

The University of New Mexico Comprehensive Cancer Center

The Official Cancer Center of the State of New Mexico

Affiliate Partners: Lovelace Respiratory Research Institute,
Los Alamos National Laboratory, Sandia National Laboratories, NMSU

Update to the State Legislature - Tobacco Settlement Committee
August 20, 2018



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

UNIVERSITY OF NEW MEXICO CANCER CENTER



**In 2015, the UNM Cancer Center Achieved Federal
Designation and Funding as a
National Cancer Institute Comprehensive Cancer Center**

The UNM Comprehensive Cancer Center is 1 of Only 49 Cancer Centers in the
Nation (Top 3%) to Achieve "Comprehensive" Status and Certification

Accreditation and Highest Commendations from The American College of
Surgery Commission on Cancer, ASCO Quality Oncology Program Initiative,
The Joint Commission, and the American College of Radiology

UNIVERSITY OF NEW MEXICO CANCER CENTER



UNMCCC Overall Goals

- To provide state of the art, comprehensive, integrated multispecialty cancer diagnosis and treatment for all New Mexicans, providing each patient with their personalized treatment plan.
- To conduct outstanding laboratory, translational, clinical, and community research focused on discovering the causes and cures for cancer, particularly those cancers that disproportionately affect the minority and underserved populations of New Mexico, and, to translate our discoveries into more effective means to prevent, diagnose, and treat cancer.
- To 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.
- To provide access to the newest cancer diagnostic, preventive agents, and treatments in a robust statewide cancer clinical trials program.
- To grow our work force by training and mentoring cancer health professionals and scientists, with an emphasis on under-represented minorities.
- To enhance economic development through science and discovery efforts.

UNIVERSITY OF NEW MEXICO CANCER CENTER



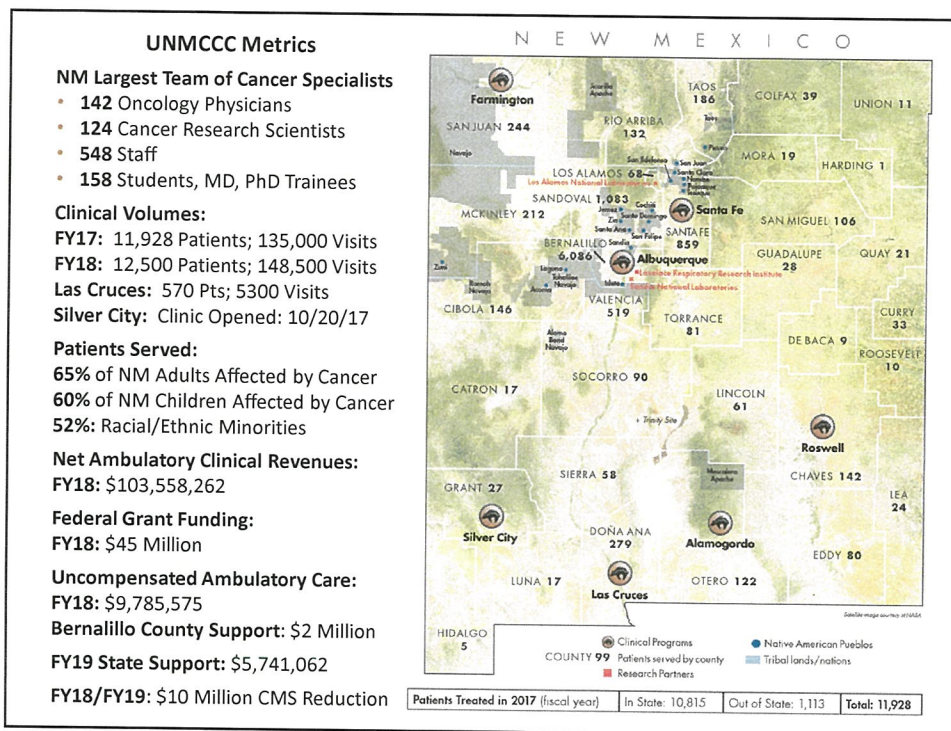
A National Comprehensive Cancer Center:

1. Delivers the highest quality, comprehensive cancer diagnosis and treatment by integrated multidisciplinary teams of cancer physicians (medical, surgical, gynecologic, pediatric, and radiation oncologists) and diagnostic scientists (precision medicine, immunotherapy, pharmacology) who work together with nurses, pharmacists, supportive care staff to develop an individualized treatment plan for each one of our patients.

At UNMCCC: New Mexico's largest team of cancer physicians, 142 cancer physicians and surgeons in every cancer specialty recruited from the finest medical schools in the nation, provide care to more than 12,000 cancer patients each year from every county in New Mexico in > 135,000 ambulatory clinic visits.

UNIVERSITY OF NEW MEXICO CANCER CENTER





A National Comprehensive Cancer Center:

2. Conducts world class research, in our laboratories, clinics, and communities, to discover the causes and cures for cancers particularly affecting New Mexicans, to overcome New Mexico and the nation's cancer burden and to promote economic development.

At UNMCCC: Supported by \$45 million annually in federal and private research funds, 124 scientists work with partners at LANL, SNL, LRRRI, and State Universities (NMSU) to discover the causes and develop more effective cancer treatment and prevention agents.

At UNMCCC: Developed new diagnostics and drugs for leukemia, breast cancer, ovarian cancer, prostate cancer, liver and pancreatic cancer, brain cancers, and melanoma.

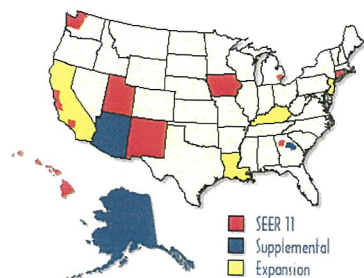
At UNMCCC: Since 2010, UNM cancer scientists have been awarded 136 new patents, with >100 patents pending, and have started 13 new biotechnology companies.

UNMCCC: Distinguishing Characteristics



1. Multiethnic, multicultural, and geographically dispersed populations with strikingly different patterns of cancer incidence, mortality, disparity
*New Mexico Tumor Registry
Project ECHO
New Mexico HPV/PAP Registry*
3. Integration of regional scientific and technologic strengths of consortium partners to create transdisciplinary research programs
UNM, LRR, LANL, SNL
4. Statewide cancer clinical trials, clinical research, and health services delivery network
New Mexico Cancer Care Alliance

Special Characteristics: NM Tumor Registry (NMTR)



Charles Key, MD
Founder



Charles Wiggins, MD
NMTR Director
PI, NCI SEER Grant

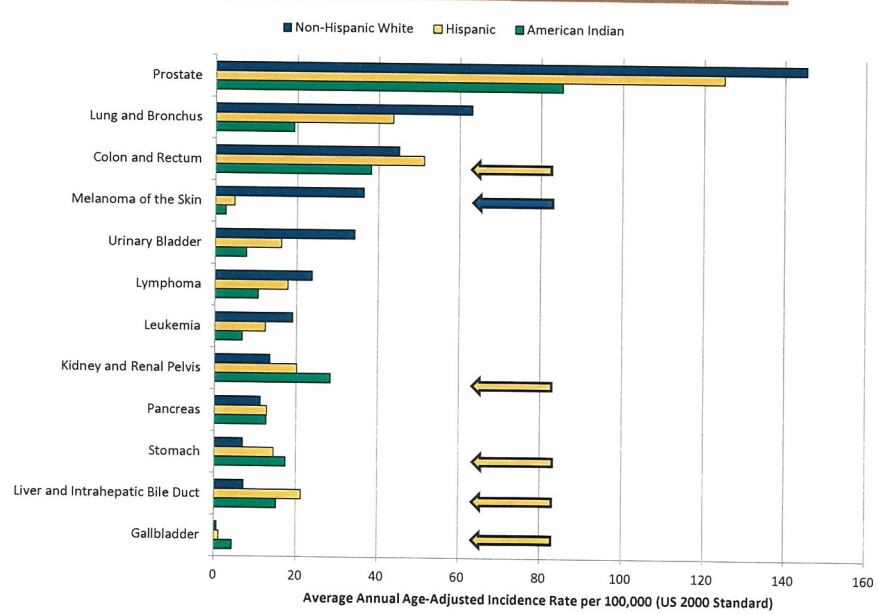
- 1966: Established by NM Legislature; mandated reporting of all cancer cases (incidence, mortality, stage of disease)
- 1973: A founding member of the NCI SEER Program
- Coverage: 100% NM Population (Arizona Indian Population); one of the largest cancer databases for Hispanics and American Indians in the world (>285,000 pt. records)
- Linkages: Virtual linkages to diagnostic pathology, laboratory records (ePATH), and tissue samples enabling hypothesis-driven research

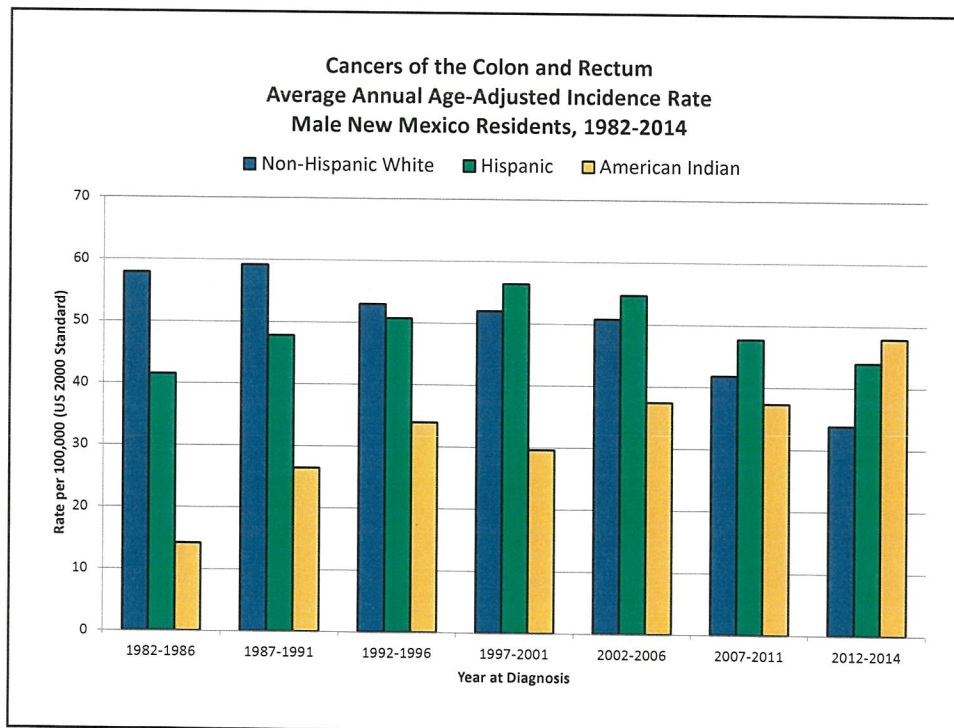
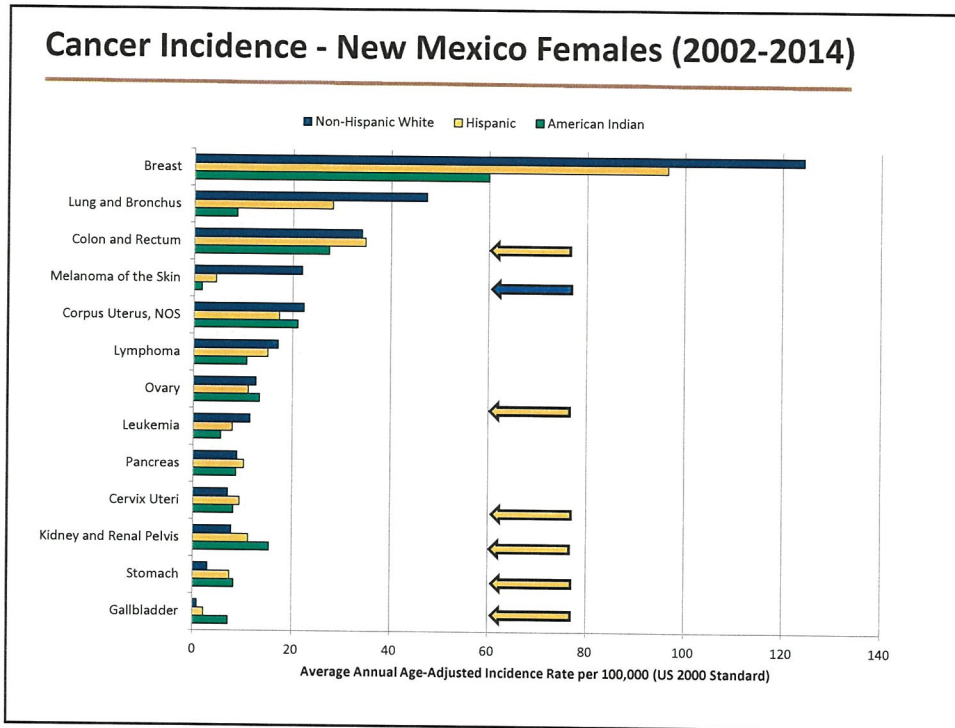
The New Mexico Tumor Registry Conducts Population-based Public Health Surveillance for Cancer throughout New Mexico and in American Indian Communities in Arizona

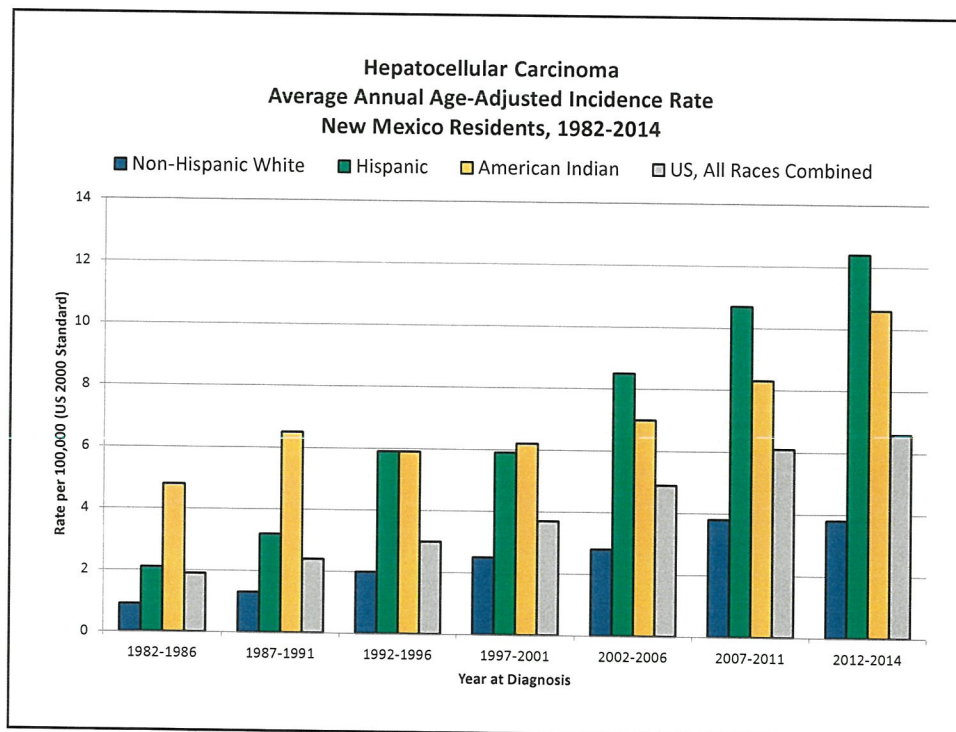
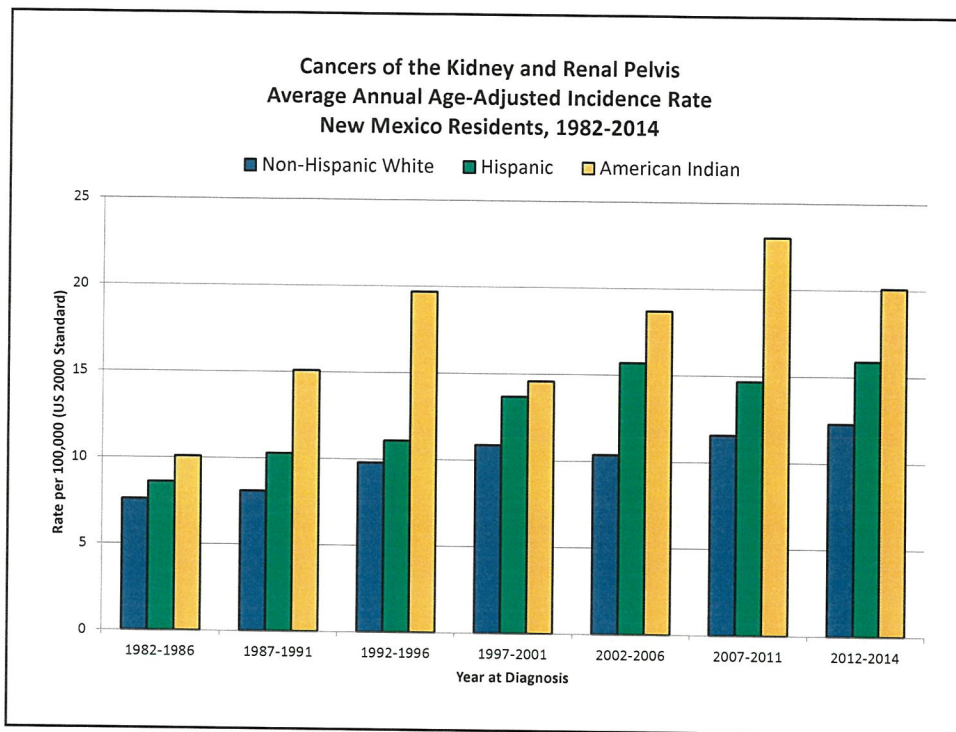


9

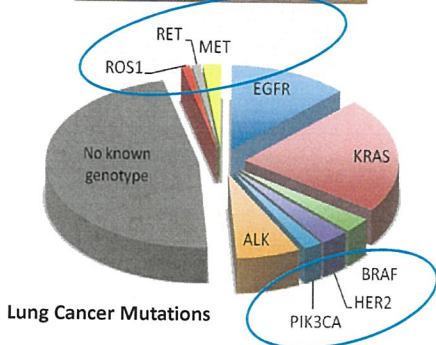
Cancer Incidence - New Mexico Males (2002-2014)







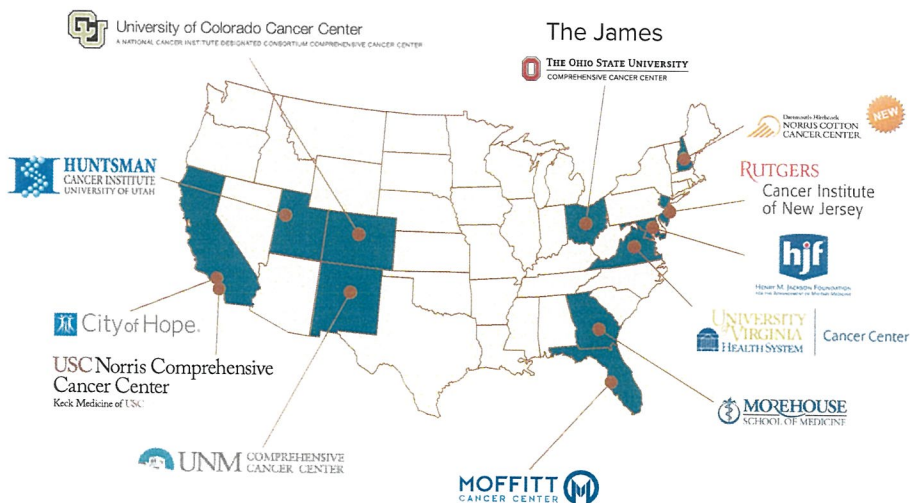
Why is Being Diagnosed and Treated at an NCI Comprehensive Cancer Center so Essential?



The Scientific Revolution in Modern Cancer Medicine

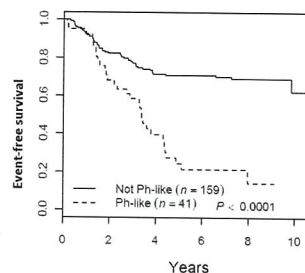
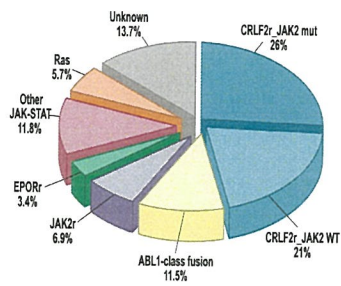
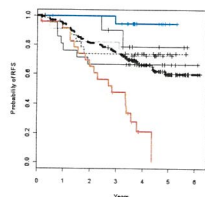
- Precision Medicine
 - Genomic Sequencing of Human Cancers
 - New Treatments Targeted to Specific Cancer Mutations
- Access to Multidisciplinary Cancer Physician and Surgeon Teams
- Access to Clinical Trials Providing Newest Treatments

ORIEN National Precision Medicine Network 20 NCI Centers / VA Health System / Walter Reed



New Members: Emory, U of Iowa, U Oklahoma, U Alabama Birmingham, U Oklahoma

Discovery that Leukemia Causing Mutations in American Indian and Hispanic Children are Different Than Non-Hispanic White Children



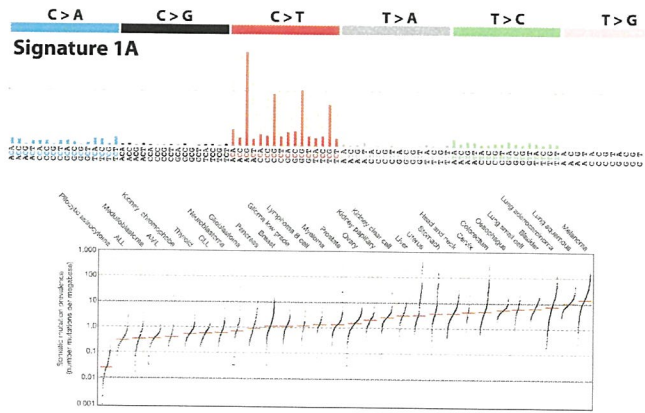
National NCI NCTN Clinical Trials for Ph-like ALL

- Received FDA IDE Acceptance (Q14170; Jan. 2015) for LDA expression screens and companion genomic diagnostics for Ph-ALL targeting
- **National NCI-Sponsored Clinical Trials:**
 - **COG AALL1131** (NCT01406756): LDA/Genomic Screening; Therapeutic: Targeting of ABL Class Fusions to Dasatinib Containing Chemotherapy Regimens
 - **COG AALL1521** (NCT02723994): LDA/Genomic Screening; Targeting *CRLF2/JAK* Mutants to Ruxolitinib
 - **ECOG Adult ALL 1910** (NCT02003222): Testing Blinatumomab (CD19 Bi-Specific T Cell Engager); Screening for Ph-like ALL Frequency Only
 - **SWOG Elderly ALL 1318** (NCT02143414): Testing Blinatumomab; LDA Screening, RNA Sequencing of Ph-like ALL Cases
 - **Alliance AYA ALL 041501** (NCT03150693): Testing Blinatumomab; LDA Stratification (RNASeq)

Mutational Signatures: Whole Genome DNA Sequencing Can Also Now Be Used to Identify Environmental Exposures

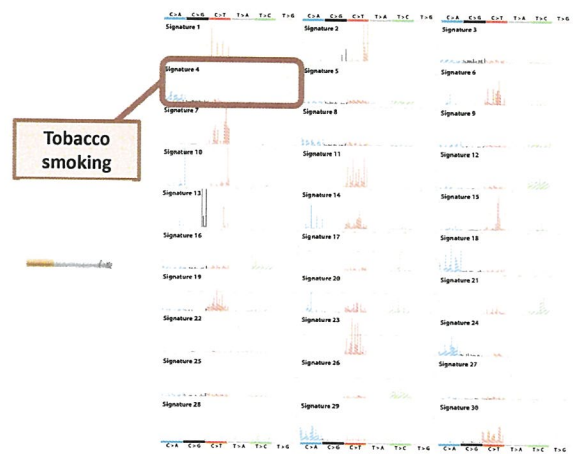


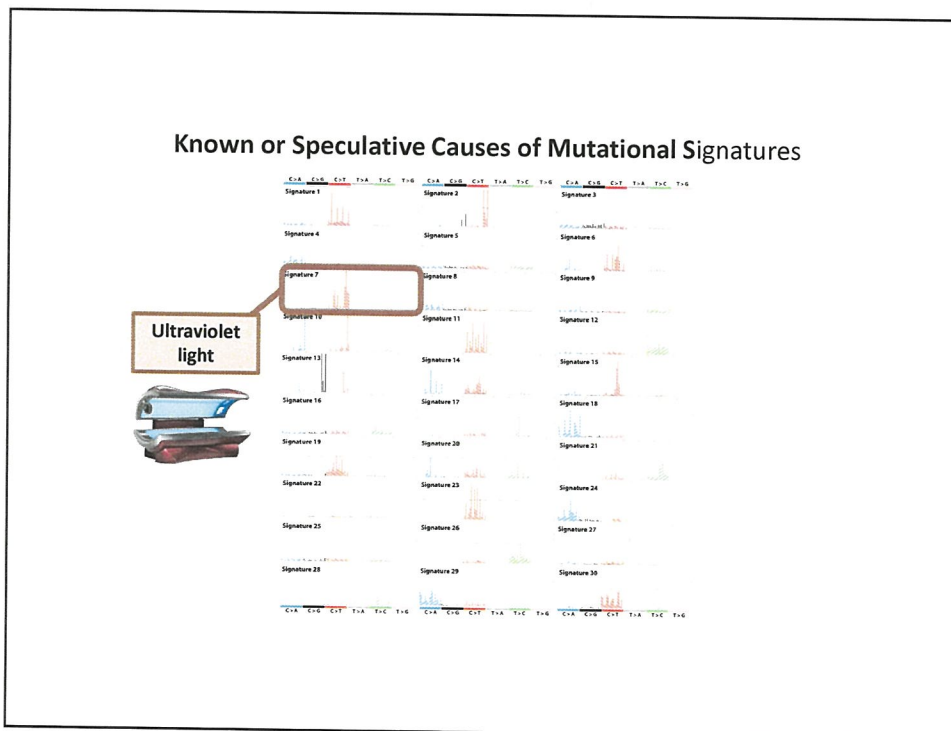
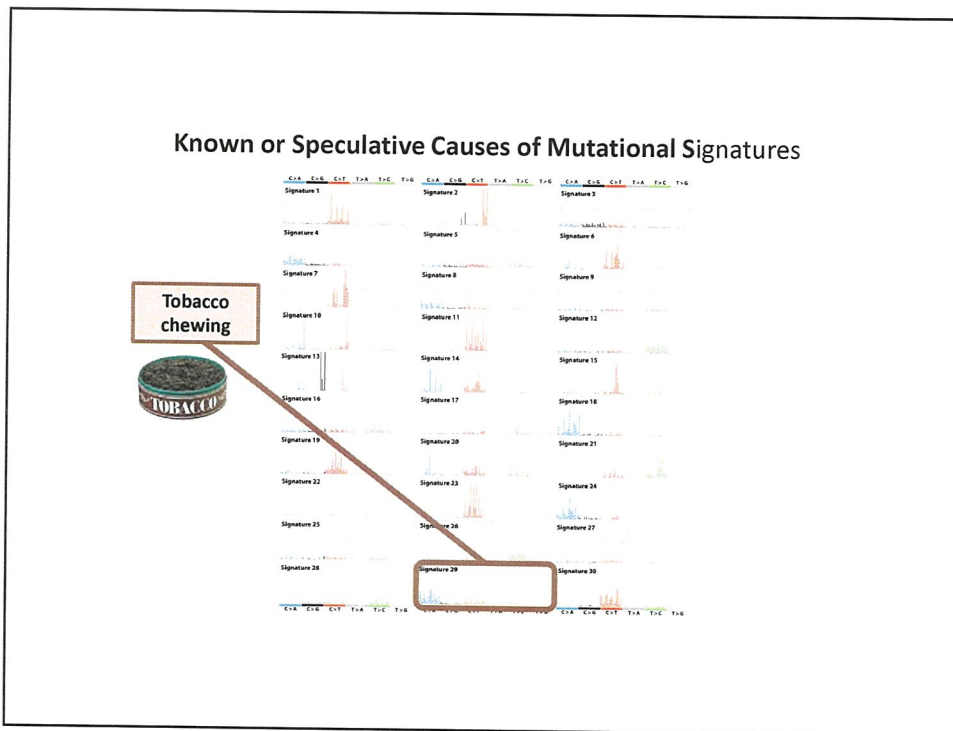
Ludmil Alexandrov, PhD
Los Alamos Oppenheimer

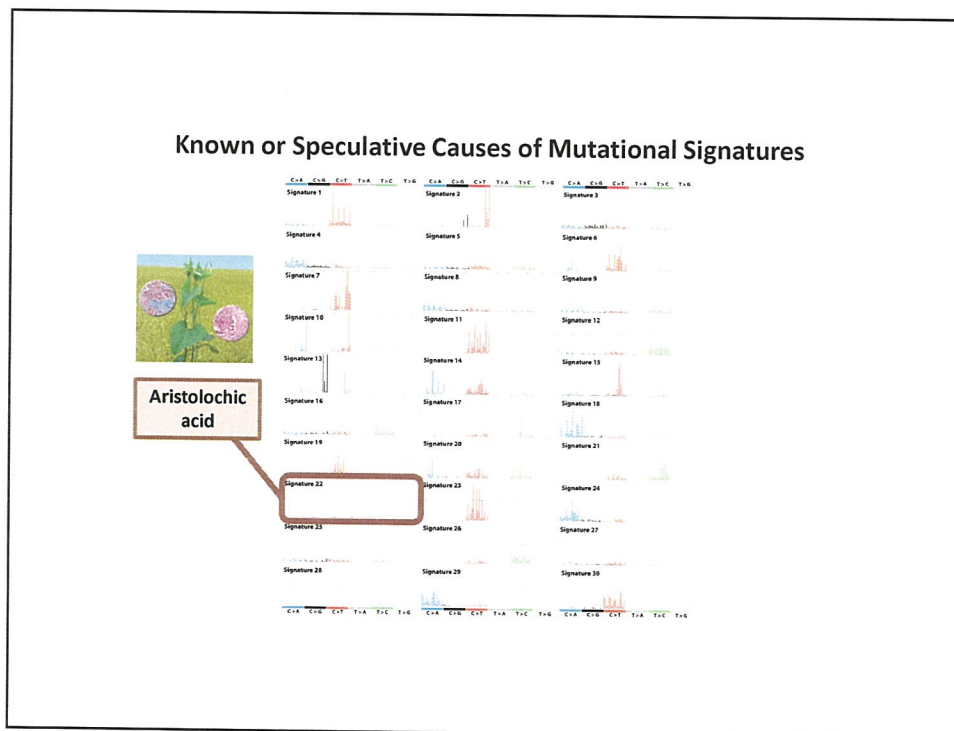
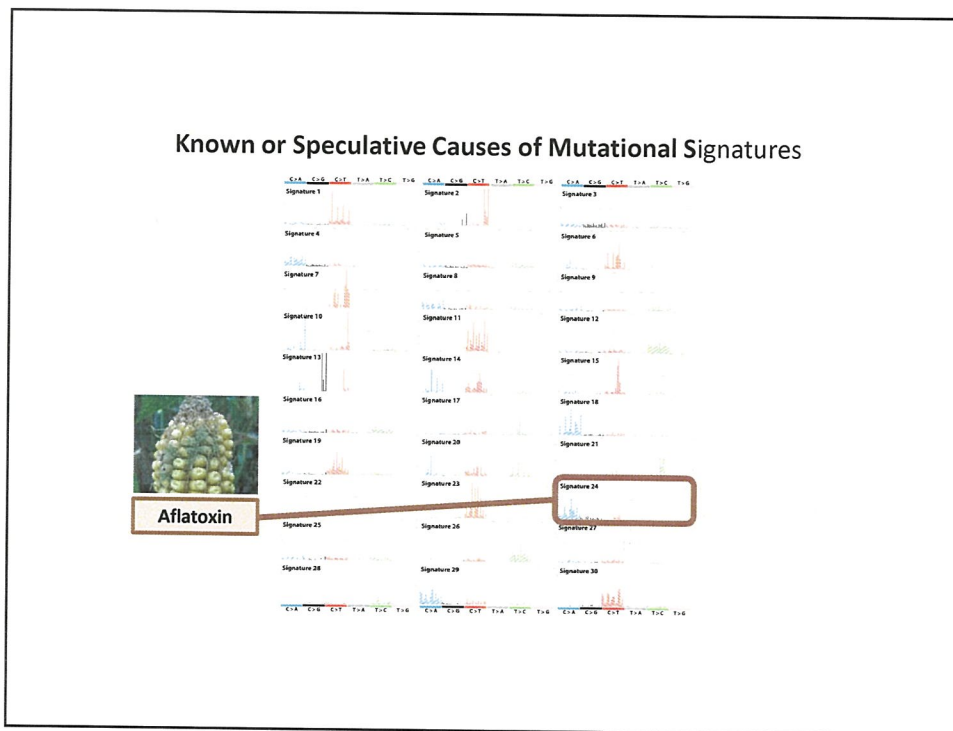


Alexandrov et al., Nature 500: 415-420, 2013

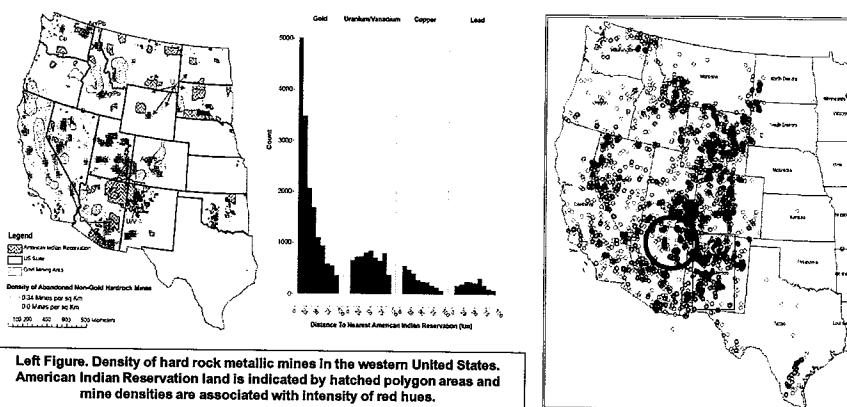
Known or Speculative Causes of Mutational Signatures







Hard Rock Metal Mines in the Southwest / Western U.S.



Left Figure. Density of hard rock metallic mines in the western United States. American Indian Reservation land is indicated by hatched polygon areas and mine densities are associated with intensity of red hues.

- >50% of Tribal Nations located in 13 states with 161,000 abandoned hard rock mines
- 40% of western watershed headwaters are contaminated from these mines (USEPA)

New Project: A Formal Biomedical Consortium with Tribal Nations: Cancer Disparities: From Discovery of Genomic and Environmental Etiologies to Clinical and Community Translation

Partners:

- University of New Mexico Comprehensive Cancer Center
- Stephenson Cancer Center at The University of Oklahoma
- The Translational Genomics Research Institute (TGen), Arizona
- University of California, San Diego: Ludmil Alexandrov
- NM Tribal Nations; Oklahoma Tribal Nations: Chickasaw, Cherokee, Choctaw; Arizona: Salt River Pima-Maricopa

Goals:

- To identify the mutations causing cancer disparities in kidney, colorectal, and hepatobiliary cancers (liver, gallbladder, biliary cancers) in paired cohorts (NHW, Hispanic, American Indian)
- To study mutational signatures to see if we can identify environmental exposures which may be associated with or causing these cancers



Zinc Chemoprevention Trial in Two Navajo Communities and Laguna Pueblo Uranium Damage to DNA



Painting by Mallery Quetawki - Zuni Pueblo

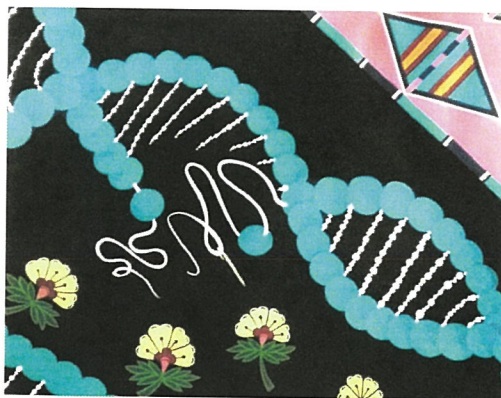
Metals Damage Proteins that Protect DNA



-  Zinc
-  Toxic metal

Painting by Mallery Quetawki - Zuni Pueblo

Zinc Helps Damage Repair



Painting by Mallery Quetawki - Zuni Pueblo

Enhancing Cancer Screening in Tribal Nations and Rural Communities

Problem:

- In New Mexico, American Indians and Rural Communities compared with non-Hispanic Whites have lower screening rates for cancers of the breast, colon and rectum, and cervix
 - The differences in absolute screening rates range from a low of 11.5% (breast) to a high of 27.3% (colon and rectum); some Tribal Nations have a colorectal cancer screening rate < 4%.
 - With timely screening these cancers can be detected early (breast, cervix, and colon and rectum) or prevented (colon and rectum)

Study Objective:

- Document cancer control needs of these communities and identify strategies to enhance screening for breast, colon and rectum, and cervical cancers per recommended guidelines



Collaborators and Community Impact

Collaborating Partners:

- Seven New Mexico Pueblo Tribes (Zuni, Nambe, Ohkay Owingeh, Pojoaque, San Ildefonso, Santa Clara, Nambe, and Taos)
- Albuquerque Area Indian Health Board
- Albuquerque Area Southwest Tribal Epidemiology Center
- Indian Health Service Santa Fe Service Unit
- Indian Health Service Taos-Picuris Health Center
- UNM Comprehensive Cancer Center and Health Sciences Center

Community Impact:

- Increased CRC screening initially
- Identification of most cost-effective strategies to enhance CRC screening among on-reservation AIs
- Sustainability and scalability assessments and plans

Tri-State Expansion to Tribal Nations in Oklahoma and Arizona, Led by UNMCCC

UNIVERSITY OF NEW MEXICO CANCER CENTER



Why is Being Diagnosed and Treated at an NCI Comprehensive Cancer Center so Essential?



Olivier Rixe, MD, PhD
Associate Director,
Clinical Research
Phase I Trials



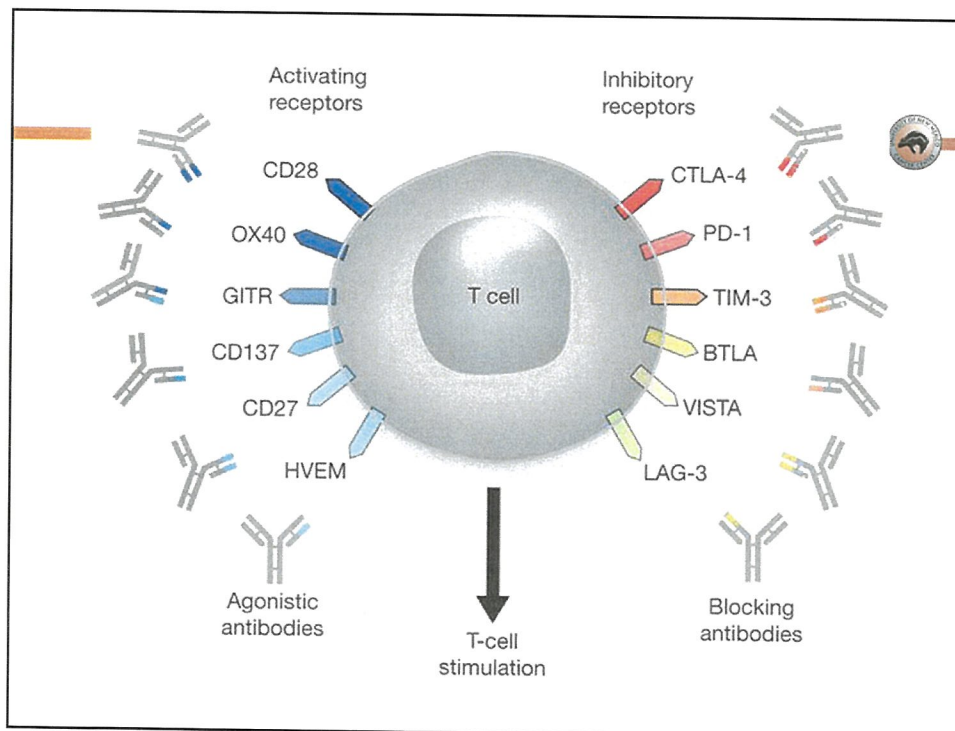
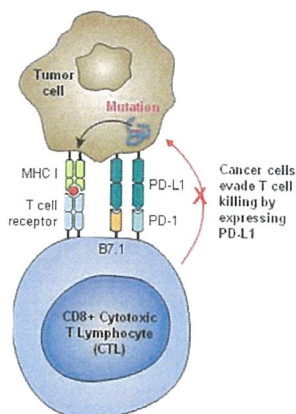
Matthew Fero, MD, PhD
Director, Stem Cell
Transplantation
Programs
Cell Based Therapies
Hematologic
Malignancies

The Scientific Revolution in Modern Cancer Medicine

- Cancer Immunotherapy
- Stem Cell Transplantation
- Cell-Based Therapies
- Cancer Vaccines
- Access to Multidisciplinary Cancer Physician and Surgeon Teams
- Access to Early Phase Clinical Trials Unit Testing Newest Cancer Treatments

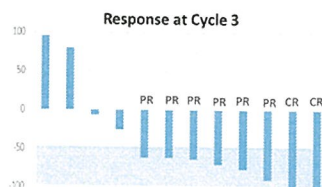
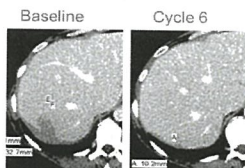
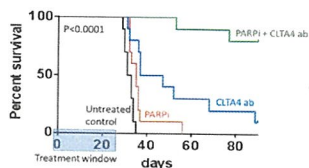
IMMUNOTHERAPY: TARGETING PD-1 / PDL-1

- Many human cancers elicit an immune response to proteins on a cancer cell surface
- How do we harness that to kill cancer cells, regardless of the genomic mutations present?
- HOWEVER, Cancer cells may also evade killing by the immune system by expressing PD-L1 and blocking anti-cancer T cells
- New anti PD-L1 treatments are having dramatic impacts in lung kidney, melanoma, and other cancers



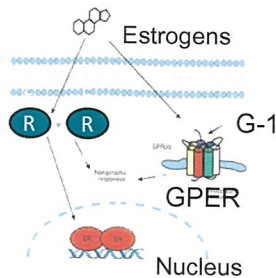
Development of New Immunotherapy for Ovarian Cancer

- Immune therapy has revolutionized cancer treatment:
 - Restores the ability of immune cells to recognize and kill cancer cells.
 - Dramatically improved survival in several poor prognosis cancers
- Hypothesized that inhibiting the DNA repair machinery in ovarian cancer (PARPi) would sensitize the cancer to immunotherapy (CTLA4 antibody).
- Phase I Trial completed at UNM; dramatic responses
- National Trial, led by UNMCCC, now open at Moffitt Cancer Center, U Virginia, Ohio State Cancer Center



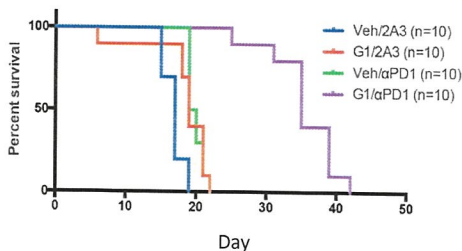
Development of New Immunotherapy for Melanoma, Pancreatic, Colorectal Cancer

- Identified a novel receptor for estrogen in human cells (GPER)
 - Synthesized agonists (G-1) that activate and antagonists (G36) that inhibit GPER
 - GPER also plays a critical role in aging and cardiovascular disease
- Collaboration with UPENN found that G-1 combined with immunotherapy inhibits growth of several poor prognosis cancers in animal models
- New UNM-UPENN partnership with start up company **Linnaeus Therapeutics** (IND, FDA)
- First in human clinical trials will be conducted in New Mexico at UNMCCC



Eric Prossnitz, PhD
Scripps Institute

Linnaeus
THERAPEUTICS



UNMCCC Phase 1 Clinical Trials Unit



- Only Phase I Program in 500 miles
- Assures New Mexicans access to the newest cancer treatments
- Testing many new therapies, immunotherapies, and novel isotopes
- Partnership with major biotech and pharmaceutical companies from US, Japan, Europe (Astra Zeneca, BMS, Novartis)
- 2017: \$3 million in pharma investment
- Conducting “first in human” studies; “first in the world”
- Since January, treated > 80 patients from NM and across the nation (LA, NYC, Arizona, Houston, Philadelphia)



UNM COMPREHENSIVE CANCER CENTER



2020 STRATEGIC PLAN

- **2019-2020: Federal NCI Designation Competitive Renewal**
- **Developed Strategic Plans:**
 - Clinical Facility and Clinical Program Expansion
 - New Cancer Clinical Service Line Development
 - Recruitment of Critical Cancer Physicians and Research Scientists
 - Expanded Community Outreach
 - Expanded Education and Training Programs

UNMCCC: The Challenge of Federal CMS Reimbursement Cuts



- Effective 1/1/18, through Executive Order, The Centers for Medicare & Medicaid (CMS) implemented a new federal rule that reduced reimbursement by \$1.6 billion annually to public safety net hospitals and cancer centers across the nation participating in the Congressionally-mandated 340b drug purchasing program
- The 340b program requires drug manufacturers to sell drugs at discounted prices to hospitals and cancer centers that provide a disproportionate share of care to low income, rural, poor, and underserved patients.
- The net effect of the CMS reduction was to wipe out the 340b benefit.
- **Annual Impact to UNM Cancer Center and New Mexico:**
 - \$9.75 million annual reduction in federal reimbursement for cancer care
 - With current provision of \$10 million in unreimbursed ambulatory cancer care, this additional cut leads to a \$20 million hit to the Cancer Center's programs
 - Immediate reduction of over 30 critical staff positions
 - Postponement, cancellation of critical physician and scientist recruitments
 - Elimination of new clinical and research programs, community outreach initiatives, and expanded training and education programs
 - **Jeopardizes competitive renewal of NCI Designation and Federal Funding**

UNMCCC: The Challenge of Federal CMS Reimbursement Cuts



- Executive Order opposed by 232 members of Congress (including the full NM Congressional Delegation)
- Lawsuits brought by AAMC, AHA, Health Systems, joined by the NM Hospital Association in an Amicus Brief, have not yet succeeded and proposed legislation (H.R. 6071) stalled in the current Congress.
- **Next Steps:**
 - Seeking One Year Extension from NCI for Competitive Renewal Submission
 - Continuing to advocate with NM Hospital Association, Congress
 - Seeking increased State Support for FY20; Advice on Best Mechanism
 - **Current State Funding to UNMCCC:**
 - General Fund Line Item (RPSP): **\$2,549,000**
 - State Excise Tax on Cigarettes: **\$3,192,062 (\$525K to SOM)**
 - State Excise Tax: **2 Allotments, Largest One Ends 2025**

