
NIH Tribal Advisory Committee Meeting
April 29-30, 2026
Rocky Mountain Laboratories | NIAID
Hamilton, MT
Photo credit:
City of Hamilton, Montana

TAC Caucus 1: Closed Session



Karina Walters Ph.D.
Director
Tribal Health Research Office

Welcome and Land Acknowledgment



Karina Walters Ph.D.
Director
Tribal Health Research Office



Kimberly Hampton, Ph.D.,
M.Psy., M.Ed., M.B.A.



Annie Belcourt, Ph.D.
Associate Professor, School of Public and Community Health Sciences Department, University of Montana

Introductions, Welcome, and Business



Karina Walters Ph.D.
Director
Tribal Health Research Office



Herminia Frias, M.P.H.



Stephen Kutz, M.P.H., B.S.N.



Marshall E. Boom. M.D.



Steve M. Holland, M.D.
Director, Division of Intramural Research (DIR),
National Institute of Allergy and Infectious Diseases (NIAID)

The National Institutes of Health Intramural Program: An Extraordinary Opportunity

Steven M. Holland, MD
Director, Division of Intramural Research
National Institute of Allergy and Infectious Diseases
smh@nih.gov

The First Hippocratic Aphorism

Ὁ βίος βραχὺς, ἡ δὲ τέχνη μακρὴ, ὁ δὲ καιρὸς ὀξὺς,
ἡ δὲ πεῖρα σφαλερὴ, ἡ δὲ κρίσις χαλεπή

Vita brevis; ars longa; occasio celeris;
experimentum periculosum; iudicium difficile.

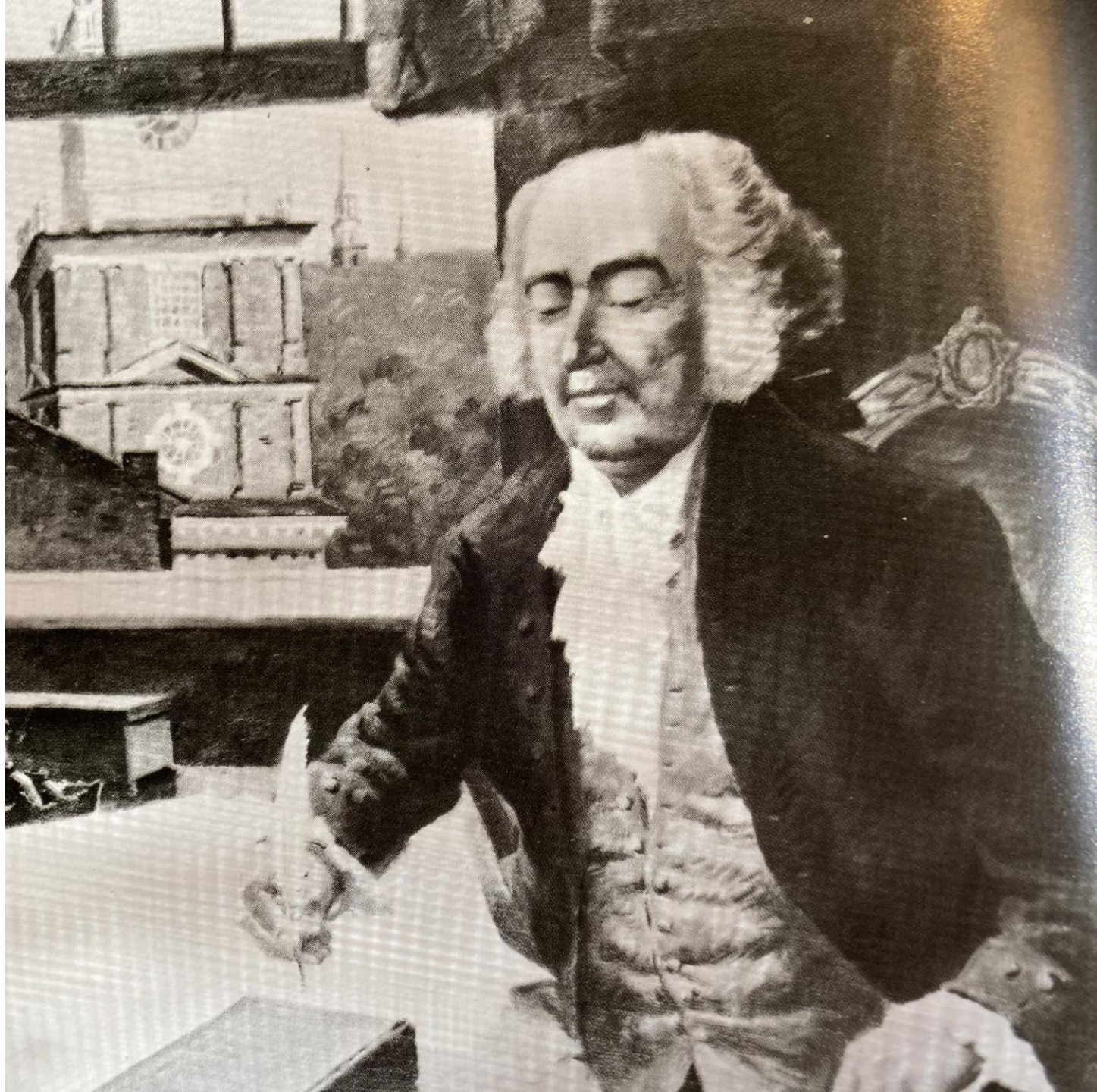
Life is short; the art is long; opportunity fleeting;
experience misleading; judgment difficult.

The Public Health Service

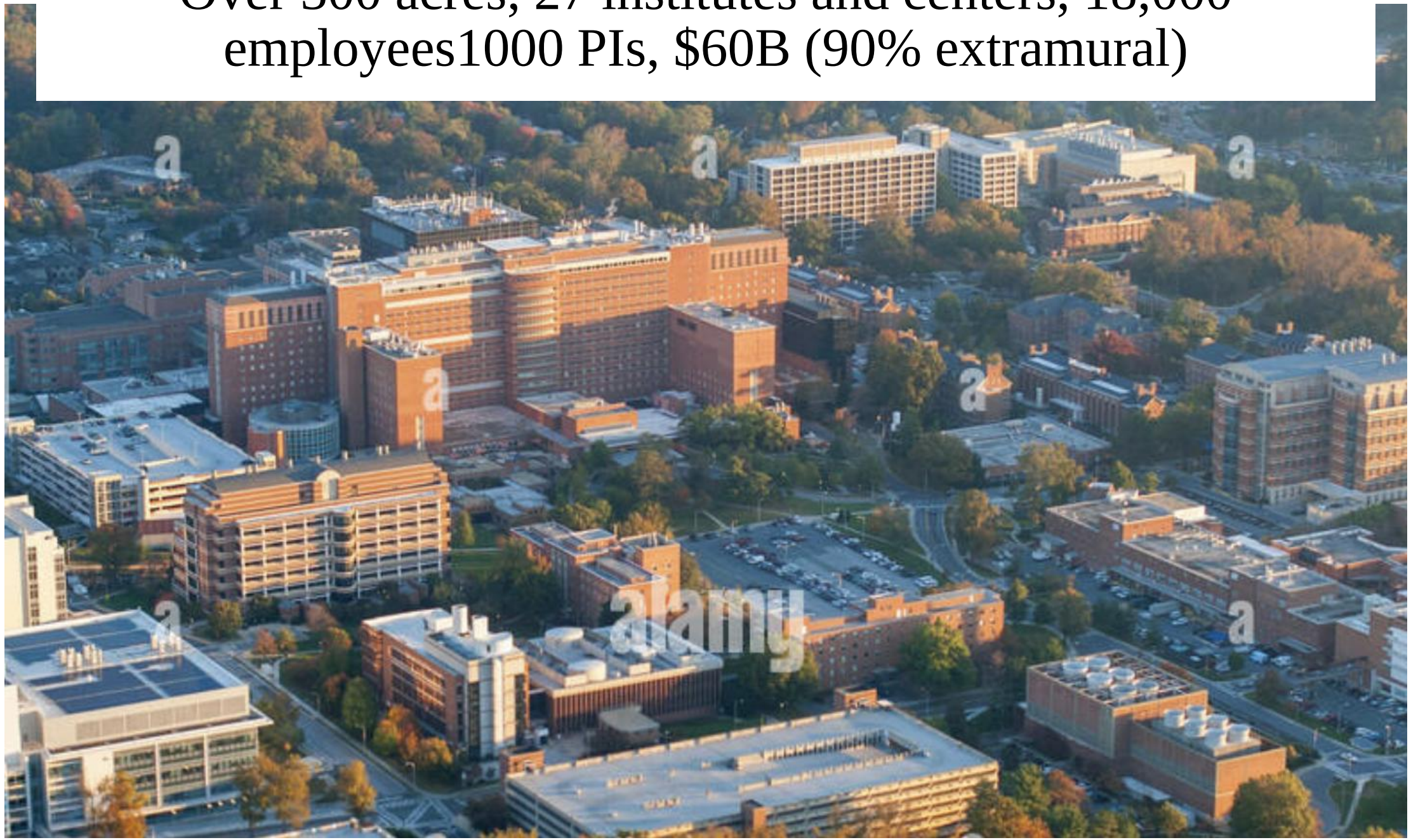
John Adams July 16, 1798

"The temporary relief and maintenance of sick or disabled seamen in the hospitals or other proper institutions now established in the several ports of the United States…"

20 cents/month per sailor



Over 300 acres, 27 institutes and centers, 18,000 employees1000 PIs, $60B (90% extramural)



The NIH Clinical Center
Residencies, Fellowships, Postdocs, Rotations, Sabbaticals



Rocky Mountain Laboratories
Hamilton, Montana



US National Institutes of Health




Bethesda
Arlington
MARYLAND
POPULATED PLACES
Baltimore
Bethesda
Cumberland
Annapolis
Washington
TRANSPORTATION
PHYSICAL FEATURES
Streams
Lakes
Albers equal area projection
PENNSYLVANIA
WEST VIRGINIA
VIRGINIA
DELAWARE
NEW JERSEY
ATLANTIC OCEAN
Frostburg
Hagerstown
Frederick
Westminster
Towson
Aberdeen
Columbia
Dundalk
Annapolis
Easton
Cambridge
Salisbury
Ocean City
St Charles
Lexington Park
Pocomoke City
Deep Creek Lake
Chesapeake Bay
Delaware Bay
Potomac River
Backbone Mtn
1,710 × 1,444

EXTRAMURAL

Domestic

Universities

Hospitals



Medical Schools

Research Institutes

International

NIAID's Complex Mandate

Respond to emerging threats and diseases

Support and promote basic science

Enable and foster clinical research

Provide outstanding patient care to support both

Why is the intramural program special?

Retrospective review of research

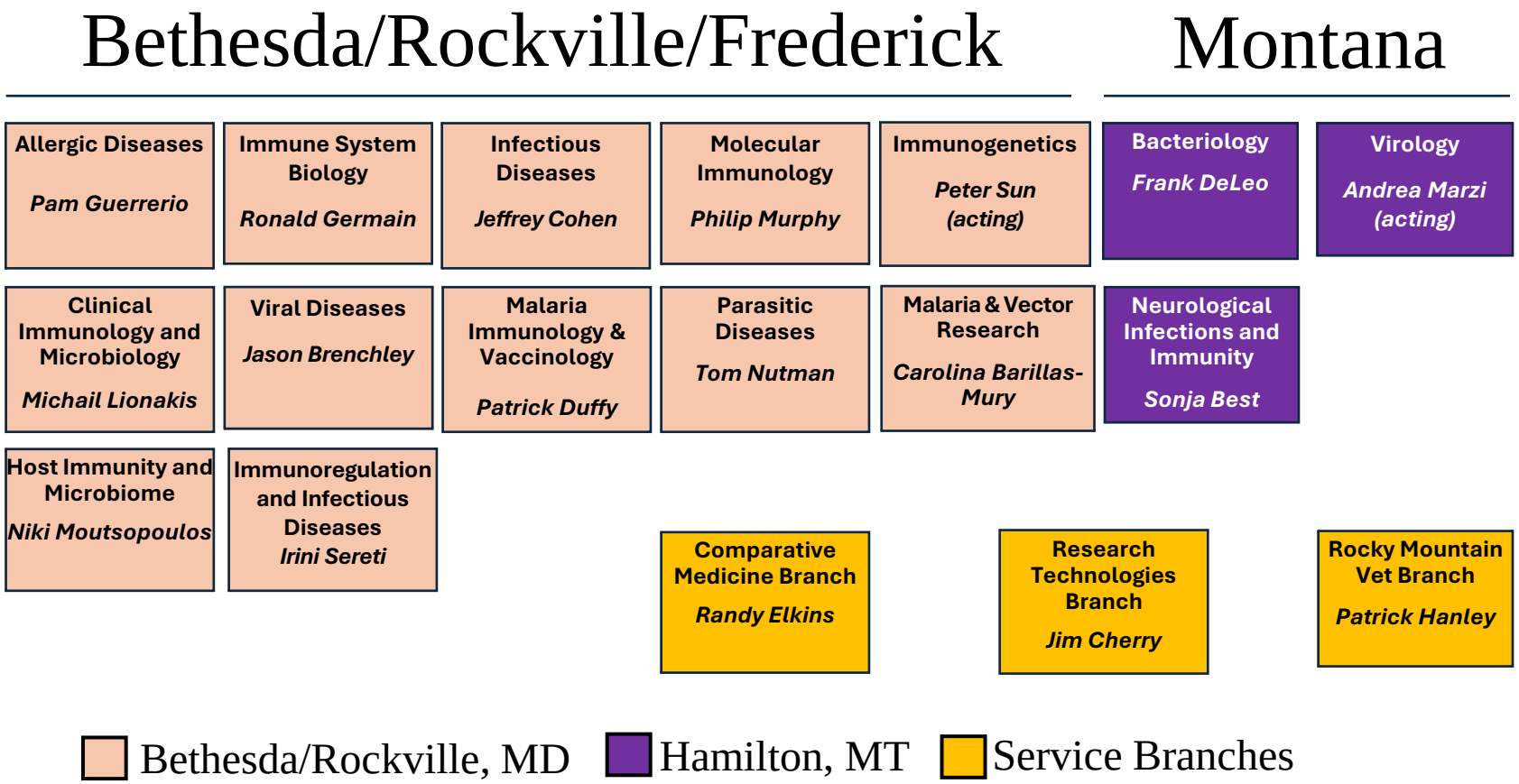
Relatively stable resources

Freedom to ask difficult long-term questions

An *integrated* research hospital

Fully covered care

Division of Intramural Research



NIAID Division Intramural Research

Basic, translational and clinical research

high-risk, high-reward

~1,800 employees, fellows and contractors

119 Principal Investigators
38 Clinical Investigators
~500 students and trainees

Scope of Research Activities

Basic	Translational	Clinical
Study the immune system	Develop vaccines	Viral, Bacterial, Fungal Diseases
Molecular structure, function, cell signaling	Design therapeutics and diagnostics	Primary Immunodeficiency Diseases
Host pathogen interactions	Control of allergic responses	Allergies
Genetic control of immunity	Microbial pathogenesis	Cell and organ transplantation
Biology of microorganisms	Blockade of disease transmission	
Life cycle of infectious agents		

Vaccine Research Center



Ted Pierson



SARS CoV2, Ebola, Malaria, HIV, Pandemic Preparedness

Division of Intramural Research II

Bethesda/Rockville/Frederick

- **Allergic Diseases** — *Pam Guerrerio*
- **Immune System Biology** — *Ronald Germain*
- **Infectious Diseases** — *Jeffrey Cohen*
- **Molecular Immunology** — *Philip Murphy*
- **Immunogenetics** — *Peter Sun (acting)*
- **Clinical Immunology and Microbiology** — *Michail Lionakis*
- **Viral Diseases** — *Jason Brenchley*
- **Malaria Immunology & Vaccinology** — *Patrick Duffy*
- **Parasitic Diseases** — *Tom Nutman*
- **Malaria & Vector Research** — *Carolina Barillas-Mury*
- **Host Immunity and Microbiome** — *Niki Moutsopoulos*
- **Immunoregulation and Infectious Diseases** — *Irini Sereti*

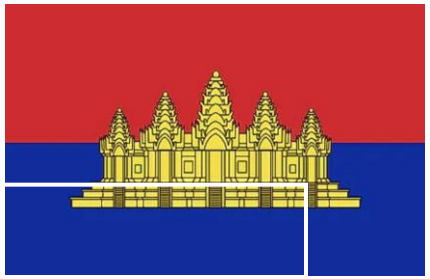
Montana

- **Bacteriology** — *Frank DeLeo*
- **Virology** — *Andrea Marzi (acting)*
- **Neurological Infections and Immunity** — *Sonja Best*

Service Branches

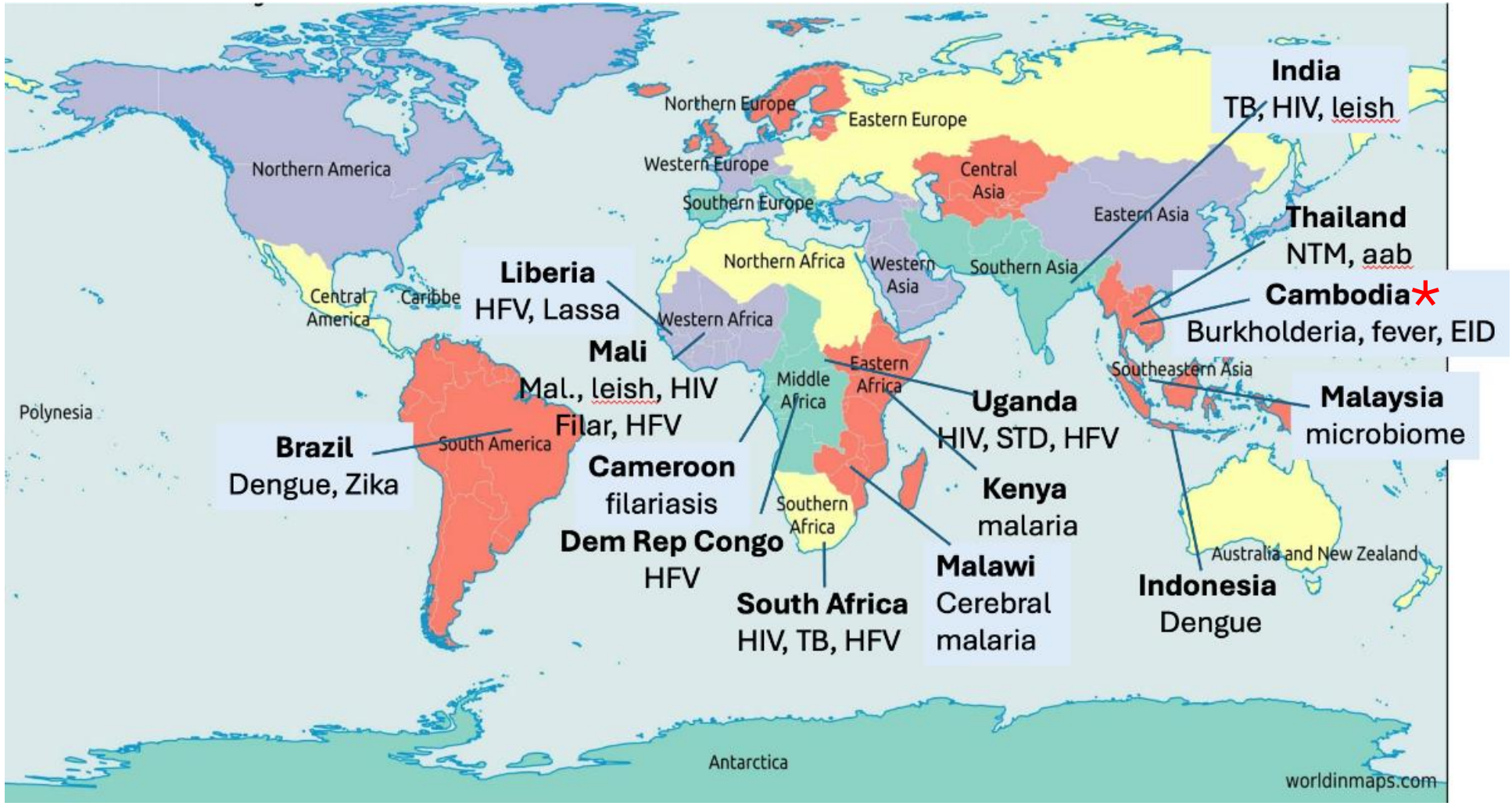
- **Comparative Medicine Branch** — *Randy Elkins*
- **Research Technologies Branch** — *Jim Cherry*
- **Rocky Mountain Vet Branch** — *Patrick Hanley*

Bethesda/Rockville, MD | Hamilton, MT | Service Branches






Everywhere Else



What will NIAID continue to focus on?

Basic Research

How does the immune system work?

How does the immune system go wrong?

How do microbes and viruses work?

Why and how do they cause disease?

How do we interact with our microbes?

High-containment research (RML, IRF)

What are the outputs of that work?

Vaccines for dengue and emerging diseases

Monoclonals for malaria

Treatments for mycobacterial diseases

Treatments for fungal diseases

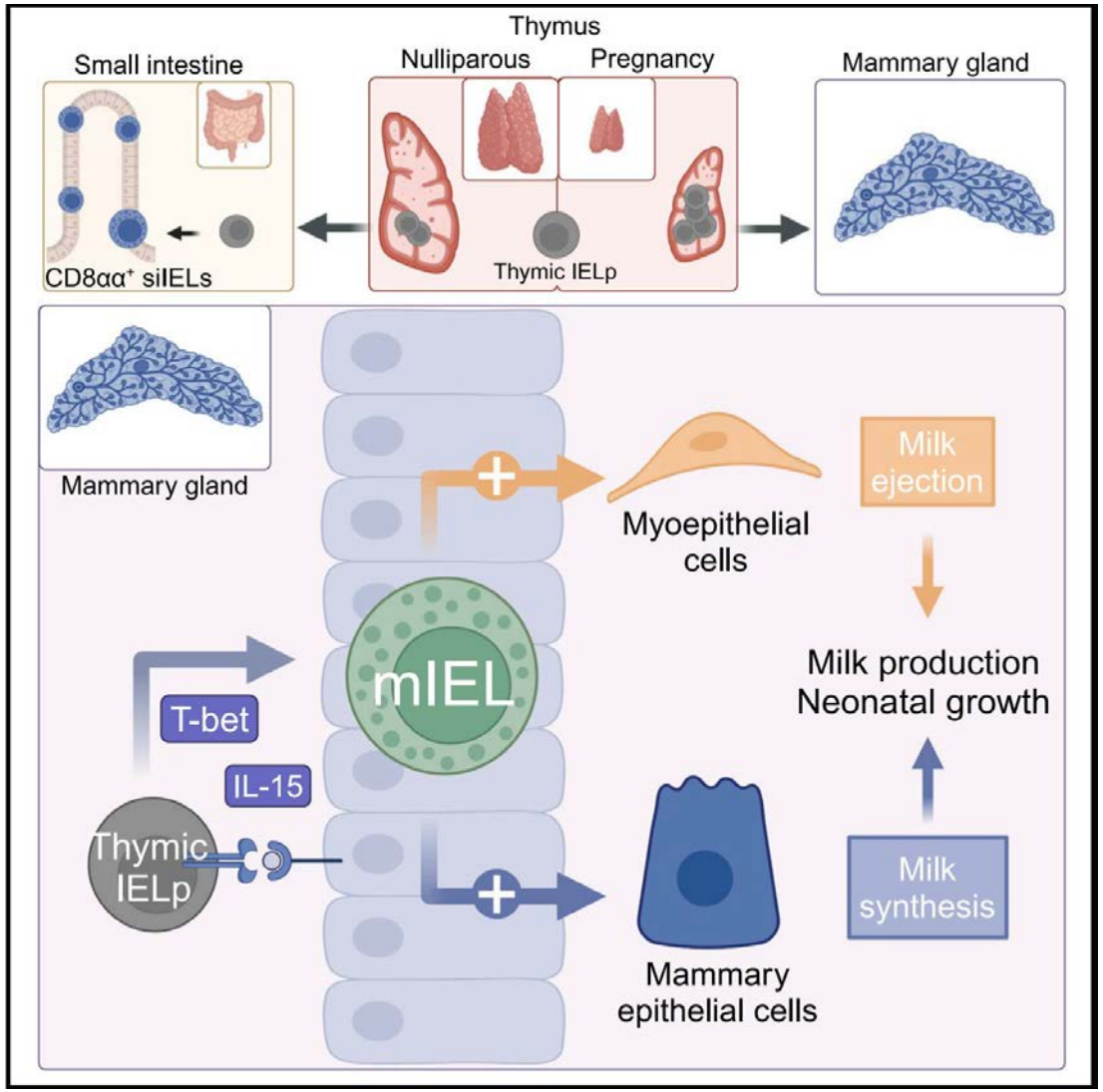
Treatments for viral diseases

Identification of Immunodeficiencies

Transplant and gene therapy

Cell

Mammary intraepithelial lymphocytes promote lactogenesis and offspring fitness



In pregnancy:

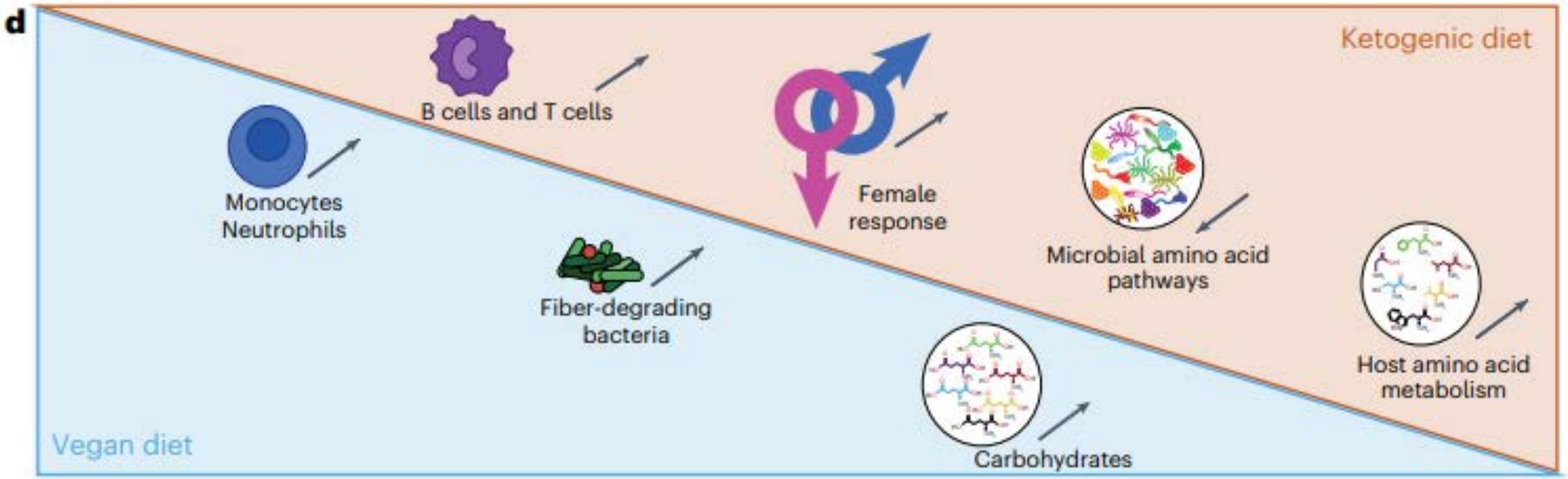
Lymphocytes are diverted from the gut to the breast
They interact with IL-15 and become intraepithelial
They promote the growth of mammary epithelium
And myoepithelial cells, making more milk and
Expressing more of it. They also go into milk.

Mammary intraepithelial lymphocytes enhance mammary gland differentiation during pregnancy, thereby promoting offspring fitness.

Corral… Belkaid et al., 2025, Cell 188, 1662–1680

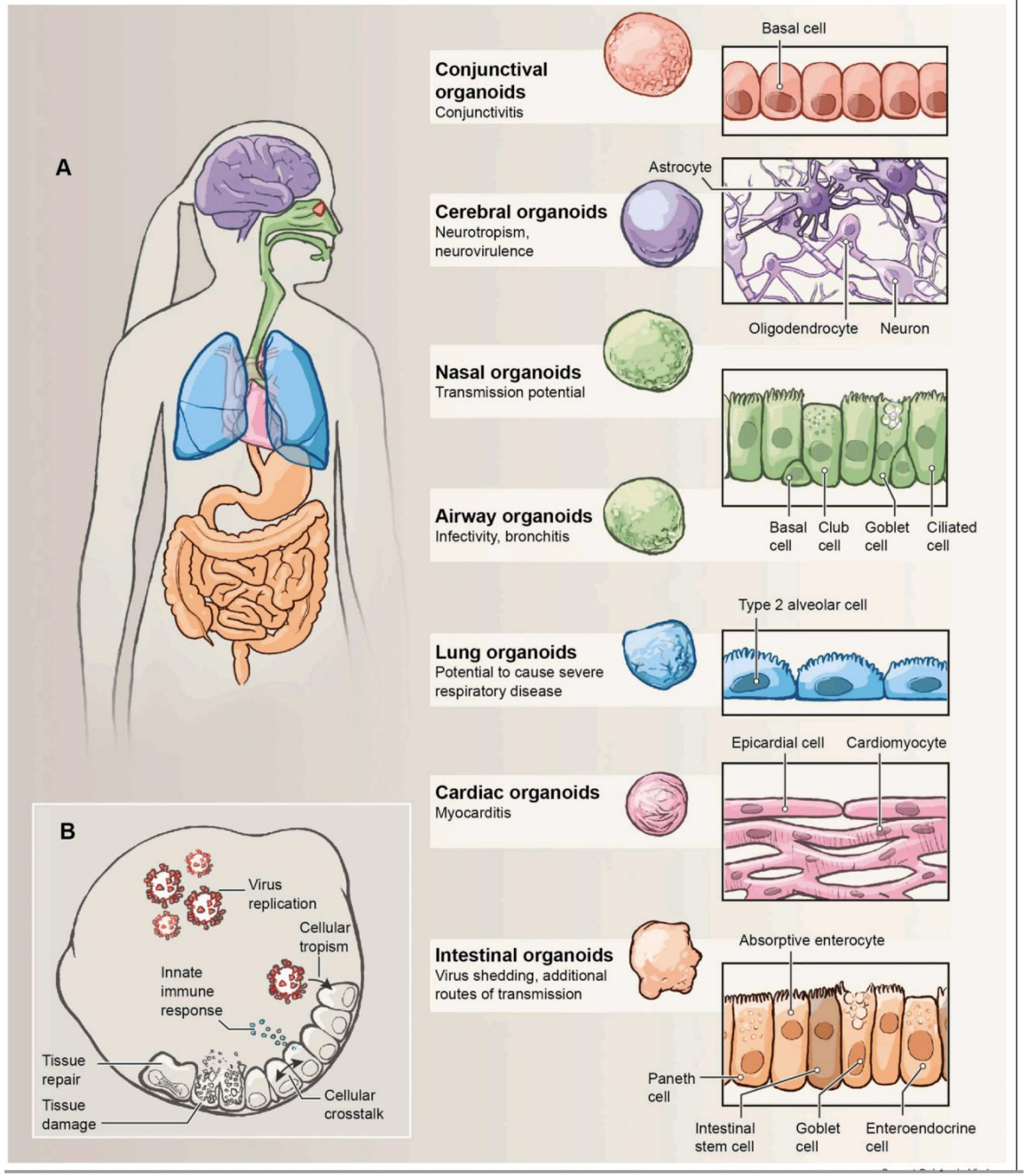
Article https://doi.org/10.1038/s41591-023-02761-2

Differential peripheral immune signatures elicited by vegan versus ketogenic diets in humans





Yasmine Belkaid

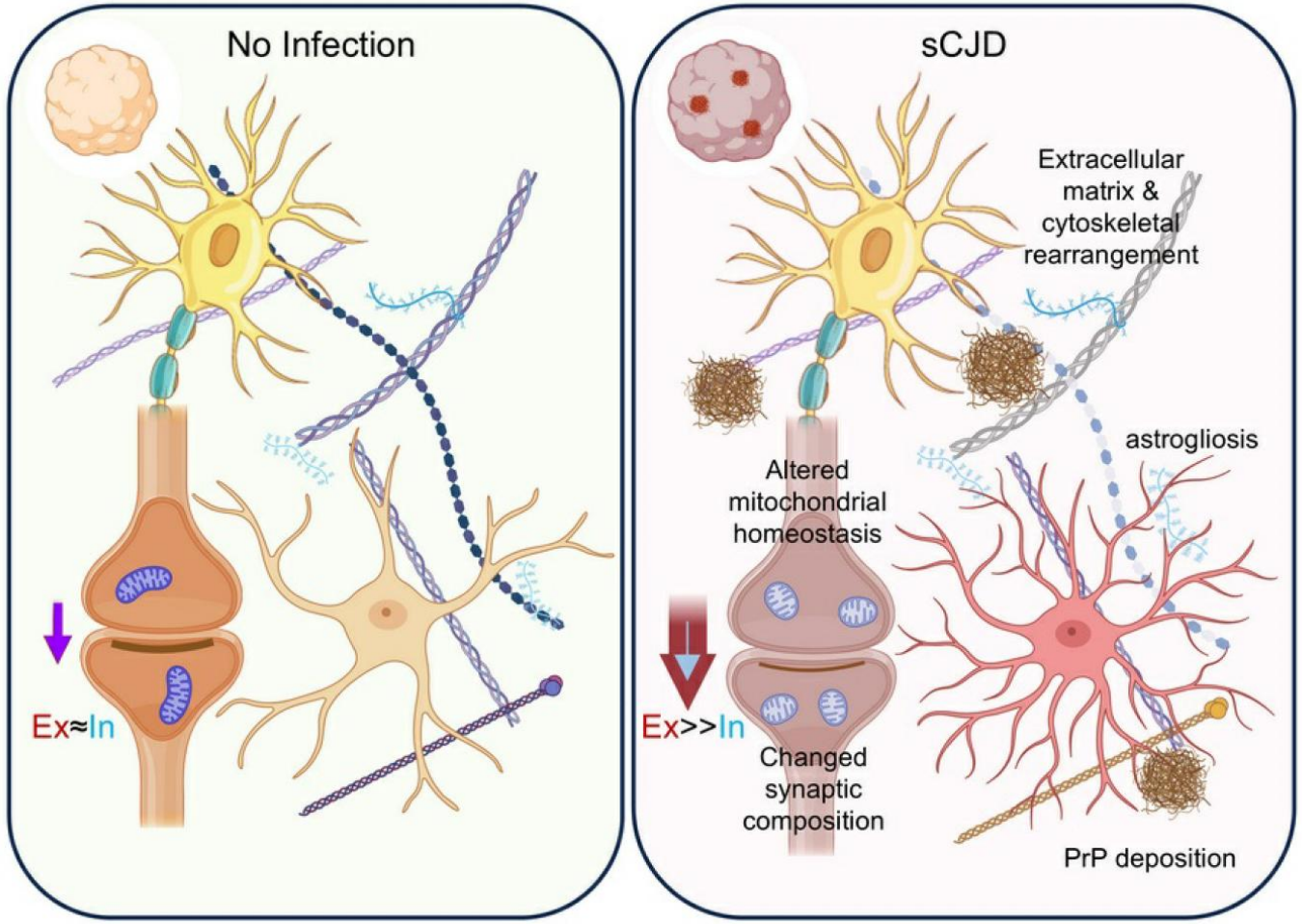


Current Opinion in Virology 2024, 68-69:101435

Distinct neuronal alterations distinguish two subtypes of sporadic Creutzfeldt-Jakob disease with shared dysfunctional pathways

Katie Williams, Bradley R. Groveman, Simote T. Foliaki, Brent Race, Arielle Hay, Ryan O. Walters, Tina Thomas, Gianluigi Zanusso, James A. Carroll, Cathryn L. Haigh

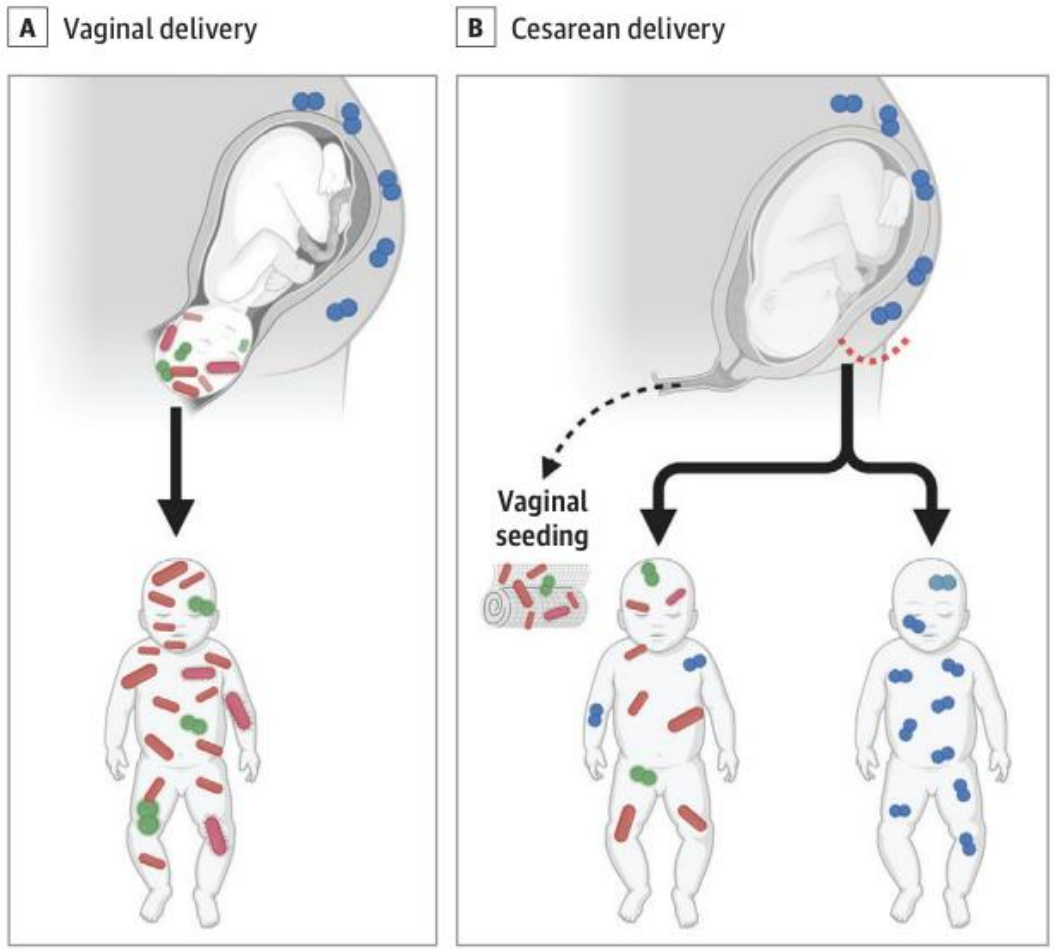
J Clin Invest. 2026;136(8):e194721. https://doi.org/10.1172/JCI194721.



Can Vaginal Seeding Improve Health Outcomes of Infants Born by Cesarean Delivery?

Suchitra K. Hourigan, MD; Noel T. Mueller, PhD; Maria Gloria Dominguez-Bello, PhD

Figure. Vaginal Seeding in Infants Born by Cesarean Delivery



Article https://doi.org/10.1038/s41591-025-03739-y

Anti-sporozoite monoclonal antibody for malaria prevention: secondary efficacy outcome of a phase 2 randomized trial



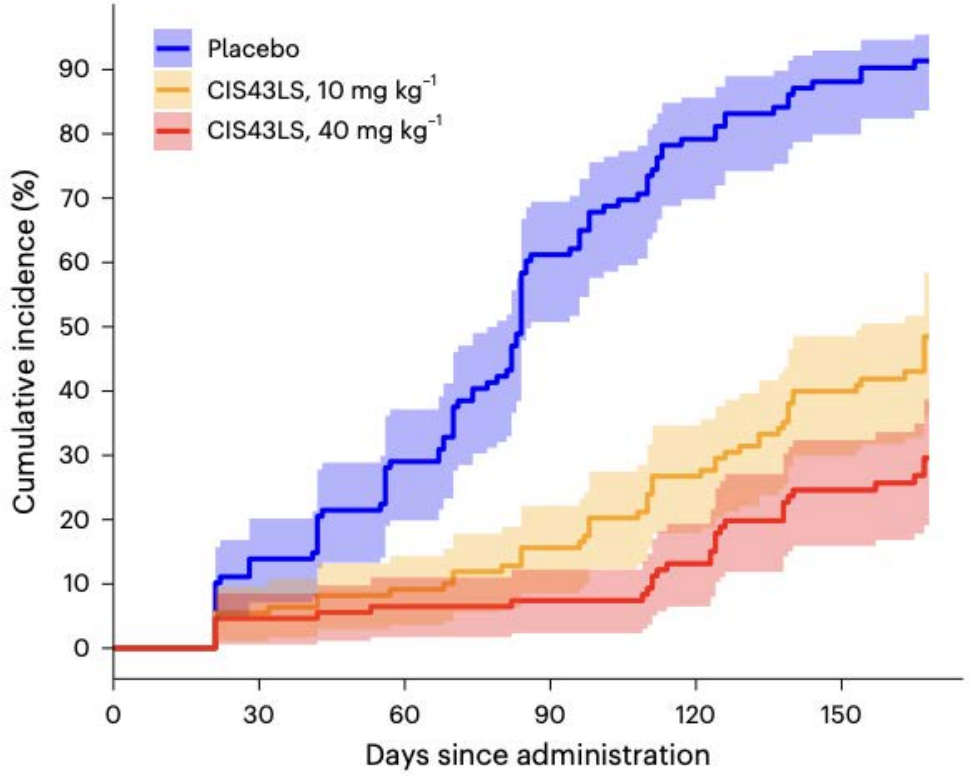
Pete Crompton



Bob Seder



Kassoum Kayentao



Number at risk

Placebo	110	91	75	41	22	12
CIS43LS, 10 mg kg^{-1}	110	103	99	91	79	62
CIS43LS, 40 mg kg^{-1}	110	103	101	99	91	79

How does NIAID do all that?

Centralized support

Genetics: from microbes to humans

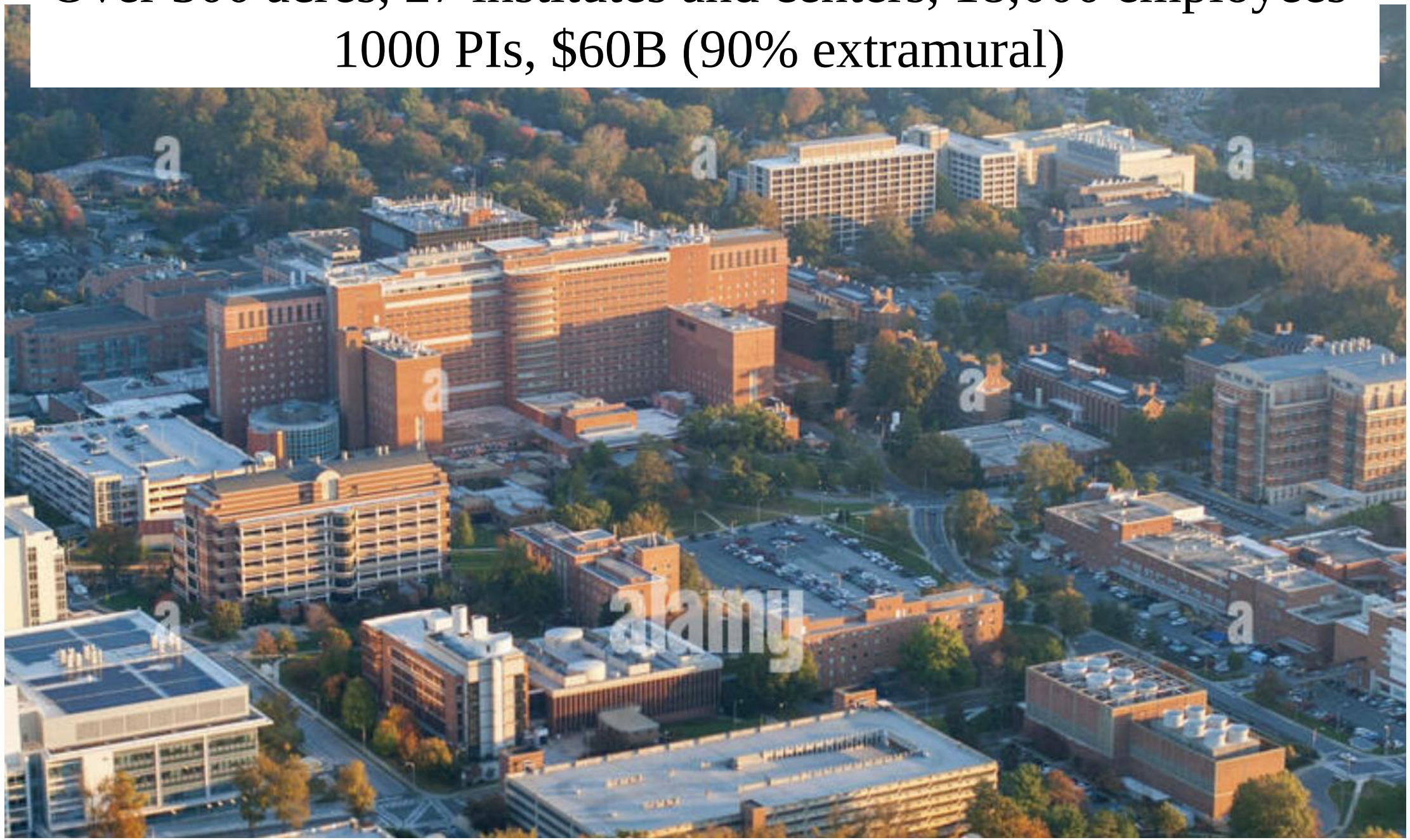
Immunologic, proteomic and molecular support

Animal replacement programs

Comprehensive clinical support

Continued emphasis on clinical activity

Over 300 acres, 27 institutes and centers, 18,000 employees
1000 PIs, $60B (90% extramural)



The First Hippocratic Aphorism II

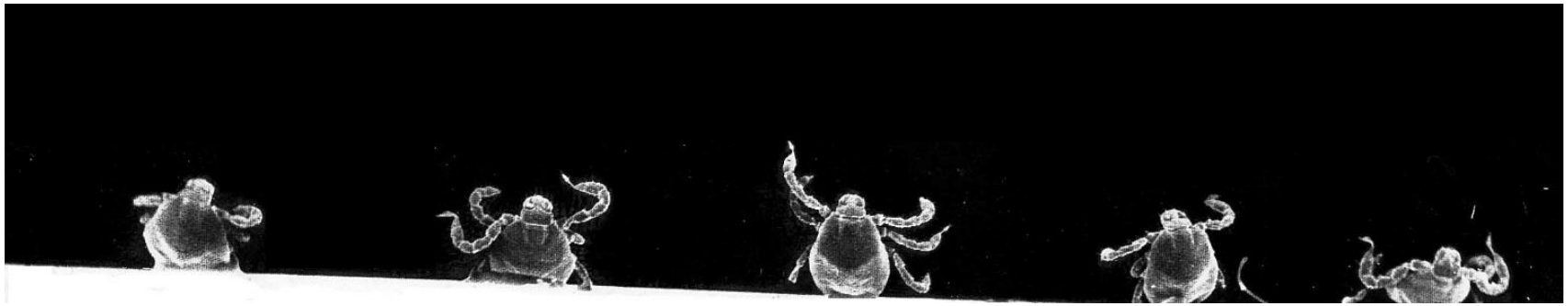
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ἡ δὲ πεῖρα σφαλερὴ, ἡ δὲ κρίσις χαλεπή

Vita brevis; ars longa; occasio celeris;
experimentum periculosum; iudicium difficile.

Life is short; the art is long; opportunity fleeting;
experience misleading; judgment difficult.



Marshall E. Boom, M.D.
Associate Director for Scientific Management,
Rocky Mountain Laboratories, Division of Intramural Research, DIR, NIAID, NIH



Rocky Mountain Labs overview

NIH Tribal Advisory Committee meeting

Marshall E. Bloom, M.D.
Associate Director for Scientific Management
Rocky Mountain Laboratories
National Institute of Allergy and Infectious Diseases
Hamilton, Montana
April 29, 2026

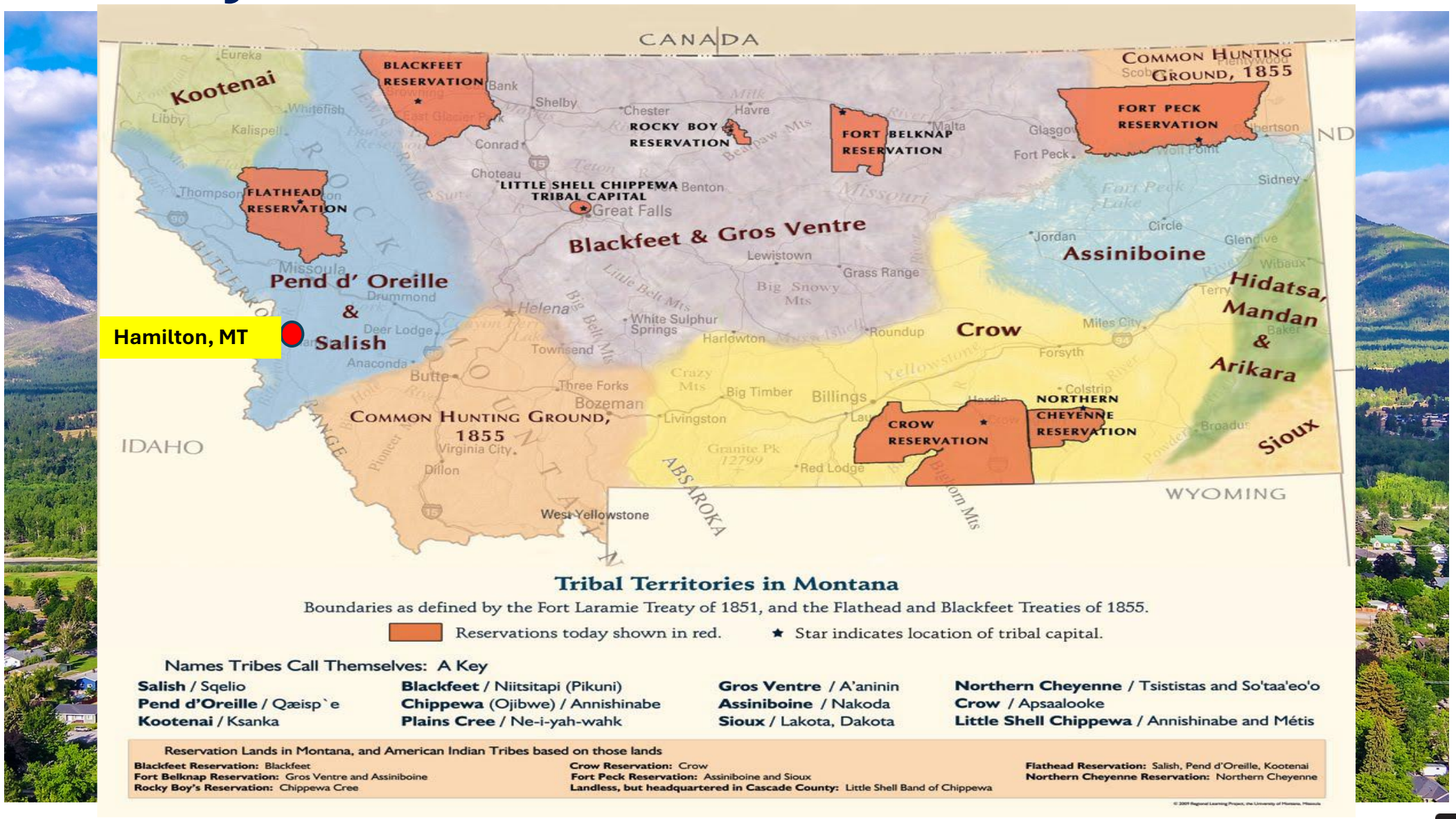
NIH National Institute of Allergy and Infectious Diseases

Rocky Mountain Laboratories



NIH National Institute of Allergy and Infectious Diseases

Rocky Mountain Laboratories II



National Institute of Allergy and Infectious Diseases



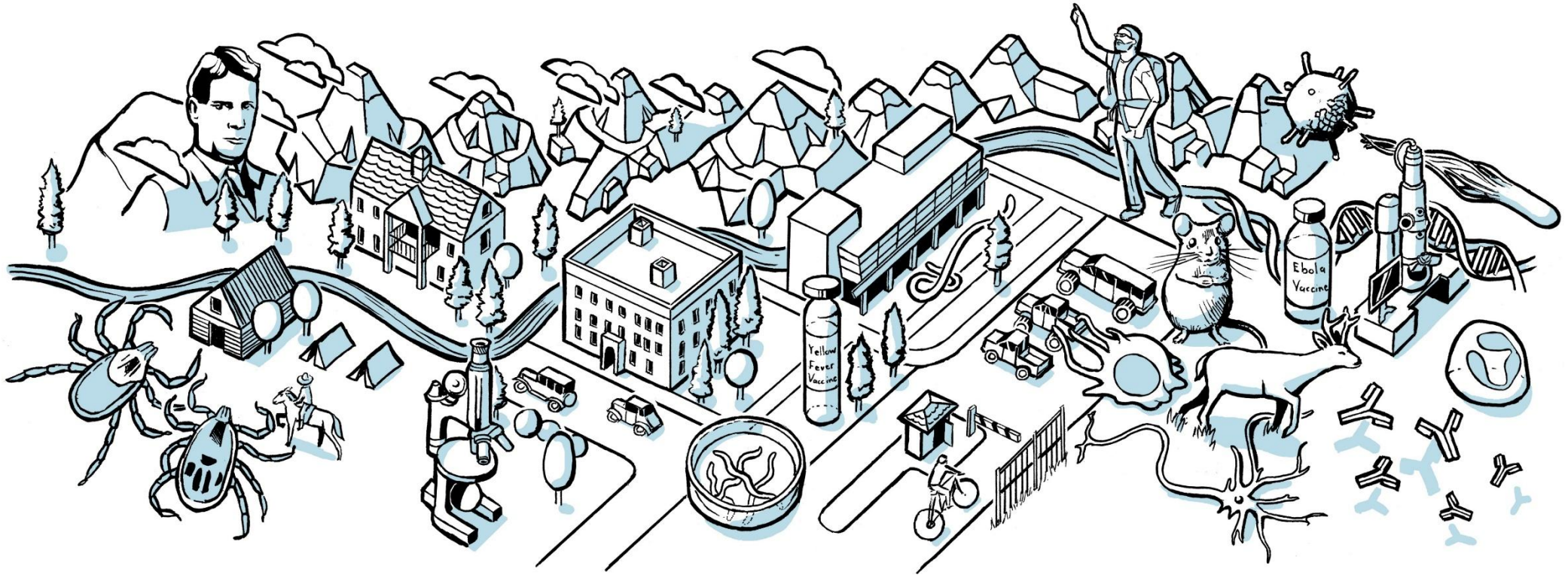
Artwork by Thomas J. Moore

Rocky Mountain Laboratories?

- Located in Hamilton, Montana.
- National Institute of Allergy and Infectious Diseases of the National Institutes of Health
  - 21 tenured or tenure track Principal Investigators (=Professors)
  - 3 Laboratories and 2 Branches (=Departments)
- Focus on emerging infectious diseases: viral, bacterial and prion
- Ca. 450 total staff members
  - Principal Investigators (PhD, MD, DVM)
  - Post-doctoral fellows (PhD, MD, DVM)
  - Undergrad and grad students
  - Technical staff (BA, MS, PhD)
  - Support staff – facilities, safety, IT, animal care, scientific illustration

NIH National Institute of Allergy and Infectious Diseases

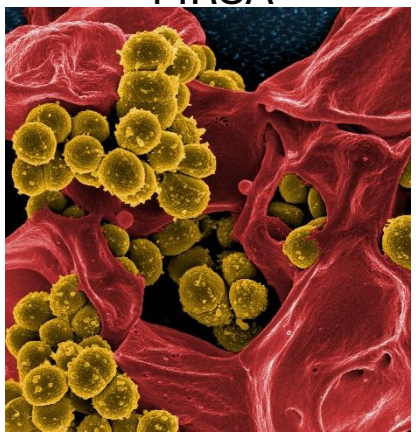
What do we study at RML?



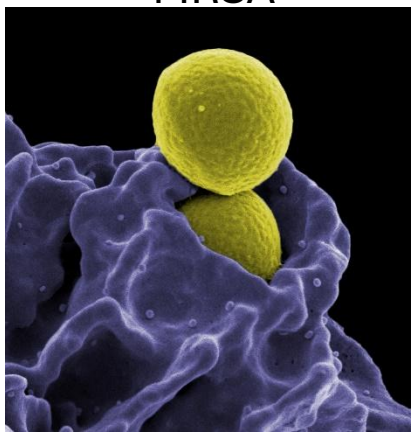
NIH National Institute of Allergy and Infectious Diseases

Bacteria Currently Studied at RML

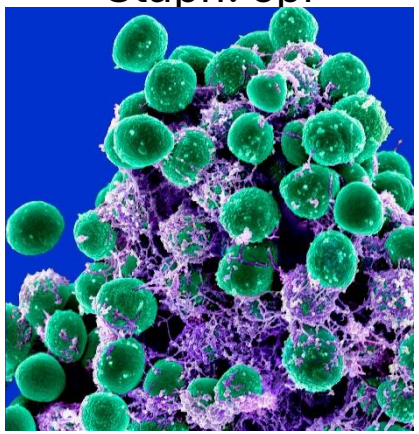
MRSA



MRSA



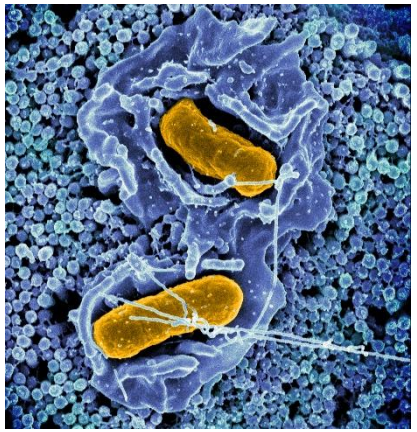
Staph. epi



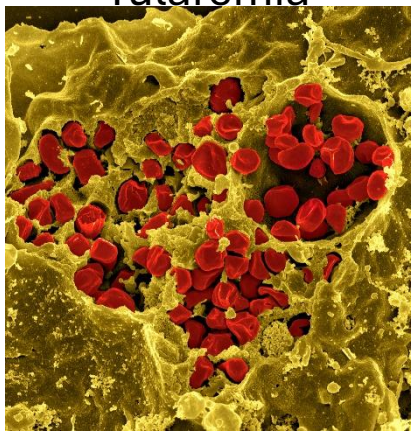
Coxiella burnetii



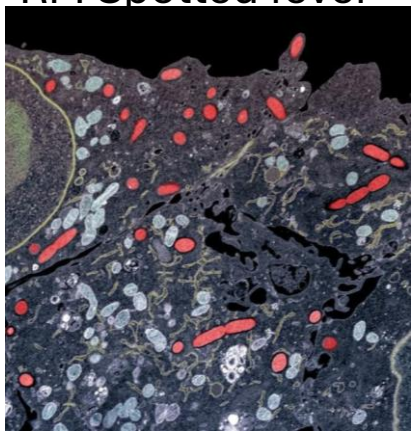
Salmonell*a*



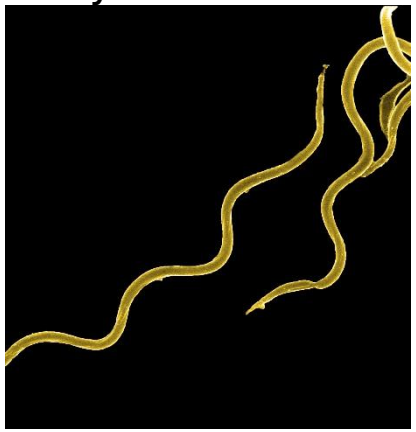
Tularemia



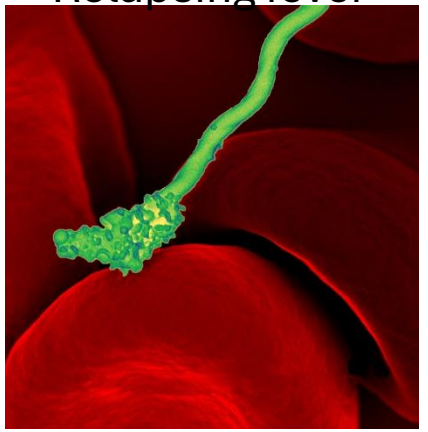
RM Spotted fever



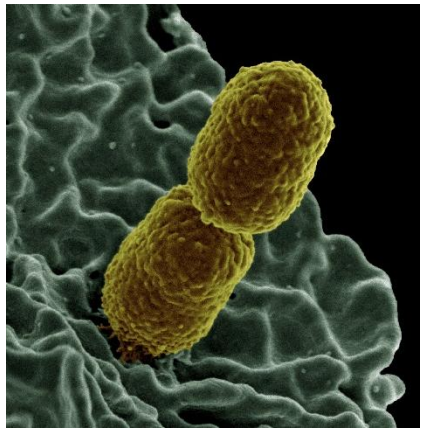
Lyme disease



Relapsing fever



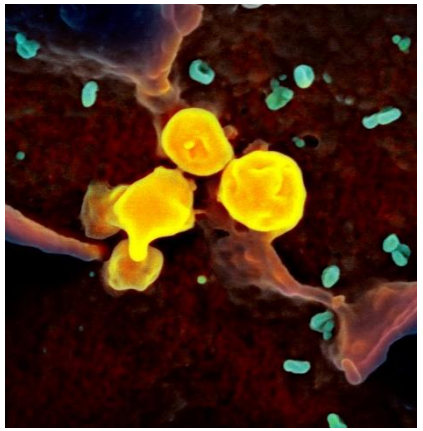
Klebsiella



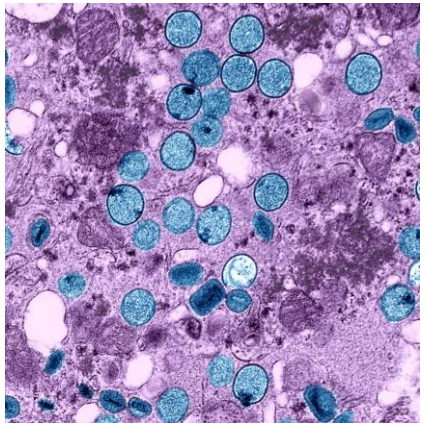
NIH National Institute of Allergy and Infectious Diseases

Viruses Currently Studied at RML

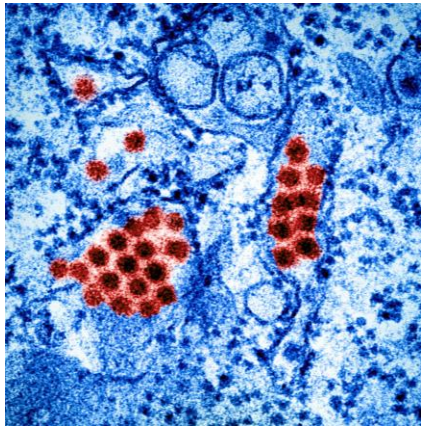
Nipah virus



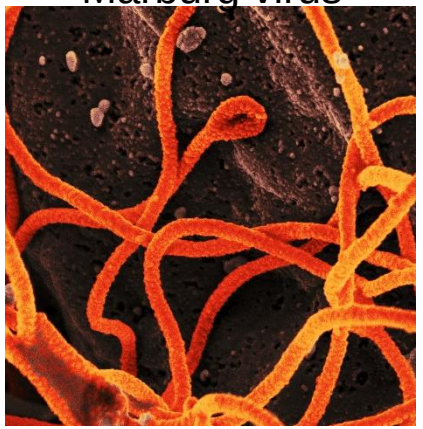
Mpox



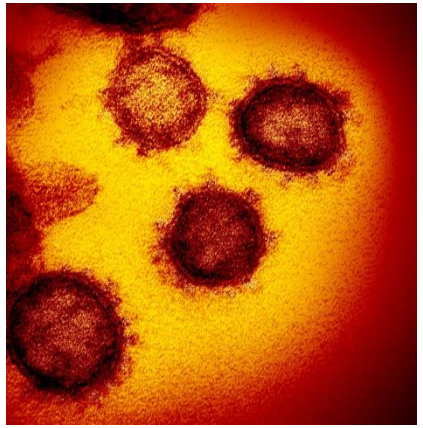
Flaviviruses



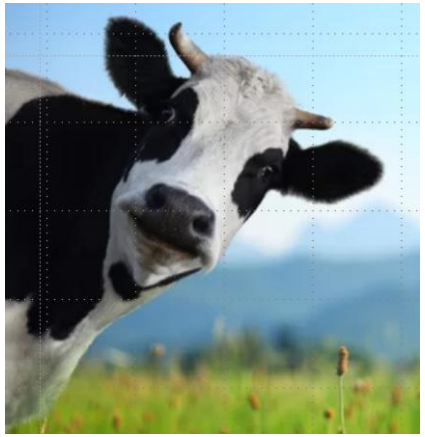
Marburg virus



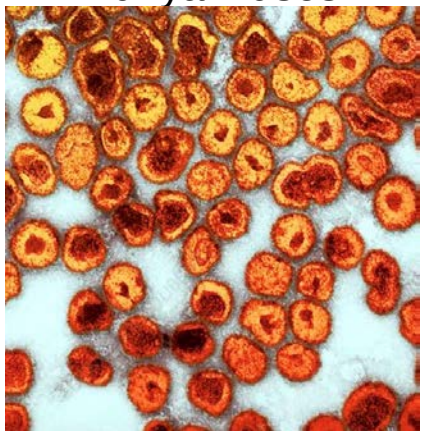
Coronaviruses



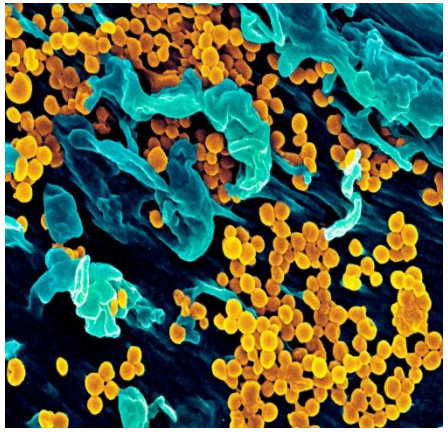
Influenza



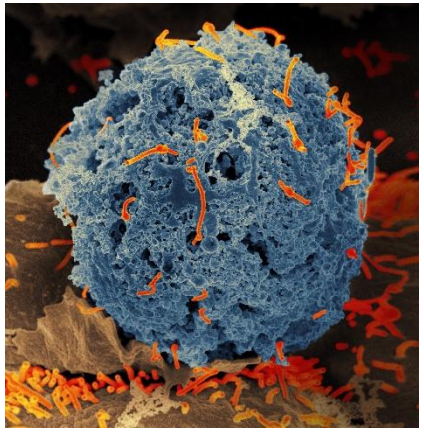
Bunyaviruses



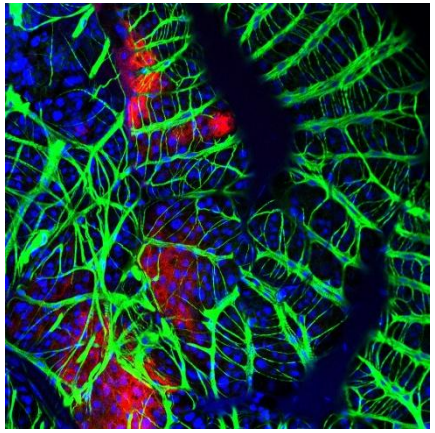
Lassa virus



Ebola virus



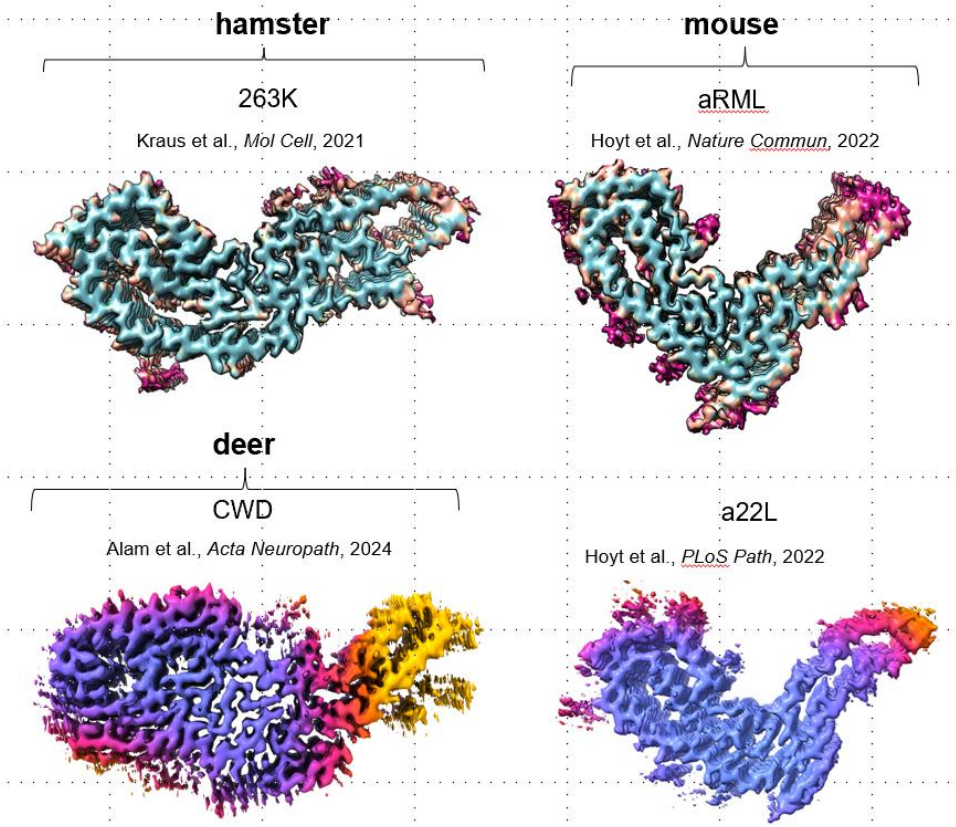
Tick-borne viruses



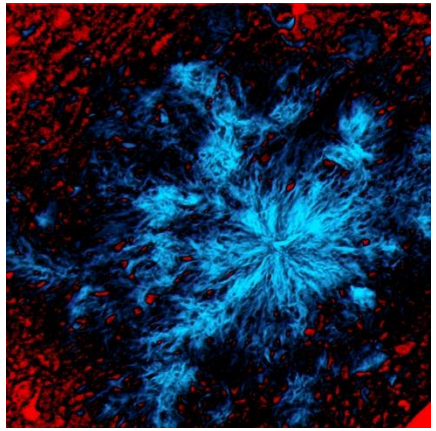
NIH National Institute of Allergy and Infectious Diseases

Prions Currently Studied at RML

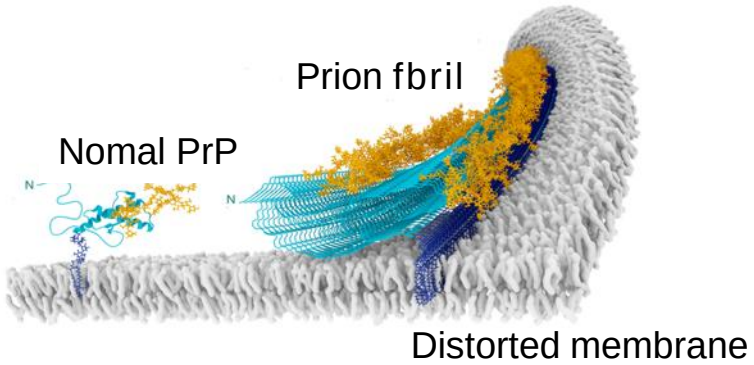
Solved Prion Structures



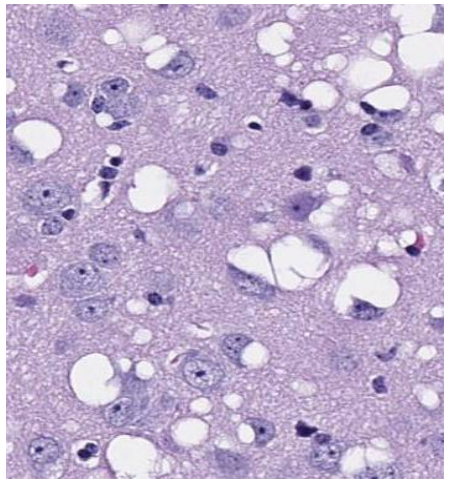
Amyloid plaque

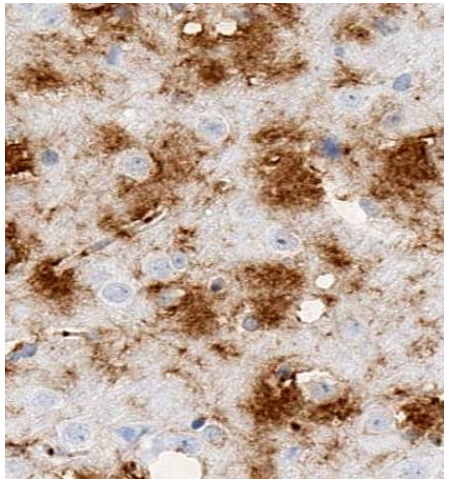


Prion propagation



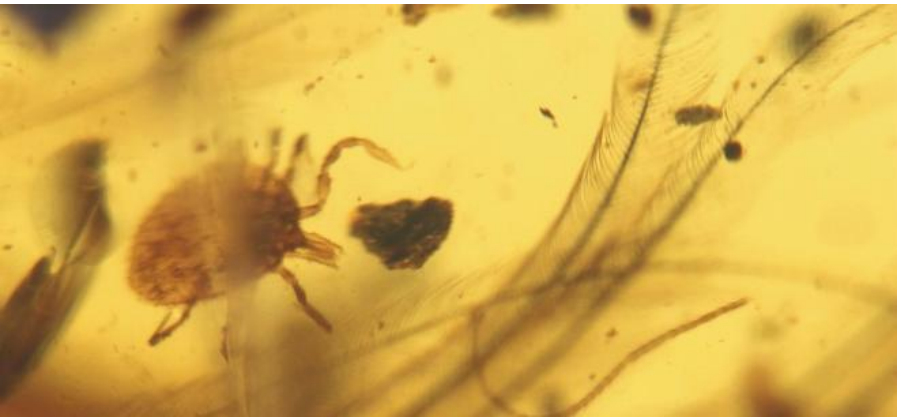
Brain pathology and prion staining





National Institute of Allergy and Infectious Diseases

Ticks & tick-borne diseases













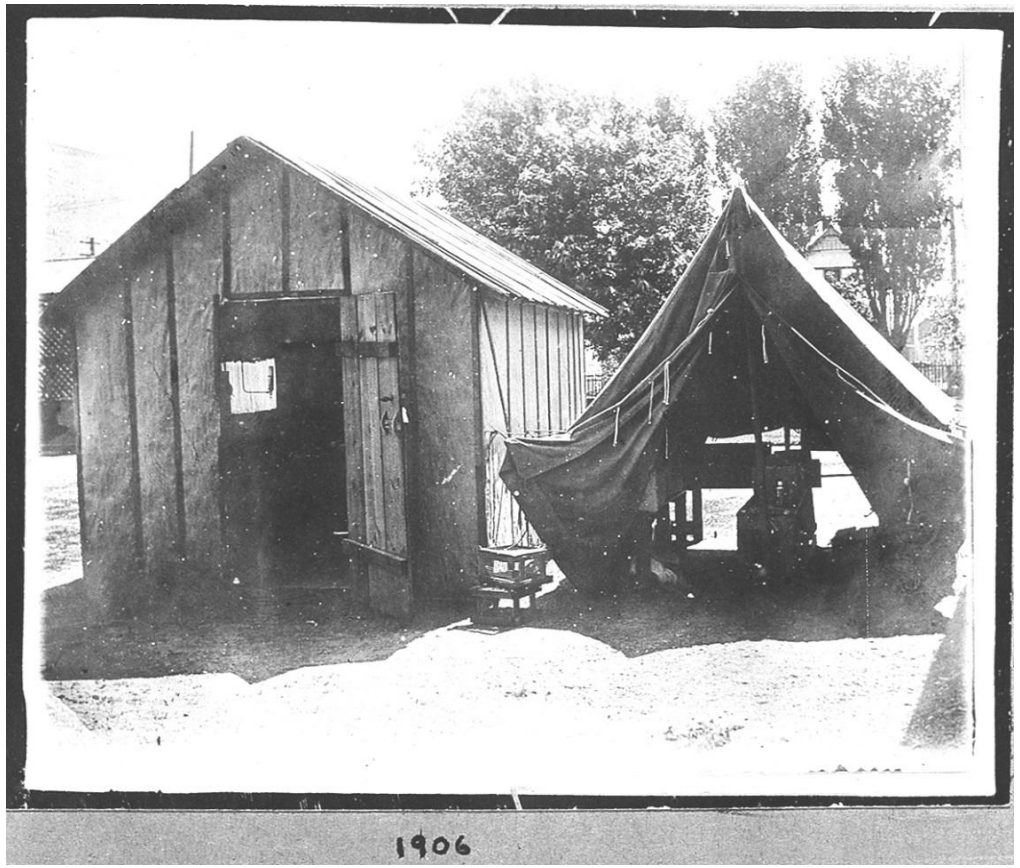


RML History Tour



NIH National Institute of Allergy and Infectious Diseases

Dr. Rickett's Tent Laboratory - 1906





NIH National Institute of Allergy and Infectious Diseases

The Schoolhouse Laboratory - 1922-1928





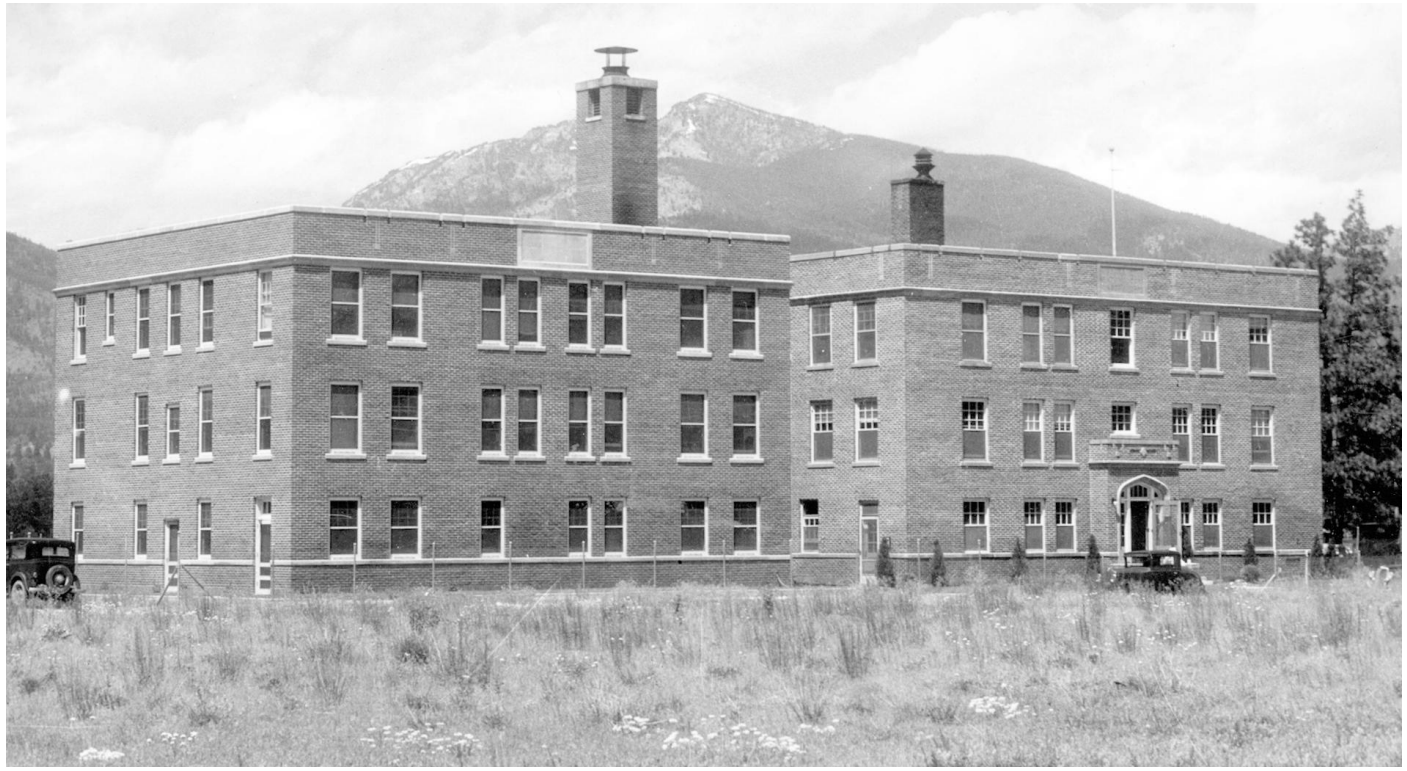
The Schoolhouse Laboratory 1922-1928

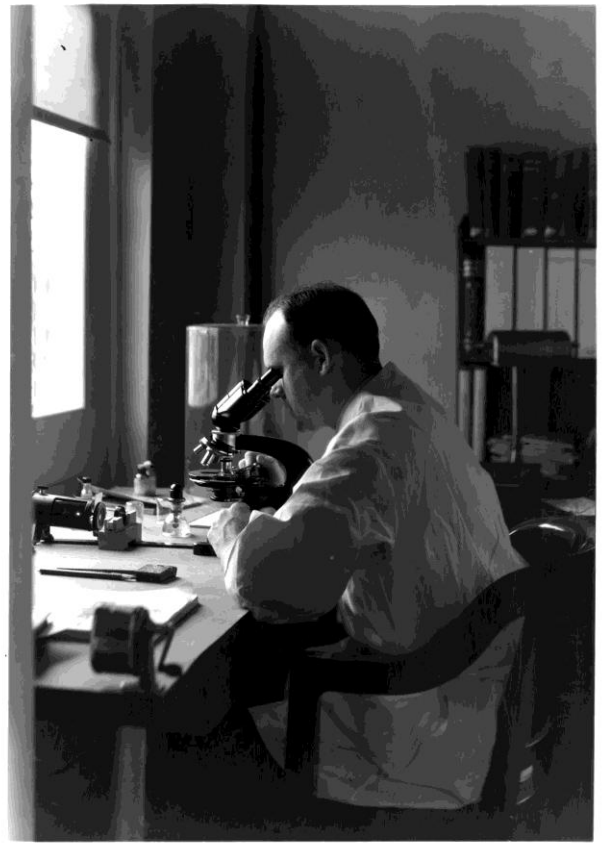






Rocky Mountain Laboratory - ca. 1938





National Institute of Allergy and Infectious Diseases

Rocky Mountain Laboratory – WWII era





National Institute of Allergy and Infectious Diseases

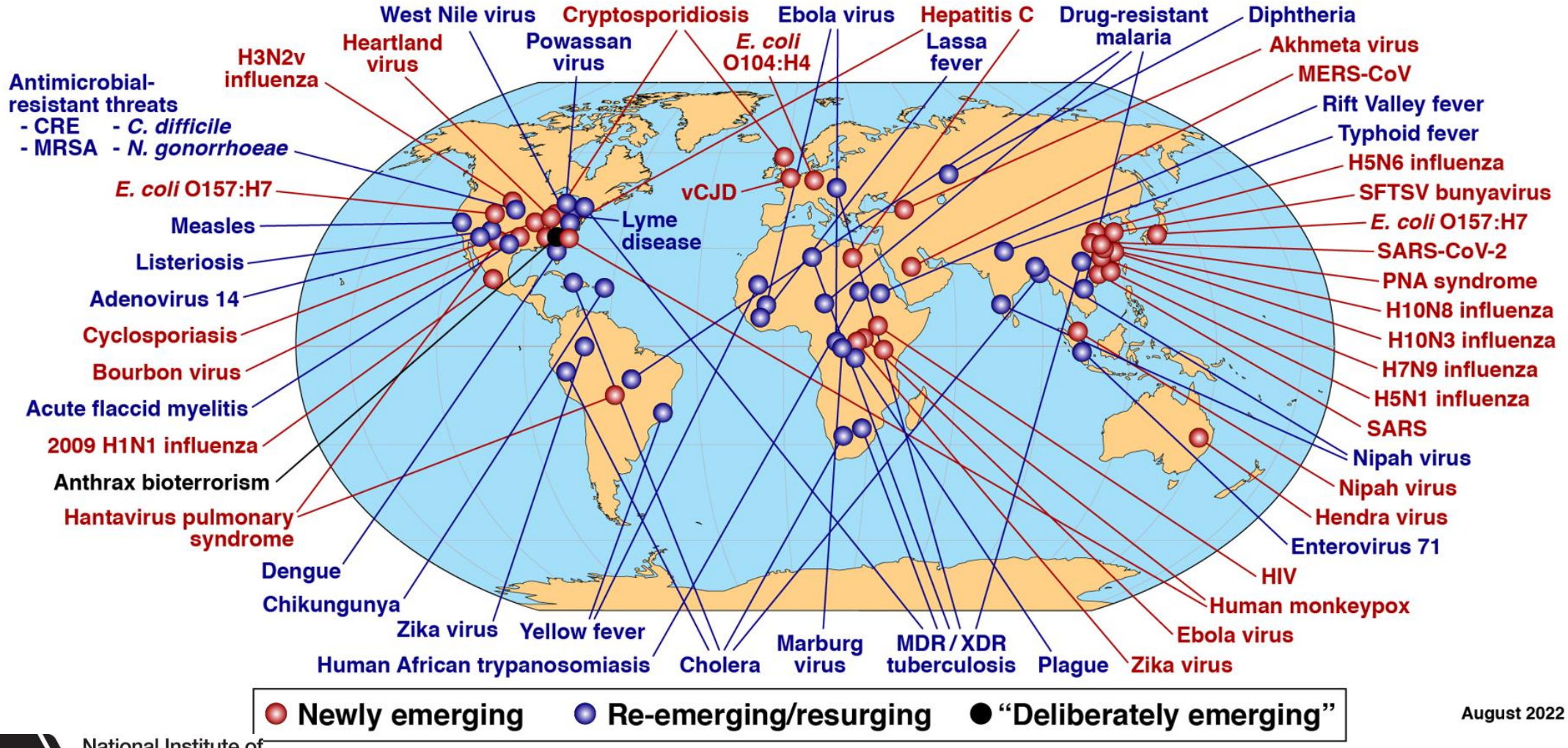
Rocky Mountain Laboratories – **“today”**





NIH National Institute of Allergy and Infectious Diseases

RML: A Century of Emerging Infectious Disease and Pandemic Research



National Institute of Allergy and Infectious Diseases

Source: NIAID

Final points.....

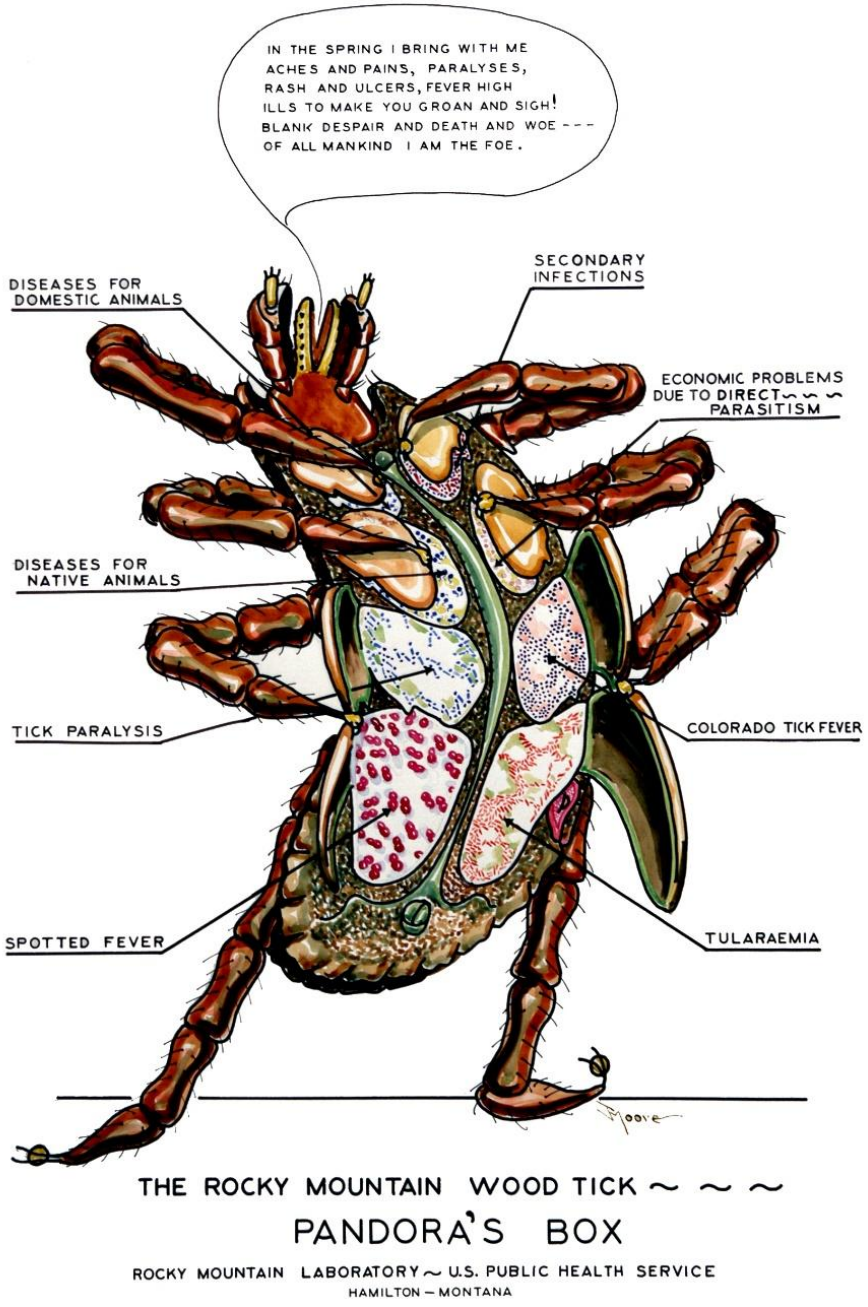
For more than 100 years, RML researchers or their Montana predecessors

- have deepened understanding of and developed new countermeasures against infectious diseases.
- have managed the dual mission of a robust research portfolio **plus** a rapid response to emerging infectious disease threats.
- have worked to share their science and benefit the local community.

NIH National Institute of Allergy and Infectious Diseases

Acknowledgements

- RML librarian Taylor Robinson (retired)
- RML public affairs specialist Ken Pekoc (retired)
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- RML Principal Investigators
- Dr. Phil Stewart
- Dr. Tom Schwan (retired)
- This presentation was supported by the NIAID Intramural Research Program.



NIH National Institute of Allergy and Infectious Diseases



Annie Belcourt, Ph.D.

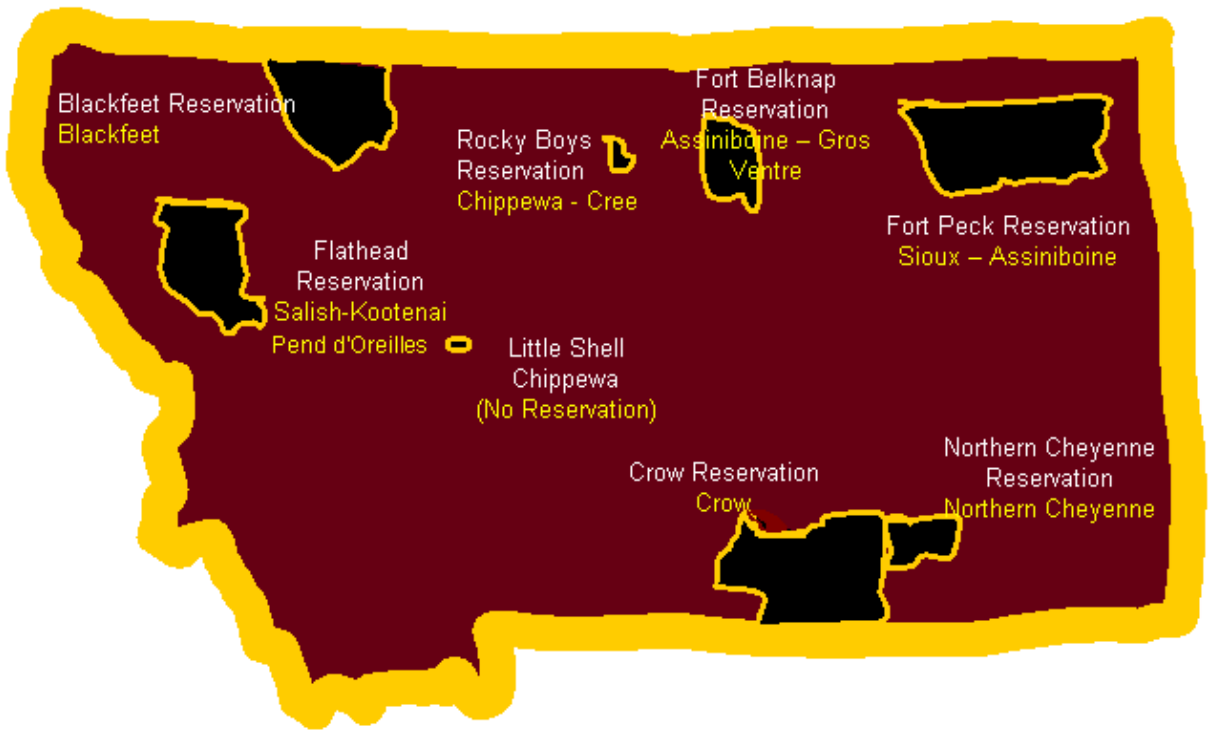
Associate Professor, School of Public and Community Health Sciences Department, University of Montana

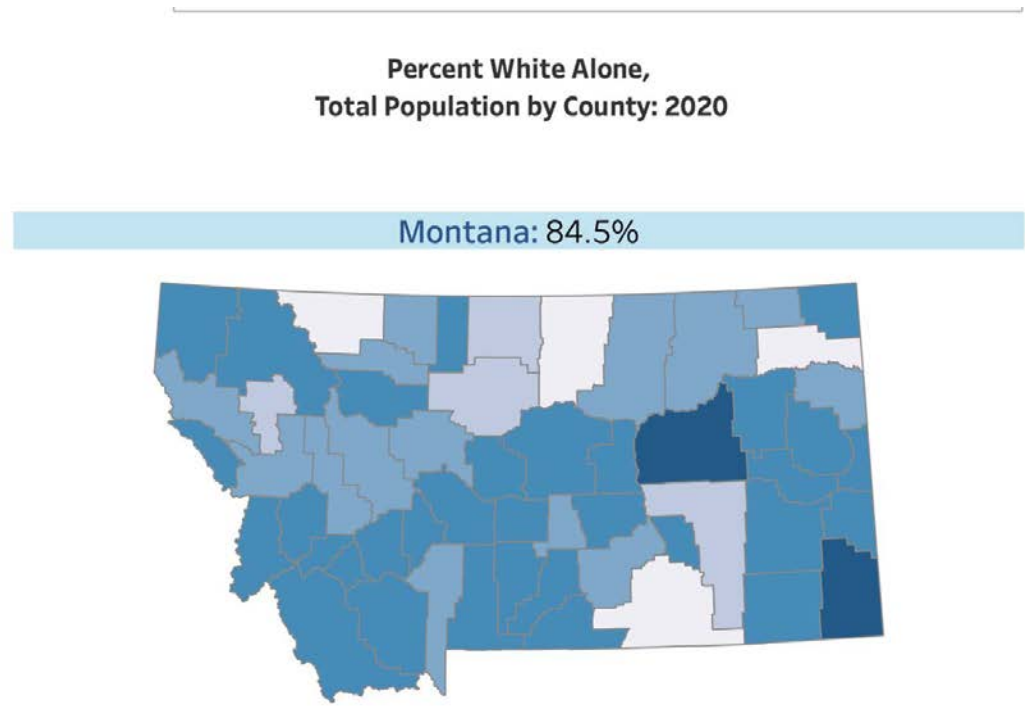
Indigenous health: Trauma and resiliency

- **Annie Belcourt, PhD**
- **Ammoniisaakii**
- **University of Montana**
- **Professor**
- **Community and Public Health Sciences**



Montana


Blackfeet Reservation
Blackfeet
Rocky Boys Reservation
Chippewa - Cree
Fort Belknap Reservation
Assiniboine – Gros Ventre
Fort Peck Reservation
Sioux – Assiniboine
Flathead Reservation
Salish-Kootenai
Pend d'Oreilles
Little Shell Chippewa
(No Reservation)
Crow Reservation
Crow
Northern Cheyenne Reservation
Northern Cheyenne


Percent White Alone,
Total Population by County: 2020
Montana: 84.5%



Blackfeet Ikaakimaat study

- NIH has helped provide funding from multiple RO1's including Environmental health and Psychiatric Epidemiology
- JPB funded research n = 380
- Developed a new measure of Environmental Exposures to climate and social stressors
- Examined its relationship to health, mental health, culture, and resiliency

Findings

- Risk profile: Trauma exposure associated with poorer health
  - Depression, PTSD, and health associated with environmental exposure within Blackfeet sample



Culture, language, and health

Resiliency:

Culture was a protective factor

- Those who participated in ceremonies less likely to have depression symptoms elevated
- Okan participation was most highly related to protective factors
- 40% gathered plant medicine for food, teas, & ceremonies

Second study a secondary data analysis of Blackfeet (N – 212)

Depression, suicidal ideation, and PTSD related to higher ACE scores

Everyday discrimination a key factor predicting each domain of risk

How does this impact health?

The life expectancy for Native Americans living in Montana is 60-63

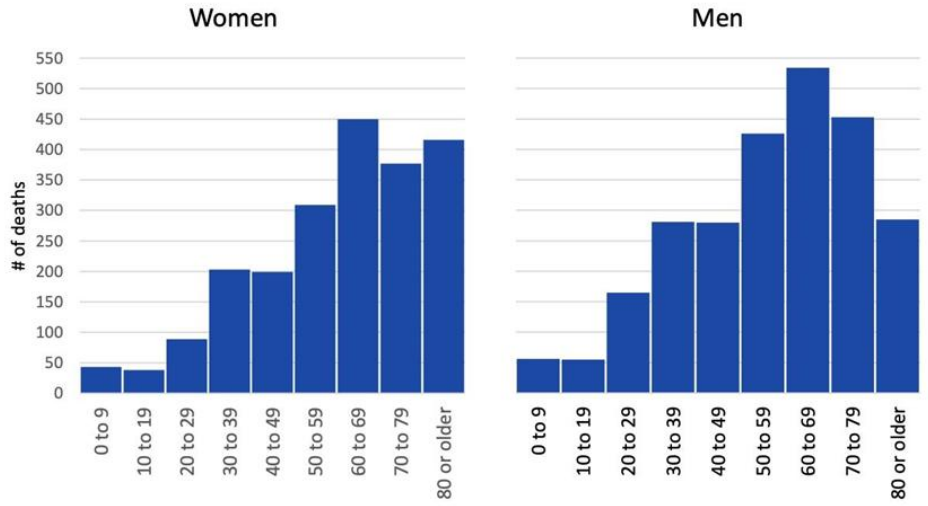
- **Great deal of diversity within and between tribes**
- **Shared history of risk as well as resiliency**
- **Overrepresentation in foster care, incarcerated, mortality, and morbidity**
- **Shorter more challenging lives**



Montana: American Indian health

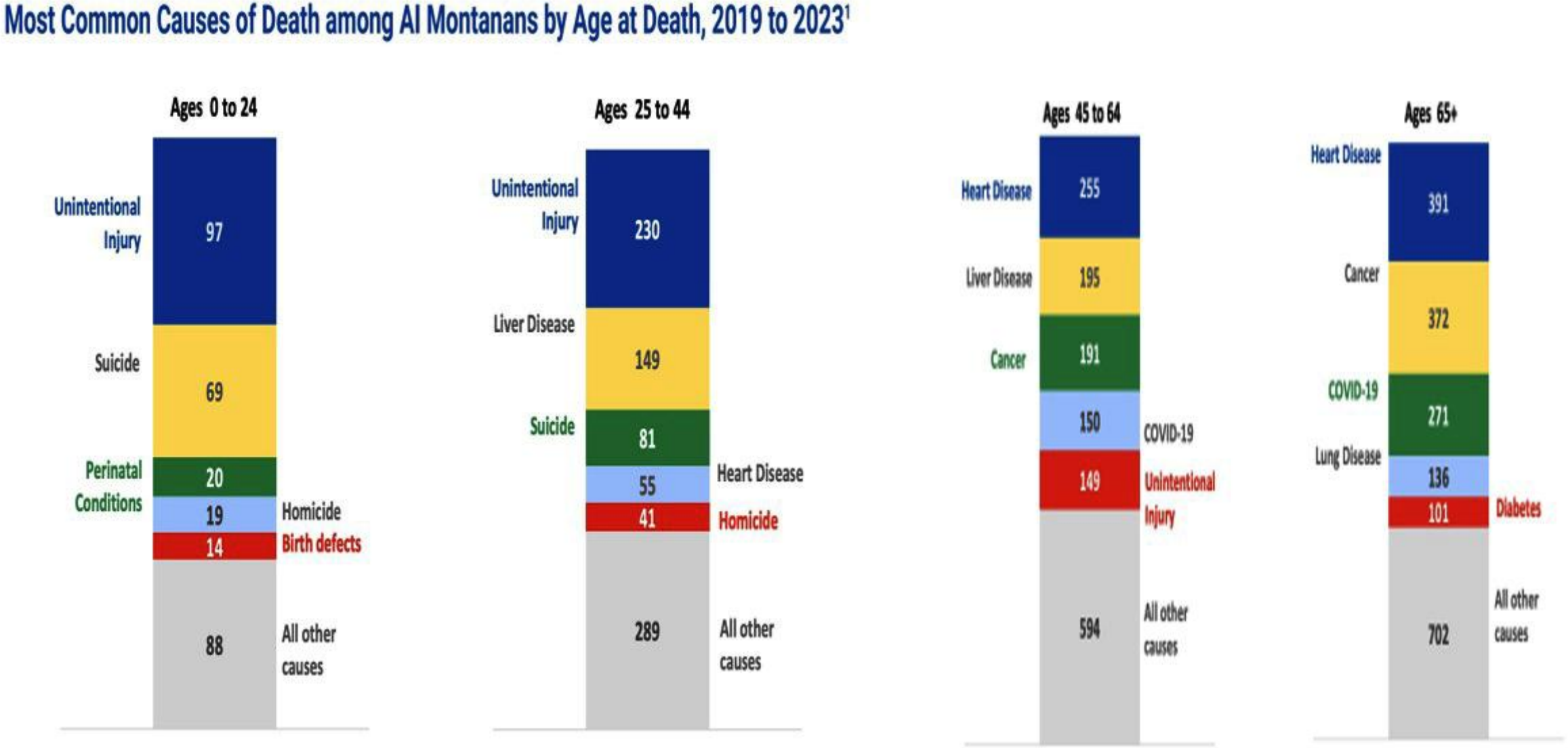
Common Causes of Death among American Indian people in Montana

Age at Death among American Indian (AI) Montanans, 2019 to 2023[1]



- There were **4,659** deaths among AI Montanans from 2019 to 2023 for an average of about **932 deaths each year**.
- The median age at death was **60 among AI men** and **63 among AI women**. That is 15 years younger than non-AI men and 18 years younger than non-AI women in Montana.
- Most deaths occurred between ages 60 and 69 among both men and women.

Mortality

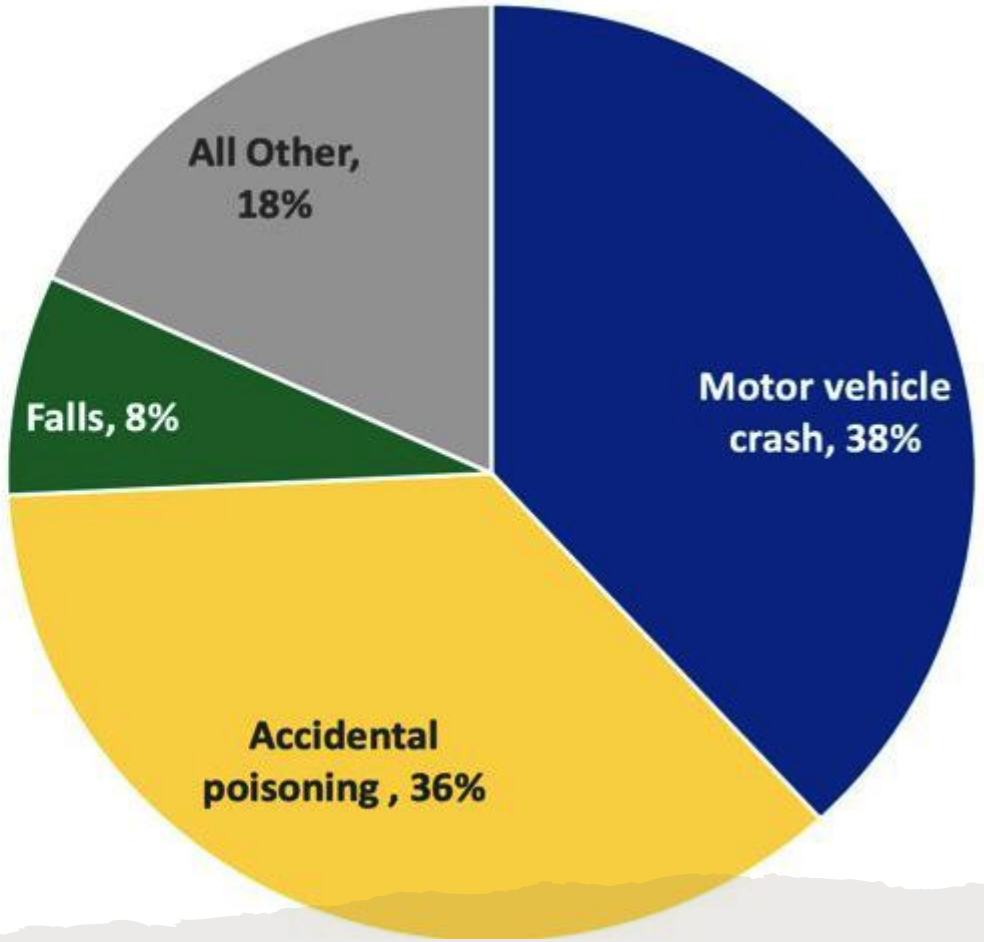

Most Common Causes of Death among Al Montanans by Age at Death, 2019 to 2023[1]
Ages 0 to 24
Unintentional Injury
97
Suicide
69
Perinatal Conditions
20
19
Homicide
14
Birth defects
88
All other causes
Ages 25 to 44
Unintentional Injury
230
Liver Disease
149
Suicide
81
55
Heart Disease
41
Homicide
289
All other causes
Ages 45 to 64
Heart Disease
255
Liver Disease
195
Cancer
191
150
COVID-19
149
Unintentional Injury
594
All other causes
Ages 65+
Heart Disease
391
Cancer
372
COVID-19
271
Lung Disease
136
101
Diabetes
702
All other causes

Leading causes

Causes of Unintentional Injury Deaths[1]

- Unintentional injury is one of the 5 most common causes of death for all age groups less than 65.
- There were **540** unintentional injury deaths among AI Montanans of all ages, about **108 each year**.
- Motor vehicle crashes (MVC) where the leading cause of injury deaths and accounted for 38% of unintentional injury deaths.
- Poisoning was the second most common cause of unintentional injury deaths with nearly all poisonings being caused by drug or alcohol overdoses.

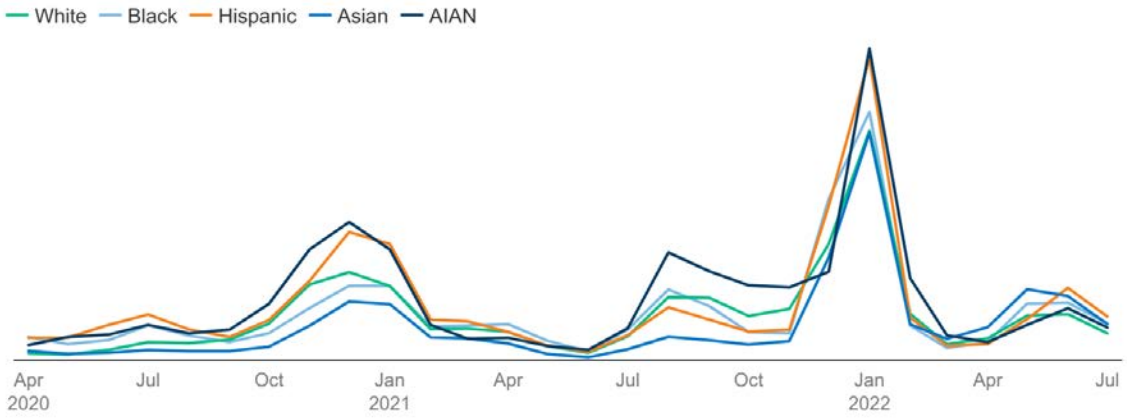
Common contributing factors to AI MVC deaths[2]



Pandemic impacts upon AIANs

Figure 2

COVID-19 Monthly Age-Adjusted Cases in the United States per 100,000 by Race/Ethnicity, April 2020 to July 2022

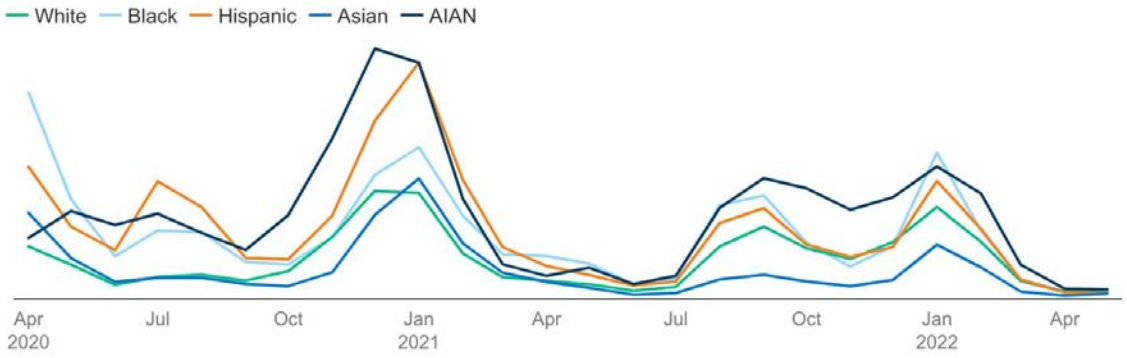


NOTE: Persons of Hispanic origin may be of any race but are categorized as Hispanic for this analysis; other groups are non-Hispanic. AIAN refers to American Indian/Alaska Native. Age-adjusted rates standardized to 2019 U.S. Census Bureau population estimates.
SOURCE: KFF analysis of Centers for Disease Control and Prevention, COVID-19 Response. COVID-19 Case Surveillance Restricted Data Access, Summary, and Limitations, released on August 4, 2022. The CDC does not take responsibility for the scientific validity or accuracy of methodology, results, statistical analyses, or conclusions presented.

KFF

Figure 3

COVID-19 Monthly Age-Adjusted Deaths in the United States per 100,000 by Race/Ethnicity, April 2020 to May 2022

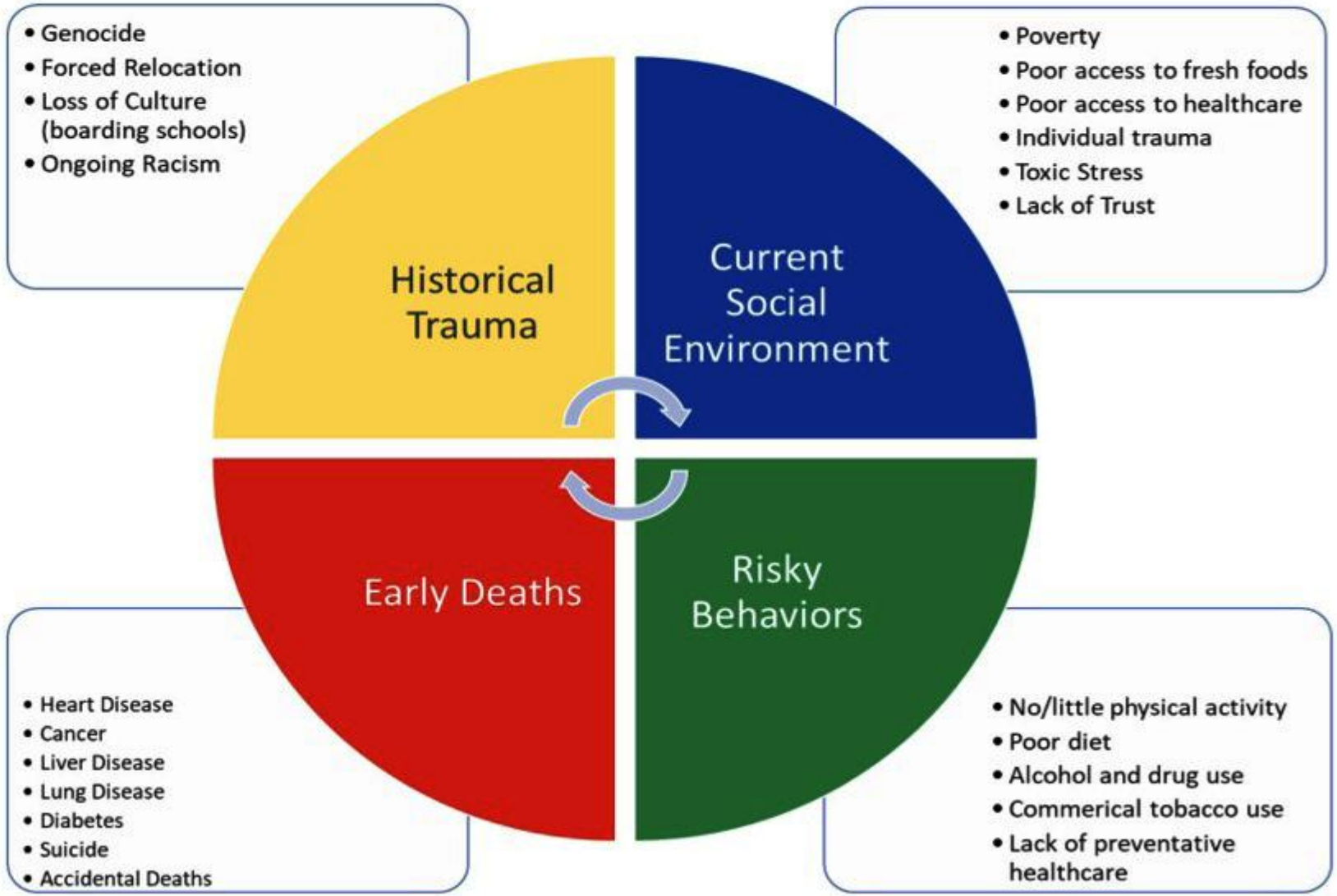


NOTE: Persons of Hispanic origin may be of any race but are categorized as Hispanic for this analysis; other groups are non-Hispanic. AIAN refers to American Indian/Alaska Native. Data for Native Hawaiian and Other Pacific Islander people not shown due to insufficient number of deaths for several months during the analysis period. Age-adjusted rates standardized to 2019 U.S. population estimate. Death data as of August 3, 2022 but only shown through May 2022 because data during recent periods are often incomplete because of the lag in time between when the death occurred and when the death certificate is completed, submitted to NCHS and processed for reporting purposes. This delay can range from 1 week to 8 weeks or more, depending on the jurisdiction and cause of death.
SOURCE: National Center for Health Statistics. Provisional COVID-19 Deaths by Race and Hispanic Origin, and Age. Date accessed August 4, 2022. Available from https://data.cdc.gov/d/ks3g-spdg.

KFF

Preventing Deaths Among AI Montanans by Addressing the Foundations of Health Disparities[3]

The most common causes of death in all age group are primarily caused by risk behaviors that can be changed: commercial tobacco use, alcohol use, substance use disorder, poor diet, little or no physical activity, and lack of preventive healthcare such as: vaccines, cancer screening, or treating high blood pressure. **Changing these risky behaviors requires correcting the current social environment and acknowledging the historical trauma that lead to it.**



3 Actions to Support American Indian Communities

1) Protect children and integrate traditional tribal practices into everything we do. This will improve their physical, mental, spiritual, and emotional health for their whole life.

45% of AI adults in Montana reported high HOPE (health outcomes from positive experiences), often or always: feeling safe, feeling like they belong at school, having support from family and friends, and participating in community traditions.[4]

52% of AI adults reported less than 4 adverse childhood experiences (ACE): living with someone with mental health or substance abuse problems, living with someone who was incarcerated, having parents who were divorced or separated, witnessing domestic violence, and experiencing physical, emotional, or sexual abuse.[4]

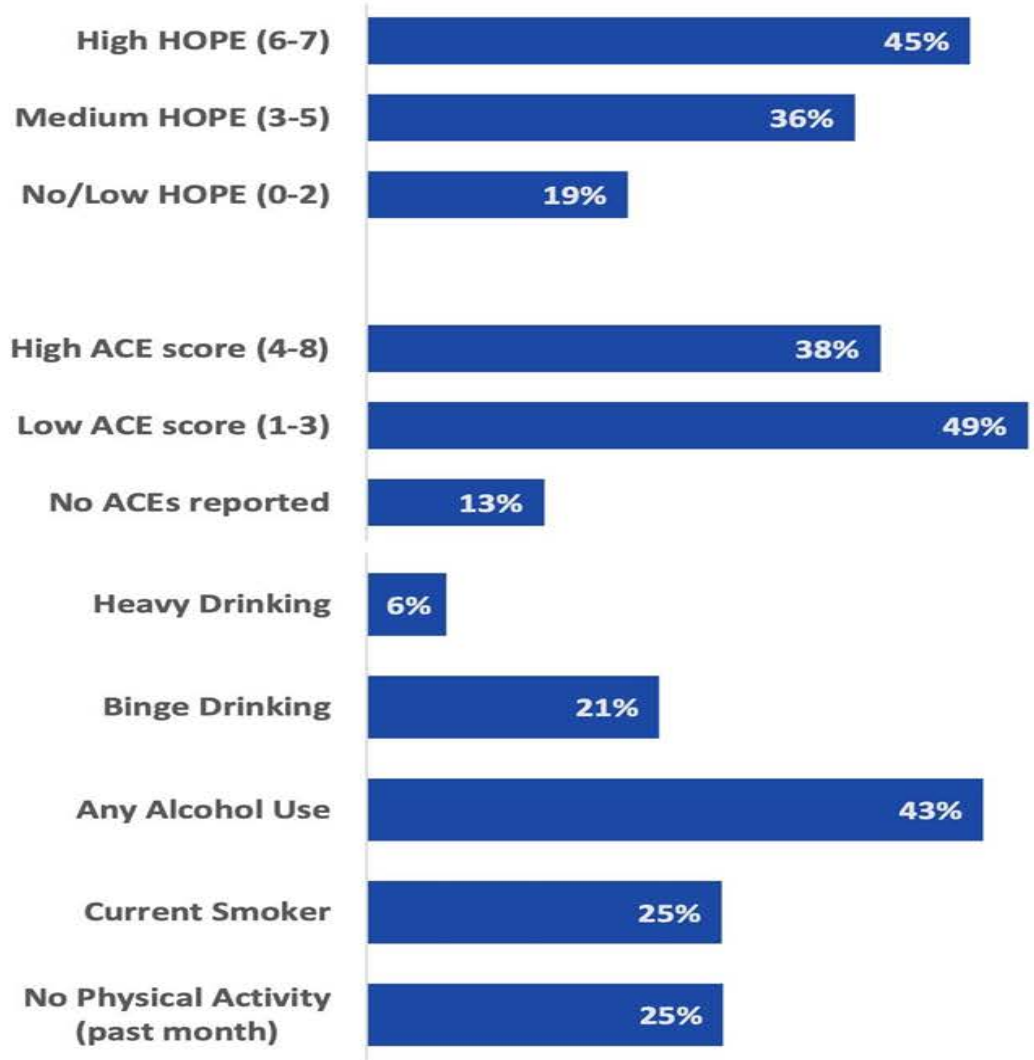
2) Reduce use of alcohol and commercial tobacco products.

21% of AI adults reported binge drinking in the past month.[4]

25% of AI adults reported currently smoking cigarettes.[4]

3) Promote healthy lifestyles through access to fresh whole foods and safe physical activity.

25% of AI adults reporting no physical activity in the past month.[4]



Binge drinking is 4+ drinks for women and 5+ drinks for men on one occasion. Heavy drinking is an average of 8+drinks for women and 15+drinks for men in a week.

MONTANA DPHHS

Key aspects of health disparities: Trauma and systematic oppressive historical factors

- Social Determinants
- Historical racism
- Contemporary racism
- Economic barriers
- Politics of colonization
- Lateral violence

Poverty by MT Reservations and State

Reservation	Poverty Rate 2000 (30.4% overall reservations)	Unemployment Rate 2005 (51.6% overall reservations)	Free and Reduced lunch Eligible Kids (2010)
Blackfeet	33.8%	68.5%	81.6%
Crow	30.5%	46.5%	89.5%
Flathead	20.3%	23.7%	56.3%
Ft. Belknap	38.9%	69.6%	79.8%
Ft. Peck	35.3%	53.5%	82.9%
Little Shell	37.4	Not Avail.	Not Avail.
N. Cheyenne	46.1%	59.8%	90.5%
Rocky Boy's	40.8%	67.9%	84.8%
Montana	***14.1%***	***6.8%***	***37.5%***

Census 2000 and MT DPHHS 2008 (Montana Poverty Study 2010)
http://www.montana.edu/extensionecon/montanacountydata.html

VIOLENCE IN AMERICAN INDIAN & ALASKA NATIVE COMMUNITIES

More than four in five experience violence in their lifetime. (83%)

Women and men have been victimized at similar rates (84% Female 82% Male)
Psychological aggression and physical violence by intimate
partners.

Women significantly higher levels of sexual violence (56.1 percent versus 27.5 percent for men) & stalking (48.8 percent versus 18.6 percent for men).

What is trauma? What are commonly encountered diagnostic factors for clients and in community?

- Clinical trauma-Most commonly interpersonal forms of trauma (abuse, neglect, sexual assault), MVA, combat, torture, etc…witnessed, experienced, or both
- PTSD-Hypervigilence, Re-experiencing, avoidance
- SUD-Alcohol, drug, gambling, online
- OCD-compulsive behaviors combined with obsessive intrusive thoughts
- Developmental Disorders: Cognitive impairment, ADHD, Autism, etc…

Trauma

- Important to consider the events that precipitate placements and the nature of trauma
  - Freeze
  - Flight
  - Fight
  - Fawn

  - With youth most at risk identity is often fragmented.
  - Memory can become distorted
  - We can help function as the Executive function cognitive portion of brain when trauma derails the youth's reactions



Clinical aspects of trauma exposure in youth

- Trauma and development
- What is normal?
- What is maladaptive or clinically significant
- What are symptoms vs diagnostic categories
- Common diagnoses:
  - Acute Stress Disorder
  - PTSD
  - Depression
  - Anxiety
  - Developmental disorders (Autism, FAS, ADHD)

How can we best provide care that is trauma informed?

What are the ways we can provide more efficient applications of science and scholarship about health and healing to benefit communities?

Risk factors	Adverse Childhood Experiences Substance use and abuse Lack of access to care Social Determinants of health
Resiliency factors	Faith Culture Social support Self esteem and positive identity



How can resiliency and culture help communities heal?

Culture, language, and identity in community

Can we work with existing systems to promote public health?

Critical question: How can we expect systematic changes for scientific equity if we avoid the most difficult questions or topics?

Balance the community need for dignity with an emphasis on strength based approached in healing and health equity WITH need for inquiry into difficult topics

“If we expect our children to be brave and to speak: We must be brave too”

”This is a good opportunity to let the world know we are here and what we are about.”
-Allan Pard Apatohsiipiikunii

Shared history of traumatic sudden population collapse due to disease, starvation, genocide, and systematic discrimination

Many tribes were moved to present day locations

Some were able to remain at historic homelands and retain cultural and language practices

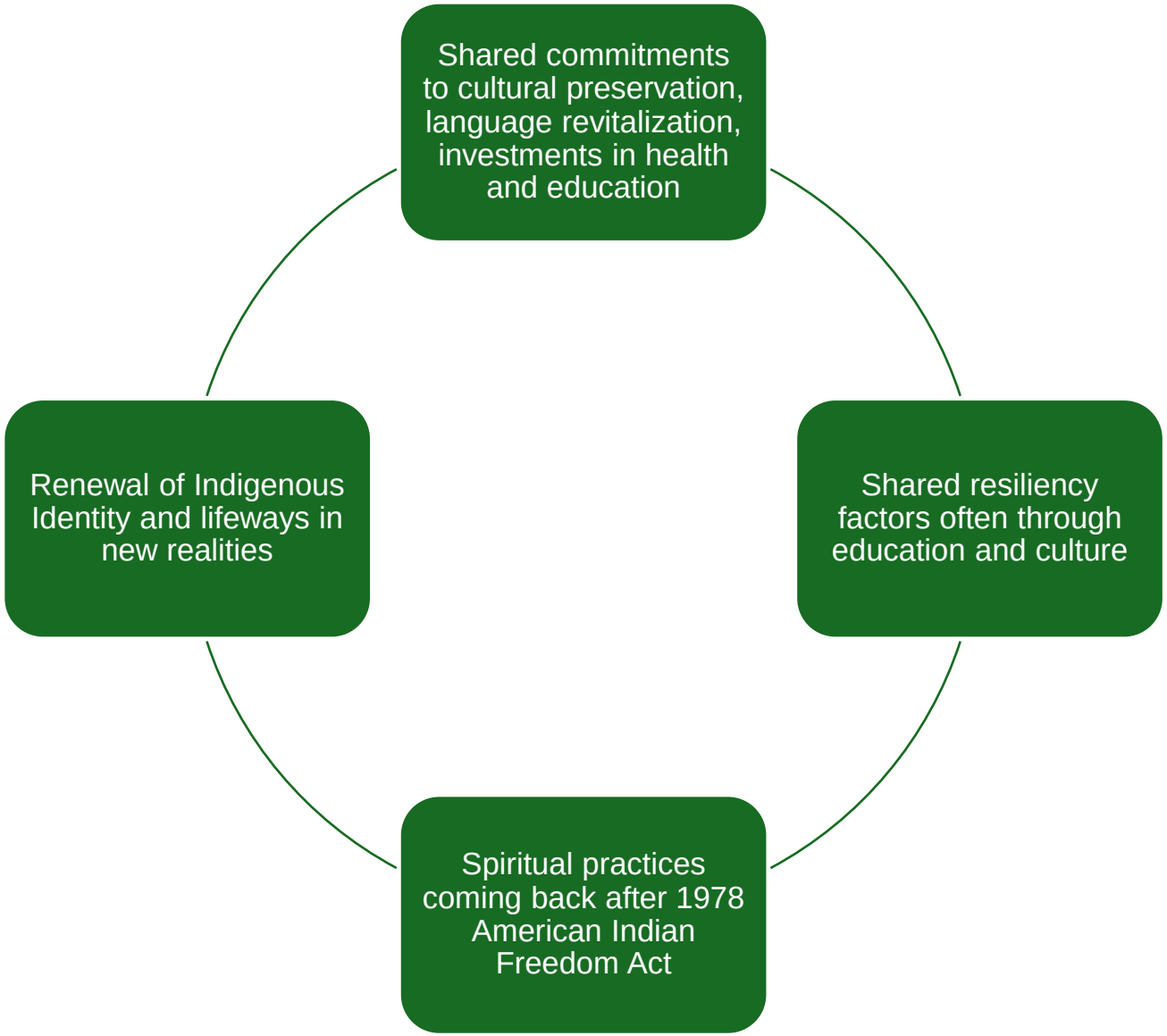
Some had more profound losses across domains of language, culture, and place

Culture matters

Half of sample spoke or were learning Blackfeet

30% attended Okan or Medicine Lodge

1/3 attended Pipe ceremony, sweat lodge, or other ceremony



Strengths

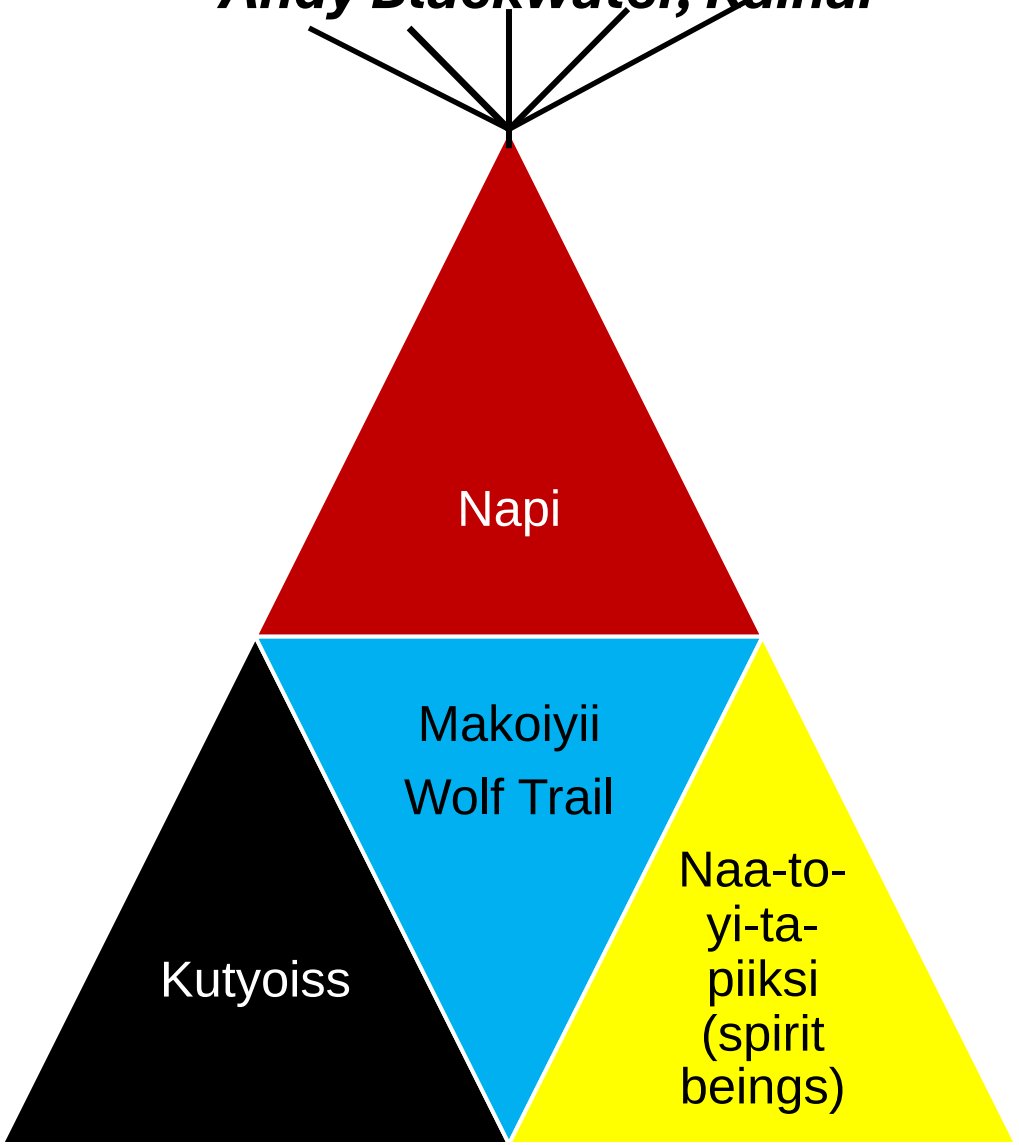
“When we pray, we call upon the sun, the moon, the stars. The Milky Way, the Earth, and everything in it.”

-Louise Crop Eared Wolf, Kainai

Niitsitapiisinni: Blackfoot Confederacy

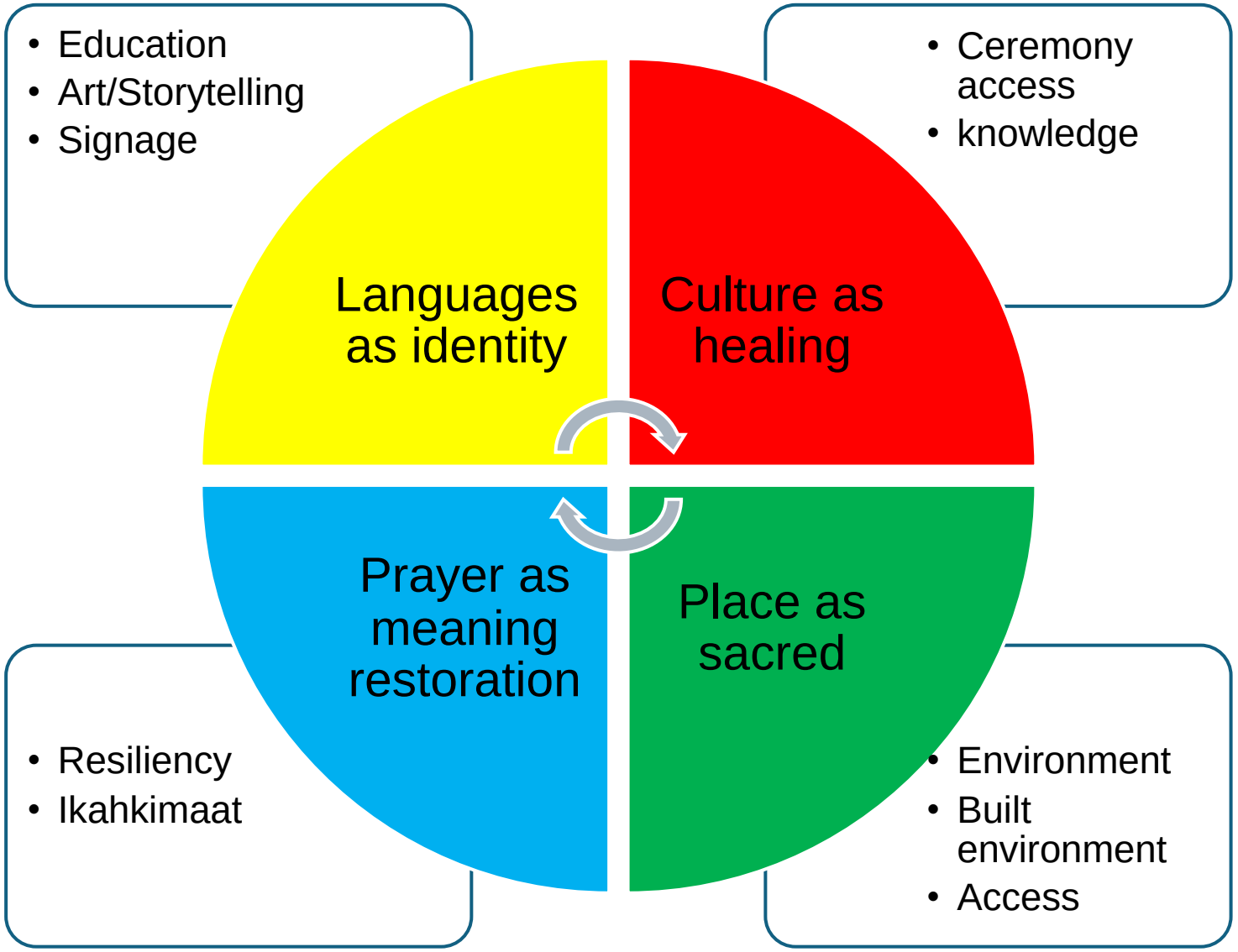
"All of our Beings are connected (Spiritually & Physically) to our homelands"

-Andy Blackwater, Kainai



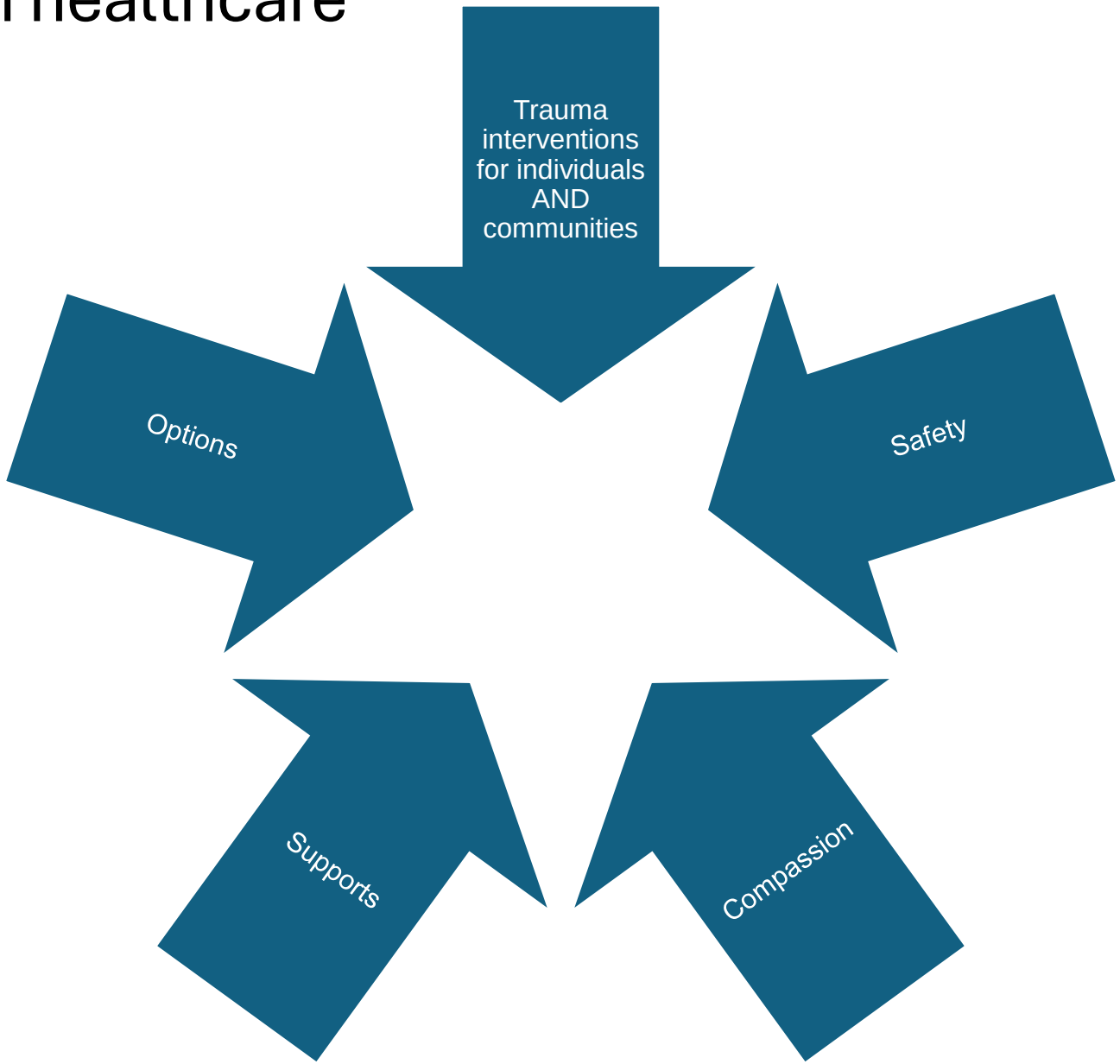
- Working together
- *'After the Niitsitapi were created we were starving. The wolf people had pity upon us and became human for one winter. They taught us to hunt or to gather medicine. Hunting required that we all work together. Everyone.*
- *This was the key to our survival and our renewal. It is living within our every relationship and ceremony. It is in our language.*
- *At the end of the winter the wolves left the Niitsitapi and became the stars of the Milky Way to remind us all of how we must live together.'*

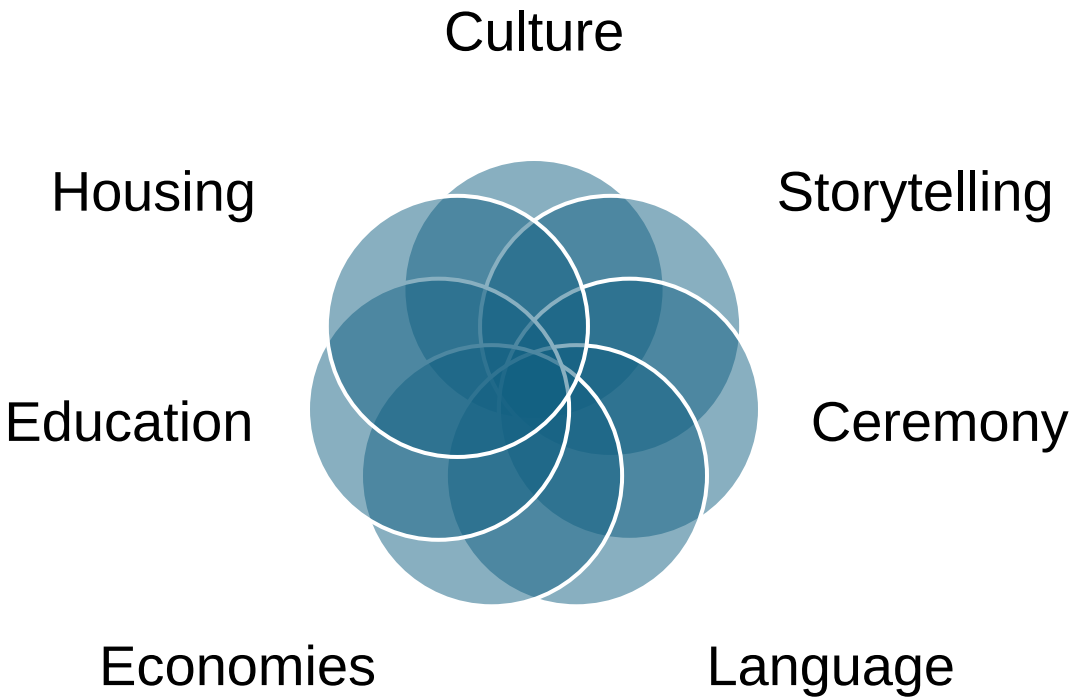
Kimm apiin yi pit sin (Compassion)



- Undoing systematic injustice requires systematic solutions
- Public health can help invest in increasing access to science and healthcare
- Developing healthcare cultures of diversity and inclusion through informed practice

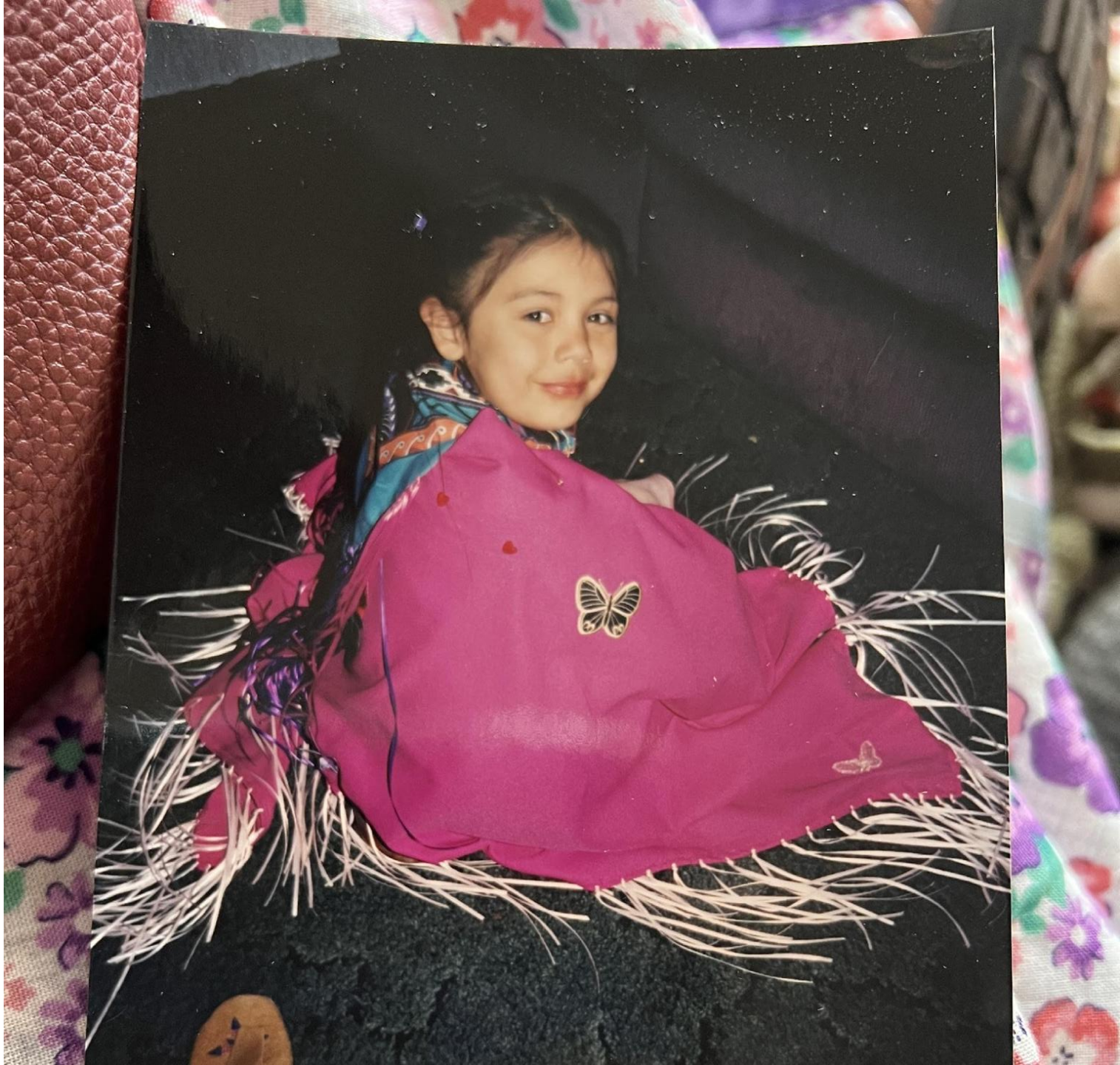
What can be done: Systematic problems require systematic solutions in healthcare





How can we live as Makoyii taught us?

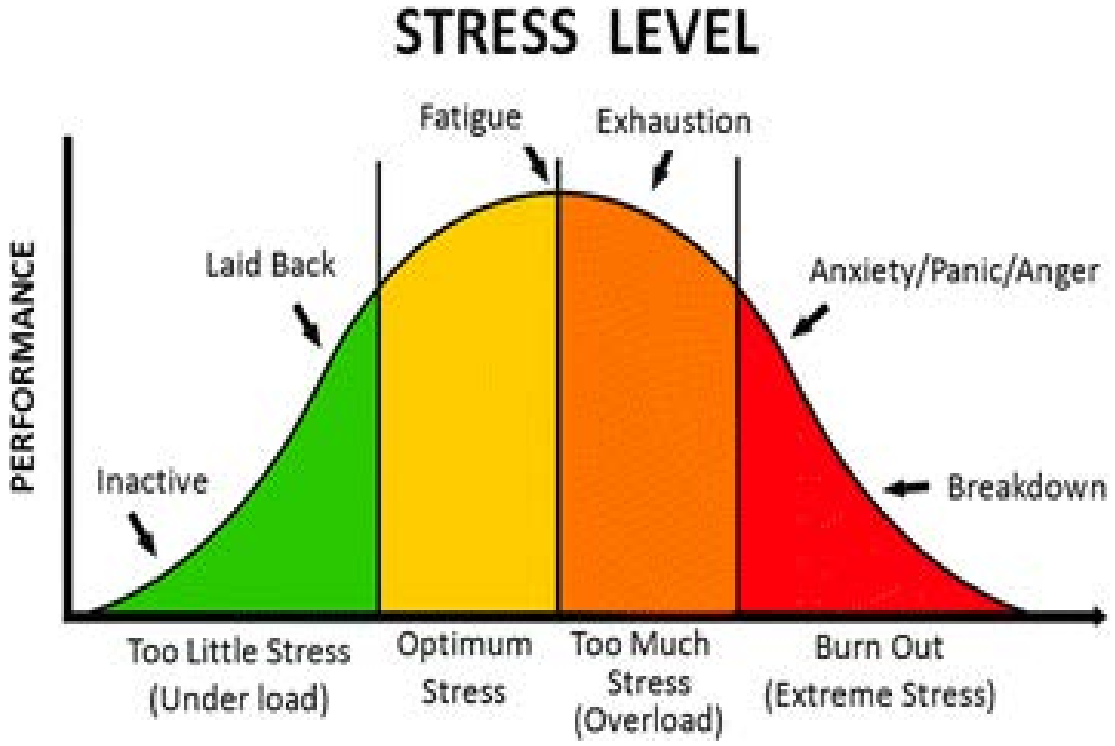
Compassion starts from within



Compassion Fatigue & Posttraumatic Growth

Compassion Fatigue: What it is and how to manage it with PTSG

How can we communicate with students, colleagues, and family in ways to support emotional health?

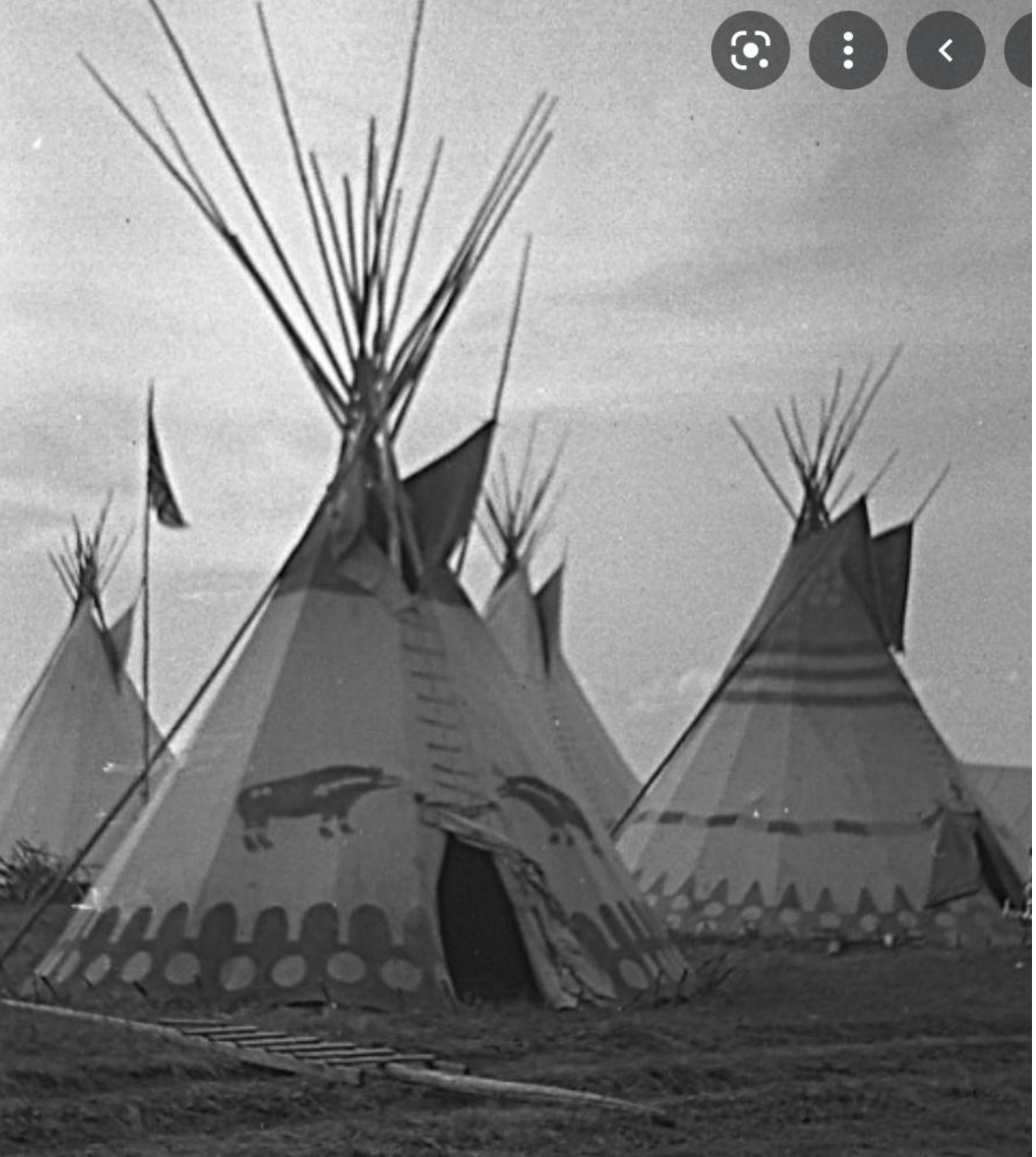


Compassion Fatigue

"Between stimulus and response there is a space. In that space is our power to choose our response. In our response lies our growth and our freedom."
— **Viktor E. Frankl**

- The emotional and physical fatigue experienced by professionals due to their chronic use of empathy in helping others in distress
  - **Figley et al., 1995, 1996, 2002; Newell et al., 2016; Stamm, 2010 Turgoose & Maddox, 2017**





Power of thought: 10 key areas & examples

- All or nothing
- Overgeneralization
- Mental Filter
- Dismissing positives
- Jumping to conclusions
- Magnification or minimization
- Emotional Reasoning
- Should statements
- Labeling
- Self Blame or Blaming others



Reframe, resist, rest, & recreate

Thoughts Emotions Actions

Trauma informed systems

Weave

- Like trauma therapy goal is to weave together identity in ways that helps people live in more balanced ways

Reduce

- Reduce symptoms first by improving safety for all
  - Reduce inequity
  - Reduce discriminatory practices that result in more pain for AIAN communities
  - Social justice is public health

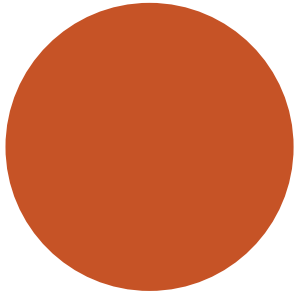
Reduce

- Reduce stigma by survivors living in courageous ways as the norm

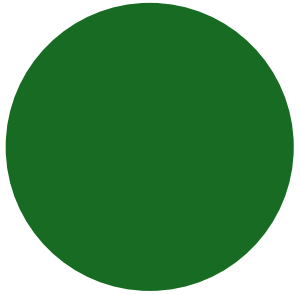
Improve

- Improve access to services and culture/language/healing

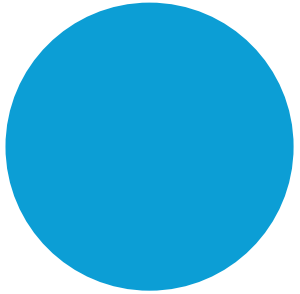
Compassion and advocacy



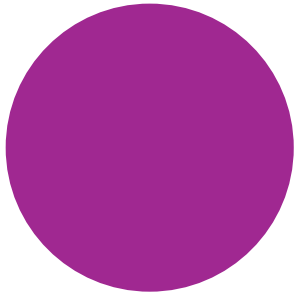
Working to advance creative ways to infuse trauma informed narrative into community engagement



Community healing



Supporting marginalized communities and identities



Trauma education for youth, providers, families, and teams

Service needs

American Indian and Alaska Native female victims are more likely to need services, but they are less likely to have access

2 in 5 American Indian and Alaska Native female victims reported being physically injured.

The services most commonly needed were medical care and legal services.

Yet, more than a third (38 percent) were unable to receive necessary services.

Many cases of domestic and sexual violence are not reported or prosecuted

Native American Research: A Community Bill of Rights

Principle 1: **Partnership is Information**

Principle 2: **Choice**

Principle 3: **Respect**

Principle 4: **Participation**

Principle 5: **Confidentiality**

Principle 6: **Voice your concerns**

Principle 7: **Access**



"When I was a boy, very few members of my tribe could read or write, but now all our young people are in school. ....That is fine, but they learn nothing about their own people and their own great chiefs.

That is American history too."

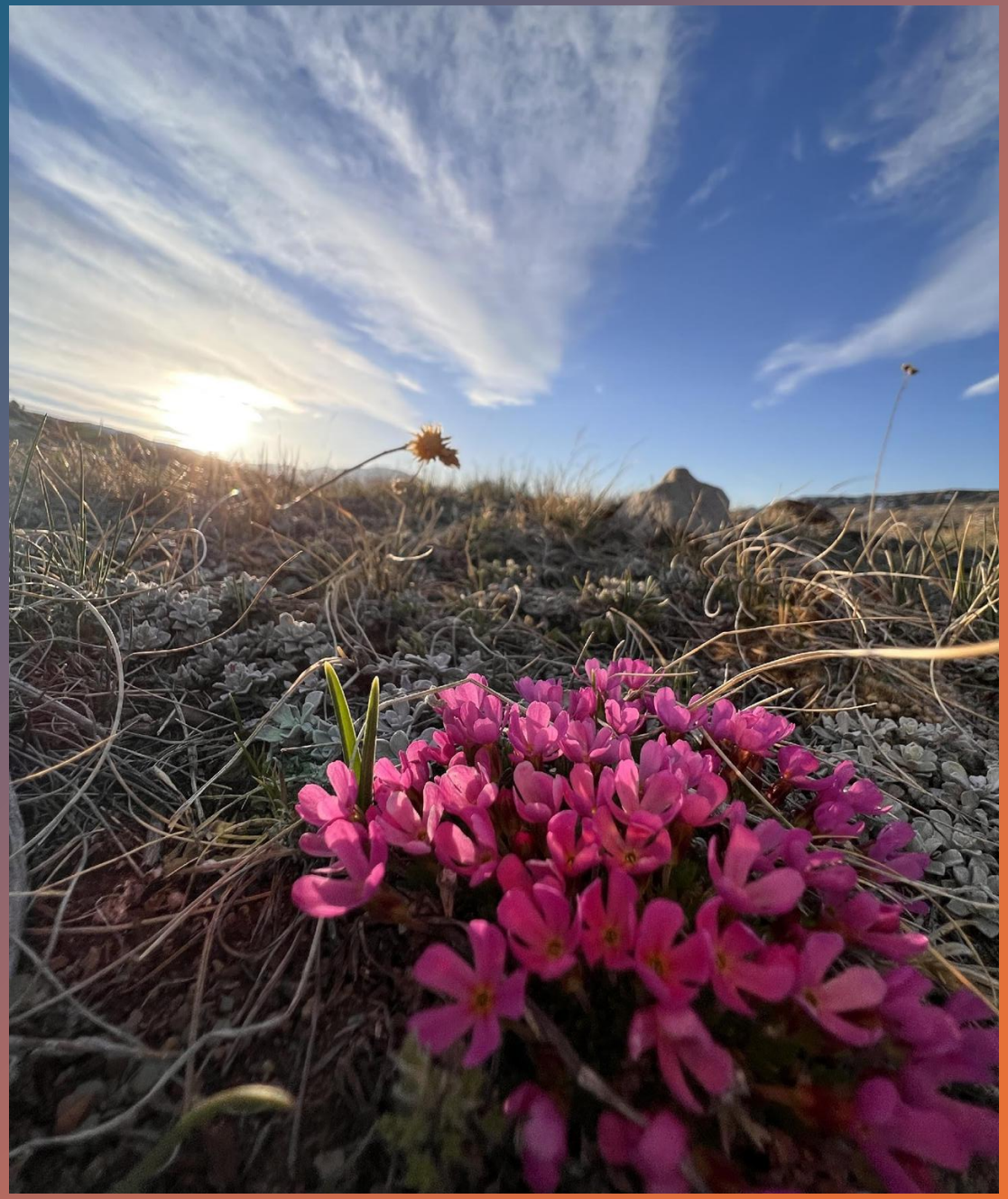
-Chief Bull
Richard Sanderville
Amskapi Pikuni

- American Indian Health: Urgency of Now
- Systemic problems = Systemic solutions
- Stories in stars: Indigenous revitalization
- Ikaakimaat: Resiliency development



Key points

- -Inclusion in meaningful ways of Indigenous voices
- -Trauma can be treated
- Health inequities can be reduced with targeted action
- Investments in Indigenous scholars requires time and resources
- Love can heal hate



Summary

- Community is a source of strength
- History when unexamined is repeated
- Legacy of trauma profound
- Resiliency transcends suffering
- Compassion for community and self
- Hate can be unlearned through love
- Informed science is better science
- Predatory research must be stopped
- Advocacy for vulnerable is essential

Lunch time !

We return at 1:00pm MDT



Brent Race, D.V.M.

Associate Scientist, Laboratory of Neurological Infections and Immunity, DIR, NIAID

Chronic Wasting Disease Transmission Studies, Are Humans at Risk?



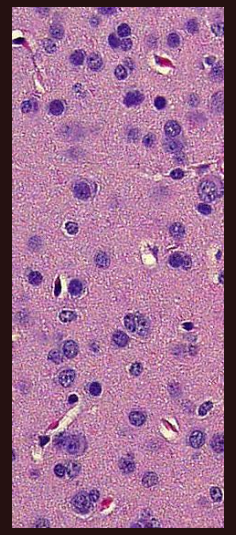
Brent Race D.V.M.
Associate Scientist, Rocky Mountain Laboratories
Laboratory of Neurological Infections and Immunity

NIH Tribal Advisory Committee
April 29, 2026

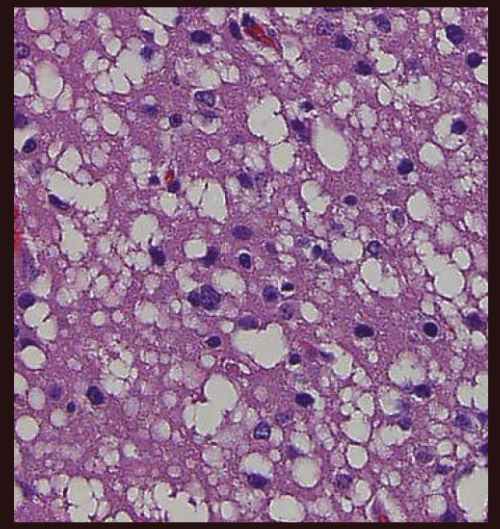
National Institute of Allergy and Infectious Diseases

Prion Disease 101-

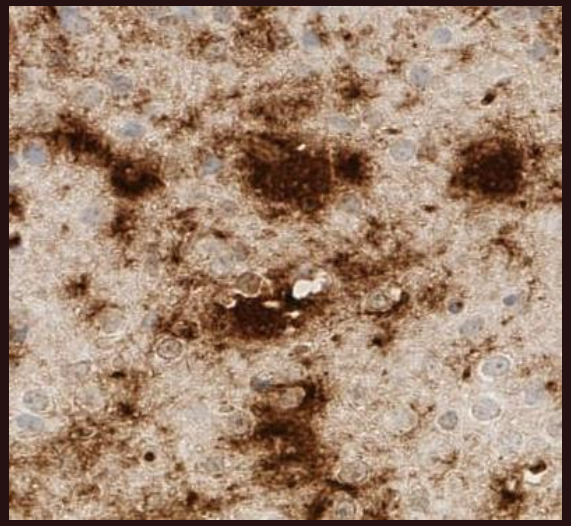
- Caused by mis-folded prion protein
- Prion accumulation destroys the brain (slowly)
- Transmissible via exposure to infected tissue/fluids
- Misfolded prions are very difficult to destroy
- Species barriers can restrict transmission



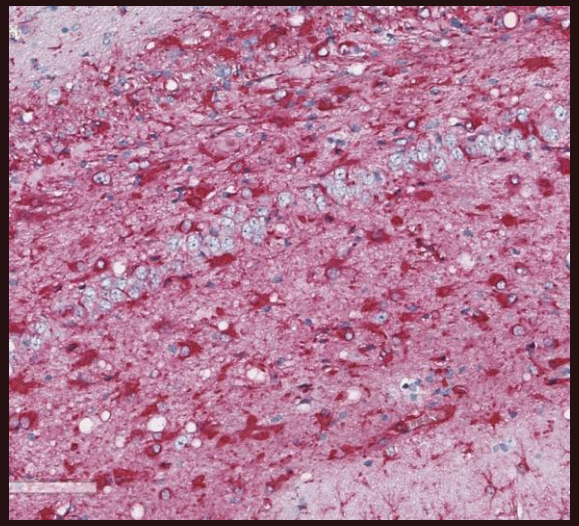
Normal



Prion-infected



Prion protein deposits



Brain inflammation

Prion diseases

Sheep scrapie



Cattle BSE

(mad cow disease)



Humans

- Creutzfeldt-Jakob disease (CJD)
  - sporadic (~85%)
  - genetic (~15%)
  - acquired (~1%)
- Kuru



Deer, elk, moose (cervids)



chronic wasting disease

(CWD)

CWD History / Facts

- First recognized and described as a prion disease by E. Williams (~1967) in deer

- Spread: US, Canada, S.Korea, Europe
  - Natural exposures
  - Accelerated
  - Spontaneous

- 100% Fatal, no cure, persists for years in the environment

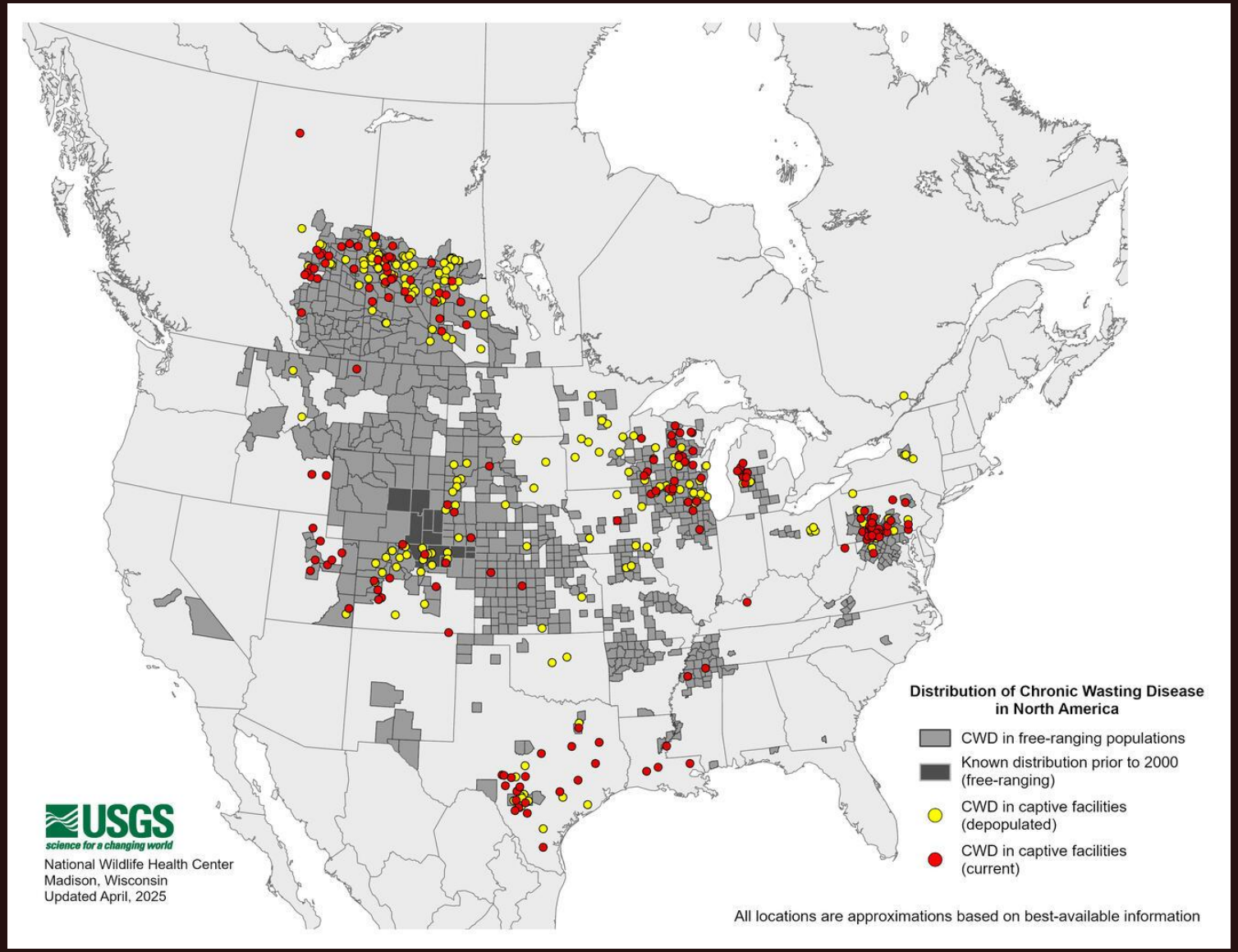
- Highly transmissible
  - 1/10,000,000th of a raisin….

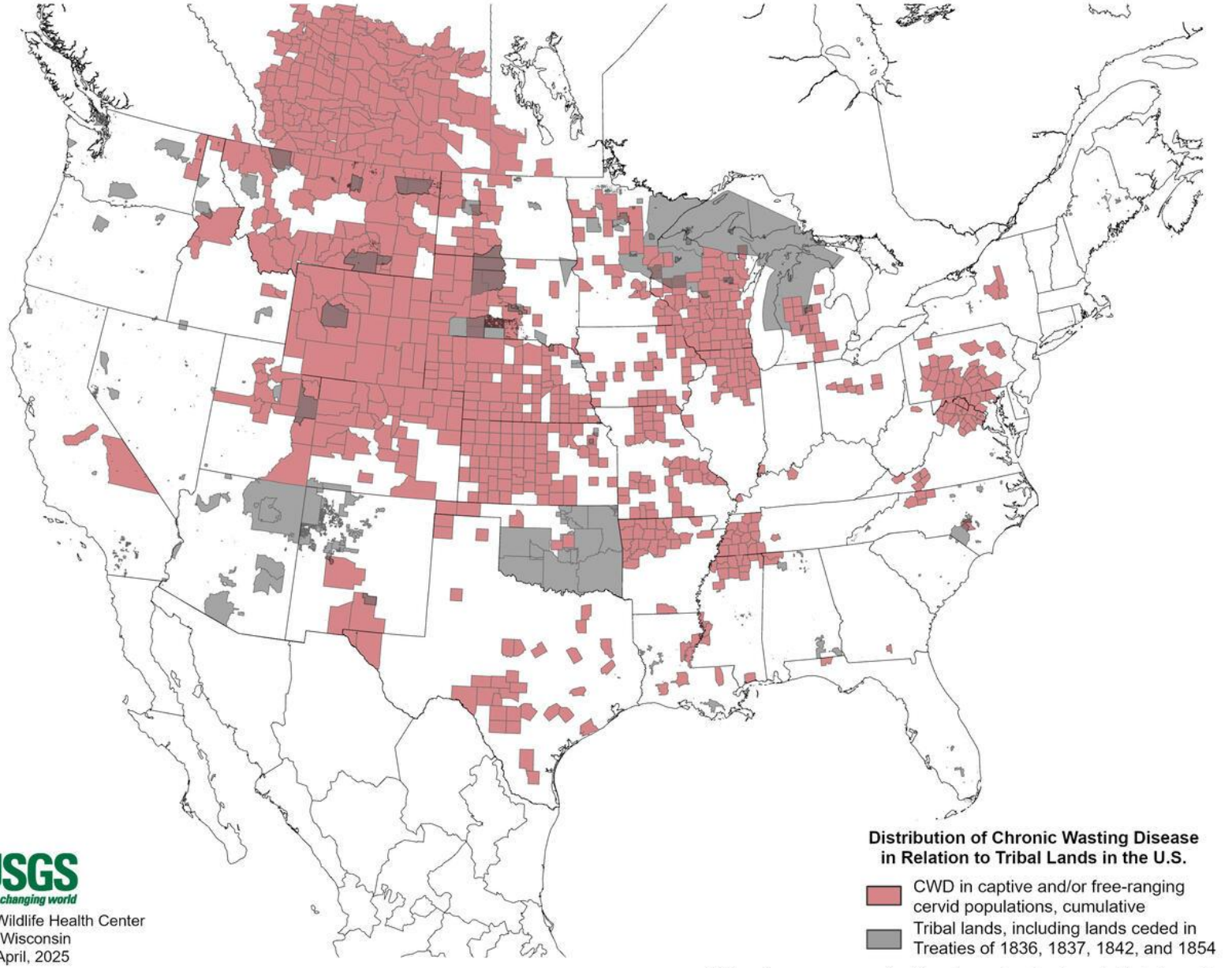
- Cervid populations decline as prevalence increases


Credit: Brady Beck

Chronic Wasting Disease (CWD) distribution in North America

- 36 states
- 5 provinces





Distribution of Chronic Wasting Disease in Relation to Tribal Lands in the U.S.

CWD in captive and/or free-ranging cervid populations, cumulative

Tribal lands, including lands ceded in Treaties of 1836, 1837, 1842, and 1854

All locations are approximations based on best-available information

USGS
science for a changing world

National Wildlife Health Center
Madison, Wisconsin
Updated April, 2025

Prion diseases and cross-species transmission

Prion source	Exposed species	Transmission Result
Sheep scrapie	Human	None
Cattle BSE (Mad Cow)	Human	+ variant CJD (rare)
CWD	Pets/Livestock	Rare
CWD	Human	Under investigation







CWD Risk to Companion Animals











Fernandex-Borges, N. et al.
PLOS Pathog 2017



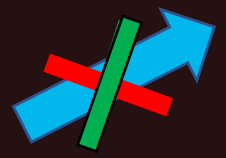
Mathiason, C et al. J Virol 2013
Wolfe, L. et al. J Wildl Dis. 2022



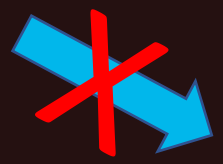
Kim, Y et al. Sci Rep. 2020
Sanchez-Garcia, J et al.
Neurobiol Dis. 2019

CWD Risk to Livestock







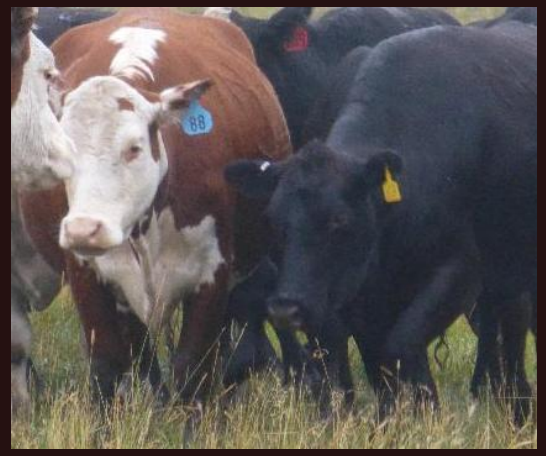




Frese, A., et al. Front Vet Sci. 2025
Greenlee, J. et al. JID 2023
Cassmann, E. et al. Emerg Infect Dis. 2021
Cassmann, E. et al. J Vet Diagn Invest. 2021
Hamir, A. et al. J Vet Diagn Invest. 2006



Moore, S. et al. J Virol. 2017
Soto, P. et al. EID, 2025



Greenlee, J. et al. J Vet Diagn. Invest. 2012
Hamir, N. et al. Vet Pathol. 2007
Williams, E. et al. J Wildlife Dis. 2018
Haley, N. et al. J Gen Virol. 2016

Prion source
CWD



Exposed species
Buffalo/Bison

Transmission Result
Untested (but unlikely)



Cullingham et al., Prion 2020
Seabury et al., PNAS 2004

Research to determine the risk of CWD transmission to humans…

- Human epidemiology
- *In vitro* studies (lab bench)
- *In vivo* studies (animal models)



Waddell L. et al. Transbound Emerg Dis.
Tranulis M.A. et al. Foods. 2023
Bartz J. et al. Pathogens 2024

Three animal models for CWD transmission to humans

Squirrel monkeys



Cynomolgus macaques



Transgenic mice
“Humanized”



Squirrel monkeys- "Positive control"



100% susceptible

		Inc. period
IC	13/13	3-6 years
Oral	12/12	5-10 years
Neg C	0/3	7-10 years

Race B. et al. Emerg Infect Dis. 2014
Race B. et al. Emerg Infect Dis. 2009

Cynomolgus macaques- Experimental model



0% susceptible

		Obs. period
IC	0/6	4-13 years
Oral	0/8	8-13 years
Neg C	0/9	5-24 years

Race B. et al. J Virol. 2018

Transgenic mice- "Humanized"



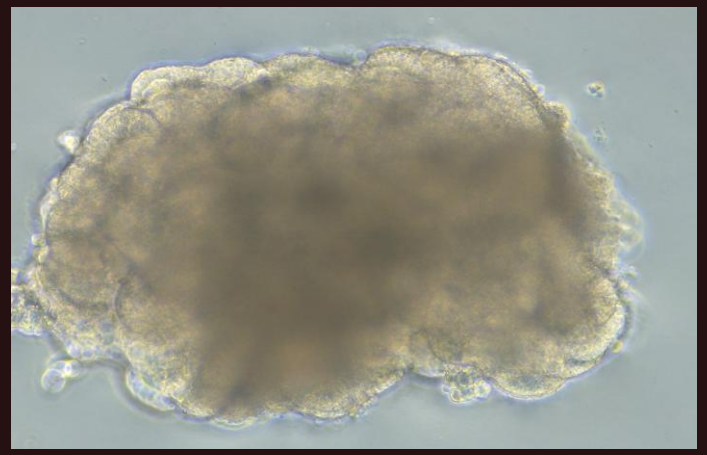
0% susceptible

		Obs. period
IC	0/108	467-798 days
Neg C	0/18	635-700 days

Race B. et al. Vet Res. 2019
Race B. et al. Vet Res. 2022

Confirmation of prion disease was based on neuropathology, IHC, immunoblot and RT-QuIC assay

Human neuronal tissue culture model for CWD transmission (organoids)



129MM
129MV
129VV
HuPrP KO

\+

1. Human CJD ✓
2. CWD ✗
3. Normal brain

Groveman, B. et al. EID. 2024

Ongoing and Miscellaneous CWD studies

- CWD strains
  - Characterization
  - Risk assessments
  - CWD “resistant” deer ☺

- CWD structures (Dr. Caughey)

- CWD Disinfection methods
  1. Bleach (Williams et al. 2019)
  2. Wex-cide 128 (Baune et al. 2023)

- CWD clearance by Mountain Lions
  - (Baune et al. 2021)



Recommendations regarding CWD

- Submit samples for CWD screening
  - Do not consume test positive animals
  - Learn regional CWD status
- Prevent additional spread (restricted transportation and disposal)
- Avoid contact with high-risk materials (brain, lymph nodes)
- 50% Bleach or 4% Wexcide-128 for surface decontamination



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Sue Priola (RML)

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- Lori Lubke
- Cynthia Favara (retired)
- Dan Long (retired)

RML Veterinary Branch Staff

Wisconsin National Primate Research Center

- **Transgenic mice**
- Robert Rohwer
- Larisa Cervenakova

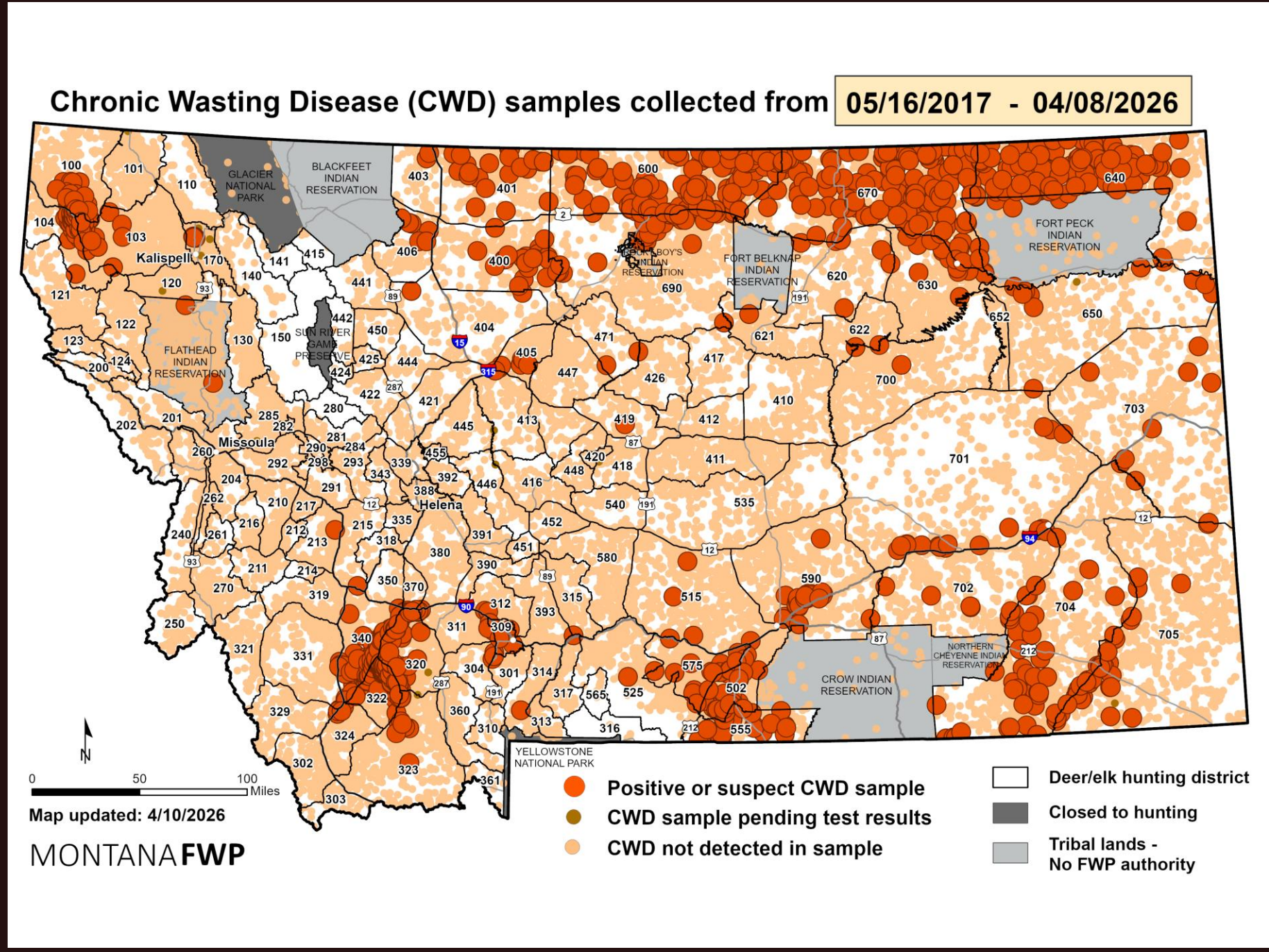
- **Montana FWP,** Emily Almberg

- **CWD+ and CWD- tissue pools**
- Mike Miller/Elizabeth Williams
- Jean Jewell
- Richard Race

NIH National Institute of Allergy and Infectious Diseases

Questions?

Discussion….





Emmie de Wit, Ph.D.

Senior Investigator Laboratory of Virology, DIR, NIAID

Avian influenza in wild birds in the US: a risk to human and animal health

Emmie de Wit, PhD

Chief, Molecular Pathogenesis Section

Laboratory of Virology

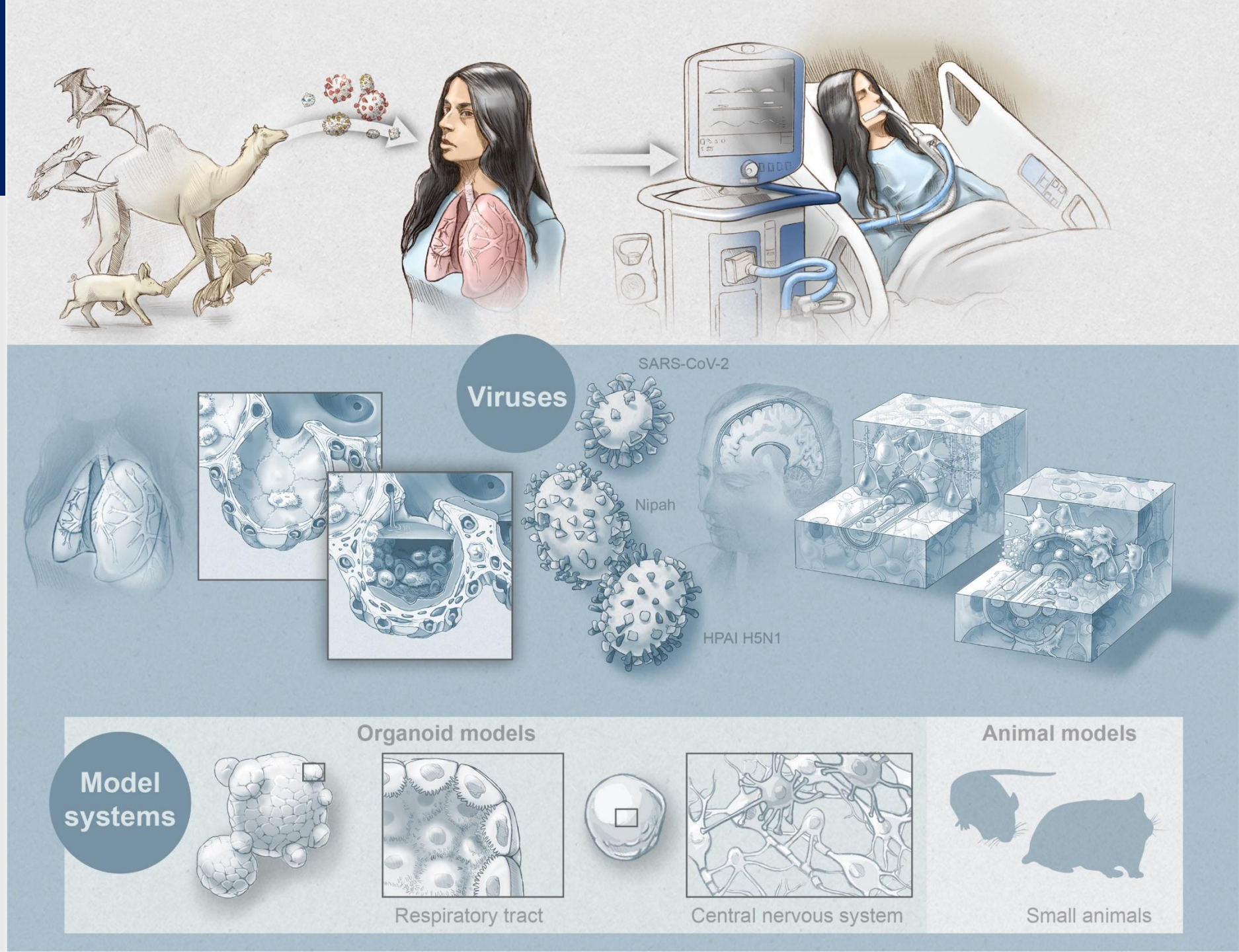
Rocky Mountain Laboratories

National Institute of Allergy and Infectious Diseases

NIH National Institute of Allergy and Infectious Diseases

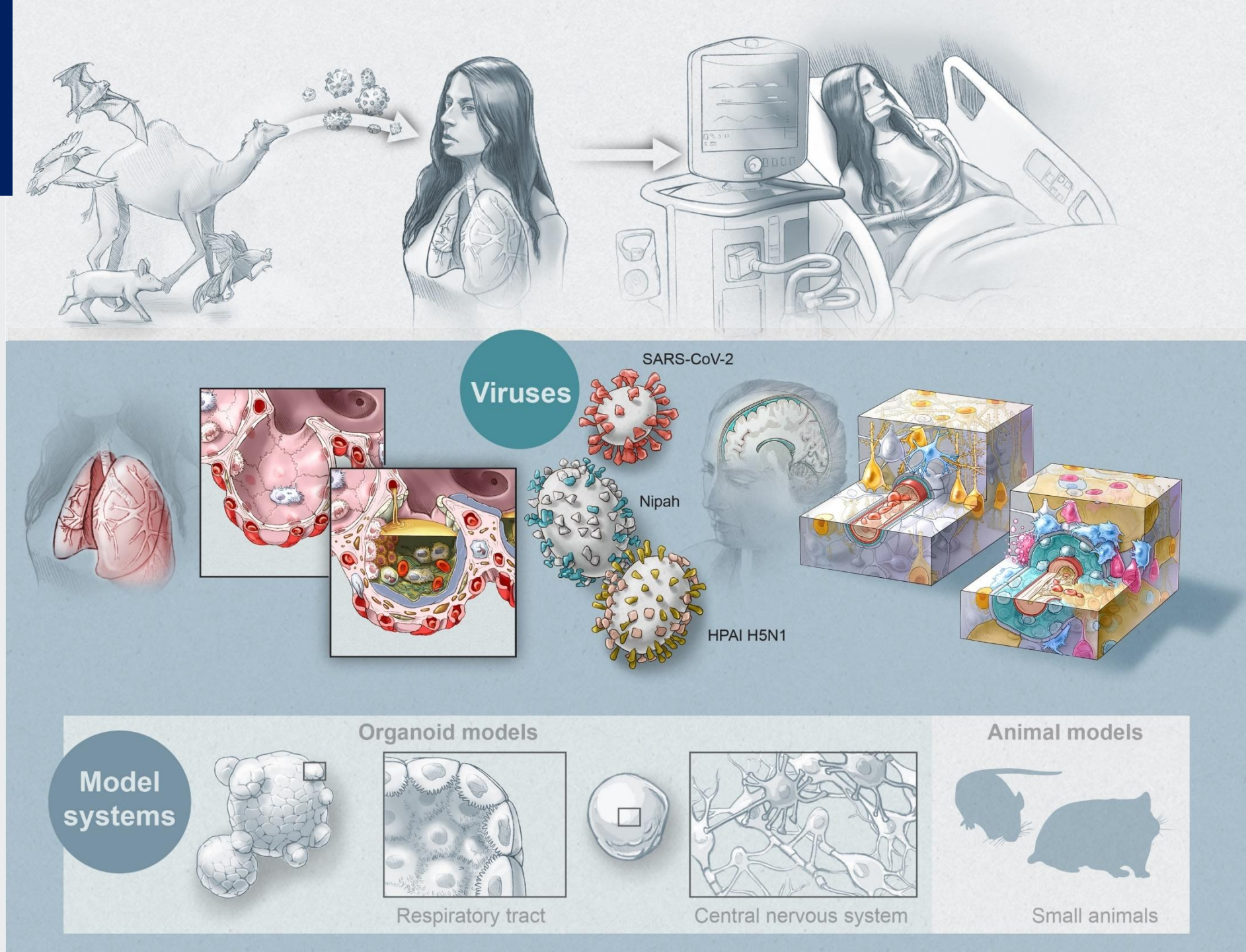
Molecular Pathogenesis Section

Our overarching goal is to understand better how emerging respiratory viruses cause severe disease.



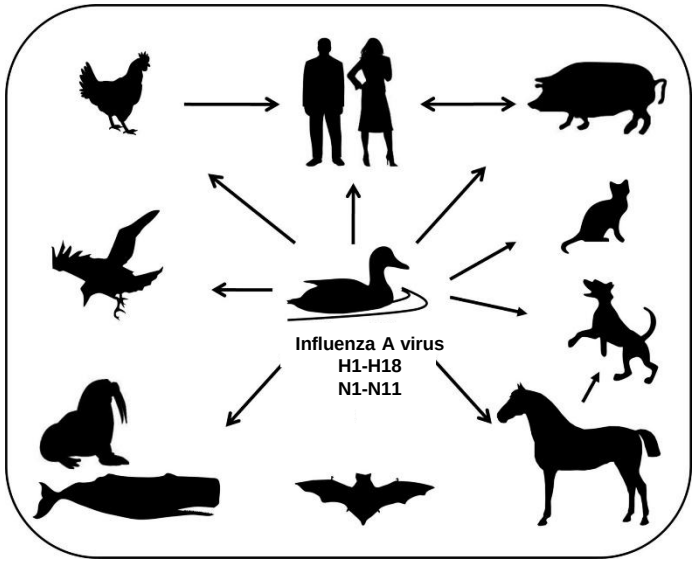
Molecular Pathogenesis Section II

We focus on viruses that cause disease in the respiratory tract and the brain, and investigate virus and host factors important in disease progression.



Low pathogenic avian influenza (LPAI)

- Avian influenza viruses are in principle low pathogenic viruses
- All seasonal influenza A viruses started as avian viruses
- Mainly present in aquatic waterfowl (ducks, geese), although some viruses in gulls too
- There are many avian influenza viruses, with 18 types of HA and 11 types of NA, in many combinations
- Does not cause overt illness in birds

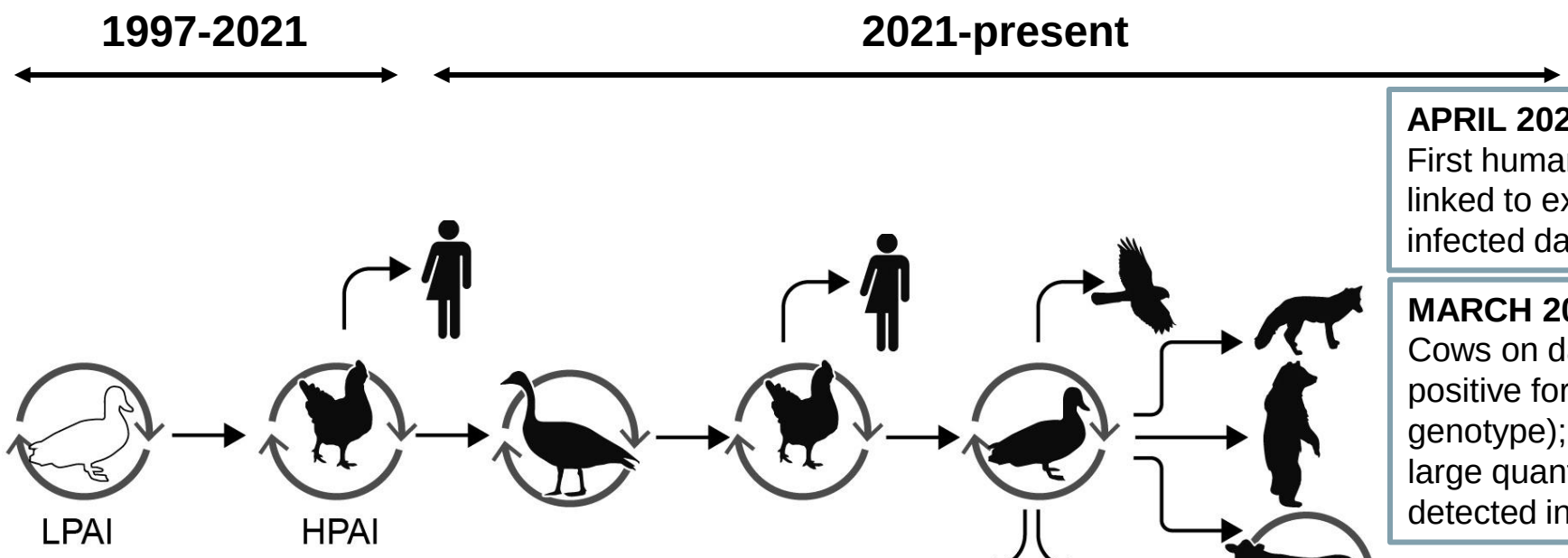


Highly pathogenic avian influenza (HPAI)

- When people talk about ‘bird flu’ they usually mean the highly pathogenic form
- Classification based on ability to cause mortality in poultry; wild birds may not show overt disease upon infection
- Confined to viruses of subtypes H5 and H7
- Change in the HA protein spontaneously occurs when H5 or H7 viruses replicate in poultry
- The virus can now replicate systemically
- 100% mortality in 24-48 hours in poultry



HPAI H5N1: then vs. now



APRIL 2024
First human H5N1 case linked to exposure to infected dairy cows

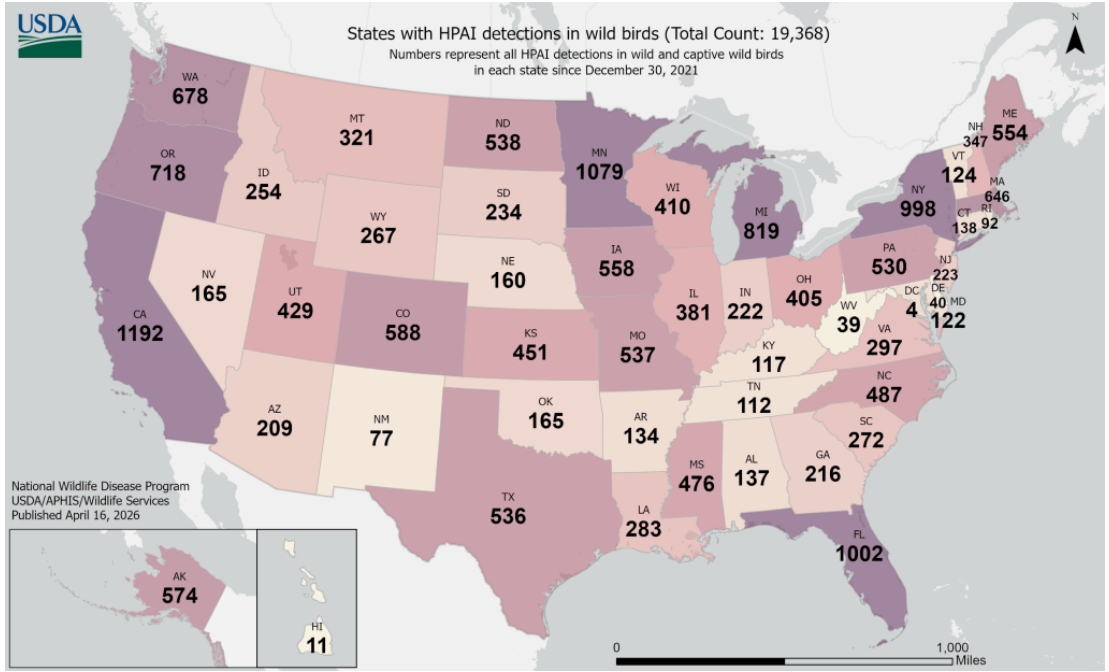
MARCH 2024
Cows on dairy farms test positive for H5N1 (B3.13 genotype); extremely large quantities of virus detected in milk

1997-2023
HPAI H5N1 outbreaks in humans result in cumulative **882 cases with 461 deaths (52%)**

APRIL 2026
- >2,000 poultry flocks of >206 million poultry affected
- >1,000 dairy herds affected
- 19 states with HPAI H5N1 in cattle
- **70 human cases of HPAI H5N1 with 1 death**

Data source: WHO, CDC, USDA

HPAI H5N1: then vs. now II





BAY AREA

Bay Area elephant seal deaths round triple digits amid bird flu outbreak

by: Ryan Mense
Posted: Mar 20, 2026 / 11:49 AM PDT
Updated: Mar 20, 2026 / 11:49 AM PDT

Twenty Endangered California Condors Die Amid Avian Flu Outbreak

Scientists fear the deaths could set back the slow-breeding birds' recovery by at least a decade

Sarah Kuta - Daily Correspondent
May 1, 2023

Get our newsletter!

Hawai'i News

Bird flu bad news for culturally important native species in Hawai'i

November 29, 2024 · 9:57 AM MDT

ENVIRONMENT

Endangered whooping crane dies of avian flu at wildlife refuge in southern Wisconsin

An whooping crane in Wisconsin has died of avian flu, which the Baraboo-based International Crane Foundation says marks the first confirmed death in this endangered species of bird due to Highly Pathogenic Avian Influenza.

Associated Press
September 29, 2025 • SOUTH CENTRAL REGION

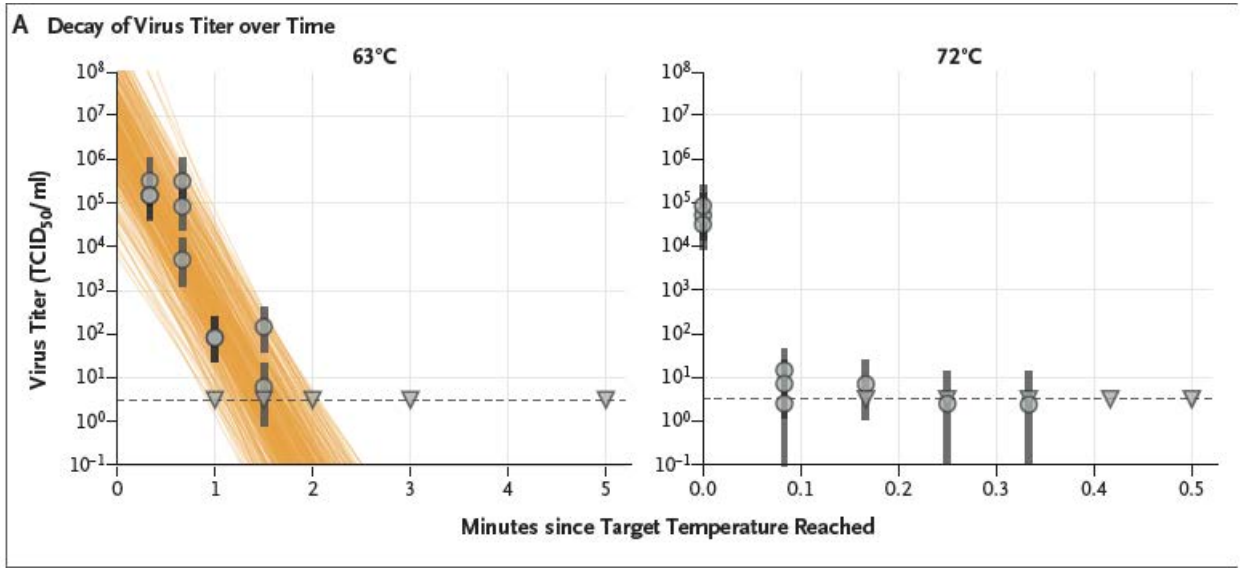
Important public health questions

- How stable is HPAI H5N1 in milk? What is the risk that there is infectious virus in milk?
- How sick will you get if infected with HPAI H5N1 by drinking contaminated milk?
- How severe is disease after infection with contemporary HPAI H5N1 viruses?
- Is there a risk of neurological complications?

HPAI H5N1 in milk: does pasteurization inactivate virus

Is pasteurization an effective inactivation method? Or: **is it safe to drink milk?**

- Raw cow milk
- 30 minutes 63°C
- 15 seconds 72°C



Yes, pasteurization inactivates HPAI H5N1 and it is safe to drink milk

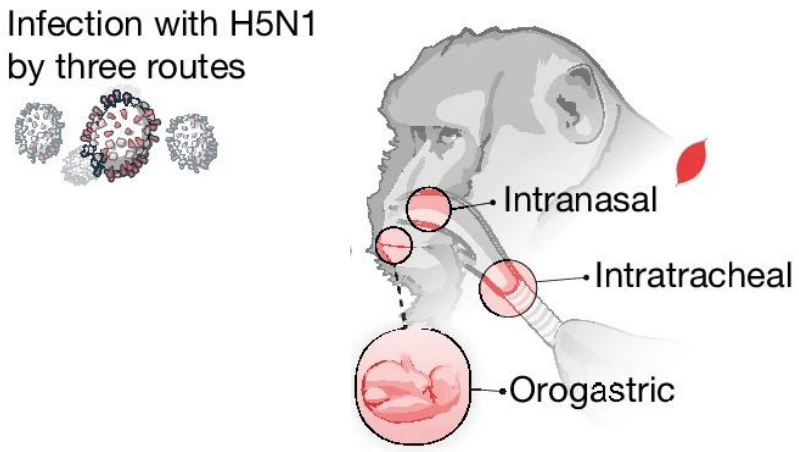
BUT… raw milk will spoil long before the virus has deteriorated to the point where it can no longer infect you

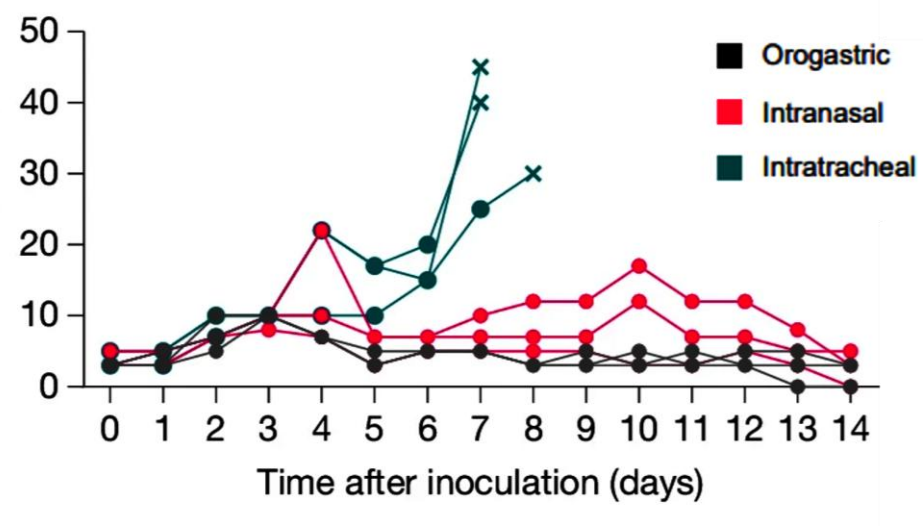


Franzi Kaiser

Kaiser et al., NEJM 2024
Kaiser et al., EID 2025

How sick will you get from drinking contaminated milk?





Yes, you can get HPAI H5N1 from drinking raw milk

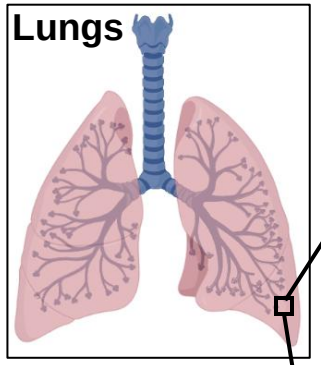
But disease is likely mild



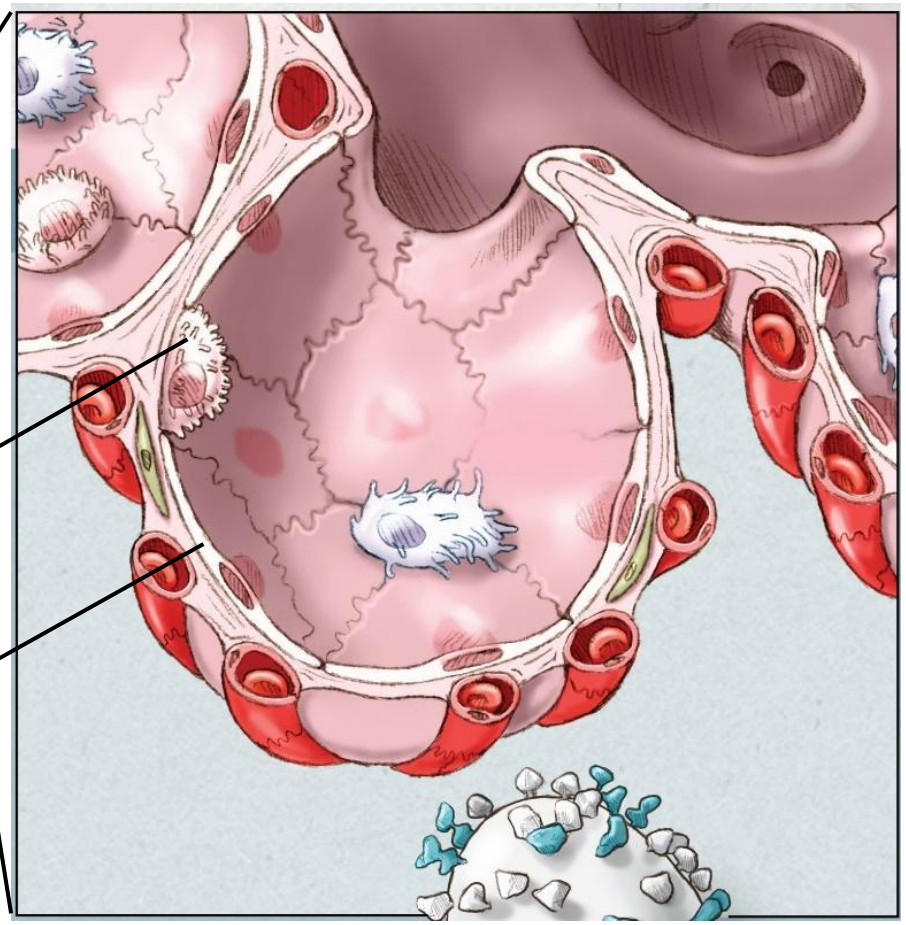
Kyle Rosenke

Rosenke et al., Nature 2025

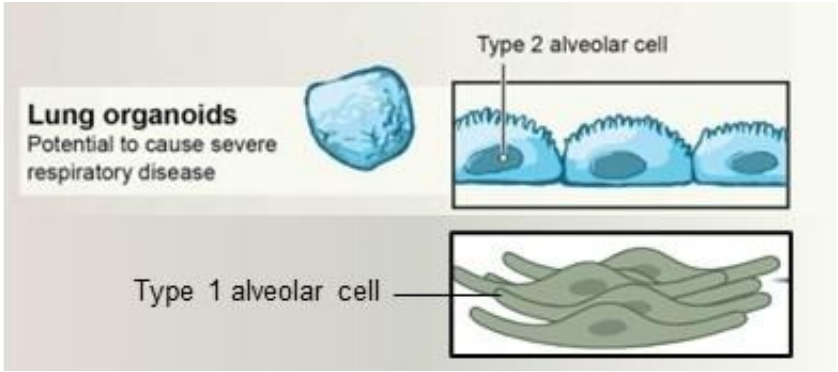
How severe is disease if you get HPAI H5N1?



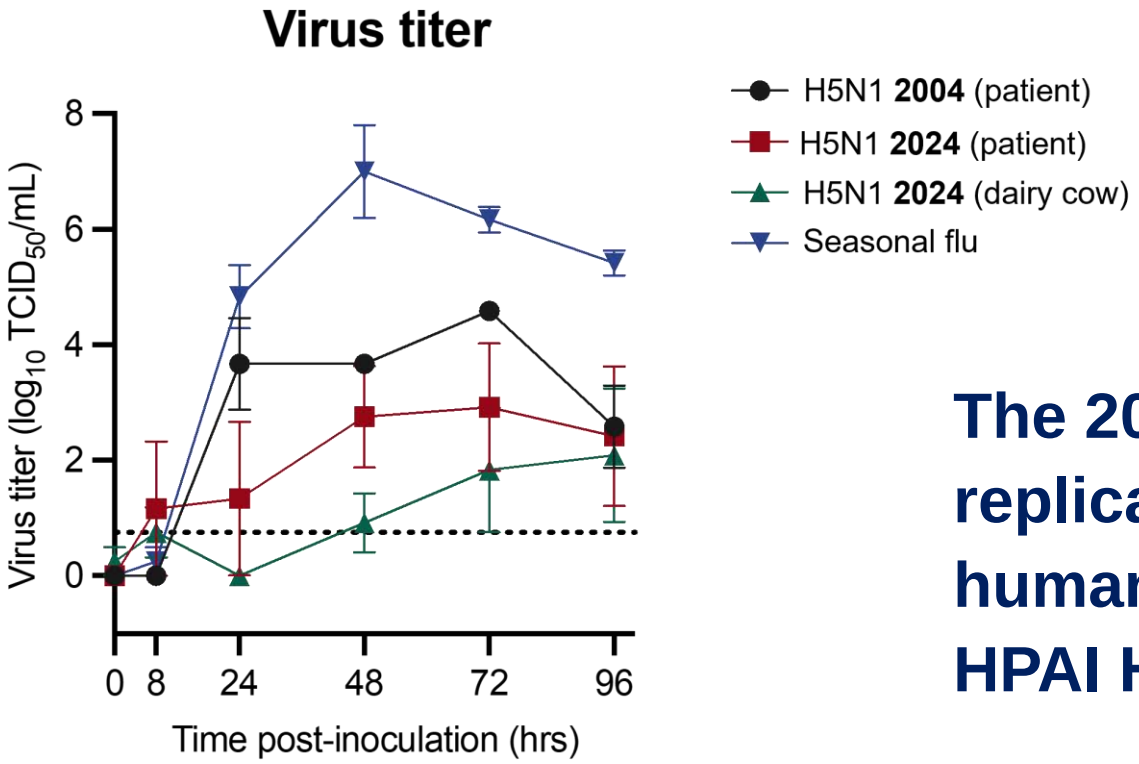
Gas exchange (oxygen in, CO_2 out) takes place in your alveoli



In the lab, we can grow the epithelial cells that make up the alveoli from human donors



How severe is disease if you get HPAI H5N1? II



The 2024 HPAI H5N1 viruses replicate less efficiently in human lung cells than older HPAI H5N1 virus

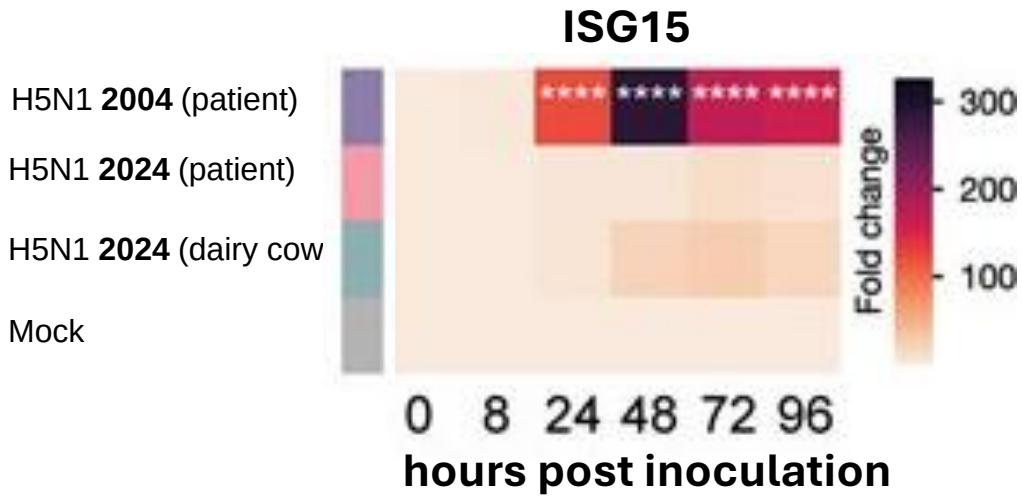


Meaghan Flagg

Flagg et al., EID 2025

How severe is disease if you get HPAI H5N1 II?

In influenza virus infection, a 'cytokine storm' is an important cause of severe disease



The contemporary HPAI H5N1 viruses induce fewer genes that result in cytokine storm

The contemporary HPAI H5N1 viruses are likely to cause less severe disease in humans than the historical isolates with a case fatality rate of ~50%

Neurological complications are associated with influenza A virus infection

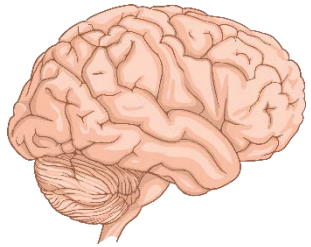
- Spanish flu 1918: encephalitis lethargica and post-encephalitis parkinsonism
- 2009 H1N1 pandemic: seizures, encephalitis, and narcolepsy-like sleep disorders
- Encephalitis has been observed in human HPAI H5N1 patients before 2021

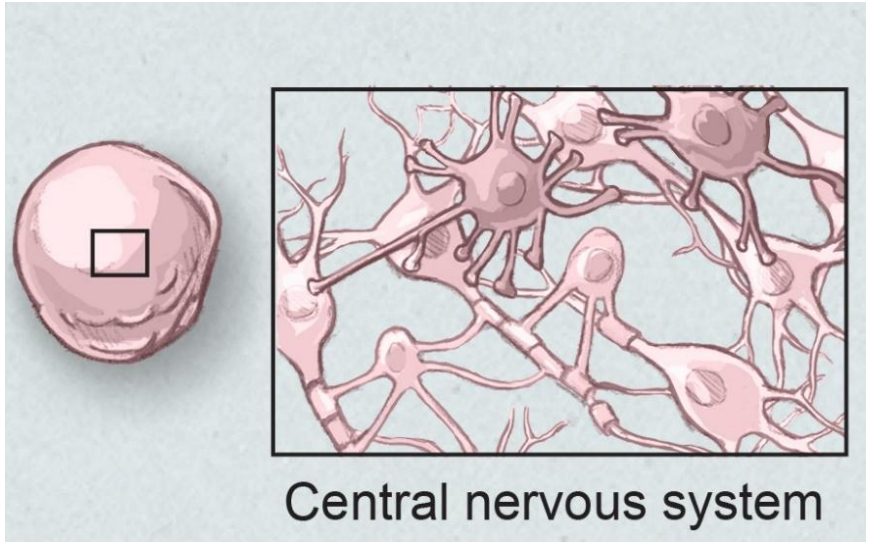
What is the risk of neurological complications from HPAI H5N1?

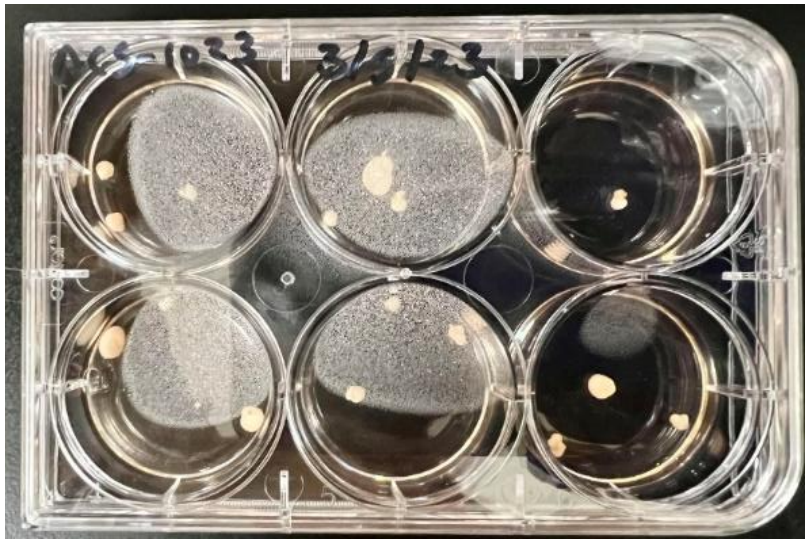
What is the risk of neurological complications?

Human cerebral organoids can be used to mimic virus infection in the brain

- Derived from human induced pluripotent stem cells (iPSC)
- Contain multiple cell types found in the brain
- Form a 3D environment that loosely mimics interactions with neighboring cells in the brain







What is the risk of neurological complications II?



The contemporary HPAI H5N1 viruses exhibit similar neurotropism to 2004 HPAI H5N1 virus

Contemporary viruses cause less cell death and a smaller cytokine response

Contemporary HPAI H5N1 viruses likely cause fewer/less severe neurological complications



Kerry Goldin

Goldin, Flagg et al., OFID 2025

Acknowledgements II

National Institute of Allergy and Infectious Diseases

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Laboratory of Bacteriology, DIR, NIAID

Rocky Mountain spotted fever: Past and Present

Ted Hackstadt
Rocky Mountain Laboratories
National Institute for Allergy and Infectious Diseases
National Institutes of Health

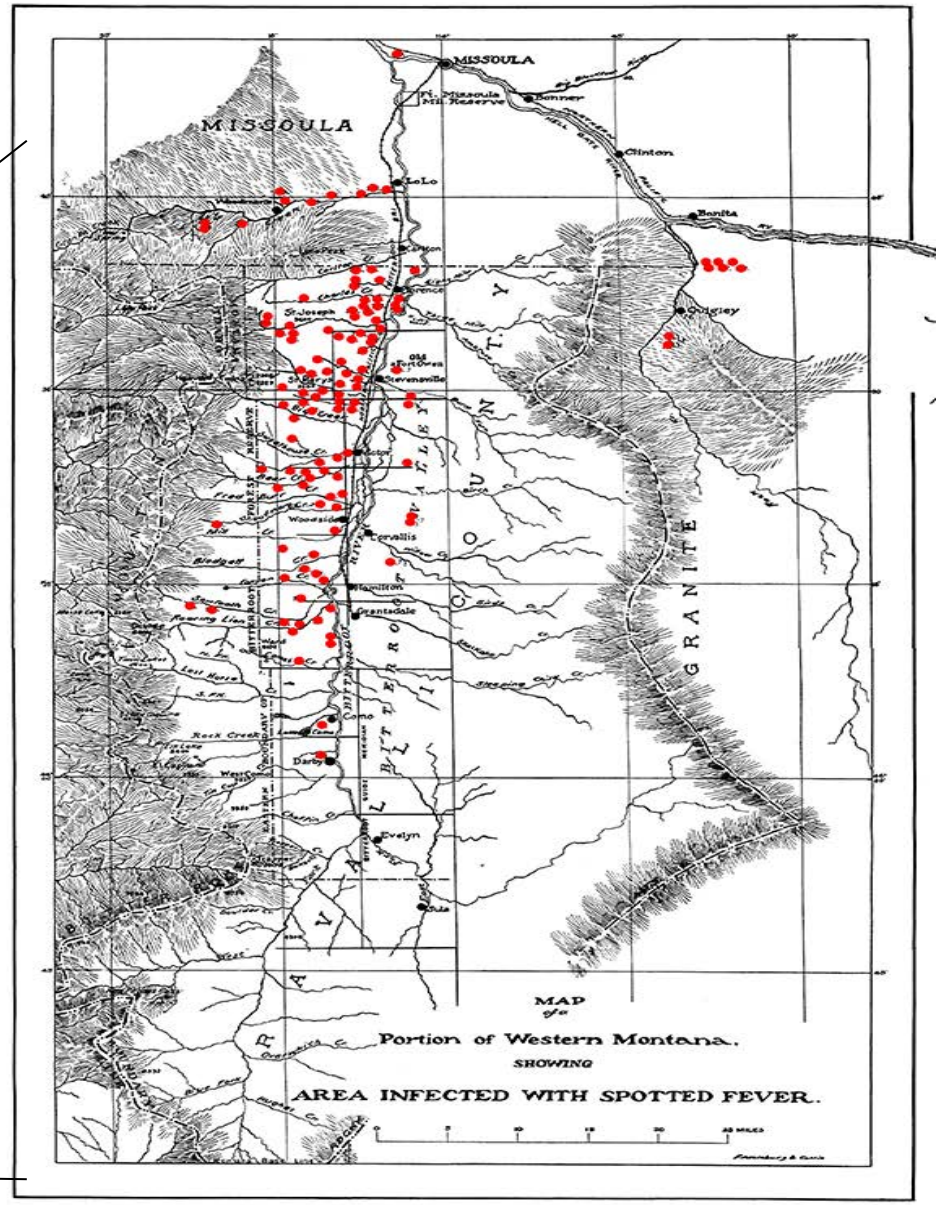


Rocky Mountain Spotted Fever in the Bitterroot Valley



Rocky Mountain spotted fever rash





STUDIES IN PYROPLASMOSIS HOMINIS.*

("SPOTTED FEVER" OR "TICK FEVER" OF THE ROCKY MOUNTAINS.)

Louis B. Wilson and William M. Chowning

Journal of Infectious Diseases, Vol. 1, No. 1 (Jan. 2, 1904), pp. 31-57

Etiology of RMSF?

- **First documented case – 1873**
- **Geographically limited**
- **Great variation in mortality**
- **Distinct seasonal appearance**
  - **Snow-melt**
  - **Protozoan parasite**
  - **Ticks**
  - **Changing ecology**



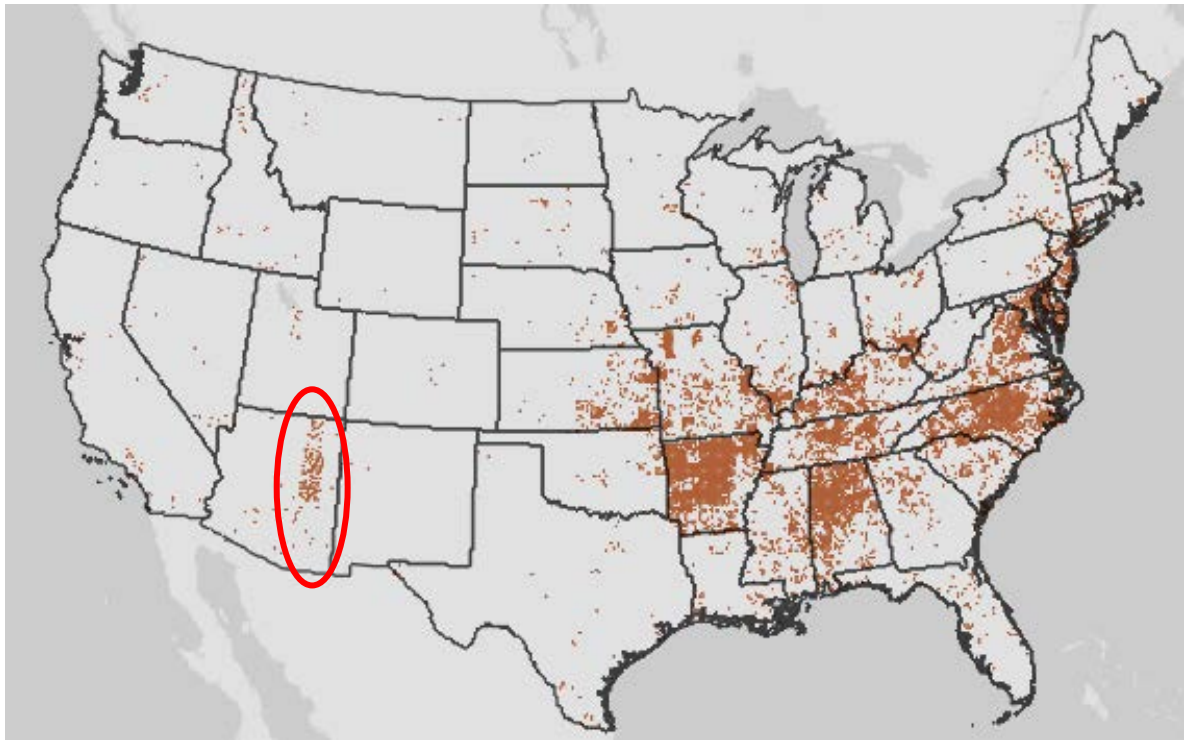
"In western Montana it is almost uniformly of a very severe character, the mortality ranging from about 65 per cent to about 90 per cent. In Idaho, on the other hand, the death rate rarely rises above 5 per cent."

Medical Record 1909;76:843-55

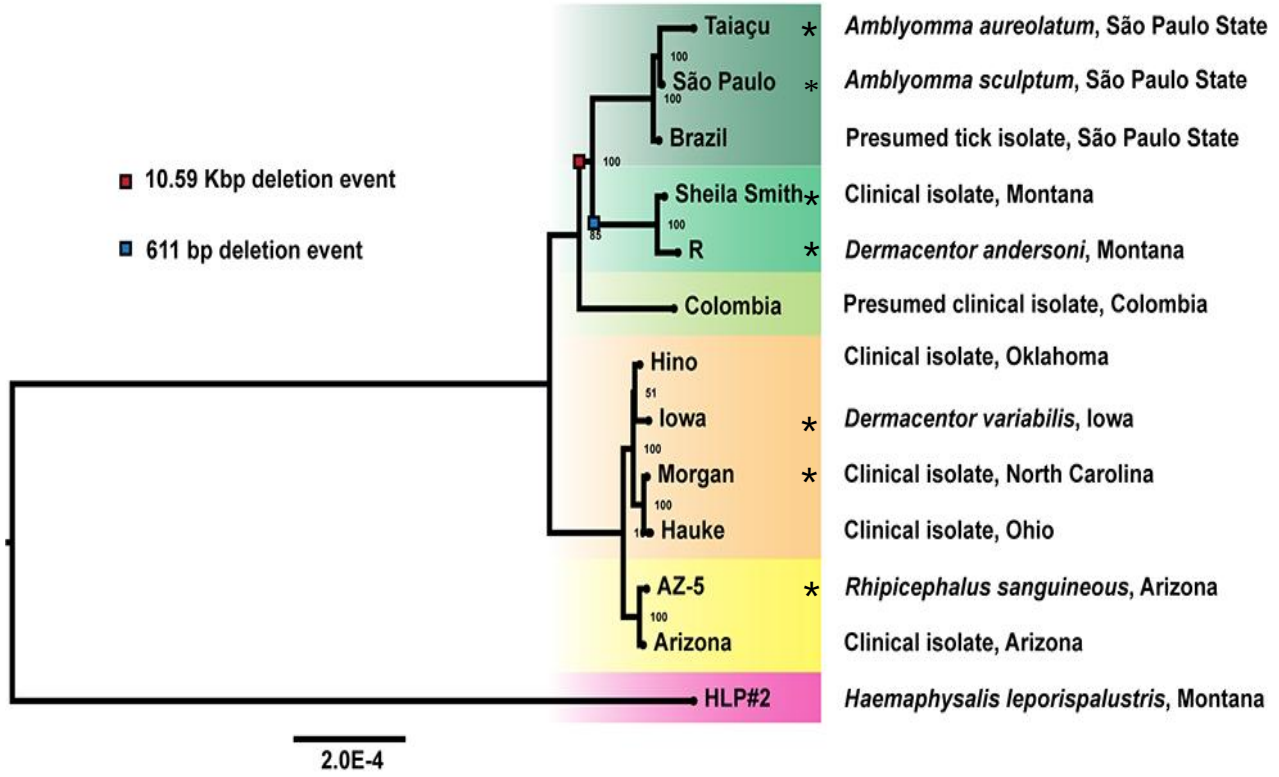


- **Gram-negative obligate intracellular bacteria**
- **Reduced genome - approx. 1.2 mBp**
- **Escape endocytic vesicle/Replicate in cytosol**
- **Arthropod borne – Ticks, fleas, lice, mites**

Distribution of RMSF and it's tick vectors



RMSF by county: 2019 - 2022



The NEW ENGLAND JOURNAL of MEDICINE

Rocky Mountain Spotted Fever from an Unexpected Tick Vector in Arizona

Linda J. Demma, Ph.D., Marc S. Traeger, M.D., William L. Nicholson, Ph.D., Christopher D. Paddock, M.D., Dianna M. Blau, D.V.M., Ph.D., Marina E. Eremeeva, M.D., Ph.D., Gregory A. Dasch, Ph.D., Michael L. Levin, Ph.D., Joseph Singleton, Jr., B.S., Sherif R. Zaki, M.D., Ph.D., James E. Cheek, M.D., David L. Swerdlow, M.D., and Jennifer H. McQuiston, D.V.M.



Dermacentor variabilis ***Dermacentor andersoni*** ***Rhipicephalis sanguineous***

Differences in Arizona outbreak vs. U.S

Table 1: Differences in RMSF Epidemiology, Arizona vs. United States (1, 3, 12)

	Arizona	United States
High volume of free-roaming dogs	Present 25% - 100% seropositive	Absent
Tick vector	Brown dog tick Up to 10% carry *R. rickettsii*	American dog tick Rocky mountain wood tick <0.1% carry *R. rickettsii*
Seasonality	Two peaks (May & August)	One peak (June/July)
Area Acquired	Near the home	Forest/wood settings
Age Distribution	Younger (<18 years)	Older (55-65+ years)
Case Fatality Rate	7%	<1%

Arizona Department of Health Services

Rocky Mountain spotted fever in Mexico



Rocky Mountain spotted fever in Mexico: past, present, and future

Gerardo Álvarez-Hernández, Jesús Felipe González Roldán, Néstor Saúl Hernández Milan, R Ryan Lash, Casey Barton Behravesh, Christopher D Paddock

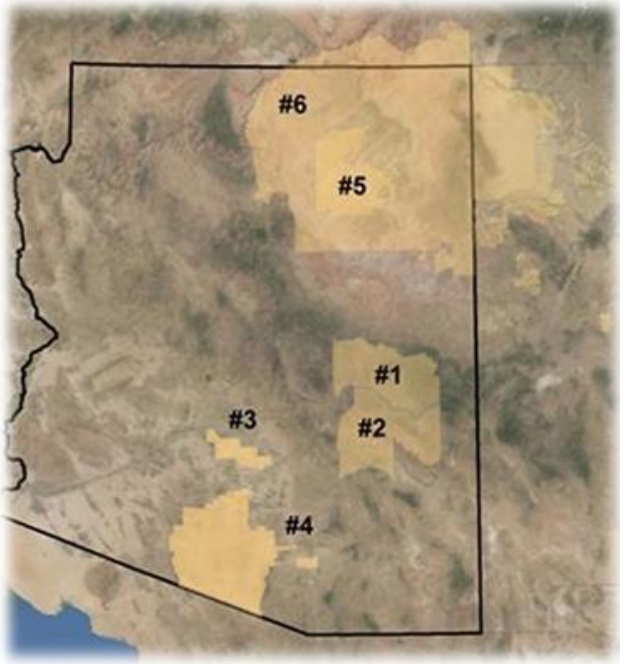
	Period	States	Number of cases (case fatality rate)
Bustamante and Varela (1943)[3]	1918–43	Sinaloa	215 (80%)
Silva-Goytia and Elizondo (1952)[13]	1951–52	Sinaloa, Sonora	45 (27%)
De Lara Huerta and Barragán (2008)[14]	1975–2007	Coahuila, Durango*	115 (55%)
Zavala-Castro and colleagues (2008)[15]	2006–07	Yucatán	9 (33%)
Álvarez-Hernández and colleagues (2016)[16]	2004–15	Sonora*	210 (30%)
Milan (2016)†	2014–16	Baja California	255 (29%)

*Paediatric series. †Department of Epidemiology, Institute of Public Health Services of the State of Baja California; data provided by NSH Milan.

Table: Historical and contemporary case fatality rates of Rocky Mountain spotted fever in Mexico, 1918–2016

Alvarez-Hernandez et al, Lancet, (2017)

Timeline of RMSF epidemic



ARIZONA ROCKY MOUNTAIN SPOTTED FEVER HANDBOOK

- 2012: Reservation #5 and Reservation #6, both located in northern Arizona.

2005-2012 RMSF epidemic growing on Reservations #1 and 2.
Prevention campaigns involving pesticide application and tick collaring dogs initiated.

2004-2005
1st human case identified on Reservation #2.
Canine serosurveys conducted.

2009
RMSF human case identified on Reservation #3. RMSF considered endemic in Eastern Arizona.

2011
RMSF cases reported on Reservation #4.

2013
Enhanced efforts for case investigation and follow-up.

2003
1st human case of RMSF identified on Reservation #1.
R. sanguineus tick identified as source.

2004-2007
Canine serosurveys conducted on Reservations #1, 2, and 3.

2012
RMSF death of Reservation #5 tribal member.
Cases diagnosed on Reservation #6.
Additional canine serosurveys conducted.
RODEO project Reservation #2.

Indications of recent introduction and expansion of infected *R. sanguineus* ticks

Canine Serosurveys Then & Now

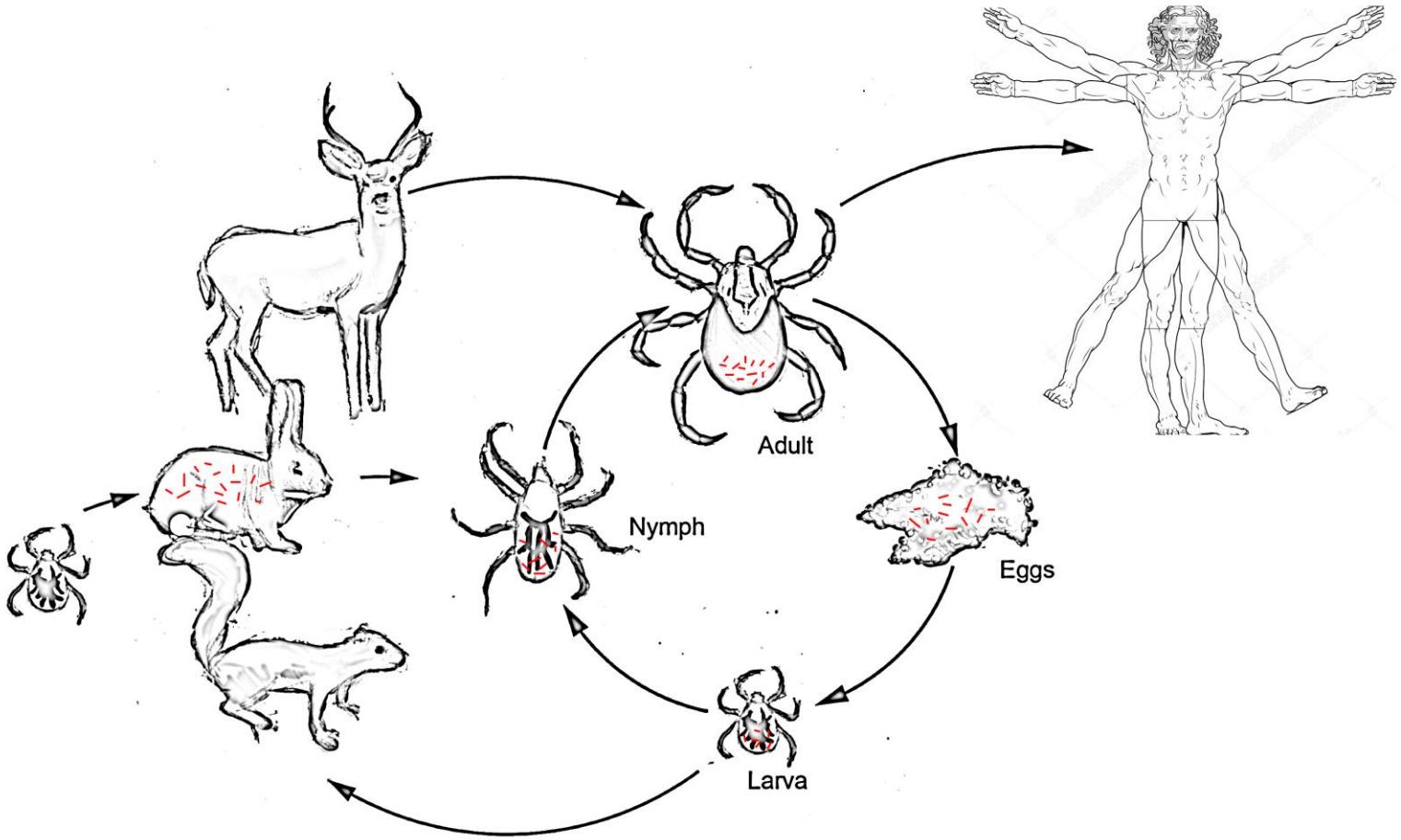
CDC data: Evidence for Recent Emergence

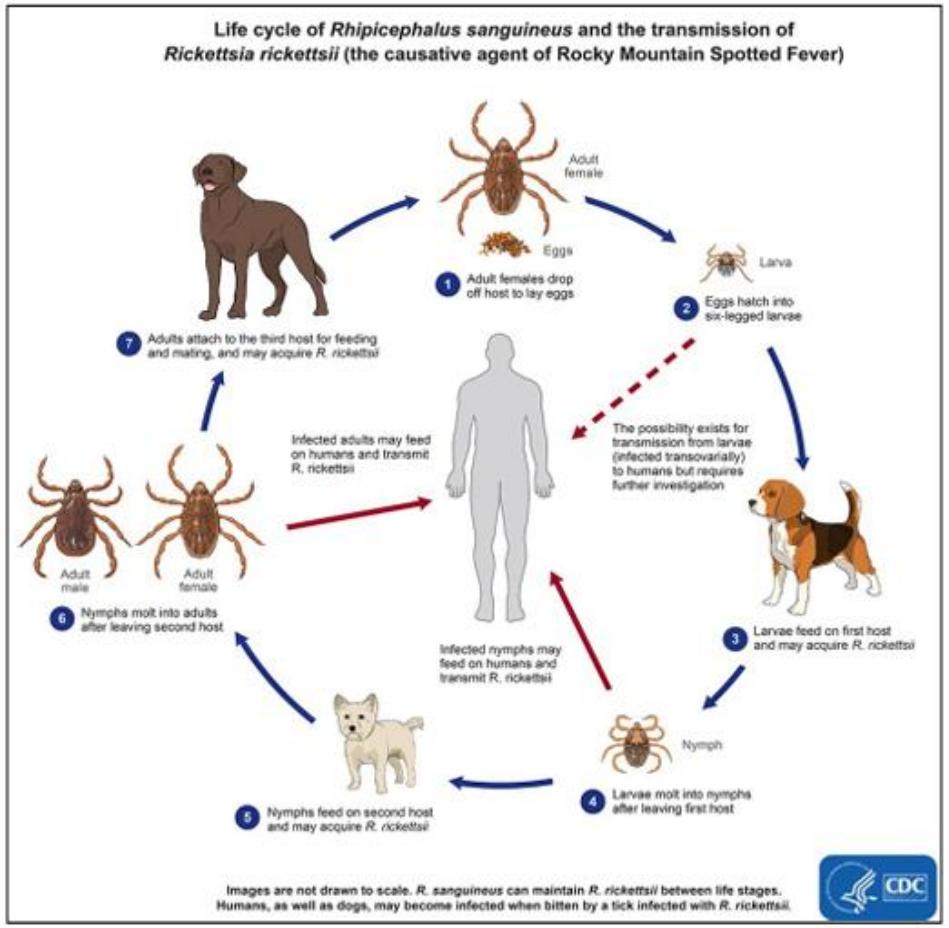
% dog bloods sero+ for *R. rickettsii*	1996	2003 & 2004
RESERVATION A	5 %	70 %
RESERVATION B	NA	57 %

Levy and Dickson – ADHS/IHS

Arizona Department of Health Services

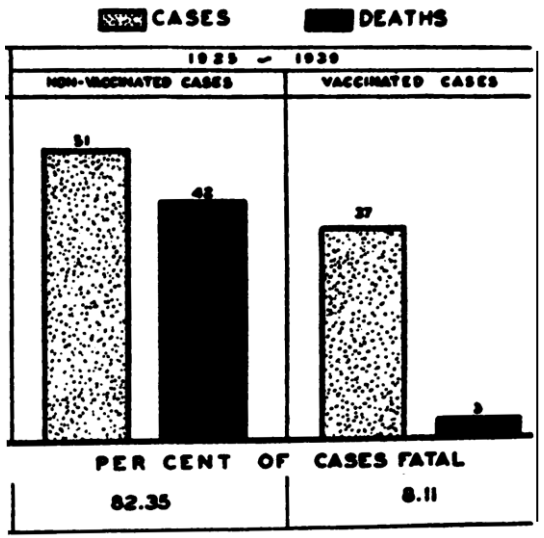
Natural History of RMSF





Spotted Fever Vaccines





ROCKY MOUNTAIN SPOTTED FEVER: RESULTS OF FIFTEEN YEARS' PROPHYLACTIC VACCINATION

R. R. PARKER



Protective Vaccines against *Rickettsia*

Humans:

- **Crushed Infected Ticks - Phenol-killed**
  R. rickettsii - 1924 - 1948
- **Infected Yolk Sacs - Ether Extracted - Formalin-killed**
  R. rickettsii - Discontinued 1978
  R. prowazekii - WWII
- **Live Vaccine Strain**
  R. prowazekii - Madrid E

Experimental (Animals):

- **Whole cell inactivated _Rickettsia spp._**
- **Subunit - Recombinant rOmpA, rOmpB, YbgF, Adr2**

Early diagnosis is critical

- **Initial symptoms non-specific: headache, fever, myalgia, fatigue, nausea**
- **Tick bite**
- **Physician awareness**
- **Responds well to antibiotics - Doxycycline**
- **Characteristic rash occurs later: 4 – 10 days**
- **Serious sequelae, mortality increases**

Preventative measures

ARIZONA ROCKY MOUNTAIN SPOTTED FEVER HANDBOOK



2/10/2020

Prepared by Arizona Department of Health Services in collaboration with Arizona Indian Tribes, Indian Health

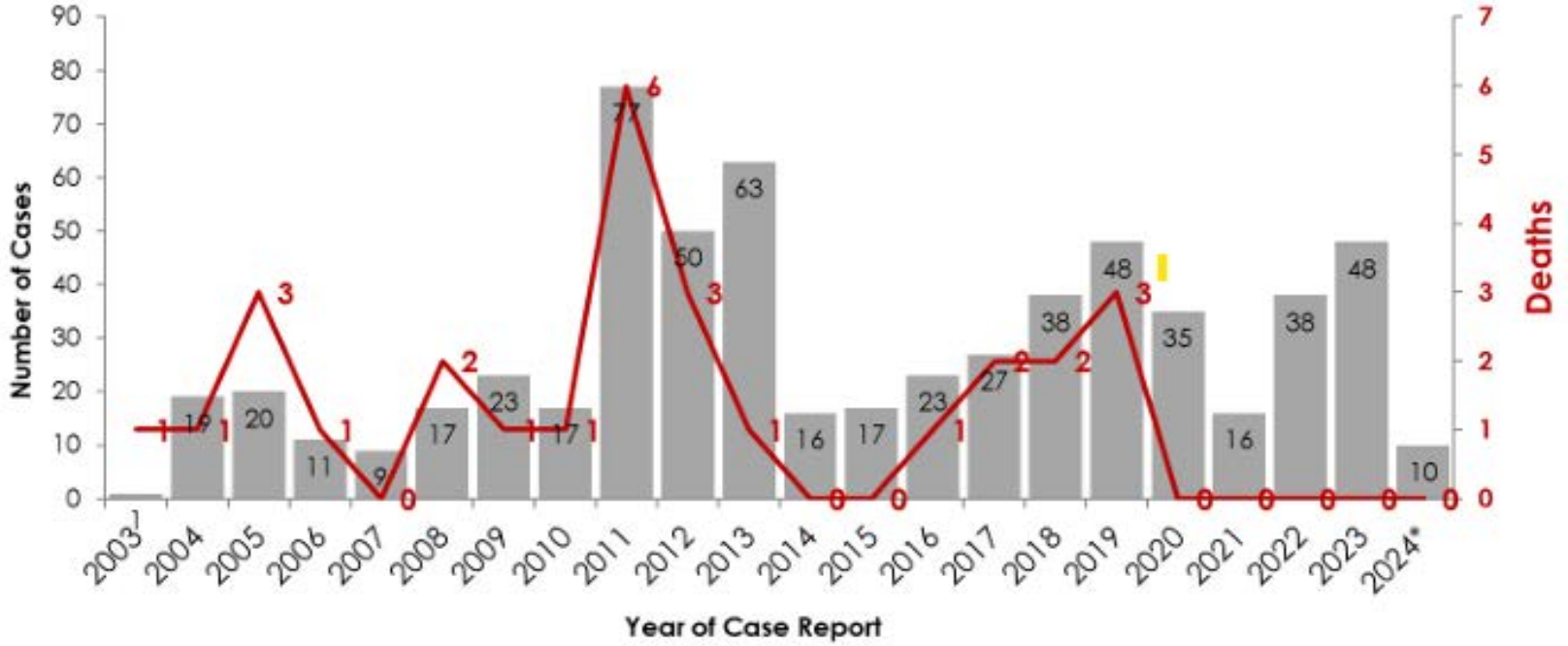
RESEARCH ARTICLE

Community-Based Control of the Brown Dog Tick in a Region with High Rates of Rocky Mountain Spotted Fever, 2012–2013

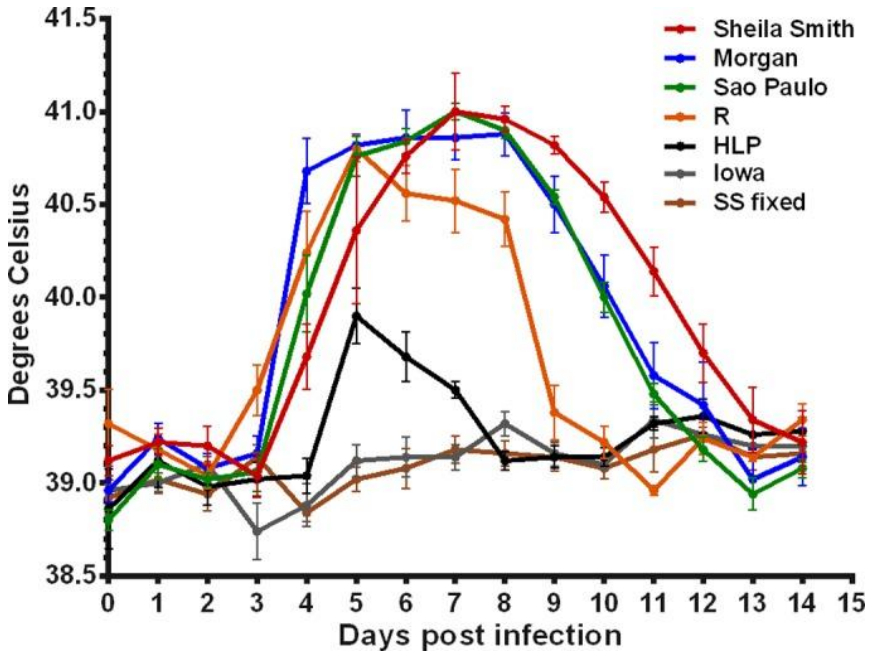
Naomi Drexler[1]*, Mark Miller[2], Justin Gerding[2], Suzanne Todd[1,3], Laura Adams[3,4], F. Scott Dahlgren[1], Nelva Bryant[1], Erica Weis[4,5], Kristen Herrick[4], Jessica Francies[4], Kenneth Komatsu[4], Stephen Piontkowski[6], Jose Velascosoltero[6], Timothy Shelhamer[6], Brian Hamilton[7], Carmen Eribes[8], Anita Brock[8], Patsy Sneezy[8], Cye Goseyun[8], Harty Bendle[8], Regina Hovet[8], Velda Williams[8], Robert Massung[1], Jennifer H. McQuiston[1]

PLOS ONE | DOI:10.1371/journal.pone.0112368 December 5, 2014

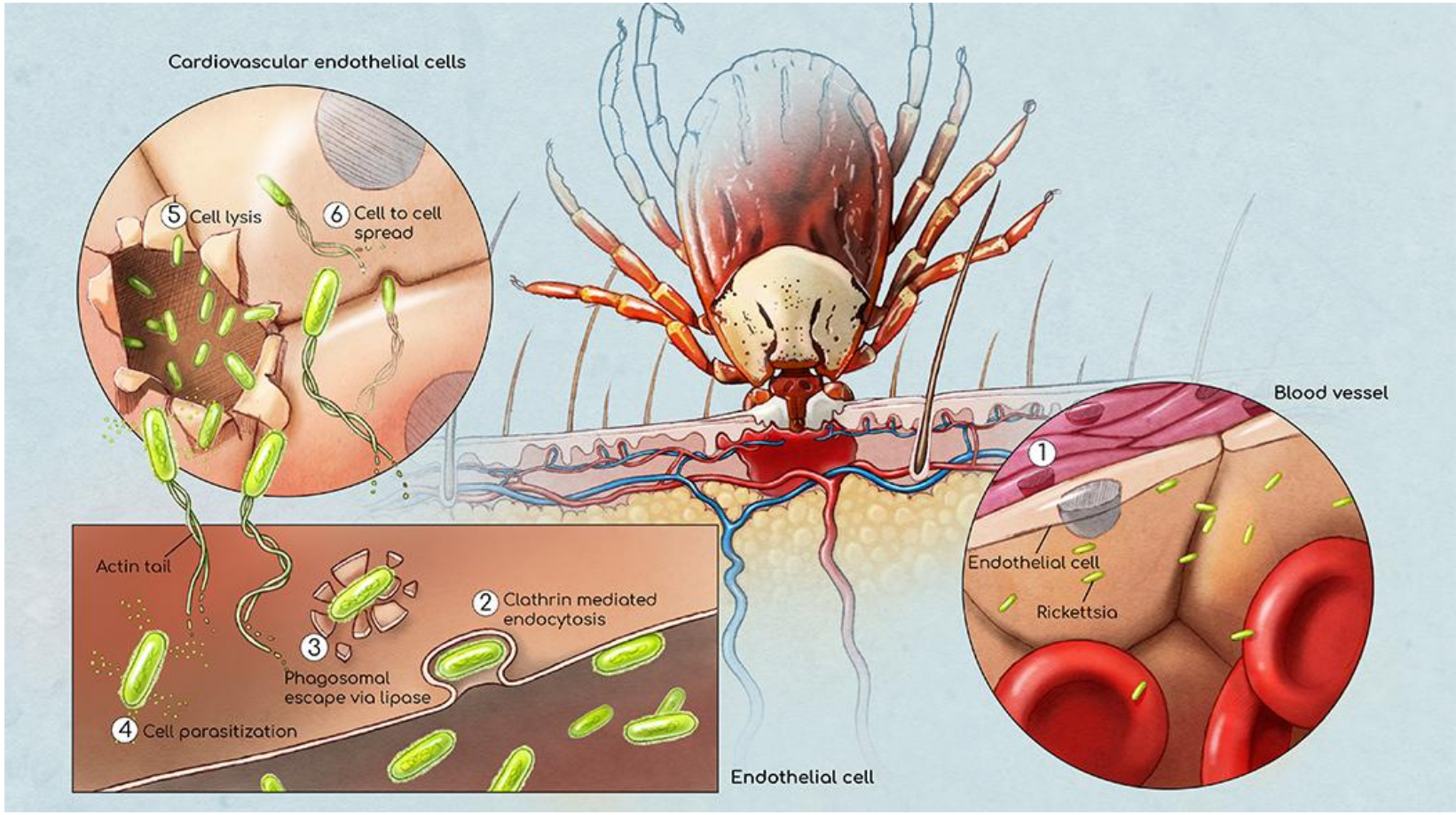
- Education/Awareness
- Health care
- Animal control
- Tick reduction in Dogs
- Tick reduction in the Environment



Current research at the RML



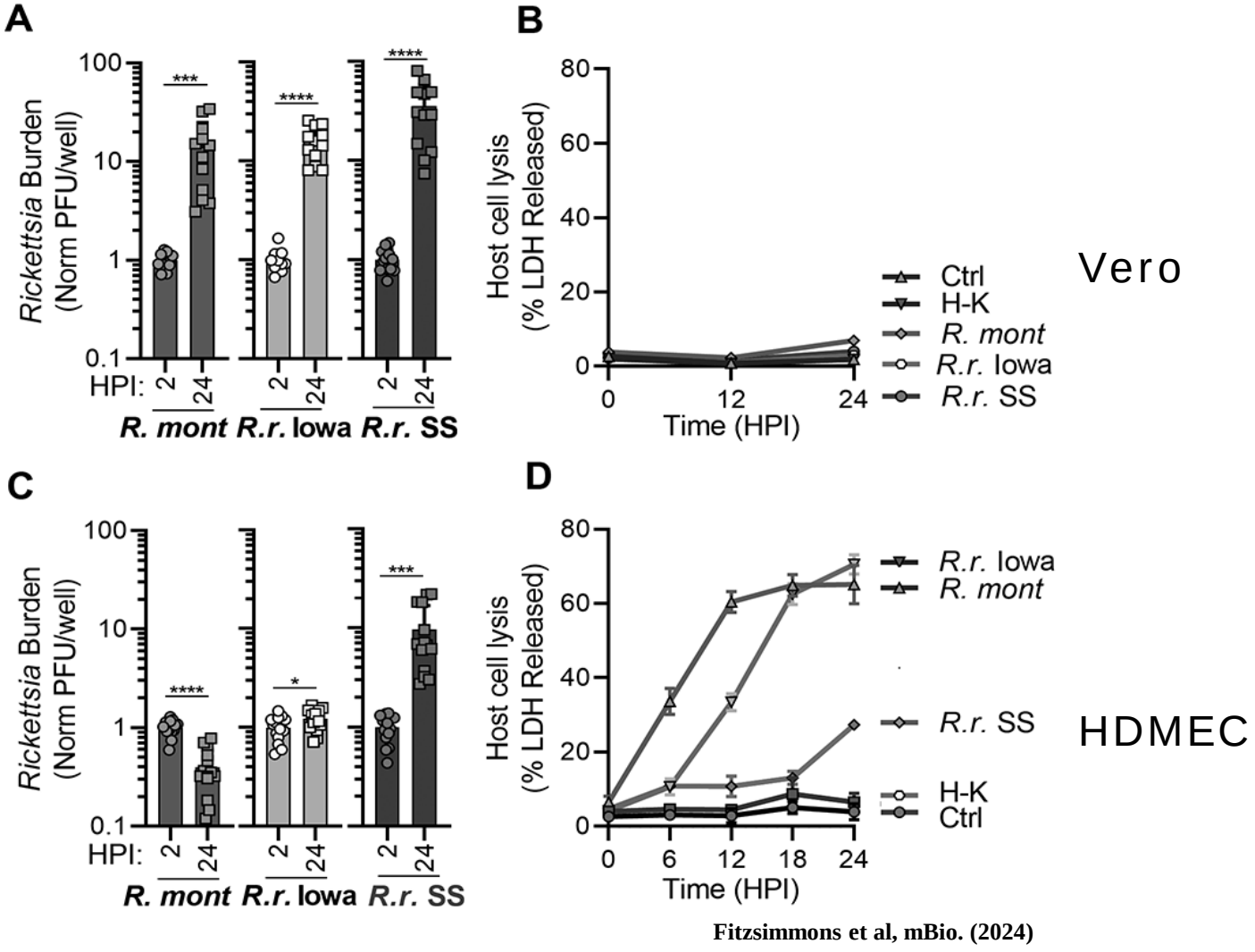
Genomic comparisons to Identify virulence related genes Clark et al, (2015)

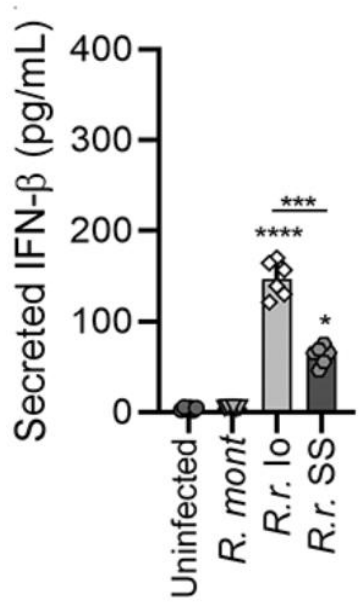


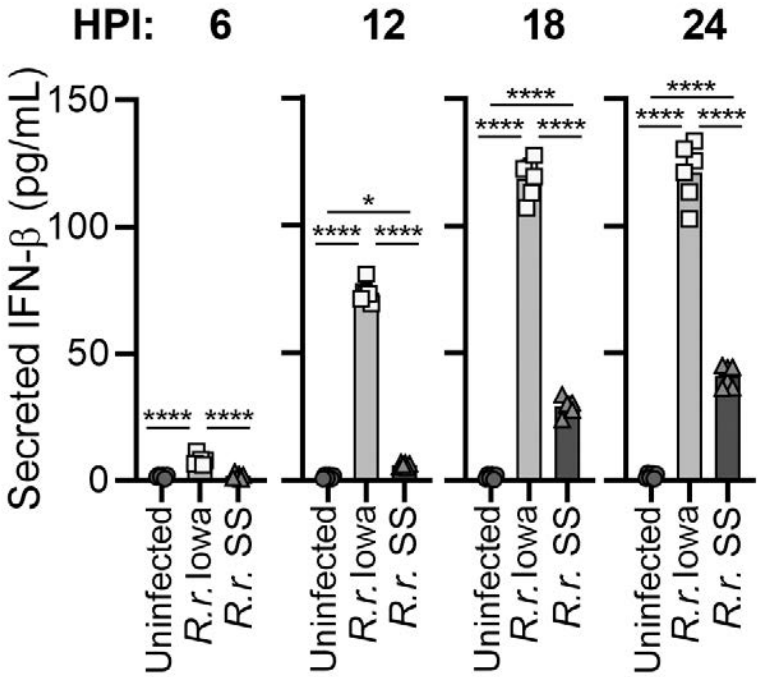
Identification of biologically relevant cell model systems

Fitzsimmons et al, mBio. (2024)

Interferon-β as an innate inhibitor of rickettsial growth

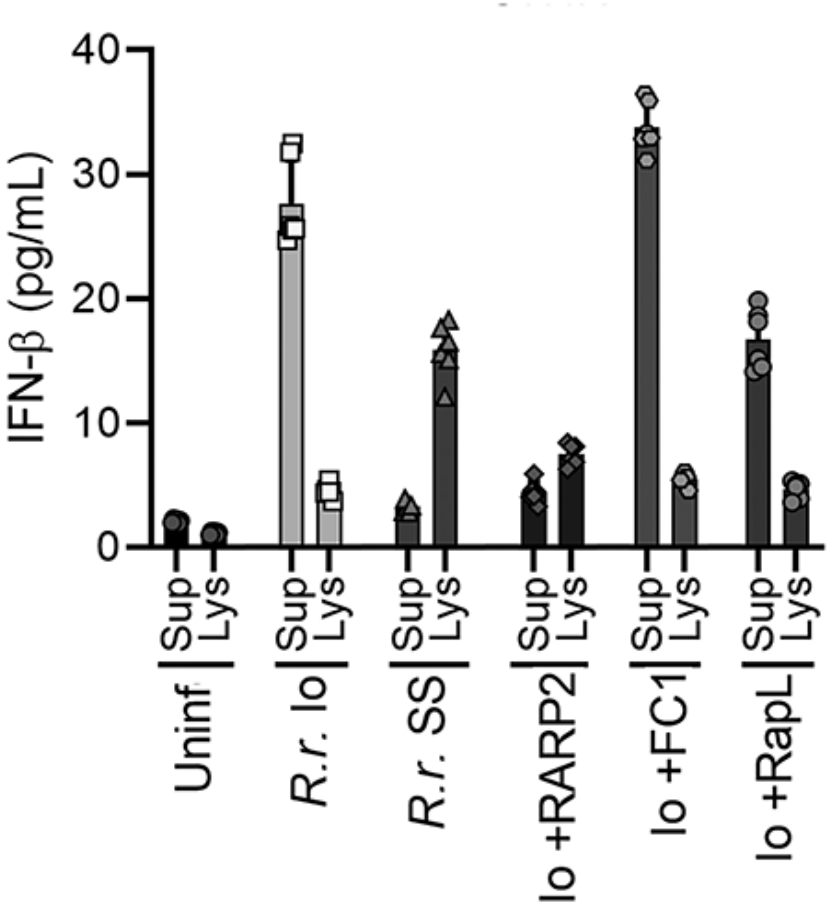


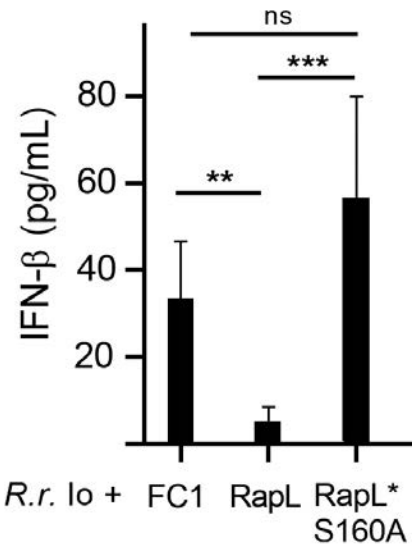


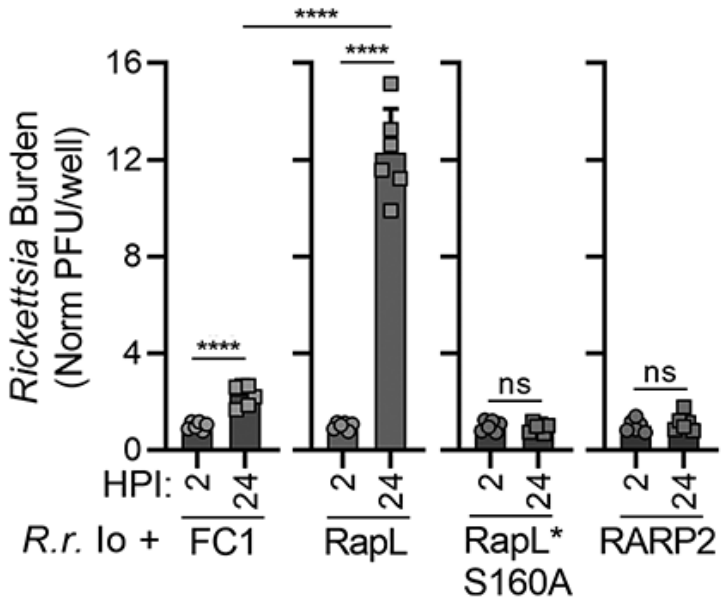


Fitzsimmons et al, mBio. (2024)

Identification of specific rickettsial genes that limit host IFB-β synthesis and secretion

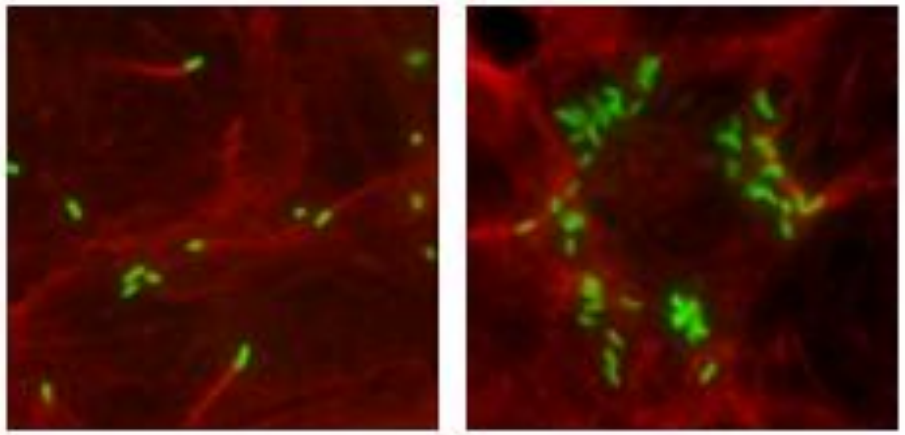


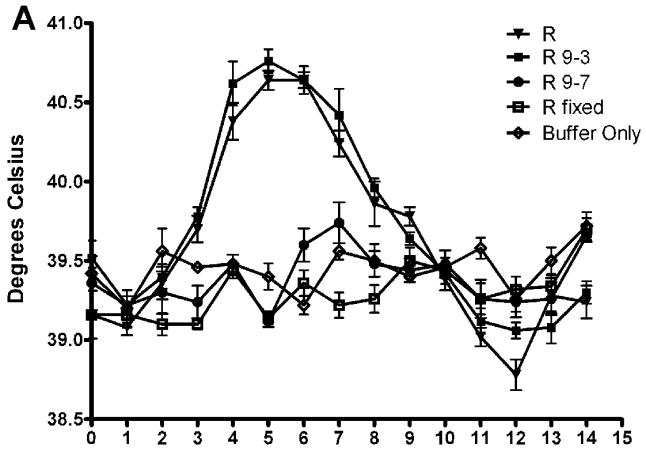




Fitzsimmons et al, mBio (2014)

Ongoing Projects:





- **Sca2 – Catalyzes actin polymerization – Promotes intra- and intercellular motility**
- **RoaM – Regulator of actin-based motility – Controls gene expression between tick and mammal**
- **RarP2 – Disrupts trans-Golgi network – Inhibits protein secretion – Blocks IFN-β release**
- **RapL – Protease that cleaves and activates surface exposed autotransporters – Inhibits IFN-β synthesis**
- **Host cell responses to challenge with virulent vs. avirulent R. rickettsii**

Host Parasite Interactions Section

Laboratory of Bacteriology

Current Lab Members:

Joshua Mettlach, Ph.D. – U. Oklahoma HSC.
Natalia Batchenkova – UNMC
Tina Clark
Rebecca Miller



Former Lab Members:

Karin Aistleitner, Ph.D. - deceased
Sita Awasthi, Ph.D., U. Penn
John Bannantine, Ph.D. - NADC
Alexandra Barger - S. Illinois Sch. Med
Clif Barry, Ph.D., NIAID
Laura Bauler, Ph.D. - W Mich Univ.
Tim Brickman, Ph.D., U. Minnesota
DeAnna Bublitz, Ph.D. – U. Mont
Rey Carabeo, Ph.D. - U. Nebraska
Nick Chamberlain, Ph.D. - GenScript
Dawn Clifton, Ph.D. – NIAID
Damon Ellison, Ph.D. – U.S.A.M.C.
Zoe Dimond, Ph.D. – Yecuris Corp.
Ken Fields, Ph.D. – U. Kentucky
Liam Fitzsimmons, Ph.D. – U. Virginia
Bob Gilmore, Ph.D. - CDC
Nicki Grieshaber, Ph.D. – U. Idaho
Scott Grieshaber, Ph.D. – U. Idaho
Bob Heinzen, Ph.D. – NIAID
Travis Jewett, Ph.D. – U. Central Florida
Wendy Jamison, Ph.D. – Chadron St. Col.
Betsy Kleba, Ph.D. – Westminster Col.
Jennifer Lam – Fred Hutchinson
Erika Lutter, Ph.D - Oklahoma St. Univ
Natalie Miller – U.Wash
Jeff Mital, Ph.D. – Quinnipiac U.
Adam Nock, Ph.D. – Texas A&M
PhuHai Nguyen, Ph.D. – U. Kentucky
Nick Noreia, Ph.D. – U. Chicago
Anders Omsland, Ph.D. - Wash St Univ
Paul Policastro, Ph.D. - NIAID
Dan Rockey, Ph.D. – Oregon St.
Lisa Rucks, Ph.D. – U. Nebraska
Marci Scidmore, Ph.D. - Cornell U.
Ed Shaw, Ph.D. – Oklahoma St.
Mary Weber, Ph.D. – U. Iowa
Katerina Wolf, Ph.D. – U. Kentucky

NATIONAL INSTITUTES OF HEALTH

NIH National Institute of Allergy and Infectious Diseases

15-minute Break



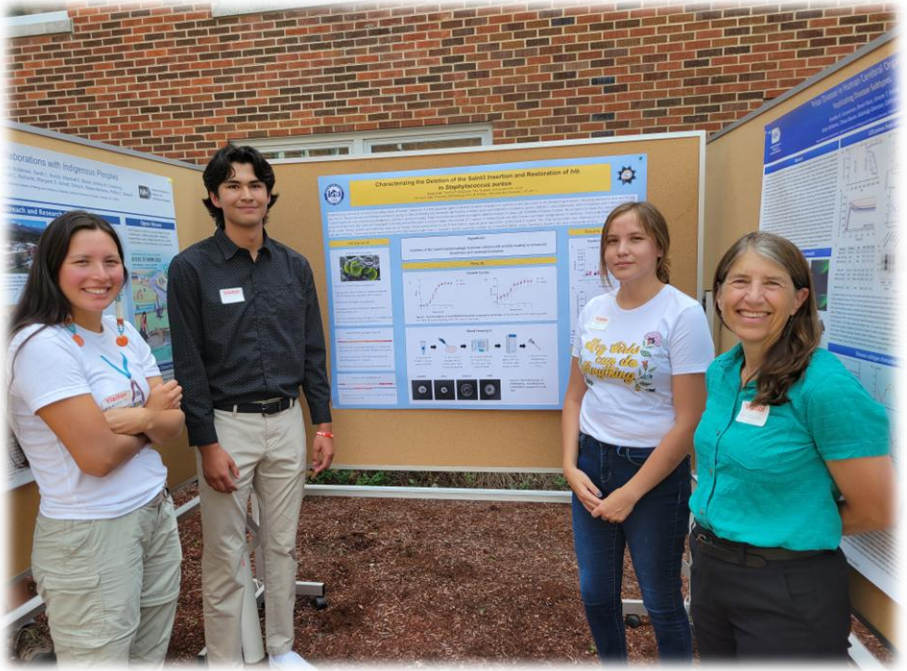
Philip Stewart Ph.D.
Special Volunteer, DIR, NIAID

RML STEAM Collaborations with Indigenous Peoples Committee (SCIP)

STEAM = **S**cience, **T**echnology, **E**ngineering, **A**rts, and **M**ath

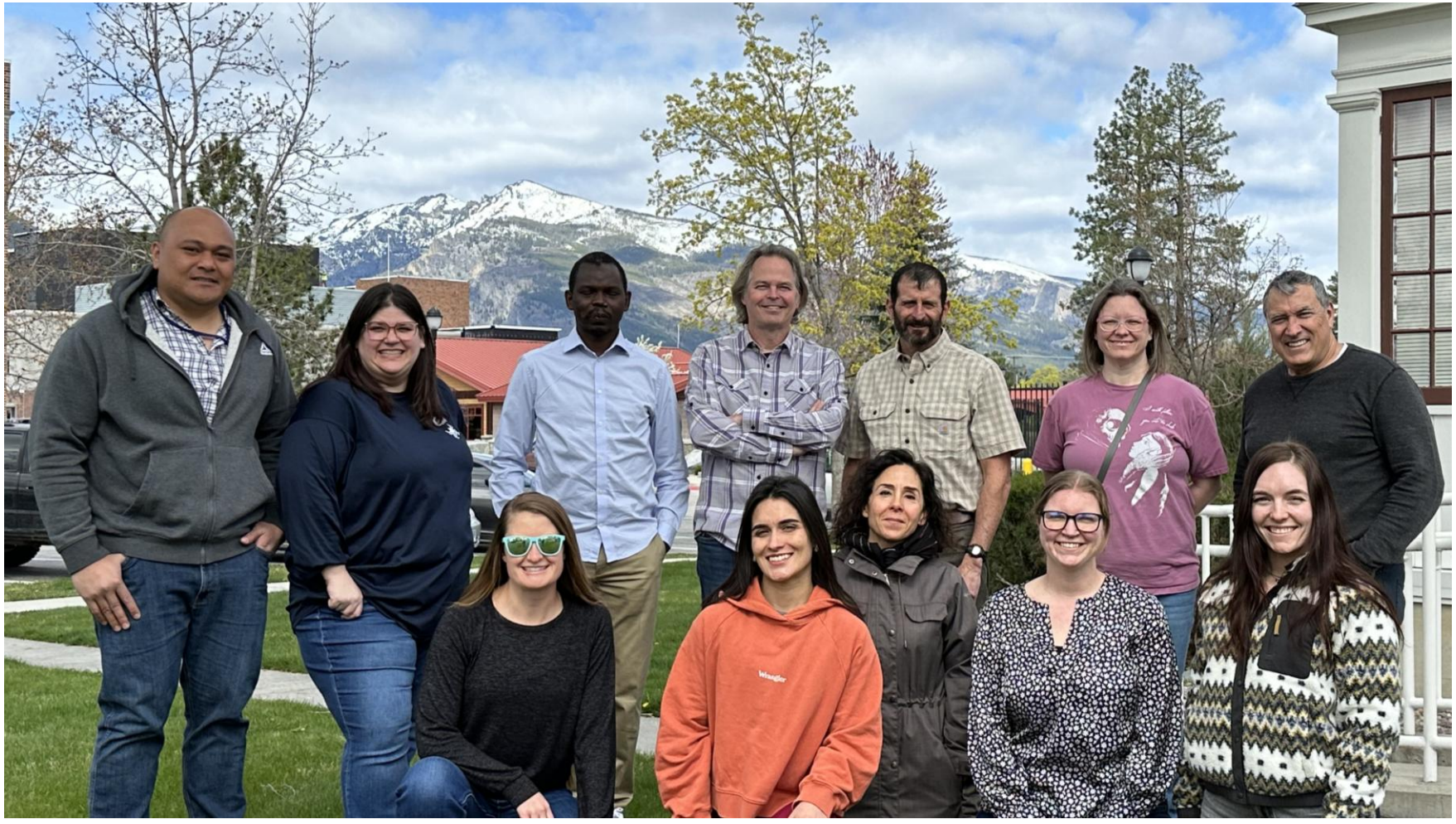






Philip Stewart
Rocky Mountain Laboratories
NIAID, NIH

SCIP Committee



Members

Ashley Wilkins, Chair
Carl Shaia, Vice Chair
Kaytlyn Menk, Secretary/Treasurer
Katelyn Anderson
Sarah Anzick
Ernest Bighorn
Marshall Bloom
Haley Bridgewater
Michael Chorabik
Simote Foliaki
Ashley Groshong
Arielle Hay
Clay Jarrett
Edwin Ogola
Christina Orru-Groveman
Philip Stewart
Barbara Conte Weck

SCIP Goals

Develop and sustain relationships with Native American communities in MT

Promote training and educational opportunities available through RML and NIH

Provide STEAM experience for Native American college students & faculty

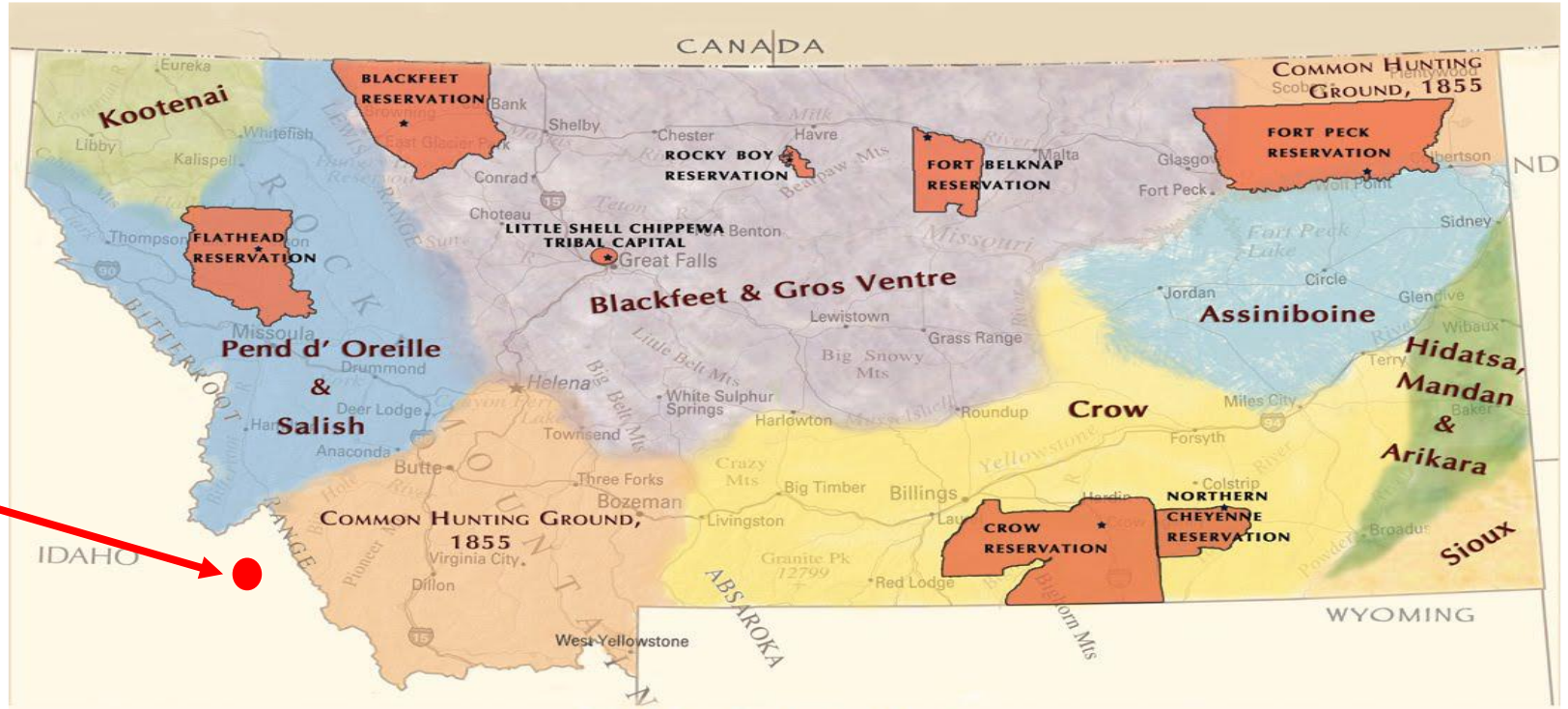
Montana Tribal colleges

University of Montana system

Improve NIH'S relationship and collaborative efforts with Montana Native American communities

6% of Montana population is Native American (5th highest in the U.S.)

RML



Montana Office of Public Instruction

SCIP Accomplishments

- Host RML Open Houses
- Tribal college outreach
- Tours & training



- Informational outreach (research institutions, congressional delegations, etc . . .)

SCIP Accomplishments II

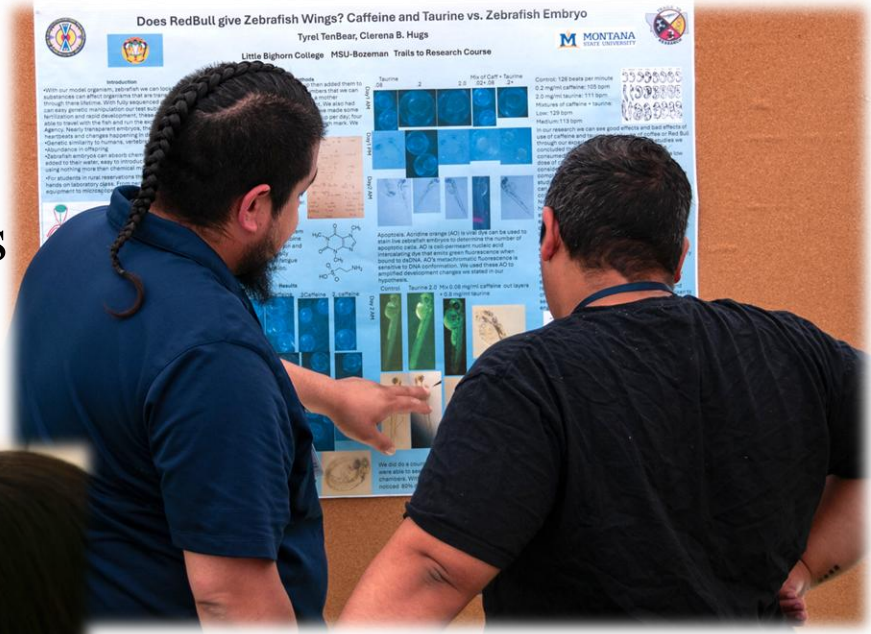
- **Hosted two RML Open Houses**

2024: Registrants from 5 tribal nations, 3 tribal colleges,

5 state colleges and universities, 3 NIH Institutes

Hosted RML Open Houses

- Presentations from NIH and extramural indigenous scientists
- Hands-on workshops
- Poster presentations
- Listening sessions
- Tours









SCIP Accomplishments III

- **Tribal college outreach**

  Blackfeet Community College
  Fort Peck Community College
  Little Big Horn College
  Salish Kootenai College

  Montana State University
  University of Montana




Soil Station
Wrangler




Day 2 – Exercise 1 – Shine a light on your results!


Bacterial DNA transformation

SCIP Accomplishments IV

Tours & training at RML



- Blackfeet Community College tours
- Montana American Indians in Math & Science – UM summer camp
- Rocky Boy Health Center











Future Goals

- **Continue to promote RML/NIH opportunities & collaborations**
- **Faculty training workshops**
- **Establish connections to all Tribal Nations in MT**
- **Expand outreach programs to younger students**

Challenges

- **Committee turnover**

- **Housing/rent – salary in arrears – daycare**

Refining a summer biomedical research training program for American Indian and Alaska Native (AIAN) students. Int J Designs Learning. 2018. National Institute of Neurological Disorders and Stroke (NINDS). doi:10.14434/ijdl.v9i1.23049.



Danielle Ortega, Diné



Josh Marceau, Confederated Salish



Moses Leavens, Chippewa Cree

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NIAID
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RML staff

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Moses Levens, McLaughlin Research Institute

Blackfeet Community College
Betty Matthews
Natalie Malaterre

Little Big Horn College
Tyrel TenBear
Sara Plaggemeyer

Salish Kootenai College
Clay Comstock

Hosted RML Open Houses II

- Presentations from NIH and extramural scientists
- Hands-on workshops
- Poster presentations
- Listening sessions
- Tours



Hands-On Workshop

Reconvene, wrap-up and Blessing



Karina Walters Ph.D
Director
Tribal Health Research Office



Kimberly Hampton, Ph.D.,
M.Psy., M.Ed., M.B.A.