



Knowledge to Protect Our Nation from Microbial Threats

Prevention, early warning, assessment, control, and remediation of microbial risks require a sound scientific basis. Anthrax attacks through the US Mail, Hurricane Katrina, massive sewage spills, Salmonella in peanut butter, deadly norovirus outbreaks in nursing homes, Bird Flu infections — all these events bring attention to the serious risk microbes can pose to human health. During outbreaks of disease, whether caused by bioterrorist attacks, natural disasters, or contamination of air, water, food, or the environment, several important questions need to be answered.

1. What is the disease risk to human health?
2. How is the pathogen spread and how do we stop it?
3. How do we clean up after an incident?
4. How do we monitor to ensure people are safe?

The Center for Advancing Microbial Risk Assessment (CAMRA) seeks to answer these essential questions. Through innovative research programs, scientists at CAMRA study how to protect human health from microbial agents in the natural and built environment. CAMRA is filling critical gaps in current microbial risk assessment frameworks needed to support environmental protection, homeland security, and public health objectives.

What is CAMRA?

The US Department of Homeland Security (DHS) and the US Environmental Protection Agency (EPA) established CAMRA in 2005 through a five-year, \$10 million jointly-funded grant. The Center is a consortium of world-class scientists and engineers from Michigan State University,

Drexel University, University of Michigan, Carnegie Mellon University, Northern Arizona University, University of Arizona, and University of California, Berkeley. CAMRA has two missions:

1. To develop models, tools, and information that will be used in a risk assessment framework to reduce or eliminate health impacts from biological agents of concern in indoor and outdoor environments; and
2. To build a national network for knowledge management, transfer, and learning among scientists, students, and professionals in the field of microbial risk assessment.

What is microbial risk assessment?

Microbial risk assessment is a way to measure the consequences of exposure to microbial agents such as bacteria, viruses, and parasites. It involves understanding the health hazard, the potential survival of a microbe, and the ability of this biological agent to move from a contaminated site to humans and initiate infection. This involves the integration of math, biology and medicine.



BL3 Facility at Michigan State

Why is CAMRA Important?

CAMRA is providing critical information for risk assessments to develop fact-based plans for monitoring, for communication on expected levels of the risk, for control, and for preventing exposure. The study of emerging infectious diseases, the ecology of those diseases, and the risks they pose gives professionals, from law makers to first responders, who are responsible for protecting public health the detailed knowledge they need to prepare for emergencies, save lives, and safeguard the future health of the nation.

What has CAMRA accomplished?

- **A new infectious disease transmission paradigm** expanding on models of direct human to human transmission to include the dynamics of pathogen transfer and infection through the environment.
- **Dose-response models for all Class A Bioterror Agents** allowing realistic estimates of the infection risk posed by these dangerous pathogens.
- **Measurements of pathogen survival and transport in the indoor environment** that fill data gaps and replace estimates with hard data for reliable modeling of aerosol and surface contamination.
- **Advanced models of pathogen movement in water distribution systems** allowing improved prediction, detection, and prevention of high risk pathogens in this key infrastructure.
- **Quantified limits of detection for pathogens in the environment** including anthrax and viruses, showing that zero detection does not mean zero risk — a fact that should be central to risk management decisions.
- **Improved methods for sampling contaminated surfaces** by comparing materials and techniques head-to-head, identifying the best tools to measure environmental contamination.



University of Arizona Water Village

and computer simulations to develop data quality standards designed to ensure reliable risk estimates.

What is the impact of CAMRA research?

CAMRA is educating the next generation to manage the microbial threats of the 21st century.

CAMRA provides assessment of state-of-the-art technology, models and knowledge for addressing the pressing human health issues associated with microbial contamination due to bioterrorism, natural disasters, accidents, and natural outbreak events.

CAMRA, along with other DHS Centers, provides high quality academic and outreach programs to inform and assist all levels of government and to engage minorities and institutions serving minorities. The DHS Centers are producing results that can be used at local, state, and national levels across all jurisdictions to enhance planning, prevention, emergency response, and recovery.

What is unique about CAMRA?

CAMRA is led by top researchers from seven universities across the U.S. Three of the principal investigators coauthored the book 'Quantitative Microbial Risk Assessment.'

CAMRA responds to sudden, unexpected risk scenarios—including air travel by a contagious tuberculosis patient—and can produce a quantitative risk assessment in days (CAMRA TB Alert, 2008).

CAMRA is researching risks from viruses, a critical knowledge gap in current quantitative risk assessment frameworks.

CAMRA researchers produce data for quantitative risk assessment using, lab experiments, literature reviews,

Where can I find more information?

CAMRA Website

www.camra.msu.edu

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