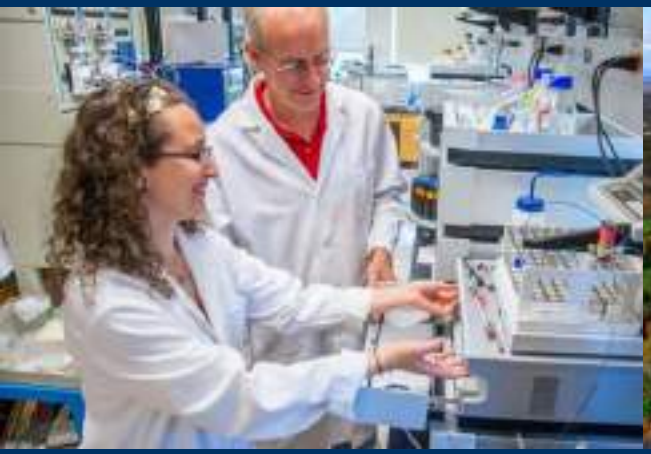
THE UNIVERSITY OF MAINE

Institute of Medicine

Advancing Human Health and Wellbeing in Maine and Beyond



Kody Varahramyan
Vice President for Research
and Dean of the Graduate School

THE UNIVERSITY OF MAINE

David Harder
Director of the Institute of Medicine

Health and Life Sciences

Over 100 Faculty in Health and Life Sciences

Health Sciences	Life Sciences
• Nutrition • Nursing • Kinesiology • Pre-Med • Bio-informatics • Biomedical Sciences • Biomedical Engineering • Psychology	• Biology • Biophysics • Biochemistry • Neuroscience • Microbiology • Social Work • Sociology • Ethics • Communication Sciences and Disorders

Pre-Med Programs

Animal and Veterinary Sciences
Biology
Biomedical Engineering
Chemistry
Food Science and Human Nutrition
Health Professions
Kinesiology and Physical Education
Molecular and Biomedical Sciences
Neuroscience
Psychology

Health and Life Sciences

Undergraduate Programs

Biochemistry
Biology
Biomedical Engineering
Biophysics
Communication Sciences and Disorders
Child Development and Family Relations
Microbiology
Human Development
Health Professions
Nursing
Kinesiology and Physical Education
Psychology
Molecular and Cellular Biology
Social Work
Food Science & Human Nutrition

Graduate Programs and Research

Master's Programs

- Biochemistry
- Biomedical Engineering
- Bioinformatics
- Microbiology
- Communication Sciences & Disorders
- Psychological Sciences
- Social Work
- Nursing
- Family Nurse Practitioner
- Kinesiology and Physical Education
- Food Science and Human Nutrition

Doctoral Programs

- Biomedical Science
- Biological Sciences
- Biochemistry and Molecular Biology
- Clinical Psychology
- Psychological Sciences
- Biomedical Engineering
- Microbiology
- Food Science and Human Nutrition

Genesis

UMaine Medicine Initiative

- Launched in Fall 2018
- Provided coordinated and synergistic support for growth and development of research and scholarly activity in health and life sciences at UMaine
- Better positioned the university with related community outreach and engagement efforts

UMaine Medicine

Key Outcome

Emergence of a transformative and coordinated community of collaborating researchers and educators, who in partnership with health care providers and other stakeholders are dedicated to the advancement of human health and wellbeing in the state of Maine and beyond, through discovery and learning in health and life sciences, from basic and translational research, to clinical practices and healthcare workforce development.

Reasons for Transitioning from UMaine Medicine to Institute of Medicine

- To further grow the benefits derived from UMaine Medicine
- To build on the solid foundation created by UMaine Medicine
- To provide the Institute the proper status that would enable optimum growth in research and scholarly activity in health and life sciences, in conjunction with engagement with the outside world.

Institute of Medicine

Vision

To make Maine a model for a healthy state.

Mission

To develop through innovative and coordinated research, education, and strategic partnerships transformative solutions that enhance the health and wellbeing of the citizens of Maine and beyond.

Goals

To advance medicine and healthcare in Maine and beyond.
To elevate the University's prominence in health and life sciences.
To develop a national model for rural medicine and healthcare.
To enable attainment of external resources to support the Institute's mission goals.

Benefits

- To support in a coordinated and synergistic manner faculty, staff, and students engaged in research and scholarly activity in health and life sciences
- To bring the relevant university centers under the same umbrella, synergizing them to reach their full potential and impact
- To provide the platform for the creation of new centers of excellence in health and life sciences
- To grow the university's state-wide and national partnerships, including with hospitals and healthcare providers
- To enable significant increase in external funding in support of faculty research and scholarly activity in health and life sciences
- To capitalize on existing partnerships and develop new ones with institutions in Maine and beyond to enhance workforce development.

Organizational Structure

Leadership Team

Institute Director and the heads of its major centers and partnering units and programs.

Steering Committee

Representation from the health and life sciences community from across the university working closely with the Leadership Team.

External Advisory Committee

Representation from major healthcare systems in Maine working closely with the Leadership Team.

Getting Affiliated with the Institute

Affiliation with the Institute follows the University of Maine Research Center and Institute Faculty Appointment Guide.

The appointment types consist of Joint, Associate, Research, and External Associate.

Research Thrust Areas

Rural Health
Rural Healthcare & Community Wellbeing

Diagnostic Medicine
Bioimaging & Radiomics

Medical Humanities
Arts & Bioethics & Social Sciences

Immune System
Diseases & Disorders

Major Anticipated Outcomes

Enhance interactions with area health care providers including Northern Light Health Care (EMMC, Acadia, etc.), St. Joseph Healthcare, Penobscot Community Health Center and others.

- **Development of Research MOUs will foster collegial interaction between University faculty, physicians and other healthcare providers.**
- **Provide guidance on matters related to health and life sciences including: translational research, public health, rural outreach, community engagement, and workforce development.**
- **The Institute will serve as a bridge connecting the healthcare community with the University**

Major Anticipated Outcomes

Enhance interactions with research institutions including MDI Biological Laboratory, The Jackson Laboratory, Maine Medical Center Research Institute, and other colleges and universities within the state and beyond.

- **Development of core resources encouraging scientific collaboration and maximization of resources.**
- **Host symposium and workshops on a statewide and national level highlighting research done in Maine.**
- **Strengthen biomedical and engineering research education and training throughout the state.**

Major Anticipated Outcomes

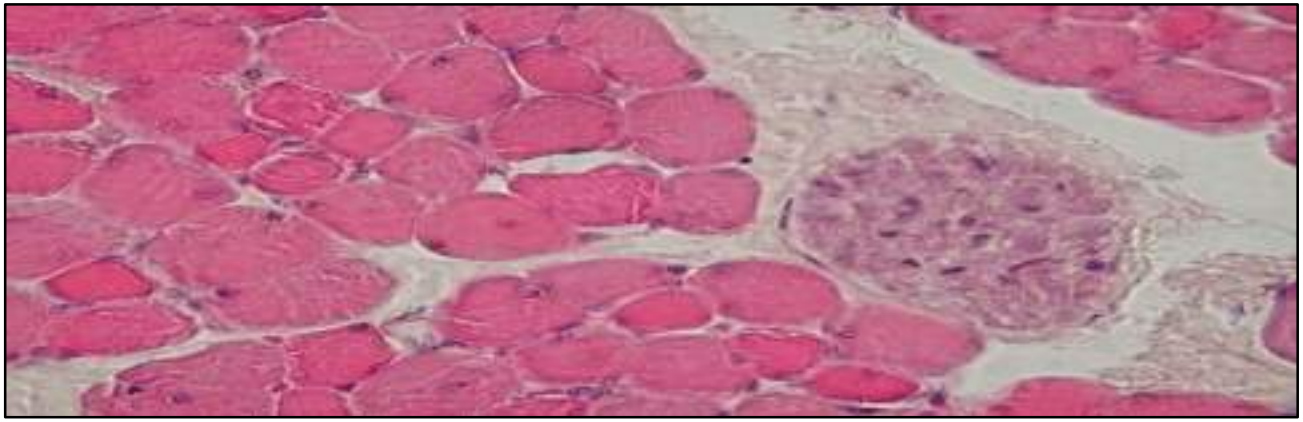
Serve as an umbrella under which faculty engaged in life sciences, social sciences, biomedical engineering and biophysics can find common ground and an enhanced profile.

- **Enhance the University's profile with NIH and other agencies with the goal of increasing funding and development of centers of research excellence.**
- **To support in a coordinated and synergistic manner faculty, staff and students engaged in research and scholarly activity in health and life sciences.**
- **To enable the university to realize its expected role as the state's foremost institution in setting agendas for the realization of health and life sciences R&D and community engagement in Maine, thereby, driving social and economic growth.**

Example of a Current Research Project

Muscle and Healthspan

This project is centered on the discovery of mechanisms that underlie skeletal muscle plasticity and health, using the zebrafish model. The research of skeletal muscle is important because its quality predicts immune system health, better recovery from illness and injury, and healthy aging.



Dr. Clarissa Henry

Dr. Ben King

Dr. Sam Hess

Dr. Josh Kelley

Example of a Current Research Project

Mast Cell and Mitochondrial Disruption by Triclosan and Related Antimicrobials

This project investigates the effects of Triclosan (TCS) and TCS substitutes on plasma membrane potential, mast cell function, mitochondria and various cell types. Dr. Gosse has previously discovered that TCS inhibits the function of mitochondria and immune cell type mast cells.

Dr. Julie Gosse

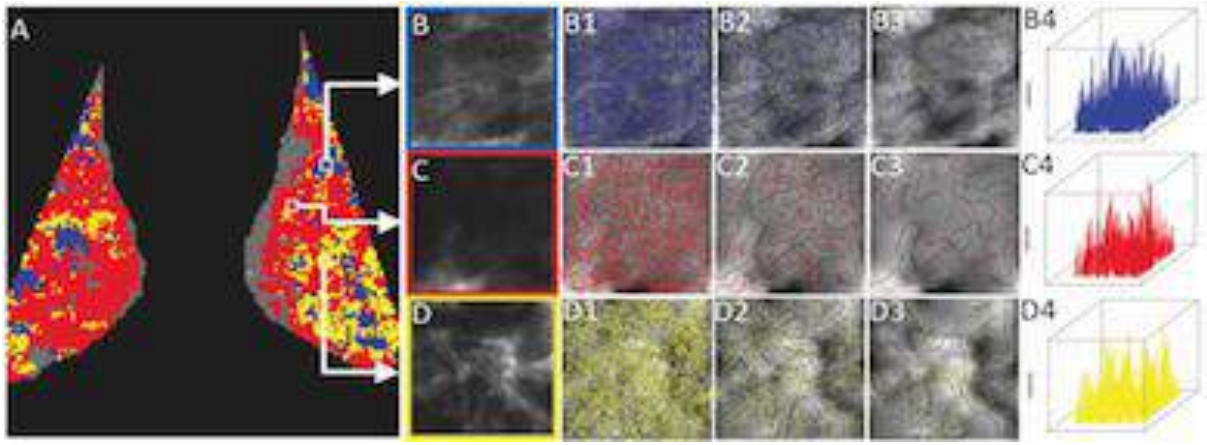
Dr. Robert Gundersen

Dr. Sam Hess

Example of a Current Research Project

Bridging the Gap in Breast Cancer Imaging

Continued efforts are needed to improve the diagnostics and understanding of breast cancer, which affects nearly 1 in 8 women in the United States. Building on Dr. Khalil's previous work in this area, this project is focused on finding the missing link to bridge the gap of tumor microenvironmental knowledge from the research bench to clinical imaging.



Dr. Andre Khalil

Dr. Karissa Tilbury

Dr. Scott Collins

Example of a Current Research Project

Negative Pressure Wound Therapy

The long-term goal of this project is to develop medical implants that reduce the likelihood of post-surgical infection. The team is working on the design and manufacturing of a prototype implant using this new technology.

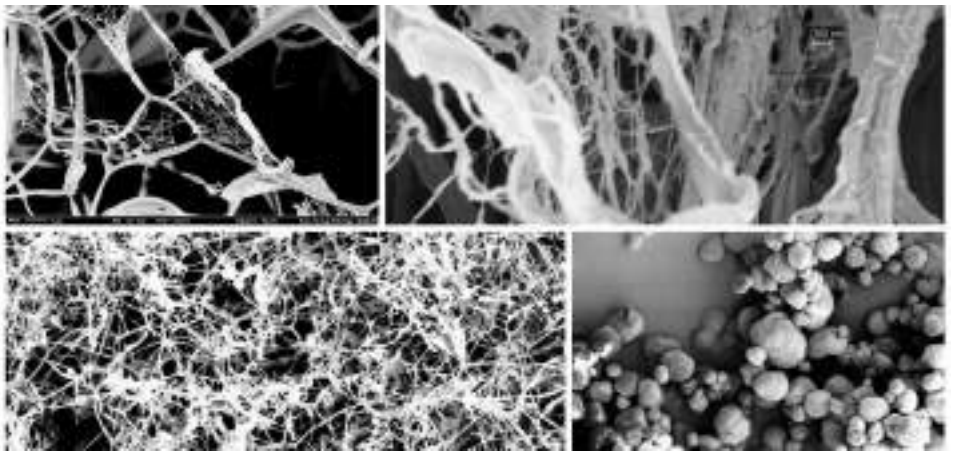
Dr. James Weber, DVM

Dr. Kristy Townsend

Dr. Ian Dickey, MD

Dr. David Neivandt

Dr. Anne Lichtenwalner



Example of a Current Research Project

Role of Extracts from Wild Blueberries on Wound Healing

The Klimis-Zacas lab recently documented in vitro that a chemical compound extracted from Maine wild blueberries increased the speed of wound closure by 38% above the control. In light of these findings, the team is now working to validate those results and design a patch or spray prototype to be tested on humans.

Dr. Dorothy Klimis-Zacas

Dr. Kristy Townsend

Dr. James Weber, DVM

Institute of Medicine

For more information visit
www.umaine.edu/medicine/

Institute of Medicine
Office of the Vice President for Research and
Dean of the Graduate School
University of Maine
York Village #6
Orono, ME 04469

Phone: 207.581.3026
Email:cecile.ferguson@maine.edu

Thank you!

Questions?

Maine Chronic Kidney Disease (ME-CKD) Genetics Pilot Study

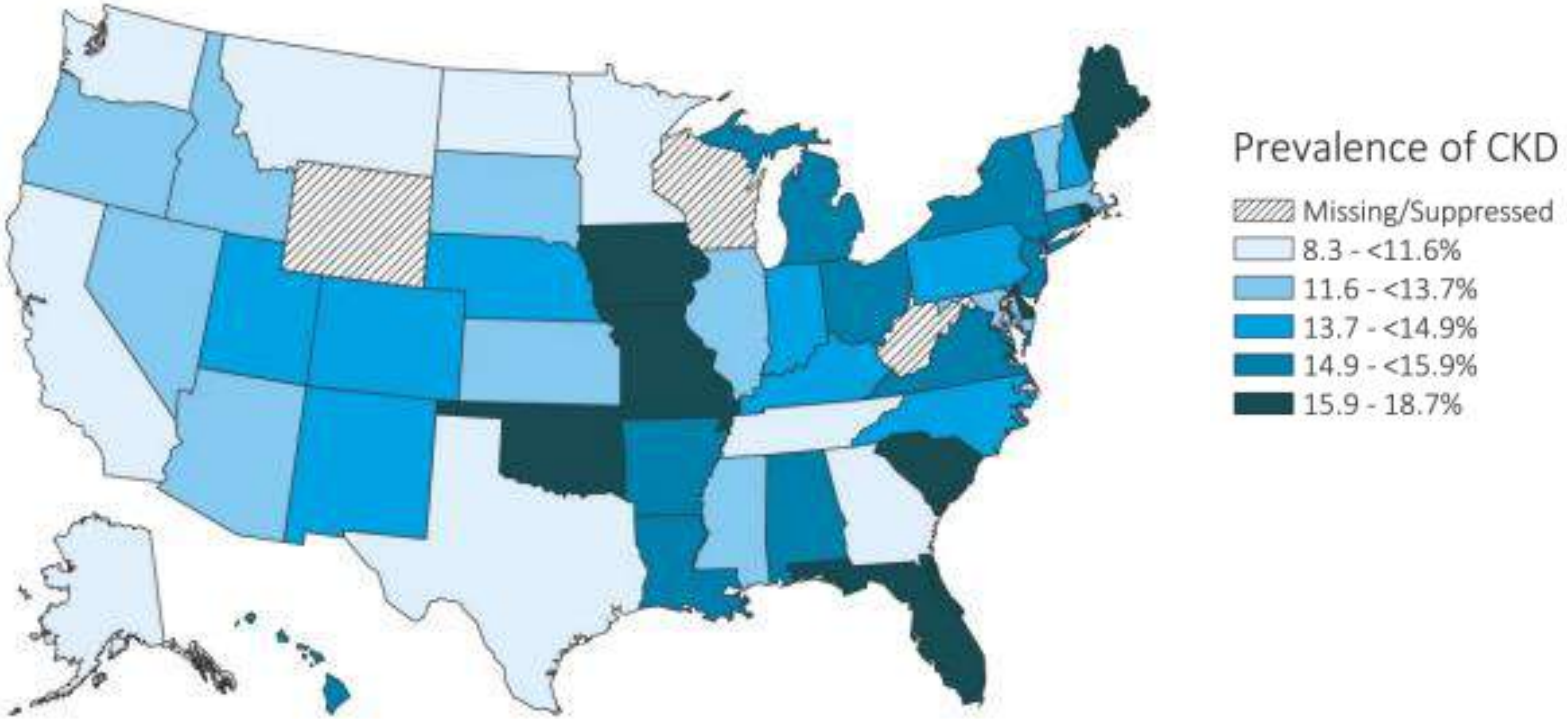
Benjamin King, Ph.D.
Department of Molecular and Biomedical Sciences
UMaine Institute of Medicine
University of Maine

Jim Jarvis, M.D., FAAFP
Director of Education and Clinical Research Center
Northern Light Eastern Maine Medical Center

Prevalence of Chronic Kidney Disease (CKD) in Maine

21,820 individuals in Maine on Medicare had CKD
1,124 of these individuals were on dialysis

8th Highest State Among Medicare Recipients (65+)



US Renal Data System Annual Data Report, 2018

Goal: Identify Genetic Loci Associated with CKD

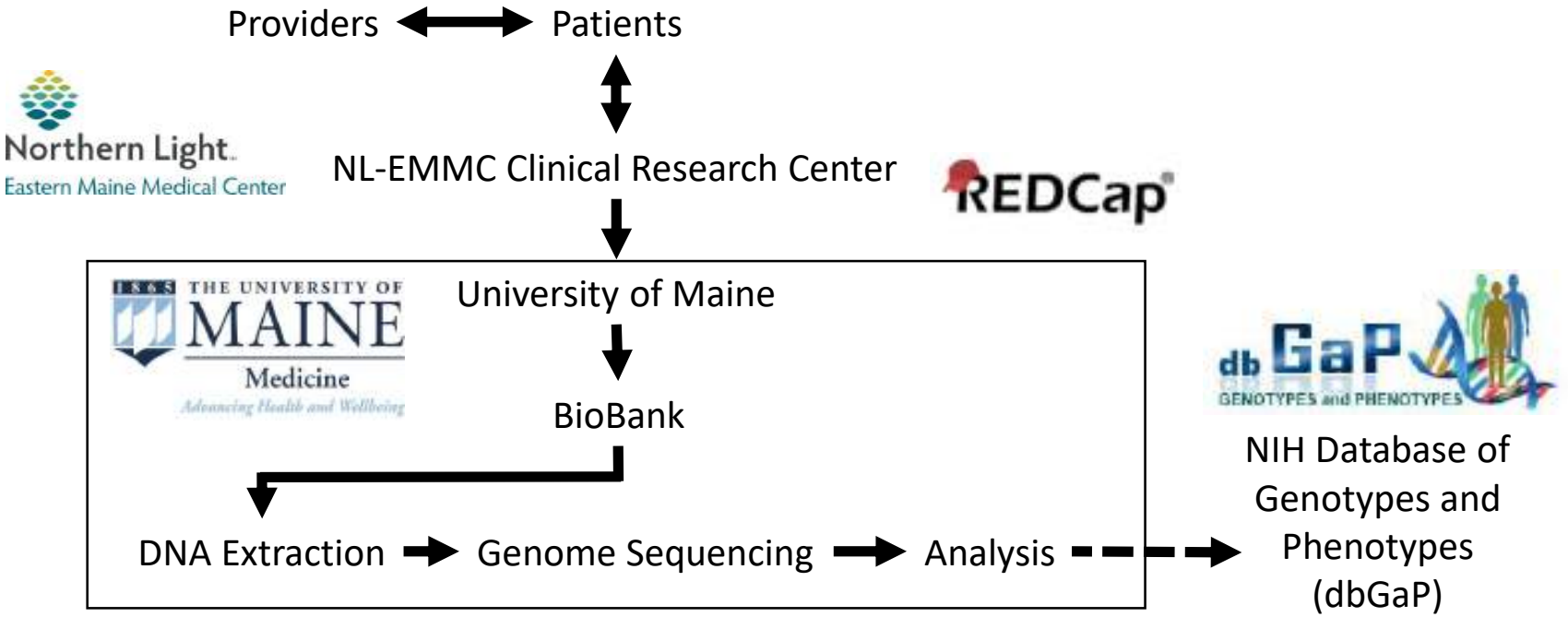
Primary objective:

1) Identify putative genetic loci that increase risk for CKD

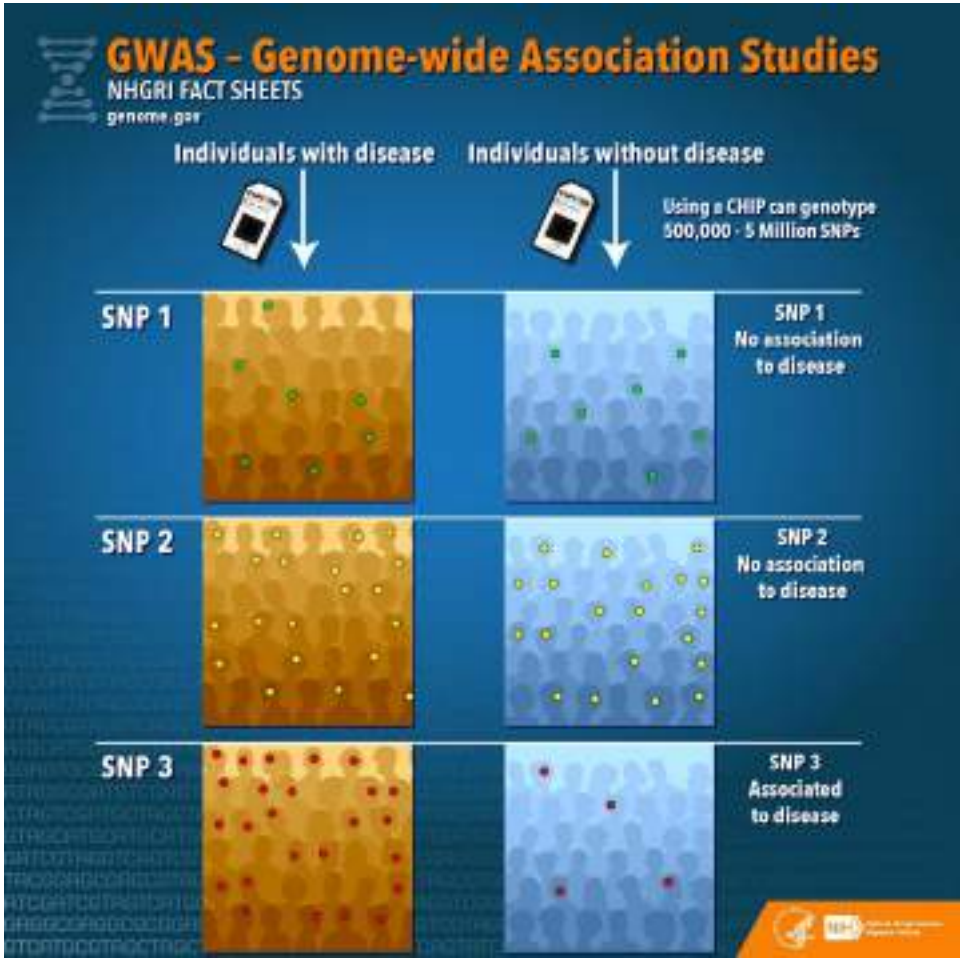
Secondary objectives:

1) Examine associations between known CKD risk loci among study participants
2) Compare genetic data with other CKD studies as a way of assessing whether study participants are a representative cohort of CKD subjects

High-Level Summary of Protocol



Genome-Wide Association Studies (GWAS) Associate Genetic Loci with Disease Phenotypes



Unique Aspects of ME-CKD Genetics Pilot Study

Inclusion Criteria

1. Provision of signed and dated informed consent form
2. Stated willingness to comply with all study procedures and availability for the duration of the study
3. Male or female, aged 18 or older
4. **Diagnosed with Stage II, Stage III, or Stage IV CKD**
5. Ability to provide a blood sample

Exclusion Criteria

Diagnosed with any of the following:

1. Stage I CKD
2. Stage V CKD
3. Diabetes
4. Cystic kidney disease
5. Glomerulonephritis
6. Cancer

Participant genomes will be characterized using whole genome shotgun sequencing

All of Us Research Program

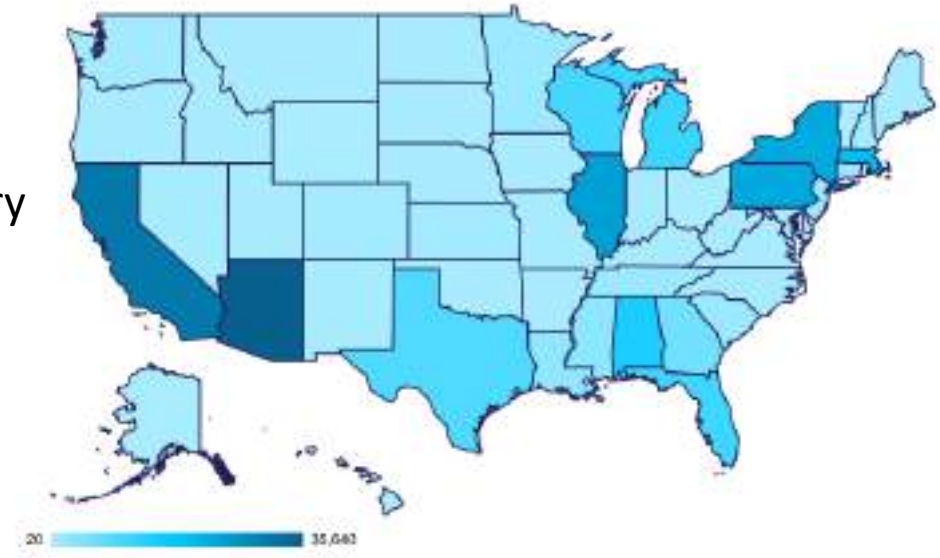
Goal: Create one of the largest and most diverse health databases to accelerate biomedical research and improve health.

1,000,000 participants

- Electronic health record data
- Surveys
- Biospecimen for genomics and laboratory assessments
- Standardized physical measurements

Of 224,143 participants:

- 706 cases
- 166,599 controls



https://www.researchallofus.org/data-snapshots/

Summary of Maine Chronic Kidney Disease (ME-CKD) Genetics Pilot Study

- Goal: Identify putative genetic loci that increase risk for CKD
  - Genome-Wide Association Study
- New collaborative clinical research project with Northern Light – Eastern Maine Medical Center
  - EMMC Clinical Research Center
  - Study protocol approved by EMMC IRB
  - Establishes BioBank for project at the University of Maine
- Access to All of Us Research Program established
- Help enable other clinical research collaborations

Acknowledgements

Northern Light Healthcare

Janet Baylaran, PhD
Liz Carroll
Clinical Research Center Staff
Barbara Sorondo, MD
Jim Jarvis, MD

Steering Committee Members

Hermann Haller, MD, MDI Biological Laboratory
Jens Reuter, MD, The Jackson Laboratory
David Harder, PhD, University of Maine

University of Maine and University of Maine System

Jason Charland, Office of Research Development
Chris Boynton, Office of Research Administration
Rachel Piper, University Services: Strategic Procurement

Funding from the University of Maine System's Research Reinvestment Fund

GSBSE Overview

- A unique collaborative graduate program comprising the five institutions which represent the biomedical research community within the State of Maine
- University of Maine is the degree granting institution
- Four private partnering institutions:
  - The Jackson Laboratory
  - MDI Biological Laboratory
  - Maine Medical Center Research Institute
  - The University of New England
- The largest Ph.D. program in the STEM area in Maine

GSBSE Graduate School of Biomedical Science and Engineering

GSBSE Overview

- 2006 - Founded as the Graduate School of Biomedical Science (GSBS) as a result of a mandate by then Governor Baldacci in his January 2005 State of the State address to bolster research and education in biomedical science.
- 2012 - Graduate School of Biomedical Science (GSBS) became Graduate School of Biomedical Science & Engineering (GSBSE)

Institution	# Students	# Alumni	# Faculty
UMaine	26	25	66
JAX	6	16	39
MDIBL	3	4	14
MMCRI	10	15	23
UNE	6	4	23
External/Other	3	1	30
PSM	21	6	--
Total	**75**	**71**	**195**

Current Degree Programs:

Ph.D. in Biomedical Science
Ph.D. in Biomedical Engineering
Professional Science Masters (PSM) in Bioinformatics

1865 THE UNIVERSITY OF MAINE

Center for Community Inclusion and Disability Studies

University Center for Excellence in Developmental Disabilities

Four Core Functions:

- Research
- Education
- Service
- Dissemination

in Developmental Disabilities

Developmental Disabilities Assistance and Bill of Rights Act of 2000 ("DD Act")

- To assure the people with developmental disabilities and their families ***participate in the design of*** and ***have access to***:
  - needed community services, individualized supports, and other forms of assistance that promote:
    - ***self-determination***
    - ***independence***
    - ***productivity***, and
    - ***integration and inclusion in all facets of community life***

  through culturally competent programs.

John F. Kennedy

Rosemary Kennedy

The Kennedy Family at Hyannis Port, Massachusetts, 1931
Photo by Richard Sears in John F. Kennedy Presidential Library and Museum, Boston

Areas of Emphasis

- Quality Assurance
- ***Education and Early Intervention***
- ***Child Care***
- ***Health***
- ***Employment***
- Housing
- Transportation
- Recreation
- Other Services, Including Formal and Informal Community Supports, that Affect Quality of Life

Community Advisory Committee
















NH-ME LEND:
Leadership Education in Neurodevelopmental and Related Disabilities

Institute on Disability/UCED

University of New Hampshire

Dartmouth-Hitchcock

THE UNIVERSITY OF MAINE

Center for Community Inclusion and Disability Studies

University Center for Excellence in Developmental Disabilities

Supporting Children of the Opioid Epidemic

- Build nationwide provider capacity in applying evidence-based practices in screening, monitoring, and supporting children diagnosed with NAS, NOWS, or suspected of being impacted by opioid use, trauma, or related exposure
- Telepractice model: Extension for Community Health Outcomes (ECHO™)

Afari™

ccids.umaine.edu/research-projects/afari

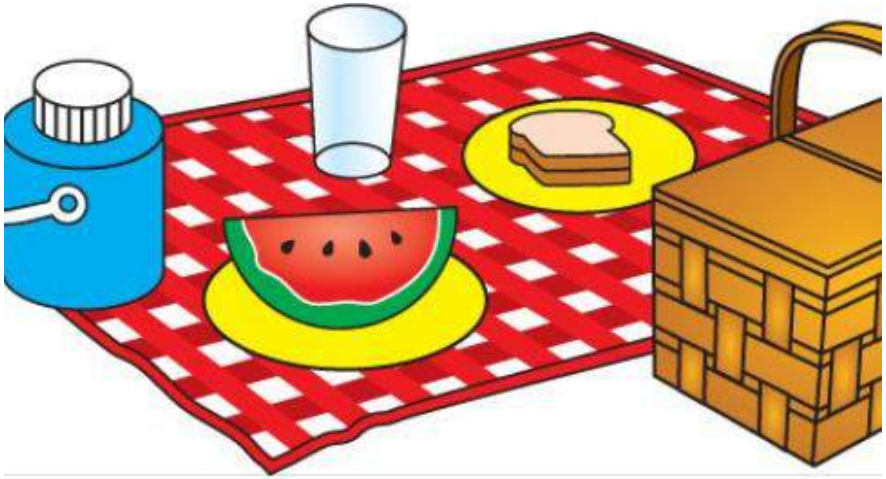
Lent by Mobility Technologies
Mobility Aid, AFARI, 2010-14
Author: Cooper Hewitt, Smithsonian Design Museum
https://collection.cooperhewitt.org/objects/1158847061

Some Other CCIDS Activities

- Undergraduate minor in Disability Studies
- Graduate Certificate
- Research, Evaluation, and Technical Assistance on Child Care and Education of Children with Disabilities
- and much more

Covid-19 Activities

- ***"Social Undistancing" Project***
- Disparities in Covid Impact
- Equitable Access to Treatment and Access to Supports



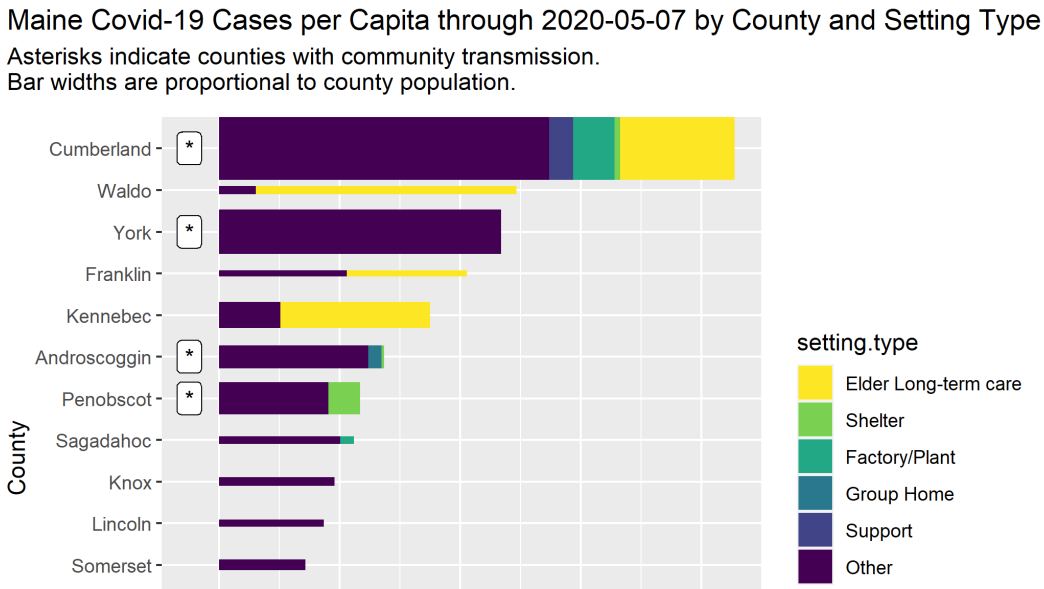
AUG
15

Virtual Picnic

Public · Hosted by **University of Maine Center for Community Inclusion and Disability Studies** and **Cindy Thielen**

Covid-19 Activities

- "Social Undistancing" Project
- ***Disparities in Covid Impact***
- Equitable Access to Treatment and Access to Supports



Covid-19 Activities

- "Social Undistancing" Project
- Disparities in Covid Impact
- ***Equitable Access to Treatment and Access to Supports***

AUCD: Growing Leaders, Driving Change

Association of University Centers on Disability
https://www.youtube.com/watch?v=EG5u8ybB92o

THE UNIVERSITY OF MAINE

Center on Aging

UMaine Institute of Medicine Webinar – Impact Week

September 29, 2020

Lenard W. Kaye, DSW, PhD
Professor and Director

Center on Aging Overview

- **Established in 2001**
- **The only unit of UMS devoted exclusively to issues of aging and the aging process**
- **An interdisciplinary research center within the University of Maine**
- **Thematic areas of emphasis**
  - Rural aging
  - Aging and thriving in place
  - Engaged/Productive aging
- **Three focal areas:**
  - Research and Evaluation
  - Education and Training
  - Service/Technical Consultation

THE UNIVERSITY OF MAINE
Center on Aging

Students Have Played an Enormous Role From Day 1

Student volunteers assist with cataloguing expired prescription drugs being prepared for disposal as part of the Safe Medicine Return for ME program

MSW students assist with the annual University of Maine Clinical Geriatrics Colloquium

Specialized training in geriatrics and gerontology for the next generation of health and human service professionals

THE UNIVERSITY OF MAINE Center on Aging

Health Promoting Community Service Programming

Helping older adults age-in-place with high quality of life

Learning for the fun of it

Placing volunteers in service to our communities

Gateway Seniors without walls IN AFFILIATION WITH UMaine Center on Aging

1865 THE UNIVERSITY OF MAINE Center on Aging

Education and Training

- Interprofessional **Graduate Certificate** in Gerontology
- Annual **Clinical Geriatrics Colloquium**
- **Health Connection Chats** helping Mainers stay safe, well, and connected during the pandemic
- **AgingME** Geriatrics Workforce Enhancement Program

Research on Topics Relevant to Life Span Health Issues

- Screening for **Elder Abuse** (Maine Health Access Foundation)
- Assessing Geriatric **Mental Health** Issues (Maine DHHS)
- Disposing **Prescription Drugs** Safely (U.S. EPA and Maine Drug Enforcement)
- Preventing Older Adult **Falls** (NIH/NIA)
- Treating **Alcohol and Substance Abuse** (ME Substance Abuse and U.S. Children's Bureau, DHHS)
- Strengthening Family **Caregiver Supports** (Weinberg Foundation)
- **Osteoporosis** Education for Post-Menopausal Women (U.S. Administration on Aging, DHHS)
- Expanding Older Adult **Medical Transportation** Services (EMHS)
- Developing **Adult Day Care** Services (Maine Health Access Foundation)
- Improving **Oral Health** in Long-Term Care (Lunder-Dineen Health Alliance)

Access to older citizen scientists through our community service programs and our Maine Older Adult Research Subject Registry

THE UNIVERSITY OF MAINE Center on Aging

Collaboration is Key

Every single initiative at CoA requires extensive and genuine collaborations with community businesses, foundations, public agencies, non-profit organizations, and older adults themselves

- Maine Professional Associations (Pharmacists, Physicians)
- USM/UNE
- Community Health Networks & Coalitions
- Medical Centers/FQHCs
- Community Action Programs/Area Agencies on Aging

Just a Few of the Partnerships Over the Years