthopedics Hip Fracture service at UAMC-University Campus; a team-based care coordination team for high cost UAHN Health Plan patients (Healthy Together Care Partnership); and developmental senior ED, Geri-ortho, and acute care of elder unit programs. They were instrumental in helping South Campus to achieve the only NICHE (Nursing Intensive Care for Hospitalized Elders) certification in Arizona.
- Innovations in health services research evaluation of aging models of care (aligning with prevention of hospitalization and ED use) places us in a strong position to assist UAHN, Tucson City and Pima County in its aging-related strategic goals. We collaborate with Banner Health Research in Sun City, who has a 1000 person healthy aging cohort, with a linked medical record, with high research potential.
- Development of body worn sensor algorithms in balance, gait and physical activity in the area of frailty/ sarcopenia in collaboration with iCAMP and the college of engineering and computer science, provide high promise for future funding.
- The ACOA has a robust research training and career development program for trainees and young faculty, which provides research training and opportunities to collaborators in many sub-specialties (emergency, trauma, surgery, GI, pulmonary, infectious disease, cardiology, rheumatology, engineering, computer science) and across all four AHSC colleges and main campus colleges (engineering, computer science).

#### **Weaknesses:**

- The biggest and most important weakness is poor coordination, cooperation, and collaboration between the health sciences in the area of aging, and the lack of infrastructure support to build these relationships (pilot grants, post doc positions, and research infrastructure including epidemiological and broad biostatistical support across basic, genetic, HSR, and clinical research methods).

#### **Opportunities:**

Opportunities lie in four major aging-related research areas, all of which are consonant with AHSC, ADHS, Pima County, Tucson City and UAHN strategic goals:

- Support research in the biology of aging (NIH, AFAR, Ellison: Funding sources)
- Promote healthy behaviors and self-care, and prevent chronic disease and disability in healthy seniors (NIH, PCORI, AHRQ, CMS: Funding sources)
- Develop and test low-cost high value models of care for high-cost elders with complex multimorbidity, reducing unnecessary utilization and associated costs, and supporting quality of life, function and independence using team-based care and technologies such as telemonitoring with looped interventions. (NIH (STTR/SBIR), PCORI, AHRQ, CMS: Funding sources)
- Develop and test geriatric education and training for trainees and health care providers in the care of aging adults, using best practices, emphasizing interprofessional education and practice in team-based care and community settings.(Reynolds, HRSA, Hartford, Macy: Funding sources)

## Threats:

- Aging demographics, and future societal issues demand that we learn how to promote healthy behaviors for our healthy aging population; build high value models of care to care for the comorbidly ill, which avoid unnecessary utilization and associated costs; and that we train our health care providers how to care for the aged. IF WE DO NOT ATTEND TO THESE REALITIES, UAHN's bottom line will suffer, our local, state and national economy will suffer, and our elders will suffer.

## Trends

- By the year 2020, 25% of the U.S. population will be over the age of 60. Most will remain healthy, highly functional and independent, yet others will be chronically ill, have poor function and quality of life, and have high health care costs.
- Along with the dramatic aging of the U.S. population during the next several decades will be significant increases in racial and ethnic diversity.

**B. 1 (f) Border Health:** Borders are areas of interconnection with their own unique population health challenges. Border population health focuses on health outcomes that are unique to border regions and the peoples that live in them. Such an approach takes into account the mobility of people who work and live on both sides of the border; it considers how that mobility must be accounted for in any population health and outcomes research. A number of colleges have strong interests in borders and border health and have made border health a top priority of their college's strategic plans. This includes the College of Public Health and the College of Social and Behavioral Sciences, which both have their own programs in border health issues as well as collaborative projects located in the U.S.-Mexico Border region. We have an enormous opportunity for binational collaboration on the shared health agendas of both of our countries and to strengthen health infrastructure in the border region.

## Strengths

- COPH is actively involved in the development of the *Healthy Border 2020* agenda which guides binational efforts of the Commission as well as the development and implementation of "Leaders Across Borders", a binational leadership program which trains 20 public health leaders yearly from Mexico and the USA focusing on a binational project. (Dr. Cecilia Rosales, COPH faculty and member of the U.S.-Mexico Commission).
- COPH has a number of binational collaborations *in infectious disease*.
  - Collaboration with partners in the state of Sonora to understand and prevent dengue, with NIH funding. COPH researchers are working with partners at El Colegio de Sonora, Universidad de Sonora, Office of Border Health and the Secretaria de Salud in Sonora to identify the factors that are leading to differential emergence of dengue in urban and rural settings. Understanding the barriers to transmission will allow us to work together to develop more effective control strategies.
  - In 2013 COPH entered into a new collaboration with the Yuma County Health Department and researchers from the University of Monterrey (Mexico) to test newer methodologies for identification of latent TB.
- COPH has binational collaborations *in chronic disease*.
  - CDC funded Arizona Prevention Research Center (PRC) has a long history of working in the border region. Beginning in the year 2000, partnerships with local community organizations in the Arizona border region have developed health promotion and disease prevention programs including a comprehensive program for the prevention and control of chronic disease with components focusing on interventions with patients, families, schools, community residents and policy change. By 2008, more than 1,000 people along the Arizona/Sonora border participated in Pasos Adelante, one of these interventions, with significant improvements in body mass index, blood pressure, total cholesterol, and glucose levels; health-related quality of life; and depression. These improvements

are sustained after the intervention ends. Pasos Adelante has been recognized by CDC as an evidence-based intervention addressing the CDC Winnable Battle:

- Beginning in 2009, CPH researchers have collaborated with the Center for Health Promotion in Northern Mexico at the Colegio de Sonora to adapt this intervention for the population in Northern Sonora. Today more than 200 people have participated in this adapted intervention, known as Meta Salud, with positive outcomes very similar to Pasos Adelante.
- CPH has been very involved in the *training of community health workers* in the border region for more than 25 years. Today, training in Arizona focuses on building capacity for policy change in local communities. In Mexico we are training community health workers who are farmworkers migrating from southern Mexico to northern Mexico to work in the fruit and vegetable production in Sonora. This project is a collaborative effort with the Colegio de Sonora and the Centro de Investigacion de Alimentacion y Desarrollo (CIAD).
- CPH Border Health *Service Learning Institute* provides an opportunity for our students to collaborate with local public health agencies and NGOs, including several projects developed by University of Arizona faculty, (ASORBO etc.) in the border region to strengthen the public health infrastructure.
- Mexican American Studies, in the College of Social and Behavioral Sciences, houses the *Binational Migration Institute (BMI)*, which conducts studies on migration issues as well as works on projects related to health outcomes for migrants – both legal and illegal. Recent projects include the study of Mexican women and family planning trends analysis.
- SIROW, in the College of Social and Behavioral Sciences, has the *Immigrant Workers' Project*, which is a foundation funded advocacy project for low-wage immigrant workers through direct legal services, public policy research, and community education and outreach, with a focus on the unique vulnerabilities of immigrant women in the workplace. The Immigrant Workers' Project is led by UA-SIROW (PI: Nina Rabin) in collaboration with the Rogers College of Law.
- The Sonoran University Center for *Excellence in Developmental Disabilities (UCEDD)* in the Department of Family and Community Medicine has for the past seven years has engaged communities along the Arizona /Sonora Border in activities to improve the health of people with disabilities. As a result of an initial assessment of needs, UCEDD:
  - Successfully organized and conducted three border conferences on disability, bringing together health care providers, families and other care providers, along people with developmental and other disabilities to learn about evidence-based practices in the field and strategies for improving health and quality of life in a resource-limited area. Over 500 people have attended these conferences.
  - *ARSOBO* developed and incubated after a 2010 Sonora-Arizona Conference sponsored by the UCEDD as a binational not-for-profit NGO located in Nogales, Mexico. With entrepreneurial grants, ARSOBO trains and employs individuals with disabilities to construct assistive medical devices (all-terrain wheelchairs, solar battery chargers for hearing aids, and prosthetics) at cost, or less, to individuals with disabilities in Sonora.
  - Forged partnerships with government agencies, businesses and non-profits working in the region to address disability issues.
  - Presented targeted trainings in Santa Cruz, Cochise and Yuma Counties for families with a disabled family member on topics such as: future planning; positive behavioral supports; and early childhood developmental screening.
- Since its inception in 1975, the Department of Family & Community Medicine (FCM) has worked in and with Border communities and patients, FCM maintains clinical, community health, and educational programs which provide links to both US and Sonora border communities, and add to the web of connections upon which border health research can be built.
  - The Family Medicine residency at South Campus is designed around rural, border and global health curriculum, scholarly projects and clinical rotations.

- *FCM Clerkship clinical sites* serve border communities in Douglas, Bisbee, Nogales, Arivaca, and Yuma; the majority of students are placed at rural sites.
- Several border health programs under FCM faculty member Tracy Carroll PT, MPH. These include:
  - The F.A.C.E.S. Conversantes is a service-learning course developed by FCM faculty for bilingual, Spanish-speaking, undergraduate students. As they learn medical terminology and interpretation techniques, they serve as Spanish interpreters in local clinics, and assist UA medical students learning medical Spanish. Conversant students work alongside UA medical students in clinical and externship sites, providing interpretation services while orienting to UA health profession Colleges and clinical environments.
  - UA medical students and residents can also rotate in a number of clinical areas at the Ministry of Health Hospital General in Nogales, Sonora. A relatively new, and expanding, government facility, it serves the general “Salud Publica” population of Nogales.
  - *EnComun de la Frontera*: Microcredit with Health Education: Growing from a Kellogg Community Fellowship Grant awarded to FCM in 1997, EnComun is now an established Microcredit non-profit in Nogales serving 4000 individuals living below the Mexico poverty line. EnComun has a Health Coordinator to assist with coordinating health services throughout the community. Each year since 2004, interns from the Colleges of Medicine and Public Health have worked with EnComun on Health and Community Development projects. This site will continue support future MD/MPH and other AHSC students in their research and service.
- Additionally, FCM faculty member James Cunningham, PhD, works with collaborators at the General Directorate of Epidemiology in Mexico City, Mexico; and the Center of Studies on Alcoholism and Addictions, Antiguo Hospital Civil, Universidad de Guadalajara to study the cross-border effects of methamphetamine precursor regulation on medical and legal outcomes.
- The Arizona Telemedicine Program, housed in the College of Medicine, has border activities in the clinical, research and service areas. Telemedicine services have been provided to rural border communities including Douglas, Nogales, and Yuma. These hospitals also receive continuing education programming over the Arizona Telemedicine Network. These organizations are users of the ATP’s monthly telemedicine training programs in Phoenix, Tucson, and Flagstaff, which have been ongoing since 2000. Over 1200 individuals from over 100 healthcare organizations have participated in these programs. The ATP also offers training in telemedicine to community health workers in border communities. The ATP has had a significant presence in Latin America. Funded by the US Department of Defense, the ATP provided technical assistance and professional leadership for the creation of a sustainable national telemedicine program in Panama.
- The UA Superfund Research Program (UA SRP), housed under the Center for Toxicology in the College of Pharmacy, is strengthening the ability of the U.S. and Mexico to jointly address common hazardous waste problems by providing training, education, and teaching tools in English and Spanish. The UA SRP also bolsters partnerships with Mexican universities and research institutes and created a functional and permanent binational consortium in 2003 that addresses environmental health issues along the U.S.-Mexico border. The Dean Carter Binational Center has a mission to empower low-income communities of the US-Mexico Border region to become active participants in recognizing and resolving environmental risks to human health. The Center has provided over 50 fellowships, organized 9 workshops with >1100 attendees, published 10 bilingual outreach information-sheets, conducted numerous trainings for community health advocates and it receives 1,800,000 web-visits/year.

## Weaknesses

- The biggest and most important weakness is lack of coordination, cooperation, and collaboration between health sciences colleges and departments, and collaboration between health sciences and main campus colleges and departments, such as those mentioned above on border health issues.

### Opportunities:

- Building on the multiple health, educational, programmatic, and research relationships between a UA entities and partners on both sides of the border in a coordinated fashion has the potential to develop a network for health research, capable of studying the impact of legal, employment, environmental, health care delivery, and public health factors on health outcomes.
- SIROW, in the College of Social and Behavioral Sciences, also houses the *Immigrant Mothers with Citizen Children: Rethinking Family Welfare Policies in a Transnational Era*, which was funded by the UA- Arts, Humanities, and Social Science research opportunity to conduct research on welfare laws and policies in a cultural context and its impact on immigrant mothers and their children. While the funding has expired, research continues on this important topic and data collected from this project.
- Leveraging the existing campus and border community relationships developed by the Sonoran University Center for Excellence in Developmental Disabilities (UCEDD), there are opportunities to:
  - Create a longitudinal AHSC student experience with home visits for developmentally disabled adults and youth in the region to address health, wellness and prevention strategies.
  - Develop curriculum and conducting training for promotoras on addressing the needs of the patients with disabilities along the border as well as follow up research on the efficacy of the intervention.
  - Create centralized resources, information and referral for people with disabilities and their families in the border region with both cultural and language competency components.
  - Develop pipeline efforts for youth with disabilities to enter the AHSC in conjunction with SEAHEC.
- Visiting faculty from CIAD in Mexico are interested and engaged in wellness research and want to expand partnerships in this area.
- The Arizona Telemedicine Program's telecommunications network is underutilized for education, research, and administrative programs. It's a value-added network that provides low cost multi-site videoconferencing. ATP has business associate contracts with its rural sites which provide established relations to UA with those sites. The ATP being housed at the UA should provide many a competitive advantage for grants & contracts.

### Threats:

- We see ASU Transborder Studies (<http://sts.asu.edu/Research>) already doing cross border work. They have key people who are actually from Mexico (Francisco Lara, with whom we submitted a SPIFI a couple of years back and his wife Hilda Perez). Both excellent academics and friend and colleagues of UACOPH faculty. Francisco is an urban planner and Hilda was trained as epidemiologist at Michigan. Both continue their affiliations with Colegio de la Frontera Norte and Colegio de Sonora.
- NAU is also involved in border issues; see a couple of examples below: <https://www4.nau.edu/uma/>  
<http://www.nau.edu/News/Articles/2013/08/Up-close-and-personal/>

## **B 2. The committee found strengths and opportunities in the areas of behavioral and emotional health, environmental health, and health care delivery.** All of these areas affect health outcomes in populations. There are collaborations between these areas and many of the disease or population specific areas described above, and opportunities for more substantive collaboration with significant potential impact.

**B.2 (a) Behavioral and Emotional Health Research:** Over half of morbidity and mortality related to chronic disease are directly caused by unhealthy behaviors, yet patient centered approaches to facilitating healthy behavior are not optimally implemented in most health care settings. Behavioral health diagnoses are also

one of the most common in primary care settings. Behavioral health research is a critical component in disease prevention and in the reduction of morbidity and mortality of chronic disease. This is also evident in high rates of non-adherence with recommendations made to patients who receive costly medical interventions but do not reap the benefits of these interventions because of lack of follow-through with self-care and medical recommendations. Behavioral research and scientists are essential to clinical and translational research to improve health outcomes. Increased demand for such investigations is evident in the federally funded *Patient-Centered Outcomes Research Institute (PCORI)* from which investigations at UA have already been funded.

Persons with behavioral health disorders have striking health disparities, particularly with respect to chronic disease prevalence. People with serious mental illnesses have an average lifespan which is 20 – 25 years shorter than that of the general population. This gap widens to 30 years in Arizona. Persons with behavioral health disorders also account for a disproportionate share of physical health care expenditures. Healthy behavior is impeded by inability to regulate emotions and depressive disorder is the most common, high impact result of failure of emotion regulation. Depressive disorder is second only to cardiovascular disease in life years lost to disability for women (10<sup>th</sup> for men). There is growing recognition that major depression is highly prevalent, is frequently comorbid with other medical conditions, causes more functional impairment than most other medical conditions and is associated with poor self-care, high medical costs, an increased risk of complications and mortality. For instance, research in patients with diabetes has shown that comorbid major depression occurs in up to 20% of patients and is associated with a higher risk of microvascular and macrovascular complications, dementia, all-cause mortality and approximately twofold higher medical costs compared with patient with diabetes alone

Emotional Health Research addresses the inextricable connection between emotional and physical well-being. When patients are able to regulate their emotions, they are better able to think clearly, make healthy choices and advocate for their own healthcare needs. Scientists at UA are integrating knowledge of brain mechanisms, autonomic physiology, and differences in emotional and social development to unlock new approaches to facilitating emotional health and decreasing mental and physical morbidity, especially in chronic illnesses including cardiovascular disease, obesity and cancer. This knowledge has not been incorporated in health services research at UA although the stage is set to do so with screening for emotional function and patient education efforts facilitated by EPIC.

### **Strengths**

- Many funded faculty members across the AHSC Colleges and centers are actively engaged in behavioral research and in health promotion related research, service, and education.
- Additionally, a search of the UA system verifies faculty and funded studies with a focus on health in the Colleges of Social & Behavioral Science (Communications, Anthropology, Geography), College of Sciences (Psychology), and the College of Agriculture and Life Sciences
- Physician scientists and research psychologists in Department of Psychiatry with R01 funding, already integrated in medical settings (sleep, cancer, heart disease).
- Physician scientists and research psychologists in the Department of Family and Community Medicine have a 20-year history of conducting behavioral research focused on multiple health behaviors, including tobacco use, diet, chronic disease management, that have significant impact across a variety of health conditions.
- Family and Community Medicine researchers have expertise in conducting behavioral research in a wide range of medical and healthcare settings, including primary care, dental, and complementary and alternative medicine settings, as well as private practice, HMO, and community health center settings.
- Our unique position as a border community contributes to questions about how culture influences health behavior (in health promotion, risk reduction, behavior change and management of health and illness).
- Unique programs such as MESH -Mechanisms of Emotion, Social Relationships and Health-The goals of MESH are to show how the mind and the brain influence the function of bodily end organs in health and disease, to

use this knowledge to develop new treatments and preventive intervention strategies and to demonstrate how these new approaches work in clinical and community settings (see appendix for more information).

- Skilled faculty and APs (COPH) in community participatory research
- HOPE center is experienced with geriatrics research
- Experienced faculty and recent hires in COPH with experience in behavioral health outcomes research. PCORI and Prevention Center funding give a foundation on which to build more research activity.
- Camp Wellness, a unique FCM service line providing wellness/chronic disease prevention care to persons with serious mental illness.
- The Workforce Development Program in FCM- a peer mental health mentor training program that has garnered national recognition
- There is expertise across the UA campus in the use of mobile technologies (e.g., mobile apps, telemedicine, web-enabled mobile) for behavior change and disease management. For example, the mHealth (mobile Health) group at UA is a consortium of over 120 members across the University. In the COM, several research projects using mobile technology for behavior change have already been funded by NCI.
- There is expertise in multi-behavioral interventions, an emerging priority for NIH. Researchers from the departments of Family and Community Medicine, Nutrition Sciences, Computer Science, and Engineering, and the College of Public Health are collaborating on several projects addressing multiple behaviors that are related to high priority health conditions (e.g., cancer, obesity, diabetes).1
- Expertise in Improving depression care outcomes using a population based approach have been demonstrated at the UA Cancer Center in a pilot study conducted by Weihs, KL et al. Resolution of depression improved from 26% in usual care to 66% with collaborative care in this pilot study. Preparation to expand this pilot work to the full cancer center is underway and funding is being sought to study the effects of this intervention.

### **Weaknesses**

- Insufficient coordination of behavioral research across campus; need for targeted faculty hires
- Insufficient integration of behavioral intervention with medical care settings. This is a missed opportunity for outcomes research – for which a fledgling model has been established at the UA Cancer Center.
- Insufficient integration of medical care into behavioral health settings, leading to fractionated care and poorer health outcomes for vulnerable populations.
- Improving, but still weak, integration of behavioral and physical health services in UAHN (FCM-Psychiatry collaborations are a good start).

### **Opportunities**

- MESH group has initiated efforts for coordination across behavioral research, including integration with studies of pain and basic neuroscience, as well as with the Metabolic Collaboratory in which diet and physical activity behaviors are being studied. Using knowledge of emotion regulation processes to enhance behavior change is a cutting edge area of patient-centered research on which we can capitalize with more integrated research teams, already started in the Sarver Heart Center and at the Arizona Cancer Center. These models can be extended to other disease related areas of excellence such as the Arthritis Cancer, Diabetes Center of Excellence and AZ Center on Aging, to name a few.
- South Campus expanding presence of lifestyle behavioral researchers (Collaboratory) as well as Behavioral Health care providers and researchers
- The Community Preventive Services Task Force in 2012 recommended Collaborative Depression Care (Am J Prev Med 2012; 42(5): 521-524) based on “strong evidence of effectiveness in improving depression symptoms, adherence to treatment, and remission and recovery from depression”. Opportunities for funding implementation and dissemination studies of this approach are available and with the UAHN now an integrated system, we are in a position to conduct such research in our network of outpatient clinics.

- The next Regional Behavioral Health Authority (RBHA) will cover the greater Arizona area (all counties except Maricopa) and will require contractors to provide integrated physical and behavioral health services to patients qualifying for publically funded health care services. UAHN, building on strengths in the departments of FCM and Psychiatry, as well as the Behavioral Health Pavilion on UAMC South campus, will place a bid for the RBHA in partnership with Cenpatico Arizona. Cenpatico is a private managed care company specializing in managing health benefits for vulnerable populations, with more than 2 million members across multiple states. A successful UAHN-Cenpatico bid will create a wealth of opportunities for clinical translational and population-based research on a broad range of topics affecting persons with behavioral health disorders, including the opportunity to develop and evaluate high value lower cost health care delivery models.
- The mHealth group and several of its members have developed working relationships with NCI in the area of technology-driven research for behavioral change, thus laying the groundwork for expedited and significant expansion in this area.

### Threats

- Disciplinary barriers and misunderstanding of behavioral disorders, sometimes stigmatized along with providers who care for them and scientists who study them, have prevented integration of behavioral expertise from broader incorporation with research activities. Continued fragmentation of behavioral research knowledge and skills could lead to “re-inventing the wheel” in multiple research settings and slow progress on patient centered outcomes research.
- Political pressures due to UAHN decision to not partner with current Pima county RHBA contractor (CPSA) for upcoming RBHA bid.

### Trends

- Growing NIH interest in multi-behavioral interventions for chronic diseases and their risk factors.
- Growing interest among federal funders (NIH, CMS, SAMHA) in chronic disease prevention and management among people with behavioral health problems.
- Increasing federal recognition of persons with SMI as a high health disparity group, and growth in funding in the development and evaluation of interventions to address this.
- PCORI funding streams will continue because of the need for more effective and efficient interventions to improve health behavior. Healthcare systems are under increasing financial pressure to address this problem as Medicare rewards systems that reduce hospital readmissions, and opportunities for innovation across prevention, primary, secondary and tertiary care settings – especially if they are coordinated.

**B. 2 (b) Environmental Health:** The UA is one of the leading institutions in the world when it comes to environmental research. While the Institute for the Environment, with world-class faculty and an international reputation may serve as a core organizing center for some of this research, the AHSC has a core strength in environmental health research.

Environmental health sciences research in the southwestern United States offers an opportunity to study environmentally-influenced disease processes affecting diverse American ethnic populations in a geographical area that is unique in its composition and source of environmental hazards. Researchers at UA take advantage of this opportunity to study the effects of arid climates and climate change on environmental toxicants. Arid climates present a number of specific conditions that can affect exposure to and health effects of environmental toxicants. In arid lands, water is a scarce resource, making the study of waterborne contaminants particularly important and relevant. In addition, the combination of low humidity and higher wind velocities found in arid regions greatly increases the likelihood of inhalation exposure to dusts and airborne pollutants. These environmental hazards come together to impact a unique population characterized by an almost continuous distribution of mixture between the



genetic backgrounds of Europeans and of indigenous Americans, backgrounds that carry unique genetic risk profiles. Hand-in-hand with the differences in genetic ancestry of our constituency are the differences in social, political, and cultural practices that all become a part of the environment. Using interdisciplinary approaches UA researchers have been focusing their efforts on the environment, diseases, and people common to the Southwest (Arizona has a 389-mile border with Mexico, with 25% of the land within Native American reservations, and ~35% of the population having Hispanic or Latino heritage). These efforts will allow broad translation to global stakeholders with similar populations and environments. Researchers at UA are well positioned to become leaders in environmental health research focusing on improving health and life in such arid environments.

Environmental exposures are an essential component for the development and exacerbation of multiple disease states, and are of particular importance to the cancer and respiratory outcomes described above, as well as for American Indian and border health communities.. In addition, environmental exposures serve as the nexus for AHSC programs within AHSC. We are recognized internationally for our expertise in exposure assessment as well as determining the mechanisms and extent of cancer and cardiovascular health effects from arsenic exposure, a ubiquitous exposure in our state drinking water. We have environmental exposure-based advanced core facilities in proteomics and genomics (the latter shared with the AZCC) that are essential to maintaining a competitive program in understanding disease mechanisms and furthering our knowledge of personal health. Within Bio5, the Arizona Laboratory for Emerging Contaminants (ALEC) has incredible facilities including cutting-edge Agilent instrumentation that will also be essential for advancing not just our knowledge of the effects of environmental exposures, but in identifying complex metabolic patterns of disease in individuals.

## Strengths

- The Center for Toxicology in the College of Pharmacy (ABOR approved in 1987) serves as the administrative umbrella for several long-standing inter-disciplinary programs fostering environmental health research.
  - The NIH-funded Southwest Environmental Health Sciences Center [SWEHSC] (1994-present), provides approximately \$1.4 million dollars a year to support core facilities for environmentally-related basic science and clinical research throughout AHSC. Two essential components are the genomics and proteomics cores, serving multiple faculty from the COM, COP, CPH, AZCC and main campus. The genomics expertise is key to our ability to continue to expand research in the key areas of epigenetics and microbiomes. This center also provides a range of other core facilities for AHSC.
  - NIH/NIEHS T32 graduate and postdoctoral training grant [TG] (1979-present) provides over \$500,000 yearly predoctoral and postdoctoral support for toxicologically-related environmental researchers.
  - UA Superfund Research Program [UA SRP] (1989-present) which brings in approximately \$3 million each year in combined NIH and other federal funding (as well as leveraging substantial additional external funding), and the Dean Carter Bi-National Center [DCBC] (2003-present). We are in elite company nationally, as only six institutions (Harvard University, Columbia University, University of North Carolina at Chapel Hill, Oregon State, University of Washington and the University of Arizona), can boast funding from NIH/NIEHS for these interdisciplinary programs [UA SRP, SWEHSC and TG].
- One of the newest UA centers, the Environment, Exposure Science and Risk Assessment Center (ESRAC) at College of Public Health. ESRAC integrates public health impact assessment across existing environmental research disciplines [www.esrac.arizona.edu](http://www.esrac.arizona.edu) In its first year, the center has already received federal and industry funding (\$2.5 million in 14 months) substantially exceeding the \$225,000 seed funding from the main campus Water, Environment, and Energy Solutions (WEES) program on main campus and is expanding its number of NIH and other federal and industry grant applications, on track to increase its level of funding from the previous total. ESRAC's approach is also consistent with President Hart's emphasis on research collaborations with state and industry partners.
- Institute of the Environment (IE)
  - IE has about \$15m in current grants, approximately \$5m a year

- IE and collaborators have in the range of \$30m in current grants
- New environmental hires have already raised a total of \$30m
- Overall environmental grants at UA are \$100m plus (and more if you include earth observing satellites and Iplant)
- Environmental and occupational exposures are key to our international leadership in mining health, safety, and sustainability, where we have attracted over \$22 million dollars in funding since 2009. In the occupational health field, we have obtained over \$5 million in additional funding since 2008. Many of these projects have included health economists from Eller to measure the return-on-investment for health and safety interventions.
- The UA Arizona *Laboratory for Emerging Contaminants* (ALEC) provides training, technical expertise, and service analyses pertaining to environmental chemistry for faculty, student and staff researchers at the three Arizona universities. With the recent acquisition of an LC-QToFMS (Liquid chromatography – Quadrupole Time of Flight mass spectrometry) instrument we have the capability to expand our high resolution organic analysis techniques in new dimensions to permit an ‘exposome’ analysis, a comprehensive accounting of chemical exposures. In addition, using advanced state-of-the-art Agilent instrumentation, worth over \$1.9 million, in addition to a \$500,000 donation from Agilent to support the instrumentation use, nearly any imaginable trace organic or inorganic contaminant can be detected. Water and Energy Sustainability (WEST) Center, a \$10 million facility funded and built by Pima County to explore opportunities to protect public health related to water and energy use.

### Weaknesses

- The main weakness is the small number of faculty members working in human environmental health and particularly lack of faculty working on toxicological endpoints in humans.
- Inadequate funding to provide sufficient GRA and postdoc salaries to cover the expanding research.
- There does not appear to be a systematic investment in creating a wider network of environmental health experts at the institutional level.

### Opportunities

- UA has expertise in climate change and its relationship with shifts in disease patterns, particularly infectious diseases. This includes the study of Valley Fever, Dengue Fever, as well as the spread of Lyme Disease.
- UA has expertise in the study of natural hazards and the impact on population health, including studies that focus on trauma and the impact of big events, such as Hurricane Sandy, on long-term health outcomes.
- UA, in the Institute of the Environment and with the reorganization of the Health Sciences, could coordinate cross-campus big grant research proposals related to environmental health, taking better advantage of one of the university’s core strengths. With expertise in climate change science, in particular, there is opportunity to build on our outstanding core facilities and basic science environmental health research in order to advance clinical research. expand on studies that deal with both chronic and infectious diseases that have regional, national, and global impact.
- Expanding current research on clinical effects from exposure to complex mixtures in environmental matrices including water, dust, food, etc. We have unique laboratory instrumentation and personnel expertise that has to date not been fully utilized.
- Expand on our groundbreaking work in the microbiome, where we already have shown clear associations with respiratory (asthma) outcomes and can expand into multiple other disease and health conditions.
- Expand our environmental and clinical work with industry, including economic evaluations of health and safety interventions and increasing translational research involving moving products to market.

### Threats

- We have achieved our tremendous gains in environmental health despite a relatively small number of faculty members. If there is a lack of AHSC investment in this area, we are likely to lose faculty with future turnover and will not have the personnel to be able to expand our grant portfolios.
- The current limited number of faculty in this area also threatens the continued success of current programs such as SWEHSC, TG and SBR which require clinical application of their research for future funding.
- More competition for limited federal dollars.
- Lack of environmental faculty hampers the ability of clinical faculty in the COM to adequately address environmental factors contributing to disease.
- If environmentally related research is not included as part of the strategic plan for AHSC, then it will be extremely difficult to attract high quality future hires in this field.
- Concern about losing wet lab space which will prevent our being able to continue current level of research or hire additional faculty

**B.2 (c) Health Care Delivery:** The UA has the ability to answer important questions in the areas of health and health care delivery, provided by its association with an integrated health care system, its access to diverse populations, and its many well-established community-based programs. New external opportunities exist through funding mechanisms focused on the science of health care delivery, and the interest by both private and public payers in healthcare innovation around quality improvement, patient experience, and cost reduction.

**Strengths** – the strengths of the Arizona Health Sciences Center related to Population Health / Health Outcomes and its health and health care delivery system include:

- **Connected Care** – in November of 2013 the University of Arizona Health Network (UAHN) went live with its **Epic Electronic Health Record (EHR)**. This system has the capacity to improve quality and decrease cost by reducing variation in care through standardized, evidence-based order sets; individualizing patient education through use of the patient portal to customize education materials for patients/families with specific diseases or risk factors; and by increasing population management through tailored risk and outcome reporting at the system, clinical program, or individual provider level. The **Arizona Telemedicine Program** has a long track record of serving communities across Arizona, and a national reputation for new paradigms for health care delivery for diverse populations. **UA Mobile Health (mHealth)** has over 120 members including researchers, educators, staff and students to research, develop and use applications to improve public health, prevent and treat disease.
- **The patients served within the system provide a health care delivery laboratory.** *The UA– UAHN Research Agreement* is a critical element. The restoration and expansion of Arizona’s Medicaid program (Arizona Health Care Cost Containment Systems or AHCCCS) combined with **UAHN’s successful AHCCCS bid**, and its successful expansion into all but the four northern counties in Arizona, will provide a large base of patients served through a total risk contract, thus providing a payer with incentive to invest in innovation in health care delivery and value-based payment methodologies. UAHN’s own employee base (self-insured) and future growth in enrollment in the UAHN Health Insurance Exchange products, will also add to the population of full risk patients. Healthcare innovation through community-engagement and peer-driven intervention was recently funded by PCORI and awarded to sleep researchers at UA, and serve as an exemplar of how health services research can be nested within the UA-UAHN healthcare delivery laboratory.
- Through a partnership with the **Arizona Emergency Medicine Research** (both Phoenix and Tucson), the Arizona Emergency Medicine Research Center, and more than 100 prehospital EMS agencies covering over 80% of the population of Arizona, the delivery of evidence-based guideline treatment for Traumatic Brain Injury has been implemented throughout the state of Arizona. This unique NIH-funded project spans all age groups and is evaluating the impact of implementation on the outcomes of TBI as a public health initiative. This has also created the largest linked, detailed TBI database in the country (and probably the world).

- **Land grant mission.** As the state’s land grant university, UA has extensive, long-standing, and formal relationships that span its missions of research, service, and education in population health, including **partnerships** with Dignity-St. Joseph’s, the Arizona Department of Health Services (ADHS), the State Office of Rural Health (SORH), the Small Hospital Improvement Program (SHIP); ; the Arizona Area Health Education Centers (AzaHEC) Program in Tucson and its five regional centers (Flagstaff, Globe, Nogales, Phoenix, Somerton); and Pima County. **Community responsive programs** include the UA Center for Rural Health (which houses the Rural Hospital Flexibility Program, the State Office of Rural Health, the Small Hospital Improvement Program, and the UA Navigator Program); the Rural Health Professions Program (RHPP), the Arizona Telemedicine Program (ATP), the DFCM Mobile Health Clinic, a number of clinical outreach programs to American Indian nations, the Health Outcomes & PharmacoEconomic Research (HOPE) Center, the University Center for Developmental Disabilities (UCEDD), the Native American Research and Training Center (NARTC), border health initiatives including the Frontera Summer Internship, the College of Public Health Service Learning courses; the US-Mexico Commission, the Prevention Research Center, and long-standing expertise in community health worker programs. The land grant mission was further addressed with the creation of the Arizona Telemedicine Program (ATP) a state-wide telehealth collaborative which links 55 healthcare organizations in 70 communities, many of which are rural. There are ATP community responsive programs including innovative programs such as electronic chart round programs for management of Hepatitis C, telecardiology programs, and Corrections telemedicine for prisoners in 9 state prisons and Pima County jails. Over 10,000 telepsychiatry and 1 million teleradiology cases have been handled over the ATP’s broadband network. The ATP has participated in many collaborative grants and contracts with other administrative units.
- **Integrated Care Models** are being piloted by such programs as the AZ Cancer Center supportive care model, UFC’s Healthy Together, and the CON’s Health 360. Faculty members have also submitted a number of CMS innovation grants over the past two years. At the time of this report, three (Fain, Muramoto, Breitbord) are awaiting decisions.
- **Diversity.** The University of Arizona 2013 student enrollment was 36.3% minority, with the largest number being Hispanic students (20.5%). The UA South branch campus has a Hispanic-Serving Institution designation. Arizona’s Hispanic population makes up 30.2% of total population (35.4% in Pima County). Arizona’s population is 5.3% American Indian (compared to a national average of 1.2%) and is the home of 20 reservations.
- **Health Care Delivery Research.** We have expertise in health care delivery systems research in Anthropology, Government and Public Policy, and Sociology in the College of Social and Behavioral Sciences.

### Weaknesses –

- *Need for greater Integration.* The transformation of health care financing and delivery will favor institutions that are fully integrated. The integration of UAHN is relatively recent, with its first CEO, Michael Waldrum, having been here for just over one year. Information systems in both the financial and clinical realms are not yet fully integrated, and the ability to evaluate care and financial performance in terms of service lines is currently limited. The limited primary care base and lack of formal risk/gain sharing agreements with a community base also limit population management opportunities. Institutions like Kaiser, University of Pittsburg, Harvard, and University of Washington are more prepared for Affordable Care Act implementation than UA. An additional barrier to integration has been the delivery of AZ Medicaid dollars separately for medical and behavioral services.
- UA – UAHN lacks *data use agreements* for investigator data sharing. Data, the cyber infrastructure, informatics and decision support capacities are evolving, but not where they need to be for UA to thrive. A number of EPIC capabilities will need to be realized, including *risk stratification* not only by age, gender, and chronic disease parameters, but also by family and community risk factors. Providers lack *real time data and analysis* to inform their day-to-day practice decisions (such as weekly or

monthly provider support reports to manage a panel of patients). The impact of delay in this capability is the lack of current and immediate incentive to enter patient data in a retrievable manner. Re-education of providers later, in order to drive research, after initial habits in the new system have been set, will be less successful and more costly. Similarly, the current lack of practice-wide standardized, evidence-based order sets, and simplified lab, imaging and other order entry, and point of care clinical decision support also impede care quality initiatives and research. The EPIC patient portal, in addition to targeted education, should be used to identify potential research subjects, and educate patients about opportunities for participation. While some progress is being made to prepare EPIC for clinical trials, there has been no identification and planning around requirements of its use for observational analyses and pilot data.

- Insufficient data on true costs, limits the system’s ability to identify cost drivers, provide opportunities to improve cost efficiency, and allow cost comparison and comparative effectiveness.
- The health economist faculty capacity is insufficient to support population health/health outcomes research.
- Better integration across campus with those engaged in health care delivery research is needed.
- The lack of a Clinical and Translational Science Award (CTSA) is a major weakness.
- Insufficient faculty mentoring, pre-award support and help for writing and submitting proposals for junior faculty and MD researchers.
- Lack of definition in our legislative priorities related to population health, health outcomes policies.
- Lack of data-sharing agreements with AHCCCS and other payers (delays from UA contracting office lost opportunity for data-sharing agreement with AHCCCS)

**Opportunities** – New funding mechanisms focused on the science of health care delivery, and the interest by both private and public payers in innovation around quality improvement, patient experience, and cost reduction.

- Clinical and Translational Science Award (CTSA)
- National Institutes of Health (NIH) ; Patient Centered Outcomes Research Institute (PCORI)
- American Cancer Society ; Health Resources and Services Administration (HRSA)
- Centers for Medicare and Medicaid Services (CMS) Innovation Center
- Centers for Disease Control and Prevention (CDC); Agency for Health Care Research and Quality (AHRQ)
- Foundation Grants, Donors – Commonwealth, Gates, Hartford, Pew, Robert Wood Johnson
- State Agencies – ADHS, AHCCCS ; County Agencies – Pima, Maricopa; Industry ; Private Insurers

Additionally, the UAHN-Cenpatico response to the upcoming ADHS RFP for the Greater Arizona Regional Behavioral Health Authority (RHBA), if successful, will provide an opportunity for the development of an innovative integrated system of care for a high cost population suffering from significant health disparities.

#### **Threats -**

- Competition – from well-integrated and /or better capitalized health systems (academic and non-academic)
- Lack of integration-poor coordination between departments, colleges, outpatient and inpatient facilities
- Financial losses – as UAHN takes on risk contracts for AHCCCS and other payers, implements new programs in new settings, communities
- Funding cuts – from state and federal sources
- Faculty, staff, leadership turnover and loss to competitors

**B. 3. The committee found strengths and opportunities in the informatics/biostatistics/technology areas.** There were additionally a number of overarching strengths and weaknesses in research infrastructure and readiness.

#### **B.3 (a) Informatics/Biostatistics/Technology:**

Informatics and biostatistics as well as advancing technology are vital to success in research. While the University and AHSC have select strengths in this area, overall significant weaknesses and critical need for capacity building in a timely manner hinder our ability to deliver on calls for high impact research.

### Strengths

- Informatics/bioinformatics: UA has numerous strengths in informatics/bioinformatics across campus and include faculty/staff/infrastructure in the majority of Life Sciences Units (e.g. iPlant, Arizona Research Laboratory, Arizona Genomics Institute, College of Science [MCB, EEB], College of Life Science & Agriculture [PLS, Entomology], Computer Science, AHSC [Y. Lussier – new hire], and Social and Behavioral Sciences (Bryan Heidorn and Hong Cui)). TGEN in Phoenix/Flagstaff should also be considered a strong asset.
- Biostatistics: College of Public Health houses the biostatistics and Epidemiology division with faculty and graduate students (Master's and PhD).
- Technology: UA has numerous strengths in technology. Strengths include:
  - 1) capacity in mobile app development for chronic disease management;
  - 2) telephone and multimodal delivery of information to patients, study participants;
  - 3) experience in the development of web- based interventions in tobacco and CME;
  - 4) a growing strength in geographic information science across a number of colleges;
  - 5) the UITS emergent center in big data analytics;
  - 6) genomics and proteomics core facilities; and
  - 7) the mHealth group which has developed working relationships with NCI in the area of technology-driven research for behavioral change, thus laying the groundwork for expedited and significant expansion in this area. In the COM, several research projects using mobile technology for behavior change have already been funded by NCI.
- The national award-winning Arizona Telemedicine Program, headquartered in Tucson, with a number of specific areas of expertise and programming, including:
  - T-Health research, focusing on radiology and pathology digital imaging research.
  - The T-Health Institute, the Phoenix-based division of the Arizona Telemedicine Program, is the site of the international award-winning T-Health Amphitheater. This facility serves as a “e-classroom of the future”, for testing innovative curriculum. Its special expertise is in hosting multi-site video conferences and in the development of clinical decision support systems.
  - The federal government (through HRSA) supports 11 telehealth regional centers (TRC's). The ATP holds the HRSA grant for the Southwest TRC (SWTRC) with funding for a virtual training center that services the four corner states (Arizona, Colorado, New Mexico and Utah) plus Nevada.
  - The Four Corners Telehealth Consortium was founded by the ATP in 2004. This consortium positioned the UA to play leading roles in creating “virtual” southwest regional education, research, and training programs. Regional meetings were sponsored on critical topics in healthcare delivery.
  - The Arizona Telemedicine Program currently sponsors an mHealth Small Grants program. As examples, these grants have been used to purchase tablet computers for roving hospice nurses, for Google glasses for orthopedic surgeons who can now visualize streams of instructive data wearing their Google glasses during operations, and for Mohs surgeons who are now able to observe pathology frozen sections of skin intraoperatively, without breaking scrub, during their Mohs procedures for the removal of skin cancers. The ATP also sponsors region-wide webinars on mHealth technologies and applications.

### Weaknesses

- Lack of the ability to obtain large volumes of clinical data in high-throughput between UMC & UA
- Lack of bio-statistical support
- Lack of expertise in high-dimensional data analysis and Limited data management support
- Lack of critical mass in researcher s across the basic, population, and clinical sciences in obesity & diabetes
- Lack of expertise in population genetics.

- Lack of planning for use of Epic for health research

### Opportunities

- Health information: 1) Electronic health records will make data accessible for more outcomes research; 2) Develop EPIC expertise to allow for not only clinical trials, but observational data which will provide preliminary data on health associations with genomic/proteomic libraries; 3) Use pilot programs to introduce system wide innovations; 4) EPIC will allow for ongoing QI and interventional research – not just archived data but live clinical research.
- Technology Transfer: 1) Promote translation; 2) Recent reorganization of Tech Launch AZ; 3) Encourage tech transfer w/ small businesses; 4) Using technology for outreach; 5) Patient-practitioner engagement via new technologies; ongoing care rather than once-a-year care; 6) Graduate training in business/entrepreneurship; 7) Teach faculty how to protect IP; 8) Tech transfer to commercialize faculty ideas; 9) Patient access to health information; 10) Industry partnerships; 11) Use of diverse research methods; 12) Proof of concept funding to aid with commercialization; 13) Recruit faculty with history of commercialization experience; 14) New applications for “old” ideas, resources.
- Data Analytics and Research Methods: 1) Build on “Big Data Analytics” and Bioinformatics research expertise; 2) Large bio-repositories can be linked to extensive longitudinal studies; 3) Community based participatory research; 4) Resources for analyzing BIG Data; 5) Identify opportunities for merging silos across AHSC around data collection and data analysis; and 6) Expand the availability of clinical faculty to incorporate environmental and other exposures into their research through subsidizing genomic (including epigenetic) and proteomic analyses using our existing cores. Beyond Big Data, we have early technology-based research methodology or “inventions” in the area of web-based behavioral trial interventions and study management that would be particularly facilitative of studies that enroll study participants across broad geographic areas.
- Increased utilization of Arizona Rural Telemedicine Network.

### Threats

- ASU as it is major competition for health services and biomedical informatics research in Phoenix
- Tucson is not considered a “technology or start-up hub”
- AHSC lacks vision of supporting young faculty in the face of a serious funding crisis

**B. 3 (b) Research Infrastructure:** The committee reviewed the SWOTT analysis, identified strengths and opportunities, and created recommendations for high return on investment to enhance our strengths and position us to take advantage of opportunities in population health and health outcomes research.

In general, the infrastructure subcommittee’s recommendations are based on the goals of:

1. Aiming for large-scale funding (e.g., CTSA, Center Grants, State Bonds);
2. Selling our uniqueness (e.g., few campuses have COM, CON, COPH, COP, CALS/Land grant, and multiple health/disease/lifestyle centers: heart, cancer, arthritis, respiratory, aging, integrative med, prevention, health promotion, rural health, etc., and our “catchment” area – urban/rural comparisons, insured/uninsured, Hispanic/Native American/diversity, migrant (Mexican immigrant or alternately “snowbirds”), economic diversity); and
3. Retaining and expanding our research faculty (e.g., recruitment and hiring of new research faculty and retaining current investigators, and facilitating existing clinical faculty to become independent investigators).

### Strengths

- Pre-award support for budget review at Sponsored Projects and some colleges, departments (Family & Community Medicine as a model)
- Post-award support for clinical trials at COM/UAHN
- Training and orientation for new faculty regarding UA/UAHN research resources

- Crosstalk talk between pre and post-award efforts, personnel
- Salary support policy ( Emergency Medicine as a model)
- Biostatistical expertise across AHSC and main campus
- Strong research base with the community (COPH as a model)
- Informatics expertise being built at AHSC
- Professional development and mentoring activities across AHSC
- Equipment across UAHN/UA
- Databases of campus expertise
- Special Interest Groups (e.g., technology)
- Research resources (e.g., proposal templates, standardized proposal sections, successful proposals) maintained at a college or departmental level
- Physical location of multiple colleges within close proximity of each other
- Reputation for high scientific rigor, productivity and excellence in training of a diverse student body
- The Center for Health Outcomes and PharmacoEconomic Research (the HOPE Center) at the College of Pharmacy
- The Phoenix Biomedical Campus

### **Weaknesses**

- Lack of incentives for MDs conducting research
- Lack of biostatistical support
- Competition/lack of collaboration among academic units for resources
- IDC competition among units
- Lack of planning for use of Epic for research purposes
- Lack of a data sharing agreement which describes a clear process for granting access to Epic for UA researchers who are not UAHN employees

### **Opportunities**

- Shared Instrumentation Grants
- Funded R01s with potential for expansion of administrative and/or minority supplements
- State bonds for centers on issues of specific relevance to Arizona population (e.g., obesity, Alzheimer's, addiction, border health)
- Impending IDC decentralization to unit and ERE decentralization to unit
- Potential use of positive variance at departmental level for research purposes
- NIH, foundations, public-private partnerships
- Recognition of the need for an expanded cadre of national thought leaders on the faculty. Status as national thought leaders should be added to the criteria for recruitment of senior faculty and academic leaders.

### **Threats**

- Shrinking funding from federal sources
- Less state funding
- Growing competition for novel sources of funding
- UA is behind the curve on health outcomes research compared with other academic health centers
- Culture of separateness between UA and UAHN that hampers collaboration on health research



## C. RECOMMENDATIONS & IMPACT

### C.1 Develop a Center for Research in Obesity and Obesity Related Disease, with a special emphasis on Hispanic and Native American populations

The Center will lead a multifaceted research agenda focused on the reduction of health disparities in obesity and obesity-related disease in AIAN and Hispanic populations, and the development of innovations in the prevention and treatment of obesity across the lifespan. The Center will bridge scientific discovery to improvements in clinical practice and public health through established collaborative relationships with Native American tribes and border populations, and with community partners who have prioritized obesity-related disease (Pima County; Arizona Department of Health Services, Pima Community College, Maricopa, Community College; Northern Arizona University; YMCA; Activate Tucson; Federally Qualified Healthcare Centers).

The Center will provide support in core areas critical to research in obesity-related disease to investigators across the UAHN campus. Proposed cores include 1) Body Composition/Metabolic Assessment Core, 2) Diet and Physical Activity Measurement Core, 3) Diet and Physical Activity Intervention Core, 4) Behavioral Intervention Core, 5) Recruitment Core, 6) Community Outreach and Engagement Core, and a 7) Registry for obese and overweight patients.

Research Objectives will include:

1) Further elucidate the biologic mechanisms regulating energy balance (fMRI imaging examining changes associated with obesity and satiety, genomic and epigenetic variations associated with obesity in AIAN and Hispanic populations and their modulation by environment, sleep disorders and metabolic alterations leading to obesity, relationship of asthma and obesity in adults and children),

2) Expand the understanding of correlates, determinates, and consequences of obesity across ethnic and socioeconomic subgroups of the southwest (clarify the roles of built, economic, policy, and natural environments in promoting or preventing obesity, in both urban and reservation living AIAN populations, Hispanic populations of the southwest, and border populations; describe the mechanisms by which psychosocial factors influence weight gain and their interaction with high-risk behaviors such as alcohol, tobacco, and drug use, and how these influences play out in AIAN and Hispanic populations; describe the role of physical activity in the modulation of obesity-related health outcomes, and individual variations in these affects; understand how individuals interpret and use messages related to diet and physical activity, and explore how social media and mobile technology influence the adoption of such messages),

3) Design and test both clinical care-based and community-based interventions to promote healthy weight, in ethnic and socio-economic subgroups of the southwest,

4) Design and test messages related to diet and physical activity utilizing different media, including social media and mobile technology, in populations differing by ethnicity, age, socio-economic status, literacy, and numeracy,

5) Examine interventions that utilize peer and/or family support in weight loss and maintenance in in populations differing by ethnicity, age, socio-economic status,

6) Determine the safety and efficacy of weight loss interventions in older adults,

7) Determine the effects of weight loss interventions on morbidity reduction in chronic disease, and variability of such effects among ethnic subgroups,

8) Design and test the efficacy of primary care-based weight loss interventions in patients with multiple chronic conditions.

9) Test whether dietary and physical activity interventions personalized based on genotypic or phenotypic characteristics are more effective,

10) Examine the effects of multi-level/multi-component intervention programs, including home, socio-

cultural, built, and policy environments,

- 11) Conduct dissemination and implementation research,
- 12) Improve measurement tools, technology, and methods

The first priority of the Task Force for this Center will be to establish the team and additional support necessary for a successful P30 application to the NIDDK for a Nutrition Obesity Research Center (NORC) .

One key hire will be that of a senior level obesity researcher to direct the Center.

## C.2 Develop a Center for Border Health Research

A central presence for Border Health research will leverage the many individual research, clinical, community health, and educational programs which provide links to both US and Sonora border communities, and integrate to establish a central UA presence upon which border health research can be built.

## C.3 Recommendations from Subcommittees

Subcommittee recommendations in their entirety are presented below. They are organized as follows: 1) a general overall plan for strengthening the needed infrastructure to support research at AHSC, followed by 2) disease and population specific recommendations, 3) recommendations in areas that affect health outcomes and 4) recommendations in informatics/technology.

### C.3(a) INFRASTRUCTURE RECOMMENDATIONS

Recommendations are grouped into short-term and long-term categories. Within each category, we have broken down recommendations into those of low, medium and high cost.

#### **Short-Term Strategies (2 – 3 Year ROI) Priorities are indicated with ⚡**

**Low Cost** – Costs associated with buy-out (e.g., all expenses [based on median expected salary] divided by median expected RVU's for the position. Result is a cost/RVU to "buy down" clinical expectations of that faculty member).

- **Develop Incentives for Encouraging Population Health and Health Outcomes Research** – Leadership from UA/AHSC will create task force or charge standing committees to complete the following:
  - ⚡ Renegotiate higher IDC rate for UA and/or AHSC with NIH.
  - Renegotiate higher IDC return from UA to AHSC.
  - Create and implement standard policy for IDC distribution.
  - Implement model of salary support from Emergency Medicine across AHSC (e.g., buy-out of clinical and/or teaching time and salary savings returned to PI).
  - Allocate resources based on indirect rate (e.g., allow units/departments to allocate more resources to NIH and other full indirect grants, or to use those resources to support educational/training/service grants with lower indirect rates).

- **Create Consortium for Professional Development (Mentorship and Training)** – Leadership from AHSC will create task forces or charge existing committees to facilitate communication across campuses (main campus, AHSC, Phoenix), and colleges and departments within AHSC to:
  - Facilitate mentoring (e.g., mentor match) for existing faculty.
  - Establish metrics, including P&T, to recognize faculty mentoring.
  - Identify opportunities for training grant applications for students, new physicians, and PhD scientists
  - Provide workshops/courses on grant/scientific writing, laboratory management, mentoring, entrepreneurship.
  - Provide targeted matching of minority students to researchers for minority supplements on R01s.
- **Share Existing Resources, Expertise and Equipment** – Leadership from across AHSC/UAHN will create task forces or charge standing committees to:
  - Create flexible usage agreements to allow equipment sharing across clinical, research, and education missions.
  - Explore a “core” services model similar to UACC shared services for meeting infrastructure needs (e.g. clinical trials recruitment core).
  - Provide funding to partially subsidize and expand the use of environmental core facilities such as biostatistics, genomics and proteomics to strengthen both mechanistic and clinical research and successful grant applications.
  - Create a central repository and communicate/disseminate campus expertise (e.g., search engines/repository from UA Vitae, Scival website).
  - Create an NIH-funded major/minor user database for SIG applicants.
  - Combine PR expertise and efforts to promote AHSC/UAHN science as well as reputation for scientific advancements nationally.

**Medium Cost** – New leadership position, additional administrative staff (approximate ratio of 2 FTE/60 proposals/year); cost of integrating systems

- **Develop Robust Consortium of Pre- and Post-Award Support** – Create a new leadership position to mobilize existing expertise across AHSC & expand administrative staff and provide strong administrative leadership to:
  - Provide administrative support for budgeting, proposal preparation and submission, create successful proposal and proposal template database.
  - Provide referrals to biostatistical/bioinformatics support consortium (e.g., statistical support, data management, database/data entry systems development, forms development, protocol development, health economics, methods, IT support, use of Epic EHR for Quality Improvement/ Health Outcomes/ Comparative Effectiveness Research) and related policy for investigator access and priority use.
  - Provide enhanced integration of UA grant-related systems (e.g., IRB, COI, PRS, ORCA, Analytics) for increased reporting capabilities and decreased PI burden.

**High-Cost Strategies** – Costs could range as high as 20% of IDC reserved for Bid & Proposal System, personnel costs for new hires, minor meeting costs for bringing together potential collaborators across campus.

- **Create Bid & Proposal Support System** – A peer-reviewed mechanism, centrally administering:
  - FTE for preparing large (>\$5M) grants (particularly those that support infrastructure, e.g., center grants)
  - Pilot/feasibility seed money
  - FTE for preparing grants that foster collaboration (e.g., at least 3 investigators from different colleges)
- **Build Scientific Teams**
  - Co-locate scientists with common scientific interests/goals and complimentary expertise (e.g., the new Collaboratory for Metabolic Disease at UASouth or sleep researchers from various disciplines) to fertilize expanded research funding and student training).

- Hire to critical mass, building on existing strengths within AHSC.
  - Cluster hires to enhance collaboration across campus (e.g., Metabolic Collaboratory: COM-COPH-CALS).
  - Facilitate campus cross-talk by rewarding new collaborations (e.g., through pilot/feasibility funds),
  - Create a shared IDC model (to reduce barriers), and creating opportunities for disparate groups across campus (including Phoenix) to interact (e.g., research “speed dating”).
- **Create Future Shared Resources and Equipment**
    - Re-Institute SIG Committee or other structure for coordinating/prioritizing SIGs.
    - Provide matching funds for shared equipment.
    - Other subcommittees might have specific equipment requests.

### **Long-Term Strategies (5-Year ROI, but need more infrastructure before these can be initiated)**

High-Cost Strategies – Potential costs TBD, as these are long-term strategies to enhance participant recruitment

- Recruitment “core”, centralized registration system.
- Standardized recruitment materials and protocols.
- Targeted co-recruiting/large-scale marketing strategies (e.g., partnerships with media).
- Reciprocal interactions with “study” participants: evidence-based practice or practice-based evidence.
- Incentivize (recognition, protected time, money) clinical scientists for participation and/or enrollment.

### **POTENTIAL FUNDING SOURCES**

- Grant IDCs
- Business model for Pre-/Post-Award Administration that could be opt in/opt out
- Philanthropy/Alumni
- Education endeavors wherein tuition is directed to research– certificates in trial design, research technology.
- Donation (supermarket campaign) ; Bonds; Equipment grants
- Industry (partnerships) – Geico, State Farm, Raytheon, Honeywell, Roche, etc
- Center grants / infrastructure grants ; Training grants ;Endowed fellowships
- Intellectual property

### **POTENTIAL IMPACT**

Significant increase in grant applications, improved recruitment, enhanced innovation (equipment, interdisciplinary teams) and, in turn, potential for higher impact and better scored grants, increase in funded grants, expanded student training opportunities and supporting research, as well as diversity in our faculty and student body, and overall faculty more satisfied with their professional contributions to science.

### **METRICS OF SUCCESS**

Number of grants submitted, grants funded, size of funded grants, number of peer-reviewed manuscripts, H-factors, new collaborations, number of collaborators, successful CTSA application or other Center or equipment grants supporting research infrastructure, number of trained doctoral students, MD/PhDs, and post-docs with peer-reviewed manuscripts and grant funding/career development awards, number of new equipment acquisitions, new revenues for research, new patents.

### **OTHER RECOMMENDATIONS CURRENTLY BEING SPEARHEADED BY OTHER GROUPS**

- Create Biostatistical Core
- Create Bioinformatics Core (could be combined with Biostats)
- Create Center for New Media and Technology for Research
- Community-based and patient cohort development and registry
- Identify current/centralized database of study participant data

- Insurance partners – beyond UAHN (e.g., AZ Health Dept. (AHCCCS), VA, Medicare/Medicaid, Banner, Statewide Health Exchange)
- Universal consent in Epic and expand to communities
- Tissue registry/Bio-repository (hair, blood, urine, stool, skin, nails, sputum, breast milk, tears, etc.)
- Expanding the intersection between the advanced environmental research at the UA and clinical disease.
- Data sharing agreement with UAHN
- Policies/procedures for recruiting via Epic EHR
- Big dataset training for investigators
- Ethics expertise / HIPAA compliant space

## **C.3 (b) SPECIFIC RECOMMENDATIONS BY RESEARCH AREA IN DISEASE SPECIFIC AREAS AND POPULATIONS.**

### **C.3 (b)i Cancer**

#### **Recommendations:**

- To strengthen the behavioral science component of Cancer Prevention and Control
  - For the campus in Tucson, 1 mid to senior level RO1 funded researcher with expertise in behavioral sciences related to cancer prevention and survivorship
- To enhance our cancer genetic risk research statewide
  - Create and support a statewide high-risk cancer family based-cohort
  - Build state of the art facility for patients at high risk for cancer for genetic testing, bio-banking, multi-lingual counseling, prevention, screening, detection and surveillance with long term patient care
- To build strength in patient outcomes research to include cost effectiveness assessment of prevention strategies
- Facilitate new research team building through competitive pilot grant mechanism in cancer outcomes research.

To establish a Phoenix-based Population Health Research Unit with the following recruitments:

- 1 family medicine physician scientist with established credentials in PH/HO research with knowledge in cancer prevention and control
- 1 behavioral scientist with expertise in cancer prevention and control
- 1 staff project coordinator

#### **Potential Impact**

In Phoenix, the Dignity-Abrazo ACO (Arizona Care Network) primary care physician practices and the 11 MIHS FQHCs are population health research resources that have scarcely been touched by UA investigators. Strategic use of the patient populations served by the providers of these organizations would add a whole new dimension to UACC cancer prevention and outreach research; examples of possible initial projects are described above under “Opportunities.” And of course these patient populations would also be a rich resource for a wide range of UA investigators with interests other than cancer.

#### **Metrics of Success**

- Peer standing as measured by number of high impact, peer-reviewed manuscripts and number of peer-reviewed grants awarded, and presence nationally (e.g., # members on study section, leadership in national,

regional and local organizations, invited seminars and presentations, # of members with roles as journal editors, # of editorials, letters to the editor, chapters, reviews, book editors)

- Program sustainability – amount and duration of funding dollars
- Number of clinical studies and number of participants accrued to intervention and observational studies.
- Well-annotated, high quality biological specimens for research purposes
- Number of training grants and quality of trainees and their success rate in publication, career placement and for junior faculty and postdoctoral fellow success in obtaining independent funding.
- Successful development of a new behavioral sciences program in the Cancer Center based on scientific excellence and impact on our catchment area

### **C. 3 (b)ii Respiratory Diseases**

#### **Recommendations:**

##### **New hires:**

- One senior biostatistician in the area of clinical/behavioral trials in respiratory disease
- One mid-level faculty in behavioral trials in respiratory disease (adherence, psychosocial issues)
- One senior faculty in clinical/comparative effectiveness/behavioral trials in COPD
- One senior faculty in clinical/comparative effectiveness/behavioral trials in adult asthma
- One mid-level faculty in psychometrics and instrument development
- One Junior to mid-level faculty with expertise in sleep
- Co-locate inter-disciplinary respiratory researchers within the ARC
- Co-locate inter-disciplinary sleep researchers in a sleep institute within the ARC
- Increase the dedicated research space allocated to respiratory disease including a dedicated sleep research laboratory. This would be best accomplished by increasing the space allocated to the ARC. This space would include offices for the new faculty hires, offices for new staff hires (from research grants), and increased research and meeting space. Furthermore, space should be allocated to house interdisciplinary respiratory researchers in a single space to facilitate interaction and collaboration.
- Easy parking for the research space and handicapped-accessible bathrooms are critical to facilitate health outcomes research. Furthermore, this research space must be located close to the hospital to allow proper emergency physician coverage for common procedures

**Potential Impact:** These strategic investments will allow us to compete for larger population health and health outcome trials in adult asthma, sleep and COPD as well as compete for PCORI grants with community partners. The proposed strategic investment will allow us to double respiratory research at the U of A.

**Metrics of Success** Number of grants submitted, grants funded, size of funded grants, number of peer-reviewed manuscripts, H-factors, new collaborations, number of collaborators,

### **C. 3 (b) iii Metabolic Diseases (Obesity / Diabetes)**

#### **Prioritization of investments/recommendations based on current strengths and opportunities**

- Need to recruit additional obesity/metabolic disease research faculty
  - Physician scientist researchers (1 Senior, 1 midlevel, 1 junior)
  - Clinician researchers from other disciplines (1 Sr, 1 junior)
  - Non-clinical researchers ( 1 in epigenetics, 1 in metabolomics)
  - Training grants/programs that feed in new science base (support for 3 post-docs) to work with existing senior faculty in obesity/metabolic disease

- Alternatively this area could be expanded through pilot funding and/or career development awards redirecting existing research faculty to metabolic/obesity associated metabolic disease
- Establishment of registry for obese and overweight patients
  - Requires faculty (epidemiologist) oversight, HIPAA-compliant data collection/ management system and research advisory team (from existing faculty) for data access, analysis, usage agreements
- Infrastructure support for Collaboratory:
  - Administrative functions
  - Shared equipment purchase & maintenance; expanded use/access to imaging equipment on campus
  - Shared facilities support
- Considerations for research faculty hires and strategic redirection of existing faculty:
  - Consider new hires with NIDDK-funded researchers (to support Nutrition Obesity Center application, or supported targeted pilot funds to support existing faculty redirection to apply for NIDDK PARs)
  - Minority researchers and those working with minority/catchment populations (targeted 2 SPFI hires - Hispanic / Native American cohort epidemiologists)
  - Researchers with expertise in mobile technology (an area where we are advancing our reputation)
  - Expansion of novel approaches/designs for obesity research
  - Joint-hires: respiratory-obesity, family medicine-obesity, sleep-obesity, healthy aging-obesity, pediatrics-obesity, psychology/psychiatry-obesity; cancer obesity; neuroscience-obesity
  - Consider joint hires of basic science researchers in obesity (consider NSC-ASHC hires)

#### **Description of the action items required to build our research programs in PH/HO in the prioritized areas**

- Targeted submissions /priority support for NIDDK funded grant mechanisms
- Recruitment of additional clinical research faculty focused on obesity
- Establishment of a longitudinal patient cohort
- Protection/Retention of existing obesity research faculty, especially as related to getting Collaboratory fully up and running as an obesity research engine.
- Replacement of aging critical equipment, planning in regard to shared use agreements for available methodology already within AHSC (i.e., NMR for metabolomics, body composition, brain studies, etc.)
- Establishment of a patient registry for obesity/overweight
- Expansion of pilot/feasibility grant funds specifically for obesity research
- Funding of obesity-targeted post-docs or K-award type positions (especially for physician or nursing scientists) to establish pipeline of new researchers.
- Submission of Nutrition and Obesity Research Center grant

#### **Description of estimated costs of these recommendations**

- Target support: .50% admin assistant at 36K annually for 3 years
- Faculty recruits –highly specific
- Retention –also faculty-specific
- Equipment – 250k would make us competitive (equipment grants also)
- Longitudinal cohort – minimum 70K year for part-time support and data collection and processing. Ideally build into EPIC for facilitated development and sustainability
- Patient registry for obesity – maybe 100K initial outlay through EPIC; for community-based depends on approach –voluntary thru website (50K for developmental work, 15-20K/year to maintain) could be cost effective but likely biases sampling
- Pilot grants –build from CRCPHP – maybe additional 50K/annually for 3-4 years- then integrate into center grant
- Training grants- only cost is time for application which could be facilitated with administrative support
- Protected time/administrative support for NORC application development; 75 K for 1 year

**Potential impact:** Potential impact of these investments is tremendous. There is a highly successful, but small group of investigators conducting obesity research. While it is a start, it is still short of the critical mass of investigators needed to leapfrog UAs current program of obesity research. Establishment of the Collaboratory is a major step in the right direction, by coalescing some of the existing obesity researchers to stimulate collaborative and interdisciplinary research. However, the Collaboratory, as it is currently resourced (entirely off indirects and contributed effort of the three lead investigators), does not address lack of a true critical mass of obesity researchers and lack of robust research program development infrastructure (pilot project funds, new researcher pipeline), and operational infrastructure (support for shared/central administrative functions)

Implications for impact on Border Health include:

- Obesity disproportionately affects Hispanic populations, it is a major health problem in border communities
- COPH Prevention Research Center has established research presence in border community of Douglas
- COPH Border Health Program (Global Health Institute) has established a number of research partnerships and collaboration with several communities and universities in Mexico
- UAHN Healthplan is a major payer in the Arizona counties along the US-Mexico border

**Metrics of Success**

Number of grants submitted, grants funded (including NIDDK funded Nutrition Obesity Research Center), size of funded grants, number of peer-reviewed manuscripts, H-factors, new collaborations, number of collaborators, successful application for Obesity Center or equipment grants supporting obesity research infrastructure, number of trained doctoral students, MD/PhDs, and post-docs with peer-reviewed manuscripts and grant funding/career development awards, number of new equipment acquisitions, new revenues



## C. 3 (b) iv Cardiovascular Diseases

**Recommendations:** To successfully compete in the field of cardiovascular population health and health outcomes, the following resources would be required.

- Recruit additional faculty: At least three cardiovascular physician scientists and PhD scientists with expertise in epidemiology and population health, genomics, proteomics and metabolomics, ideally with interest in preventive cardiology and health disparities as well.
- Biostatistician/Informatics staff, PhD level, ideally with experience in cardiovascular epidemiology.
- Support for cardiovascular database development and maintenance, including a mechanism for long-term storage of PHI including longitudinal clinical data, outcomes data, imaging data, and biobank data, including blood samples and possibly even tissue samples.
- Clinical research staff and infrastructure ideally at all 3 clinical sites, including FTE research staff, outpatient space for longitudinal study visits, and support for community outreach.
- Faculty development infrastructure, including training grants, internal K-award and post-doc positions for cardiovascular epidemiology, seed grants to allow collection of preliminary data from existing repositories and facile modification of databases as new questions arise.
- Space and facilities for biobanking, particularly secure long-term storage of serum specimens.
- Infrastructure for secure PHI data storage and a mechanism for secure data sharing with approved collaborators. This needs to include mechanisms for image sharing. If UA becomes successful, collaborators should be able to ship in patient images and biospecimens in ways that are IRB approved and secure.

**Potential Impact:** The return on the above investments in population health infrastructure and cardiovascular medicine will be increased academic prominence for the University of Arizona and the Sarver Heart Center. Junior faculty, able to engage in important research, will experience more successful academic career development than is currently the case. The number of NIH and other awards in the division will increase, with R01s at the senior faculty level, and, due to the mentoring senior scientists bring to the University, K awards will also increase. Market share in the highly lucrative cardiovascular disease arena will be increased as the public realizes the cutting-edge nature of the care and research at the University, and the Center would become increasingly a regional center for cardiovascular care excellence.

**Metrics of Success:** Number of grants submitted, grants funded, size of funded grants, number of peer-reviewed manuscripts, H-factors, new collaborations, number of collaborators, successful CTSA application or other Center or equipment grants supporting research infrastructure, number of trained doctoral students, MD/PhDs, and post-docs with peer-reviewed manuscripts and grant funding/career development awards, increased academic caliber and productivity of cardiovascular fellowship candidates, number of new equipment acquisitions, new revenues for research, new patents.

## C. 3 (b) v Aging

**Recommendations:** We propose the following resource allocation to build the coordination, cooperation, and collaboration across these four areas of aging research and evaluation.

- |  |           |
|--|-----------|
| 1) \$125,000 per year/ 4 years for pilot projects across all four areas (competitively offered \$20,000 pilot projects x 5 in each area annually administered by the ACOA) | \$500,000 |
| 2) \$50,000/ year/ 4 years for post-doc for each of the four research areas (to be administered by the ACOA)   | \$800,000 |

3) Use of shared research methods and biostatistical core (skills within this core should encompass basic, genetic, epidemiologic, behavioral and social science, and health services methods)

4) Co-funding of a 0.50 epidemiologist with Banner Health Research Center Healthy Aging Cohort (with Banner and ASU) in collaboration with AHSC aging researchers would allow access to a large, extant Aging Cohort (Zhao Chen, Mohler, Fain, Nikolich and Banner and ASU colleagues are presently in discussion). This would build upon the in-progress Flinn Foundation Seed grant (Najafi, Mohler with Banner and ASU Coon and Sabbagh), and would provide access to a robust research infrastructure and population, and follow-on Flinn funding consonant with the goal of building statewide collaboration. \$100,000 /4 years **\$400,000**

### C. 3 (b) vi Border Health

**Recommendations:** To strengthen our presence in the border region, resources could be utilized to continue the development of interventions which focus in the area of both infectious and chronic disease as well as in building leadership for binational initiatives among public health leaders in the region as well as among our students at both the master's and doctoral levels. Public health challenges require collaboration to achieve global solutions. As a state and as an academic institution, similar collaborative endeavors are essential for accomplishing regional solutions.

**Opportunities for advancing the border health agenda include the following:**

- CHW's binational/regional training center-community health workers have proven to be effective extensions of the healthcare and public health delivery system. Collaborative efforts to develop and standardize training of CHW's would strengthen disease prevention and health promotion initiatives and contribute to policy change;
- Development of a binational systematic surveillance system that would monitor healthy border indicators - drawing from Mexico's national survey and the U.S.'s Behavioral Risk Factor Surveillance System (BRFSS) in the U.S. as models;
- Binational Prevention Research Center—The current model is the Arizona Prevention Research Center (COPH) that has received continued CDC funding for the last 15 years due to its successful development and evidence-based interventions. Creation of a binational model would strive to enhance efforts in the elimination or reduction of health disparities;
- Binational IRB process to assure human subjects protection across borders;
- Strengthen and sustain a health diplomacy and leadership program with the ability to influence binational solutions through effective and just policies (economic, social, political);
- Create opportunities for a sustainable Telehealth / telemedicine infrastructure to innovatively address public health and healthcare delivery challenges experienced currently by uninsured population not qualified under the ACA. Thinking outside the political realm and partnering with Mexico to carryout service delivery to migrants living abroad through telemedicine;
- Establish interdisciplinary teams of scholars that work north and south of speedway on border issues;
- Build a center on border population health studies that serves as node of and clearing house for border health research not only in Tucson but in the wider Southwest Region;
- Make borders and mobility key objects of analysis in population health and health outcomes research at the UA, focusing attention on the relationship between border mobility and health outcomes, for example in the areas of chronic and infectious diseases;
- Focus on issues that impact border populations most directly, including environmental health outcomes research for people on both sides of the border – making the border a laboratory for examining how boundaries may or may not impact population health outcomes.
- Leverage, in a collaborative and coordinated fashion, the many individual research, clinical, community health, and educational programs which provide links to both US and Sonora border communities, and

integrate to establish a central UA presence upon which border health research can be built. This may require the development of an Office of Border Health, or an associate VP for Border Health.

**Potential Impact:** Working together with public, private and academic entities on both sides of the international boundary can serve as an economic engine by creating opportunities for innovation, which can translate to healthier communities.

**Metrics of Success:** Number of grants submitted, grants funded, size of funded grants, number of peer-reviewed manuscripts, new collaborations, number of collaborators; increased academic caliber and productivity of border health research and community programs.

## **C.3 (c). SPECIFIC RECOMMENDATIONS BY RESEARCH AREA IN AREAS THAT AFFECT HEALTH OUTCOMES**

### **C.3 (c) I Behavioral Research**

#### **Recommendations**

- 1) Build MESH (Mechanisms of Emotion, Social Relationships and Health)** from a Developing Program within BIO5 into a Developed Program. MESH is a collaborative group of funded investigators from the Colleges of Medicine, Nursing, Public Health, Agriculture and Science who have been meeting monthly for the past 2 years to develop and conduct

The goals of MESH are to show how the mind and the brain influence the function of bodily end organs in health and disease, to use this knowledge to develop new treatments and preventive intervention strategies and to demonstrate how these new approaches work in clinical and community settings.

The focus is on clinical translational research in which an integrative model of the brain, the mind and the body come together to foster wellness for patients with chronic and life-threatening illness and their families. They examine the risk and protective mechanisms through which the mind and the brain affect medical illness and health. They develop and test interventions to modify these mechanisms and, ultimately to implement these interventions to promote wellness, prevent disease and to optimize aging in the face of chronic and life threatening illnesses. (See listing of investigators and current projects in the appendix).

Their work could be propelled forward with the following investments:

*a) Infrastructure* for conducting pilot studies, identifying populations of interest within the UAHN system and longitudinal cohort management. Key elements of this infrastructure would include:

1) *Senior Research Specialist:* project initiation, management for pilot studies, staff training, quality maintenance, subject identification, recruitment, managing longitudinal sample preservation.

2) *Data acquisition and management specialist:* Interface with EPIC for subject identification, medical and cost data acquisition, etc.

*b) Salary Support:* Although MESH draws members from across the university, a key need is to provide salary support for 25% time for 2 years for established investigators in the COM and CON to work with colleagues from the Colleges of Science and Agriculture, writing grants and papers and conducting pilot research,

and a 50% time for Melanie Bell, Ph.D. a behavioral scientist in the College of Public Health. There are 3 physician investigators, Drs. Lane, Raison and Weihs and 2 clinical psychologist investigators, Drs. Breitborde and Haynes who currently have no protected academic time except that which is funded by their NIH R01s and a few other funded studies.

As such, the following hires are requested:

1. Physician investigators in Psychiatry:  $\$181,000 \times 25\% \times 3 \text{ people} \times 2 \text{ years} = \$271,500$
2. Clinical psychologist investigators in Psychiatry:  $\$110,000 \times 25\% \times 2 \text{ people} \times 2 \text{ years} = \$110,000$
3. Three PhD behavioral scientists in the College of Nursing, Drs. Terry Badger, Tad Pace, Kathie Insel. To have 25% protected would involve an average of approximately  $\$30,000 \text{ per year} \times 3 = \$90,000 \times 2 \text{ years} = \$180,000$ . (ERE to be provided over and above the salaries requested.)
4. Salary support for 50% time of Melanie Bell, Ph.D. a behavioral scientist in the College of Public Health, specializing in behavioral intervention study design, conduct and analysis to participate in the work of MESH pilot studies and grant applications.
5. Salary support for 50% time for Sally Dodds, Ph.D., a health services behavioral researcher, to collaborate on study design and on the conduct of research as described above for the MESH group.
6. Pilot funds for joint projects across departments and colleges to include: 4 – 6 projects at  $\$60,000$  per project over 2 years

## **2) Build a Consortium for Behavioral Research in Health Services and Outcomes**

This would build on existing expertise in both population and clinical behavioral interventions (see strengths in Section above) and would capitalize on increasing integration of care delivery *within* UAHN and improved collaboration *with* UAHN. This consortium would also take advantage of the opportunity presented by the upcoming UAHN bid for the Greater Arizona Regional Behavioral Health Authority (RBHA) contract as a platform for integrated mental health and physical health outcomes research in primary and secondary care settings. Leadership would include representation from the Office of the VP of AHSC, from UAHN's University of Arizona Health Plans, lead investigators from existing behavioral research programs, and clinical leaders in primary care and behavioral health.

- *One half-time lead staff* to support the leadership group, to gather and distribute knowledge of research infrastructure and facilitate the collaboration of groups of interested investigators
- *Funds for pilot and feasibility projects* in the area of multi-behavioral interventions in chronic disease would be administered through the consortium leadership.
- Support for *three shared hires* in behavioral health interventions and outcomes research in behavioral health in chronic disease, with potential homes in Family and Community Medicine, Psychiatry, College of Nursing, College of Public health, and relevant Centers (Heart, Cancer, Respiratory).
- Support for one *health services scientist* in the area of behavioral health.
- Collaboration would be further facilitated by *policies related to ICR* sharing as described in the Infrastructure section above.

### **Potential Impact**

#### **MESH:**

- New faculty hires in Psychiatry, Psychology, Nursing, Public Health, Agriculture will be of higher quality (have more already funded grants) because they are attracted to join the productive MESH research team (this is already the case with Drs. Raison and Kilgore joining UA).
- CTSA will benefit from physician investigators at UA making Emotional Health Research on Cancer, Heart Disease, Sleep, Chronic Disease Management and Pain, especially in the cross-disciplinary uniqueness of this work.

## Behavioral Research in Health Services and Outcomes

- Successful dissemination of best practices to system-wide implementation and evaluation.
- Infrastructure, including EPIC, for scientific investigation of services within the RBHA will provide the opportunity for many additional funded investigations in this organizational setting.

## Metrics of Success

### 1. MESH:

- a. 3 R01 applications from MESH investigators funded within two years
- b. Program project grant approved for submission by National Institutes on Aging and submitted within two years.
- c. T32 funded for MESH post-doctoral training

### 2. Health Outcomes Research:

- a. Successful hires of three researchers in behavioral health interventions and outcomes research in behavioral health in chronic disease.
- b. Successful hire of one health services scientist in the area of behavioral health.
- c. Increased number of interdepartmental and intercollegiate submissions for behavioral research in health services and outcomes research.
- d. Increased funding from NIH and PCORI in the area of behavioral research in health services research and outcomes.
- e. PCORI funding for study of integrated behavioral and medical care of chronic illness in primary care and/or specialty clinics
- f. Supplemental grants for the Prevention Research Center at the MEZCOPH
- g. EPIC optimized for Collaborative Depression Care
- h. Infrastructure developed for scientific investigation of services within the RBHA.
- i. Publication of pilot research from UA cancer Center Collaborative Depression Care as foundation for implementation grant funding.
- j. NCI funding or AHRQ funding for Implementation grant to study UA Cancer Center Collaborative Depression Care implementation

## C.3 (c) ii Environmental Health

### Recommendations

Environmental health research is an area with current strength but with tremendous opportunity for expansion, particularly given its collaborative nature and existence of multiple centers and laboratory core facilities, many of them unique, from which to draw expertise for additional grant proposals. In addition to NIH and other federal funding, state, local and industry funding sources represent additional opportunities for growth beyond the current strong base. To take full advantage of these opportunities, we recommend to:

- Provide postdoctoral support (x2) for 3-5 years to rapidly build on available collaborative research opportunities, with a focus on clinical and community exposures and health outcomes
- Hire additional environmental health-oriented faculty over the next 1-3 years specifically addressing human toxicology and microbiome to fill existing gaps and greatly expand research collaborations and grant submissions
- Expand or at least maintain current wet laboratory space

**Potential Impact:** Increased external funding to understand the mechanisms of environmental exposure on clinical disease development through increased faculty collaboration and use of our unique laboratory core facilities

- Identify economically feasible means of improving community health through reduction of adverse environmental exposures.

- Expand our current UA international leader standing in the environment into international health, particularly in relation to health impacts of mixed exposures such as those in water and food and from use of alternative energy sources.

## Metrics of Success

- Grants: We anticipate that we can more than double our current annual funding (not including the Institute of the Environment funding) from approximately \$12-13 million to \$25 million within four years
- There will be an increase in peer-review publications to share our research findings, and number of doctoral and post-doctoral trainees.
- We also anticipate being able to demonstrate measurable increases in measures of community health through reduction of adverse environmental exposures
- Increase in number of products developed in partnership with industry to improve environmental health

## C. 3 (c) iii Health and Health care Delivery

**Recommendations**, including near-term (<24 months) and long-term (24-60 months):

### Near Term: 12 to 24 months

- Execute **data use agreements** between UA - UAHN to facilitate investigator research
- Train Epic ‘Research Champions’ and create an **Epic Research Advisory Group** which includes members of the UAHN EPIC and IT team, as well as researchers in population health, outcomes research.
- Develop a mechanism through this group to **fund optimization of EPIC** functions necessary to meet both UA research goals and UAHN goals of improved quality and cost control. This will likely require both UA and UAHN resources.
- Develop ‘**Big Data’ capacity, training** for investigators, include All Payers Claims Database An All Payers Claims Database capacity for Medicare, Medicaid (AHCCCS), Marketplace data and analysis
- **Expand border health research** partnerships as described in Border section above
- Write, submit research proposals related to population health, health outcomes
- Write and submit **CTSA** proposal
- Develop **legislative priorities** related to population health, health outcomes
- Defend current center and grant funding proposals (non-competitive renewals, competitive renewals) related to population health, health outcomes
- Develop **Multi-payer Quality Consortia**
- Develop population health, health outcome metrics – how we will measure success and return on investment
- Expand, diversify junior faculty research participation as described in **Infrastructure** section above
- Develop risk stratification, risk mitigation abilities for our direct care population, and our UAHN contractual network (AHCCCS, Marketplace Plans)
- Develop and **execute federal and state legislative policies and priorities** related to population health / health outcomes consistent with our land grant mission and social contract to improve health outcomes and population health for all Arizonans.

### Intermediate to Long Term: 24-60 months

- Obtain CTSA funding
- Write, submit research proposals related to population health, health outcomes.
- Measure # grants submitted, grants funded and amount, peer-reviewed manuscripts published, H-factors, publications in lay press (print, radio, television).

- Expand **health economist, comparative effectiveness research capacity**. Two faculty health economists, and two data analysts are needed to create comparative and cost effectiveness capacity. Write, submit research proposals related to population health, health outcomes
- Expand **health economist, comparative effectiveness research capacity**. Critical mass can be achieved by hiring two full time equivalent health economists and two data analysts.
- Measure # grants submitted, grants funded and amount, peer-reviewed manuscripts published, H-factors, publications in lay press (print, radio, television)
- **Implement 'big data' center, housing all payer claims data base (APCD)**. To create the capacity to evaluate health care delivery costs, quality, and efficacy - an All-Payer Claims Database (APCD) should be created at the University of Arizona. APCD's are databases created by state mandate or voluntary reporting, that include data derived from medical claims, pharmacy claims, eligibility files, provider files, and dental claims from private and public payers. The two faculty health economists and two data analysts would be sufficient to create an APCD service center at UA.

An APCD will inform policy and decision makers, stakeholders, and consumers to improve health outcomes, accountability and cost efficiency in Arizona's health system. As states implement Affordable Care Act (ACA) coverage provisions, policy decisions will affect health care delivery and financing. An APCD will provide comparable and transparent data to evaluate health policy decisions and their effect on health outcomes and cost. APCD's can be used to stratify risk, and data used to address risk mitigation. The addition of two health economist faculty and two data analysts will give sufficient support to fully use APCD capacity, and assist faculty researchers and staff in the Health Sciences Center.

## Potential Impact

ACA coverage provisions from 2014 to 2022 will expand Medicaid enrollment by 11 million, cover another 25 million through health insurance purchase on a state or federal exchange, and lose 6 million in employer sponsored insurance. Thus by 2022, there will be a net gain of 30 million covered by Medicaid or a plan purchased on an exchange, and there will be 30 million residual uninsured.

Though most states have hospital discharge data reporting systems, including Arizona, data on costs of outpatient, pharmacy, and other components are lacking. ACA provisions in Arizona (2014-2020) will have 300,000 uninsured covered by Medicaid expansion, 600,000 purchasing health insurance through the federal exchange, a loss of employer sponsored insurance of 300,000, and a net decrease in uninsured of 600,000 of the state's 1.2 million uninsured. The state will see a net decrease in uninsured of 150,000 in 2014 alone. Comprehensive data on Medicaid, Medicare and exchange coverage will allow analysts to identify cost drivers in the state's health system. Comparing these public payers with private payers, or commercial insurance enrollees, will allow for improved determination of health outcomes, delivery of care, and cost for these different populations in addition to improved management of Medicaid programs.

Arizona recently restored Medicaid coverage to 100% of the Federal Poverty Level (FPL) in January of 2014, and expanded Medicaid to 133% FPL as allowed by the ACA. Therefore, the creation of such a database and analysis of claims data is not only timely, but would also allow for efficient and effective decisions and improvements with the state Medicaid program to be made if expansion occurs. This is particularly important for the University of Arizona Health Network (UAHN), due to its successful Arizona Medicaid (Arizona Health Care Cost Containment System AHCCCS) bid. UAHN Medicaid enrollees will likely double over the next two years.

Of additional consideration, is the high utility of an APCD to consumers, including employers and employees who are evaluating health insurance carrier coverage and health care delivery sites. Information on out of

pocket cost and insurance coverage based on a provider or facility can be useful for employees and individuals with high cost-sharing and deductibles.

Further, APCDs can provide information to employers on utilization, quality, preventive services, and pricing for different health insurance carriers, allowing for employers to make informed decisions on health insurance provision and coverage for employees. As the state's land grant university, UA is the logical institution to house the state's APCD. APCD large data and analysis capacity will be crucial to CTSA success.

## Metrics of Success

- Complete recruitment and hire two faculty health economists
- Complete recruitment and hire two data analysts
- Create UA All Payer Claims Database Service Center
- Execute data use agreements with UA-UAHN, public and private payers
- Use data to identify cost drivers
- Use data to perform risk stratification, risk mitigation
- Execute contracts with public, private payers for data reports and analysis
- Write, submit research proposals related to population health, health outcomes

## C.3 (d). SPECIFIC RECOMMENDATIONS IN INFORMATICS/BIostatISTICS/TECHNOLOGY

The following recommendations are based resources required for successful acquisition of a CTSA. This will require:

- Innovative ideas and Access to a high skilled technology transfer office
- Strong investments in bio-statistical/methodology
- Methodological expertise including non-traditional data analysis in genetics, genomics, model testing
- High impact scientific research with state-of-the-art equipment
- Make technology transfer a component of promotion and tenure
- Use of individual technology Aps for research and are quickly adapted for use in clinical care

### Recommendations:

**1) Creation of a Center for Data Science**, modeled after MD Anderson's Center for Quantitative Science that encompasses biostatistics, clinical Informatics, and biomolecular informatics.

- The personnel needed to create and run such a center would include present and future hires in data collection/entry, data bases (DBs would include integrated resources of data from individuals, healthcare systems and community-based entities), genetics, genomics, modeling, neuro-networks, epidemiology, and biostatistics (e.g. Center for Statistical Analysis – serving the campus).
- Expertise would also include: Cross-Speedway collaborations/interactions – e.g UITS, Computer Science, and other units as appropriate.
- The creation and maintenance of a strong graduate student program across the AHSC.

Prioritization based on current strengths and opportunities : We need this now!

- Need to change the culture between the medical school and other research entities at UA to establish robust and meaningful MOUs to collect and warehouse the data;
- New hires with support (long-term) from upper administration, training at all levels (graduate students, medical students, faculty & staff);
- Need the computer infrastructure to build and maintain the "Uber AHSC Database."



Action Plan: This action plan assumes that the data will be there, or plans are in place to collect and/or generate the data. This is a BIG assumption given the present culture at UA.

a) Establish a committee to devise a plan to make this happen and answer the following questions/address the following issues:

- 1: What data to collect/house/generate?
- 2: What questions to be asked?
- 3: What should the structure of the database look like>
- 4: How and who will access the database?
- 5: What is required to set up and maintain such a database?
- 6: Staffing – Faculty, Staff
- 7: How can we fund this? Grants, IDC return, Donations, Partnerships with Industry?
8. Incentivize data generation/sharing
- 9: Assemble an expert panel to advise the committee on how to proceed and monitor progress

Description of estimated costs of these recommendations

- Committee work – 2-3 months
- Estimated up-front investment: \$2-5 million
- Estimated total cost: \$25million
- Estimated annual layout to maintain and upgrade the system: \$2-3 million

**Potential Impact:** Huge!!!! Transformative!!!!

**Metrics of Success**

- Grant acquisition ; High-impact publications
- Positive press in state-wide, nation-wide media outlets
- New applications for precision medicine
- New drugs ; New therapies; Patents; New companies
- A healthy Arizona

**2) Creation of a Center for New Media and Technology in Research :** The Center for New Media and Technology in Research (CNMTR), modeled after the Columbia Center for New Media Teaching and Learning. The purpose of the UA CNMTR will be to enhance research through the purposeful use of new media and technology. In partnership with faculty, the Center will support efforts ranging from basic website management to advanced website or mobile app development for intervention trials. The CNMTR could become a leader in the field of new media and technology for research. The CNMTR will engage in ongoing evaluation of the efficacy of its services within the University. The Center would receive initial funding through an NIH center grant mechanism, and would be sustained through a business model of fee for services.

**Basic Strategy I: Creating the Culture of Use :** The Center will extend the population of involved faculty by providing a broad range of points of access: forums, workshops, individual consultations, as well as ongoing and sustaining support in the development of projects.

**Basic Strategy II: Forging Partnerships:** The Center will build partnerships and provide the venue for the integration of disparate efforts in digital development. In this capacity, the Center will work with not only individual faculty members but also other entities of the University committed to similar goals. The Center will contribute to the strategic planning on the health sciences campus and university level.

**Partial list of Resources Related to New Media and Technology for Research:** Below is a list of Mobile Health Technology resources at UA. There are many other resources (e.g., BIO5, Biocommunications, Computer Science, Engineering, School of Theater, Film and Television, etc.) at the UA

**mHealth Special Interest Group:** A group of researchers, educators, staff and students at the University of Arizona developing and researching the use of mobile devices for improving health and well-being. It currently consists of more than 120 members from across UA, including AHSC.

The overall goal is to understand and address the use/application of mHealth approaches to public health challenges such as the prevention and treatment of diseases and conditions, whose outcomes may be modified through changes to lifestyle behaviors. The Group's activities primarily focus on the use of mobile devices to conduct assessments and interventions related to improving the health status of individuals and populations.

The mHealth SIG is research and data-driven. Activities span the land-grant mission of the UA to include research, instruction, and outreach. Broad examples of work include collection of community and clinical health data using real-time methods, and the direct provision of health education and health interventions to researchers, educators, practitioners, students, and participants/patients via mobile software applications and interfaces.

#### Partners

- College of Agriculture & Life Sciences (Department of Nutritional Sciences; UA Cooperative Extension)
- College of Science (Department of Computer Science)
- Bio5 Institute
- College of Engineering (Department of Electrical and Computer Engineering)
- Mel & Enid Zuckerman College of Public Health
- College of Social & Behavioral Sciences
- Arizona Telemedicine Program and T-Health Institute (Phoenix)

**Mobile Matters:** A supportive, campus-wide community for all things mobile, whether you are a student, teacher, researcher, developer, designer, ideologist, or consumer.

Goals are to provide a place for those interested in mobile development to share ideas, find resources, and learn about best practice approaches. Once you are ready to take an app to market, we will also help you learn how to publish in the UA store. Mobile Matters coordinates and hosts two symposia per year that bring together UA faculty, students and staff interested in mobile technologies. Mobile Matters provides year-round support for development and publishing of mobile apps.

#### Partners

- University Relations
- Student Affairs – Marketing
- Office of the Chief Information Officer
- Office of the General Counsel
- Office of Technology Transfer

**The Learning and Teaching with Technology (LATTe) SIG:** A collaborative community that explores and shares ideas, resources, and activities related to the use of instructional technologies which support the teaching and learning mission of The UA. Anyone with an interest in good teaching and learning practices and the effective and appropriate application of instructional technologies in classroom, blended, and fully online learning environments is invited to join. Representation from every college and support unit is encouraged so as to create a campus-wide and discipline-

rich membership base upon which to create a synergistic community of technologists, educators, consultants, faculty, TA's and/or students. Current membership is approximately 115.

#### Sponsorship

The group is sponsored and coordinated by the Office of Instruction and Assessment at the University of Arizona.

#### **Current Examples**

- Example of a Clinical Decision Support System (CDSS) integrating mobile technology and Electronic Health Record (EHR) for Tobacco Screening and Brief Intervention Best Practices ( FCM/COM)
- E-book Aps for children as an interactive application for obesity and diabetes education and prevention among children (COPH)

#### **UA Web Developers Group**

The UA web developers group supports webmasters and support personnel in designing and maintaining UA Websites effectively and according to UA Standards. Members of the university community that develop official University of Arizona websites are invited to join the UA Web Developers group. The Steering Committee membership includes:

- CALS Comm and Technologies
- BioCommunications
- College of Engineering
- Social & Behavioral Sciences Tech
- UITS
- English as a Second Language

#### Benefits

- Access to the UA Web Developers Directory
- A listing of registered campus webmasters. Includes areas of expertise and contact information.
- Shared expertise among group members
- Regular meetings to share information
- Access to training opportunities

## D. CONCLUSION

The Population Health and Health Outcomes Advisory Council had five Council meetings, and 4-5 meetings of each of 6 subcommittees (Diseases, Behavioral and Emotional Health, Border Health, Research Infrastructure, Bioinformatics and Biostatistics, Health Care Delivery). The Eller Think Tank was used as part of the SWOTT analysis process. Committee co-chairs then met with the AHSC Vice President and his staff.

**Initial priorities** for population health and health outcomes were identified as:

- 1) The development of a **Center for Research in Obesity and Obesity Related Disease, with a special emphasis on Hispanic and Native American populations**, and
- 2) The development of a **Center for Border Health Research**.

The Population Health/Health Outcomes Advisory Council established two **Task Forces**, each charged with refining an operational plan for one of these areas. Each task Force will be comprised of Council members (including one of the Council co-Chairs) and of non-committee members chosen by Task Force members for their content expertise.

The Council's Subcommittees developed detailed SWOTT analyses and made recommendations in a variety of areas, including cancer, respiratory diseases, obesity/metabolic disease, and cardiovascular disease, as well as in the areas of aging and border health, behavioral health, environmental health, and health care delivery. Additionally, recommendations were made for the development of bioinformatics and technology, and in biostatistics, and for the research infrastructure as a whole, and made some overarching recommendations.

The development of a long-term comprehensive plan for population health and health outcomes at the UA, and the ability to respond to new opportunities in the local or national environment, will require ongoing development and prioritization of these areas. Therefore, the Council recommends that it continue as an advisory body to the VP.

## APPENDICES

- Metabolic Collaboratory
- The Center for Toxicology in the College of Pharmacy (COP)
- Center for Population Health Outcomes and Health Services Research (COPH)
- HOPE

## APPENDIX #1

### Collaboratory for Metabolic Disease Prevention and Treatment

**Background:** The University of Arizona “Collaboratory” for Metabolic Disease Prevention and Treatment is an enterprise designed to co-locate faculty with similar interests, coalesce faculty expertise, offer student training experiences and foster interdisciplinary research aimed at understanding, preventing, and controlling metabolic disease. While there is significant expertise in this area across campus in biological, clinical and behavioral sciences, the faculty members are dispersed and some are housed in substandard facilities. In addition, there is redundancy in equipment and services contributing to inefficiencies and inflated costs. Research participants must visit multiple sites on campus which imposes a substantial barrier to engagement in UA research and collection of longitudinal data. The “Collaboratory” addresses these concerns and needs.

**Partners:** The “Collaboratory” was conceived as a result of long-running discussions by faculty in the Colleges of Agriculture and Life Sciences (CALs), Public Health (MEZCOPH) and Medicine (COM). This group collectively has expertise in biological, clinical and behavioral science, basic and clinical/translational research, medicine, and community-based participatory research as well as development and delivery of evidenced-based clinical and community programs. The faculty are unified in the vision that “together we can achieve more” including successfully targeting large research grants and securing future center grants and program project funding. It is also likely, and desired, that a number of other UA units will join the Collaboratory as it develops, e.g., College of Pharmacy, College of Nursing, College of Social and Behavioral Sciences, and others. We envision other units will join the Collaboratory, either as fully supporting members, or as limited partners contracting to use research facilities or joining programmatic initiatives. This Collaboratory concept enjoys the support of Pima County’s Division of Health Policy, where the leadership regards the Collaboratory as integral to their vision for County Health Policy and Programs.

**Location:** With the establishment of University of Arizona Medical Center (UAMC)-South Campus and the location of the Department of Family & Community Medicine (FCM) and the Department of Medicine’s Section of Endocrinology/Diabetes Program at the adjacent Pima County Abrams Building, coalescence of some Collaboratory faculty is already underway. Location of the Collaboratory in the Abrams Building will put clinicians and scientists together (and in close proximity to the hospital) fostering collaborative research and enhanced educational opportunities. Collaboratory faculty offer expertise and services important to patient care, student training, research and evidence-based community programs. A diverse client/patient population will be available for recruitment into research projects. Collaboratory space would be available for clinical trials which is currently lacking on the South Campus. South Campus is situated in a high need, underserved community whose residents suffer a disproportionate burden of chronic disease. UAMC-South Campus hospital and behavioral health facility has a long history of serving vulnerable populations from Tucson’s south-side and surrounding rural communities in Southern Arizona. South-side residents have been under-represented in university studies, in part because of difficulty getting to main campus, a reluctance to leave the community, and parking and navigation issues once on campus. Location of the Collaboratory on the UAMC-South Campus would support participation of the Kino area residents in research and education initiatives. The long range vision of a “wellness” focus for the UAMC-South Campus supports expansion of the Collaboratory and a future move to larger space on the campus as it grows and develops.

**Administrative Structure:** Oversight of research and programmatic initiatives will be the responsibility of Co-Directors representing the founding members, CALs, MEZCOPH and COM. The Collaboratory Co-Directors represent the Center for Physical Activity and Nutrition (CALs), Canyon Ranch Center for Prevention and Health Promotion (MEZCOPH), Diabetes Center (COM), and Family & Community Medicine (COM). Each Co-Director represents a unit bringing unique content expertise, research and community/clinical service programs to the Collaboratory. The Co-Directors will report to the Deans of their respective units. A Governing Board of faculty from the participating units will be established and the Directors and Board will be advised by an Advisory Board that includes community members.

**Development Support:** In order to support the Collaboratory space, operations and joint efforts, each unit entered into an agreement with their Deans to secure a consistent percentage of IDCs for the Collaboratory effort. Individual projects may or may not engage the Co-Directors or staff, but if the research is conducted at the facility the IDC rate requirement will be honored across all colleges. Further, participating units will be expected to commit resources from their respective Development Offices in support of Collaboratory development.

**MISSION AND VISION :**The mission of this project is to bring a thriving program in nutrition and physical activity, clinical/translational research and outreach education to the Kino campus and the surrounding community by establishing a partnership among UAMC/COM/Diabetes Program and Family & Community Medicine (FCM) Integrative Wellness Programs, CALS - Department of Nutritional Sciences (NSC)/Center for Physical Activity and Nutrition (CPAN), MEZCOPH/Canyon Ranch Center for Prevention & Health Promotion (CRCPHP) and Pima County.

We envision clinicians and faculty engaged in collaborative clinical programs, research (clinical/translational) and outreach education that targets the involvement of the community and neighborhoods surrounding the Kino Campus. Clinical programs (treatment and prevention) will provide tailored diet, physical activity and health behavior change directives to meet the needs of individuals and families across the lifespan.

Utilization of existing or development of new and novel evidence-based curricula and approaches will be a central component of this effort. Research will include individual and community level interventions and lifestyle focused clinical trials in areas that advance knowledge of nutrition and physical activity as it relates to investigational products and devices, wellness and disease prevention, and treatment.

An important collaborative focus will be community engagement-based research and the initiation of a Tucson wellness registry to track health indicators over time and intervene on targeted health concerns in the community. Outreach education will engage area schools, community health centers, health practitioners, UAMC-South patients, community-based organizations and local government (Pima County) in a structured program which addresses the diet, physical activity and wellness needs of diverse, medically underserved/low income populations. The outreach will be facilitated through active grassroots input (community advising board and outreach to other stakeholders), as well as evaluation of program efficacy and specific planning around sustainability.

Health literacy will also be central to this effort. Workforce education will be an added benefit of this collaboration. The Kino campus provides a rich environment for health training to meet a broad spectrum of professionals and paraprofessionals. Importantly the centralized training affords unique opportunities to build a multidisciplinary training compound – MD, RD, MPH, DrPH, MS/PhD in NSC, PharmD, RN, etc., as well as an impetus for the development of new targeted training to meet the healthcare needs of the local community. Each partner currently has programmatic initiatives, sometimes overlapping, and we often find ourselves competing for resources rather than integrating our efforts and leveraging resources for greater impact. The Collaboratory address this concern, promotes collaboration, and fosters sustained success.

The Partnership will utilize available space on the Kino campus and will relocate key faculty and staff involved in community-relevant research and extension programs within COM/Diabetes Program, COM/FCM Programs, CALS /CPAN and MEZCOPH/CRCPHP to the Kino campus. This will result in unique, cost-effective, high-impact, sustainable programs that will actively engage and serve the surrounding community. In the short term, this plan builds on the community collaborations and tailored educational programs of the research, extension and translational expertise of CALS-NSC/CPAN, the expanding clinical programs of UAMC and the community-engagement research and program implementation and evaluation expertise of the MEZCOPH/CRCPHP, and the clinical, community and translational research programs of COM/FCM, as well as the native strengths and resources of a diverse and participatory local community. In the longer term, the programs of the partnership will be sustained through externally funded research, strategic clinical fee-for-services options and integration into existing programs,

## PROGRAM GOALS

- Provide individual and community education and outreach and engagement efforts that encourage a healthy lifestyle, disease prevention and treatment;
- Expand the academic community and increase scholarly activities in areas of physical activity, nutrition and related chronic disease prevention and treatment;
- Nurture a reciprocal relationship between community members and organizational stakeholders that facilitate on-going community participation and engagement in translational research;
- Develop regionally unique fee-for-service offerings in the areas of diet and physical activity, and prevention and treatment of life-style related diseases; Encourage and promote collaborative research via joint projects and grant efforts among partners;
- Foster the active and timely translation of research findings to the community;

## IMPACT

- The Partnership will establish a robust University academic community on the UAMC South Campus, where scholarly activities are directly relevant and beneficial to the local community and that builds on the strengths of the growing clinical programs. This will occur easily and efficiently by relocating programs and scientists engaged in interventions and community education in the areas of nutrition, physical activity and related chronic disease prevention and treatment, such as diabetes, obesity, cardiovascular disease and cancer, to the South Campus.
- This relocation of faculty and staff engaged in community and clinical research as well as outreach will benefit greatly the surrounding South Campus community by bringing intervention and education programs and the expertise to deliver them directly to the community and The South Campus community will have increased opportunities to participate in programs designed to promote health and prevent disease through dietary and physical activity intervention research. We already have a rich history of working with the Kino community.
- We anticipate that this relocation will facilitate greater involvement of community members in our programs because delivery will be centralized on the South Campus allowing participant's ready access to all available activities. At present, individuals from the community have limited opportunities to participate because they are obliged to come to the UA Health Sciences Center or main campus.
- The scientists and students working within the local community will receive the great benefit of increased cultural awareness and competence.
- Finally, we expect that increased interaction among students, scientists, clinicians and the community will promote community engagement in future project development. Such a community-driven approach is essential to success at both the individual and community level. Few universities have had the opportunity to establish such a physical presence within the communities most in need. What is being proposed here will set precedent nationally to increase community-based translational research.
- The proposed program also will serve as a platform to enlarge the scope and dimension of current community-based nutrition and physical activity initiatives and clinical programs that focus on low income and minority groups.
- Engagement of the South Campus community will increase program participation of these underrepresented groups and improve representation in interventions and clinical trials. Several intervention currently underway from NSC and MEZCOPH target the Kino community, particularly youth within area schools. NSC Extension personnel, the MEZCOPH, and FCM also have extensive and successful experience in the translation of scientific research results into community education. FCM faculty have expertise in community-based training programs for lay persons and health professionals, distance and distributed learning, health literacy, cultural competence training, integrative medicine and program evaluation.



- The geographic adjacencies to other key partners including the Pima County Health Department, WIC, Sunnyside and Tucson Unified School Districts, the YMCA, and El Rio, UAMC-South Campus Hospital and St. Elizabeth's Community health centers will support and encourage these efforts.
- Finally, this program will maximize use of the available South Campus facilities and encourage professional as well as community education. NSC investigators will use extant UAMC-South clinical services including clinical laboratory, phlebotomy, imaging and medical consultation services. Community-based interventions and outreach activities will maximize use of the existing conference rooms and classrooms as well as the adjacent open spaces and sports fields/facilities. The professional South Campus community will strengthen interdisciplinary and inter-professional education by facilitating interactions of graduate students from the nationally-ranked NSC graduate program, with Internal Medicine and Family Medicine Residents and Fellows from the new South Campus GME training programs, as well as students in Public Health.
- This endeavor provides all the partners an incubator for joint projects involving clinicians, scientists (behavioral, basic and public health) and community. The resulting product is an innovative and functional model that will produce competitive grant applications and peer reviewed scholarship in translational research. These efforts will provide the community with increased access to resources and will enable community centers and schools to apply for federal support in grants and matching federal formula funds. In the process UAMC, COM, CALS, MEZCOPH and Pima County will emerge as leaders in the promotion of evidence-based community-tailored research and educational programs that build on native strengths within the population and support healthy lifestyles and disease prevention.

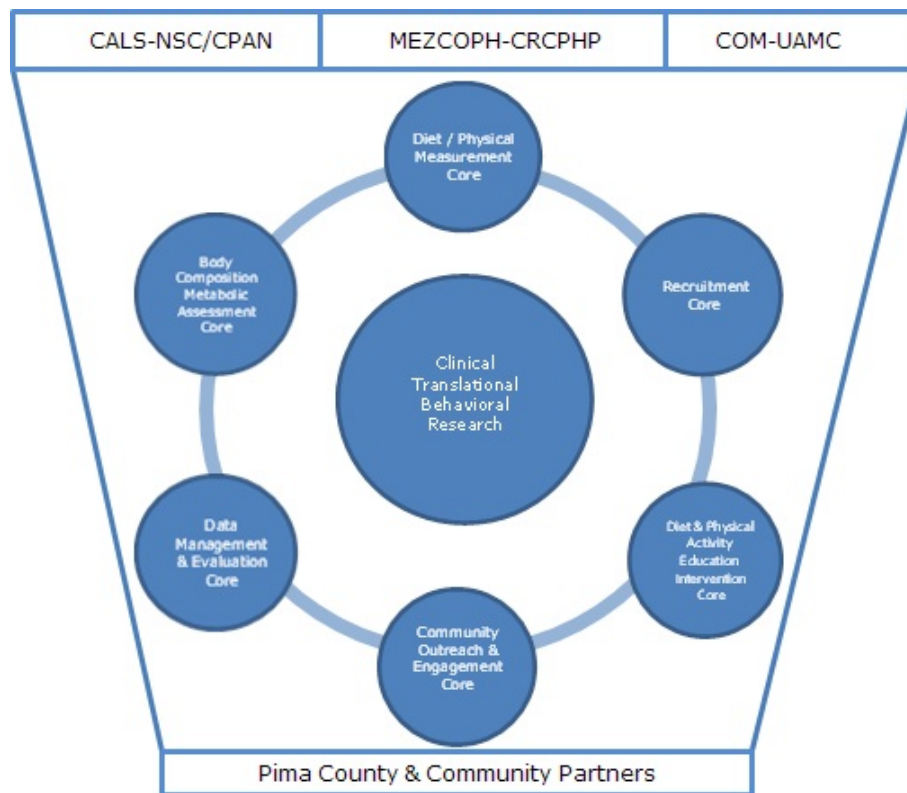


Figure 2: Partners and core functions of the Collaboratory

## APPENDIX #2

### The Center for Toxicology in the College of Pharmacy (ABOR approved and founded in 1987)

It serves as the administrative umbrella for several long-standing inter-disciplinary programs fostering environmental health research.

- Southwest Environmental Health Sciences Center [SWEHSC] (1994-present),
- UA Superfund Research Program [UA SRP] (1989-present),
- T32 graduate and postdoctoral training grant [TG] (1979-present)
- The Dean Carter Bi-National Center [DCBC] (2003-present)

The Center is in elite company nationally, as only six institutions (Harvard University, Columbia University, University of North Carolina at Chapel Hill, Oregon State, University of Washington and the University of Arizona), can boast continuous funding from NIEHS for these interdisciplinary programs [UA SPG, SWEHSC and TG].

#### **Strengths:** Infrastructure:

- Leaders in these programs foster collaborations amongst researchers from more than 5 Colleges, 15 Departments and Academic Units in environmental health research on campus.
- SWEHSC members attract over 27 M annual Direct Costs from both federal and non-federal agencies
- The vision of these programs is to become a global leader in environmental health issues associated with at-risk populations residing in arid environments.
- The mission of these programs is to understand the mechanisms behind the modulation of human disease risk by environmental exposures. This is essential to our long-term goal of bringing an improvement to the lives of the people of the Southwest by developing rational approaches to mitigating their risks of hazardous environmental exposures and by maximizing their protective environmental exposures.
- Common threads running through many of these interdisciplinary collaborative research initiatives focus on gene by environment interactions to better define sensitive populations susceptible to the development of environmentally related diseases, including respiratory diseases, cancer (melanoma), obesity, metabolic disease and diabetes. For example, adverse health outcomes from exposure to arsenic continue to be a world-wide issue. While the effects of exposure to arsenic through water ingestion have been recognized for some time, other avenues of exposure are now emerging as important areas of research interest in the development of complex diseases from arsenic exposure. In addition, novel sites of action including the interactions between the microbiome and arsenic are also emerging.
- Investigators are united with common themes with diverse expertise to produce environmental health deliverables through the incorporation of key elements of our philosophy for environmental health science, including (i) a human/translational focus, (ii) defining protective as well as harmful environmental exposures, (iii) viewing environmental problems through an international perspective, and (iv) utilizing cutting edge technology to enable systems-level biological analysis.
- Researchers are using cutting edge technologies in support of assessment of cell injury and risk of exposure, as well as biomarker discovery, include subcellular confocal imaging, genetic and genomic/epigenomic analyses, and qualitative and quantitative proteomic analyses.

**Weaknesses/Threats:** Sustaining federal funding, updating state-of-the-art instrumentation, resources in support and expand on facility core to better serve faculty on campus.

#### **Impact**

Serve as Home for Environmental Health research, training and outreach programs for the University of Arizona.

## Recommendations

- Institutional supports (matching funds of 500k/year) on existing facility cores to better serve researchers at UA, particularly in integrating basic sciences and translational research. This is essential for the successful competing renewals for all collaborative programs.
- Expand on “Omics” facility cores beyond the Cellular Imaging, Genomics and Proteomics Cores to establish a Metabolomics Core (300k/year for initial three years).
- Expand on the “Integrative Health Sciences Facility Core” (matching funds of 300k/year) to better coordinate human subject-based environmental health research at UA.
- Provide matching pilot project funds (300k/year) to recruit clinician scientists to engage in environmental health research.

## **Appendix #3**

### **Center for Population Health Outcomes and Health Services Research**

MEZCOPH has strength in both fundamental public health research as well as translational and applied public health research. Fundamental research seeks to advance our knowledge about health conditions and generates new ideas, principles, and theories for health promotion and disease prevention. Translational and applied research is research that attempts to move evidence-based guidelines into health practice, through delivery, dissemination and implementation research and evaluates interventions and treatments in community and practice settings.

Traditionally, health outcomes were assessed in terms of physiological measurements such as laboratory test results, complication rates or death. However, these measures alone do not adequately capture population health status. A patient's functional status, satisfaction with care, quality of life and well-being, must compliment the physiological measures.

The mission of the center is to develop practical solutions for the nation and Arizona's health system to improve outcomes, enhance access to quality health care, reduce health inequities, assess cost effectiveness and assure accountability. The Center will serve as a timely, trusted data analysis and policy source for health care systems, the public, and policy makers.

#### **Strengths**

- Faculty expertise in health outcomes research: Michael Halpern (cancer); Lynn Gerald (RESP) Joe Gerald (RESP)
- Faculty expertise in Health care delivery research : Dan Derksen, Leila Barraza
- Faculty expertise in population health sciences ; Cecilia Rosales, Jeff Burgess; Cyndi Thomson, Leslie Dennis, Zhao Chen,
- Faculty expertise in health disparities: Cecilia Rosales, Scott Carvajal. Nicky Teufel-Shone, Good funding /grant acquisition history
- Ongoing national search for 2 new hires in health outcomes
- Availability of master and doctoral students to support the center
- One of the 4 strategic areas of the AHSC

#### **Weaknesses**

- Lack of enough resources to attract a senior level (well-funded) faculty in health outcomes to lead the center ( High salary & start-up package)
- Lack of resources to support the infrastructure of the center to be able to attract experienced researchers such as funds for a coordinator, seeds money for research, support for graduate students
- Need for additional biostatistics and bioinformatics support
- Lack of integration and sharing of databases and resources among the different AHSC units

#### **Opportunities**

- Availability of different funding mechanisms ( NIH, CDC, State, Foundations; global)
- The Center will serve as a timely, trusted data analysis and policy source for health care systems, the public, and policy makers.
- Work broadly across AHSC colleges, UA Colleges, Centers, MEZCOPH Divisions and Sections to have access to large databases and provide data for health services research and policy analysis such as for the new

Electronic Medical Record (EPIC), and an all payer claims database for Medicaid and plans offered on the state or federal exchange.

- Build our own Hispanics cohort in Arizona ( data and biological sample collections)

#### **Threats**

- It is difficult to attract accomplished faculty in health outcomes without having the structure that support and enhance their productivity

#### **Recommendations**

- Complete the hire of a senior well-funded faculty with expertise in Health Outcome Research
- Create a Center for Population Health Outcomes & Health Services Research that will identify and rapidly respond to opportunities at the state, federal and bi-national levels to develop practical solutions for Arizona's health system that improve health outcomes, enhance access to quality health care, reduce health inequities, assess cost efficiency and assure accountability.
- Hire a faculty member with expertise in managing and analyzing high dimensional biomedical data and large databases (In Coordination with AHSC data center : Yves Lussier)
- Hire a coordinator for the center

#### **Potential Impact**

- The Center will serve as a timely, trusted data analysis and policy source for health care systems, the public, and policy makers.

#### **Metrics**

- Number of awarded grants
- Number of awarded contracts

## APPENDIX #4

### The Center for Health Outcomes and PharmacoEconomic Research (the HOPE Center)

HOPE is an ABOR center established in 1986 by J. Lyle Bootman as **one of the first academic research units in the world** dedicated to the assessment of health outcomes and the economics of medication use. Its investigators have been at the forefront of innovation in the field of health outcomes and pharmaco-economic research, its translation to the organization and financing of pharmaceutical care, and its integration to the delivery of quality and cost-responsible health care. However, in parallel with a slowing in innovation within the field of health outcomes and pharmaco-economics at large (as historically defined), the HOPE Center experienced a similar stagnation.

In Fall 2012, re-engaging strategically and operationally as the Founding Executive Director, J. Lyle Bootman appointed Ivo Abraham, a nurse by profession and outcomes and effectiveness scientist by trade, to serve as Director. The charge was to map out new directions in the changing field of health outcomes and health economics; rebuild and diversify the funding base; broaden the Center's scope beyond medications to encompass any interventions and technologies in health care; build alliances with other centers on campus and stakeholder groups beyond the University; and provide leadership in late-stage translational research on human therapeutics.

Today, the HOPE Center's research, training, and service activities are guided by its **M2M/P2P framework** – focusing on interventions that may range from single molecules to models of care and examining their effectiveness and outcomes from single patients to large populations. **Knowledge to Care** is the Center's commitment to develop and disseminate *the* knowledge needed to care – so as to translate science *from* knowledge to care.

**Vision:** To serve the University of Arizona, the state, the nation, and the world as a pre-eminent scientific, operational, and policy-enabling operator, incubator, innovator in health outcomes, performance, and effectiveness research and synthesis - through a unique global partnership of academic, health care provider, governmental, financial, industry, and philanthropic organizations.

**Mission:** To promote interdisciplinary research development as well as interprofessional education on the outcomes, performance, and effectiveness of health care interventions, technologies, and systems - from a clinical, economic, and humanistic view – at the patient, health care provider, health system, community, and population levels. The Center aims to optimize the access, quality, and cost of health care to generate value for patients, providers, payers, and policy makers; and to foster evidence-based patient care, performance, and policy regionally, nationally, and internationally.

#### Functions:

##### Incubator

- Enable, stimulate, and promote research development in the broad area of health outcomes, performance, and effectiveness through scientific and technical support, active development services, proposal and budget development, and technical writing support.
- Provide access to experts locally, nationally, and internationally.
- Provide development leadership: opportunity-tracking, relationship management, competitive and risk/benefit analysis, strategy and approach.
- Provide seed funding for programs with high-return potential.

##### Innovator

- Provide strategy and planning support, development services, and technical and scientific assistance to next-

stage investigators and groups, while aggregating, expanding, and positioning AHSC- and University-wide focal areas of R&D&S.

- Link research, education/training, and service initiatives within the University of Arizona; the Center's ex-UA membership; and academic, service, and industry partners to develop and sustain new programmatic efforts in health outcomes, performance, and effectiveness research.
- Promote the University of Arizona's expertise in health outcomes, performance, and effectiveness nationally and internationally – and across stakeholder groups and target audiences.

### **Operator**

- Serve as the engine to promote, develop, grow, and sustain research, education and training, and service related to health outcomes, performance, and effectiveness.
- Provide contracted outcomes, performance, and effectiveness services to the health care delivery and health care supplier sectors: design – implementation – data management – statistical analysis – results reporting – communications.
- Develop, maintain, expand, and innovate a technology and resource infrastructure to support contracted services as well as the incubator and innovator functions of the Center.

### **Recent Achievements**

- Over the past 18 months over \$310 million worth of proposals have been submitted.
- The HOPE Center is in the final contracting stages to provide comprehensive research, education and training, and innovation and service solutions in the areas of health outcomes and health economics to the Ministry of Health of Saudi Arabia. Fully populated, this 7-year engagement has a revenue potential upward of \$285 million.
- The HOPE Center has assumed the scientific stewardship function for the Medication Management Center and its corporate (UA spin-off) partner Sinfonía-Rx. This has created a laboratory for outcomes and population science research of 6+ million patients – the largest such resource for clinical, patient-centric medication use research in the US and the world.
- The HOPE Center is partnering with the newly established BioInformatics Core (head: Dr. Yves Lussier) - with both groups integrating clinical, claims, and survey databases and sharing diverse analytical methods to establish a scientific information environment across the translational research continuum.
- The HOPE Center is recognized internationally as the premier independent resource on the clinical safety and efficacy of biosimilars, especially those used in cancer care – having anticipated the entry of these agents on the US market following their adoption in Europe.

### **Leadership**

**J. Lyle Bootman, PhD, ScD**, Professor of Pharmacy, Medicine, and Public Health and Dean of the College of Pharmacy, is the Founding Executive Director of the HOPE Center.

**Ivo Abraham, PhD, RN**, Professor of Pharmacy and Medicine, assumed the role of Director of the HOPE Center director in September 2012.