

The University of New Mexico Comprehensive Cancer Center

A National Cancer Institute Comprehensive Center
The Official Cancer Center of the State of New Mexico

NCI Consortium Partners: Lovelace Respiratory Research Institute,
Los Alamos National Laboratory, Sandia National Laboratories

Update: State of New Mexico Tobacco Settlement Committee – July 1, 2016



Cheryl L. Willman, MD

The Maurice and Marguerite Liberman Distinguished Chair in Cancer Research
UNM Distinguished Professor of Pathology and Internal Medicine
Director and CEO, UNM Comprehensive Cancer Center

UNMCCC: Distinguishing Characteristics



1. Multiethnic, multicultural, and geographically dispersed populations with strikingly different patterns of cancer incidence, mortality, disparity
2. Statewide registries and networks to facilitate transdisciplinary cancer control and cancer care delivery research

***New Mexico Tumor Registry
NM HPV/PAP Screening Registry
Project ECHO***

3. Integration of regional scientific and technologic strengths of consortium partners to create transdisciplinary research programs

UNM, LRRI, LANL, SNL

4. Statewide cancer clinical trials, clinical research, and health services delivery network

New Mexico Cancer Care Alliance

UNMCCC: Leadership Team



Cheryl Willman, MD
Director & CEO



Richard Lauer, MD, FACP
Chief Medical Officer



Olivier Rixe, MD, PhD
Associate Director,
Clinical Research



Alan Tomkinson, PhD
Associate Director,
Basic Research



Wadih Arap, MD, PhD
Deputy Director
Distinguished Scientist
Translational Research



Anita Kinney, PhD, RN
Associate Director,
Cancer Population
Sciences



Scott Ness, PhD
Associate Director,
Shared Resources



**Angela
Wanger-Ness, PhD**
Associate Director,
Education, Training



Carolyn Muller, MD
Associate Director,
UNM Women's
Cancer Center

UNMCCC: Leadership Team



Linda Cook, PhD
Cancer Control
Research Leader



MaryAnn Osley, PhD
Cancer Genetics,
Epigenetics & Genomics
Research Leader



Steve Belinsky, PhD
Cancer Genetics,
Epigenetics & Genomics
Research Leader



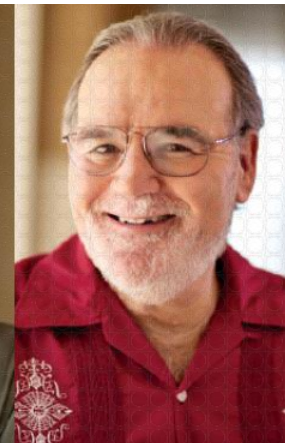
Bridget Wilson, PhD
Translational Cancer
Biology & Signaling
Research Leader



Eric Prossnitz, PhD
Translational Cancer
Biology & Signaling
Research Leader



Renata Pasqualini, PhD
Cancer Therapeutics
Research Leader



Larry Sklar, PhD
Cancer Therapeutics
Research Leader



Cosette Wheeler, PhD
Distinguished Scientist
Public Health/Population
Research



Ji-Hyun, Lee, DrPH
UNMCCC Director,
Biostatistics

UNMCCC: Senior Staff Leaders



Rodney Martinez
Chief Financial Officer

Rae Ann Paden, MPH
Chief Administrative
Officer



Teresa Stewart, MHA
Administrative Director
Clinical Research Office

**Melissa Fitzmaurice
Neligan, MPH, CRA**
Director, Research
Administration

Justin Schroer
Director of Development

UNMCCC: History and Accomplishments

2000:

NCI P20 CCSG Planning Grant

\$11.3 M Annual Research Funding; 56 Scientists; 9 Clinical Faculty

2003: Received Critical State Funds for Programs and Physician/Scientist Recruitment

2005:

NCI P30 CCSG: Received NCI Designation. Merit: *Excellent / Very Good*

\$23.5 M Annual Research Funding; 85 Scientists; 42 Clinical Faculty

2007: Received Critical State Bond Funds (Cigarette Tax) for New Facilities

Annual State Appropriation Increased to \$6.6 Million

2010:

NCI P30 CCSG 1st Renewal. Merit: *Excellent to Outstanding, "High Impact"*

\$39.7 M Annual Research Funding; 103 Scientists; 74 Clinical Faculty

2015:

NCI P30 CCSG 2nd Renewal. Merit: *Outstanding*; NCI COMPREHENSIVE DESIGNATION

Designated as One of 45 NCI Comprehensive Cancer Centers (Top 3% of Centers in the Nation)

\$72 M Annual Research Funding; 125 Scientists; 116 Clinical Faculty

63 New Faculty Recruits (45 Members; 8 New Leaders); 19 New Endowed Chairs/Professorships

Economic Impact Since 2010: 52 Patents / 117 Patents Pending; 13 Start Up Companies

2015 NCI Federal Critique: Center Strengths

- The UNMCCC is uniquely poised to have a major positive impact on cancer scientific discovery based on the focus and expertise of their laboratory and translational programs. Its unique geographic location in the Southwest, with close proximity to its consortium members (Los Alamos National Laboratory, Lovelace Respiratory Research Institute, and Sandia National Laboratories), creates a rich environment for complementary expertise and collaboration. The impact of their science and translational capabilities of their discoveries into clinical applications attest to a high level of significance.
- The Center has the capacity for transformative research with their advanced science and technology, including novel modeling, technology, delivery, and imaging platforms, and, work in cancer risks and outcome based on genetic ancestry modifiers.
- Center investigators are highly collaborative as noted by the large percentage of collaborative publications and grants. Center science is strong with important contributions and discoveries with therapeutic implications.
- UNMCC is a superb model for addressing the cancer health care delivery research and cancer disparities in underserved populations.

2015 NCI Critique: Center Strengths

- In summary, the UNMCCC has undergone significant reorganization over the past 5 years with several notable strengths including the strong science conducted by program members, the number of high impact publications, and focused recruitment of highly talented cancer investigators.
- At UNMCCC, the cancer research enterprise is well aligned and there is a very noteworthy state and institutional commitment. The impact in translational science is important as well as the strong commitment to their community and population they serve. New faculty and leaders have been recruited, there has been a realignment of the programs to bring more focus on translational and clinical components.
- Overall the new leadership has developed a clear vision for growth to further develop the mission of the Center. Under Dr. Willman's visionary leadership and expertise, the Center is poised to further enhance its translational capabilities. The Center is on a very positive trajectory focused on exciting new initiatives.

2020 Strategic Goals

New Cross-Cutting, Transdisciplinary,
Inter-Programmatic,
Transformational Initiatives



UNMCCC Strategic Goals: 2020

1. Conduct outstanding research, focused on discovering the causes and cures for cancer, particularly for cancers disproportionately affecting New Mexico's multi-ethnic populations, and translate discoveries into more effective means to prevent, diagnose, and treat cancer

Disparities in Screening, Incidence, Outcome:

- GI: Colorectal Cancers: Gastric, Colon, Rectal Cancers
- GI: Liver / Hepatobiliary Cancers: Hepatocellular Carcinoma, Cholangiolar / Biliary Carcinoma, Gallbladder Cancer
- GU: Kidney, Bladder Cancer
- Breast Cancer

Unique Genetic Ancestry Factors / Novel Therapeutic Opportunities:

- Lung Cancers
- Leukemia (Acute Lymphoblastic Leukemia, ALL)
- Prostate Cancer
- Ovarian Cancers
- Head and Neck Cancers
- Neuro-Oncology
- Melanoma

FY16 State Appropriation for 3D Mammography

- HB2: “For the UNM Health Sciences Center to provide three-dimensional mammography services to women eligible for the state Medicaid or the Breast and Cervical Cancer Screening Program and to provide outreach and education concerning three-dimensional mammography” (\$250,000).
- Challenge: Does 3D vs standard 2D mammography improve cancer detection rates or reduce recall rates?
- Developed Institutional Clinical Trial 1525 (UNMCCC, Radiology, BCCS):
INST 1525: Medically Underserved Women in New Mexico: Comparing Outcomes and Lowering Recall Rates with Digital Breast Tomosynthesis (3D Mammography) Versus Full-Field Digital (2D) Mammography: The New Mexico LOVE Study (Drs. Fine, Brown-Glaberman, Saline, Mishra)
- To Date: 842 women consented and received both 3D and 2D mammograms in FY16; state funds fully expended to pay for 3D imaging
- FY17 Plans:
 1. UNMCCC providing \$250,000 match to screen up to 1000 women
 2. Funds will support data analysis and patient interviews to understand barriers
 3. Funds will be used for study dissemination and statewide education of healthcare providers

UNMCCC Strategic Goals: 2020

1. Conduct outstanding transdisciplinary research, focused on discovering the causes and cures for cancer, particularly for cancers disproportionately affecting New Mexico's multi-ethnic populations, and translate discoveries into more effective means to prevent, diagnose, and treat cancer
2. Reduce New Mexico's cancer burden by discovering the genetic, environmental, social, and behavioral factors that contribute to the distinct patterns of cancer incidence, mortality, and disparity in our populations
 - Expand partnerships with the NM DOH, Indian Nations, and multi-ethnic communities to design and implement culturally appropriate community-based cancer control interventions
 - Translate statewide registry models (NM HPV/Pap Screening Registry linked to NMTR/SEER) to other screen-preventable cancers (colorectal cancer, hepatobiliary cancers)
 - Develop consented prospective cancer patient cohorts to be followed from diagnosis through a patient's lifetime (ORIEN: Total Cancer Care Protocol) with extensive tissue sampling (diagnosis, recurrence), genetic ancestry determination, genomic/biomarker characterization, with clinical and epidemiologic data annotation and collection (UNMCCC)

ORIEN: Current Membership

Current Total Cancer Care Accrual: >150,000



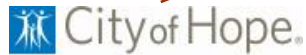
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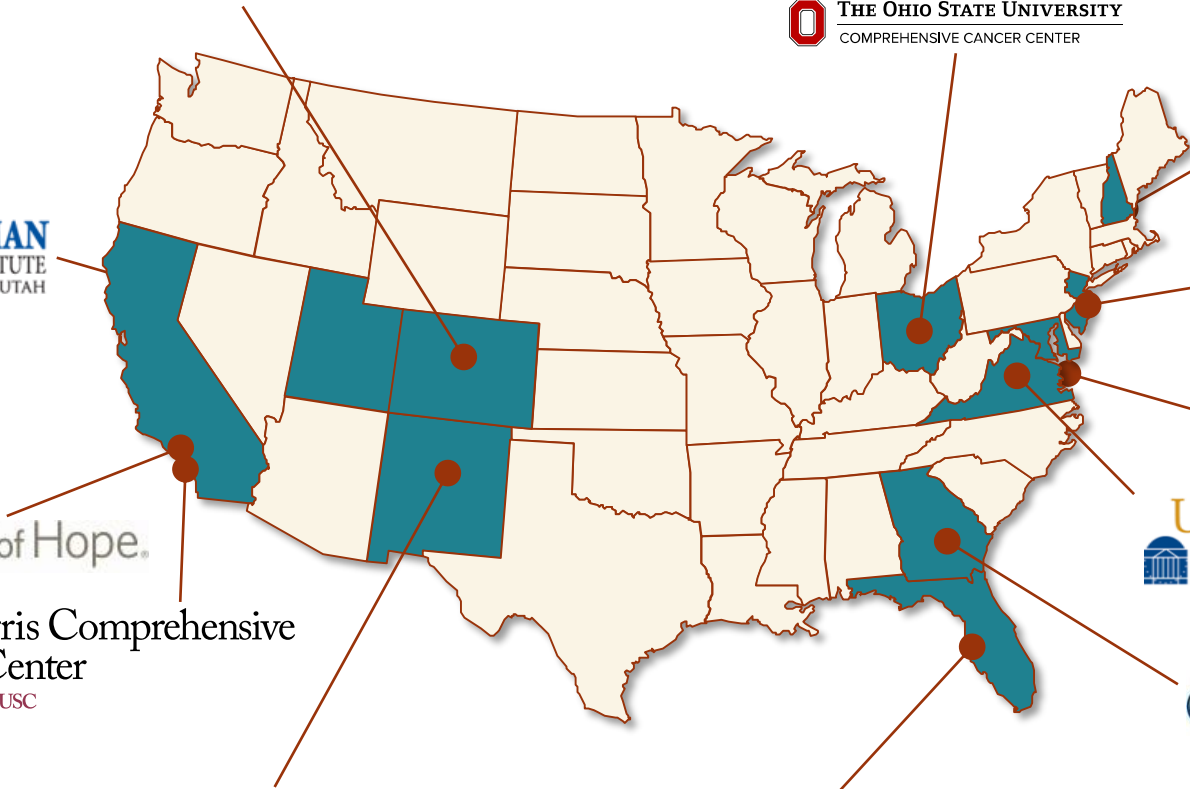
Walter Reed
Murtha
Military
Cancer
Center



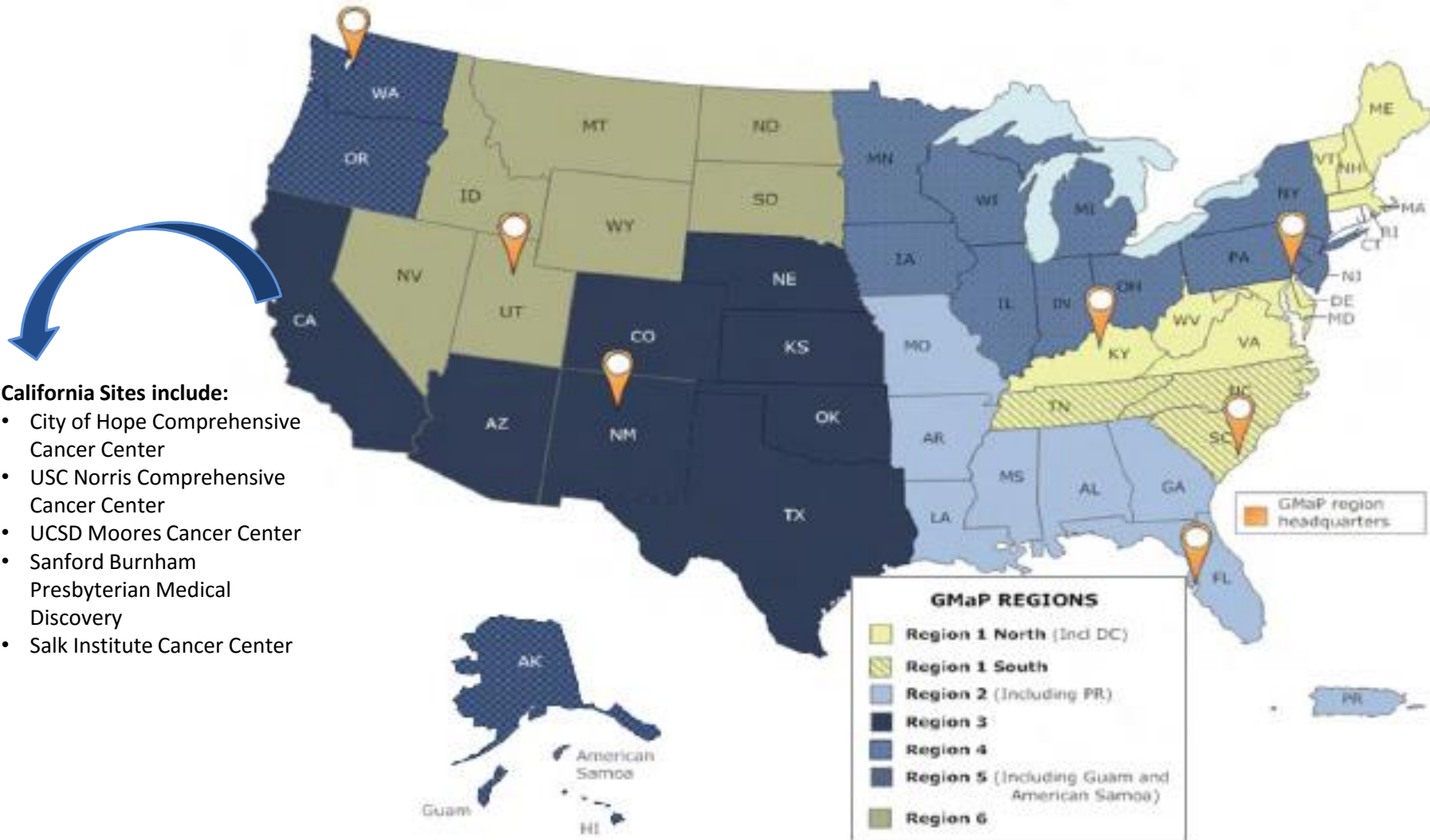
HENRY M. JACKSON FOUNDATION
FOR THE ADVANCEMENT OF MILITARY MEDICINE



- Emory U Winship Cancer Center
- U Iowa Holden Comprehensive Cancer Center
- U Alabama Birmingham Comprehensive Cancer Center
- U Oklahoma Stephenson Cancer Center
- Veteran's Administration Health System



Geographic Management of Cancer Health Disparities Program (GMaP): UNM CCC Region 3 Hub



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2. Reduce New Mexico's cancer burden by discovering the genetic, environmental, social, and behavioral factors that contribute to the distinct patterns of cancer incidence, mortality, and disparity in our populations
 - Determine the impact of environmental exposures on cancer causation in NM communities (arsenic, uranium, heavy metals, indigenous carcinogens)
 - Pilot Studies: Perform WES/WGS on retrospective multi-ethnic cancer cohorts (SEER; UNMCCC Tissue Core) with disparities (hepatobiliary, kidney, bladder, colon, head/neck, ovarian) to discover distinct and potentially targetable novel mutations and/or whole genome mutational signatures reflective of specific environmental and dietary exposures

Zinc Chemoprevention of Arsenic Carcinogenesis

Community Translation: Zinc supplementation studies with vulnerable populations in NM catchment area

Arsenic in Unregulated Well Water on Reservations and Rural Lands



Abandoned Uranium Mines (Navajo, Pueblo Lands)



Gold King Mine Disaster >250,000 SW Mines



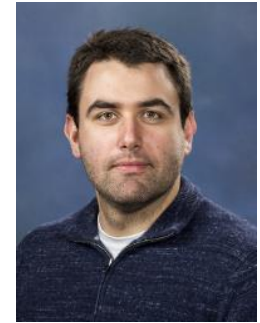
NIH ES021100 (ViCTER): *Impact of Zinc Status on Susceptibility to Arsenic-Induced Toxicity* (MPI: Hudson, Liu; Co-I, Lewis)

NIEHS P50 Centers of Excellence on Environmental Health Disparities Research: *Center for Native American Health Equity Research* (PI: Lewis; Co-Is, Hudson, Liu)

NIH 5U01TS000135: *Prospective Birth Cohort Study Involving Uranium Exposure in the Navajo Nation* (PI: Lewis; Co-I, Hudson)

NIH 3P20MD004811-02S1: *Supplement to the NM CARES Health Disparities Center; Project 2: Zinc Intervention for Uranium Toxicity* (PI, Williams; Co-Is, Hudson, Liu, Lewis)

Accumulation of Somatic Mutations Mutational Signatures in Human Cancer



Ludmil
Alexandrov, PhD
LANL (CGEG)
Oppenheimer
Fellow

Science /AAAS
Top Scientist
Under 30
(Biomedicine)

Current “Big Data” Capabilities at LANL:

- High throughput external network connection and capability to download petabytes of data from external sources
- High performance computational pipelines for cancer genomics analysis
- Current access for cancer genomics: 5PB data storage; “free” computational/CPU compute time
- Completed analysis of >35,000 cancer genomes (ICGC, TCGA)



Known or Speculative Causes of Mutational Signatures



Tobacco smoking



Known or Speculative Causes of Mutational Signatures

Tobacco
chewing



Known or Speculative Causes of Mutational Signatures



Ultraviolet
light



Known or Speculative Causes of Mutational Signatures



Aflatoxin

Known or Speculative Causes of Mutational Signatures



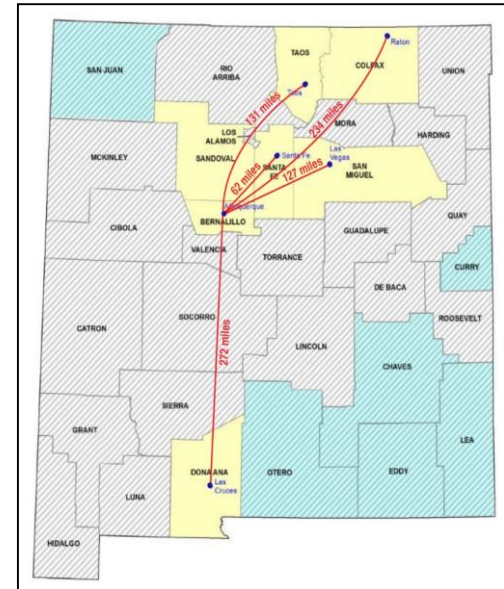
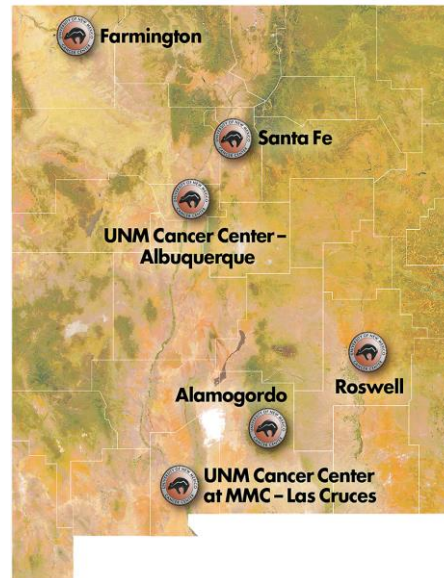
Aristolochic acid



UNMCCC Strategic Goals: 2020

3. Provide access to state of the art cancer diagnostics and treatments at UNMCCC and assure access for all New Mexicans to cancer clinical trials through the NMCCA, sponsored by NCI, Industry, UNMCCC Investigator-Initiated Trials, and ORIEN
4. Build integrated, enterprise-wide cancer informatics platform (epidemiologic, clinical, tissue, imaging, sequencing/biomarker, therapies, clinical trial, and outcome data) to facilitate cohorts, discovery, and clinical trials matching (UNMCCC, ORIEN, Industry)
5. Lead cancer care delivery research efforts in NM, NCI NCTN (NM NCORP)
 - **Implement projects using the UNMCCC/NMCCA network model; Project ECHO**
6. Continued Targeted Faculty Recruitment, Program, and Facility Expansion
 - **10 Laboratory-based and population science investigators**
 - **Open New Clinical Programs with Finish Out of Facility (October 2016): Stem Cell Transplantation, Immunotherapy, Phase I Facility, Neuro-Oncology, AYA, Survivorship**
7. Expand education, training, and mentoring programs in laboratories, clinics, and communities, emphasizing training under-represented minorities.

Special Characteristics: Statewide Cancer Clinical Trials Network



The New Mexico Cancer Care Alliance (NMCCA)

- Non-profit (501c3) public-private joint venture: UNMCCC, 5 health systems, virtually all NM community-based oncologists
- Governed by constitution and bylaws creating a single statewide cancer IRB and integrated infrastructure for the management and oversight of cancer clinical interventions and trials
- Based at UNMCCC; UNMCCC Director is Board Chair with authority over all UNM and NMCCA trials
- Financial support: UNMCCC, NM Health Systems, and NCI (2003-14: MBCCOP U10CA86780)

Awarded NCI NCORP (U01CA189856: Multi-PI Royce/Muller; CCDR: Kinney)

- Merit Score: 10; “exceptional, exemplary model for the nation of academic/community network”
- Fully funded as “high accruing site” with same per case reimbursement as NCI LAPS
- New engagement of Texas Tech University System (El Paso, Lubbock, Amarillo) in planning stages

New Center Recruits Since 2015 NCI Site Visit

Physician Scientists:



Matthew Fero, MD, PhD (FHRC, Seattle); CWG: Hematologic Malignancies Stem Cell Transplantation; Immunotherapy; Stem Cell Biology Recruiting 3 Additional Faculty (Transplant / Lymphoma)



Yanis Bumber, MD, PhD (Fox Chase, Philadelphia); CWG: Lung Cancer Lung Cancers; Collaborating with LRRI



Emrullah Yilmaz, MD (MSKCC; Einstein, NYC); CWG Head & Neck Cancers IDH1 Mutations / Mutator Phenotypes; Phase 1 Trials; Gliomas



Alexandria Phan, MD (MD Anderson, Houston): Head of GI Oncology



Vi Chiu, MD, PhD (UC-Irvine, MSKCC): Co-Lead for GI Oncology and GI Oncology Research

Population Scientists / Biostatistics:



Cindy Blair, PhD
U Minn / UAB



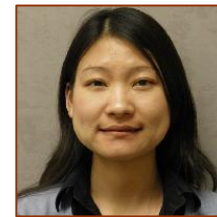
Jean McDougall, PhD
FHRC



Margarita
Santiago-Torres, PhD

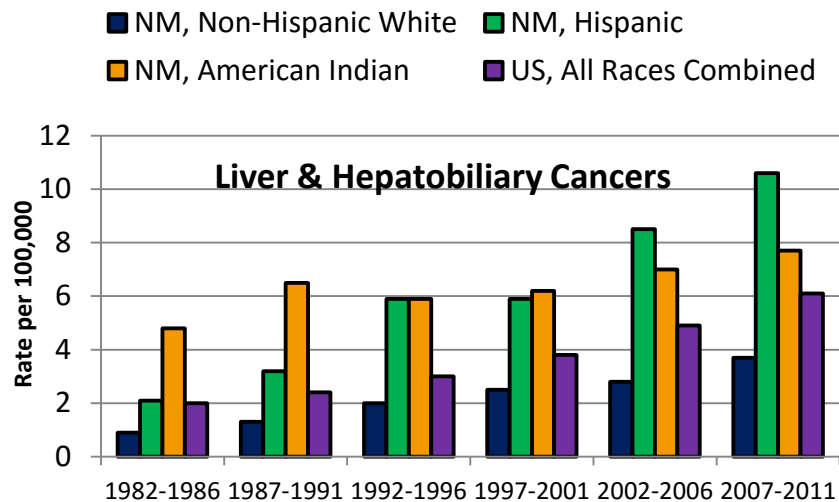


Ajna Hamidovic,
PharmD, UNM



Li Luo, PhD
UT Public Health

Special Characteristics: Project ECHO



Sanjeev
Arora, MD



- **PROJECT ECHO:** Use of multipoint videoconferencing, best practice protocols, and co-management of patients with case-based learning so primary care providers in remote and underserved areas can be trained by tertiary specialists to safely and effectively treat complex diseases in their home communities to overcome health care disparities
- **CMS Innovation Award:** *“a fundamental shift in health care delivery, from moving the patient to moving knowledge”*
- 29 New Mexico Hubs and 4 Global Networks (Uruguay, India, Ireland, Canada)
- **Developing UNMCCC ECHO projects for cancer care delivery research (delivery of cancer care to remote sites), cancer screening, patient/provider genomics education**

NEJM 364:2199,2011; Academic Med 89:30, 2014

Funding: DHHS CMS; RWFF; GE Foundation; State of NM; NCI CA189856 (NCORP)