

BACKGROUND

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T)'s National Biodefense Analysis and Countermeasures Center (NBACC) is the first national laboratory created by DHS. Established in 2004, the lab operates in partnership with the Federal Bureau of Investigation (FBI) and is located at the National Interagency Biodefense Campus at Fort Detrick, Maryland. NBACC provides a continuously available, one-of-a-kind biocontainment laboratory capability to address biological threats. NBACC's components include the National Bioforensic Analysis Center (NBFAC) and the National Biological Threat Characterization Center (NBTCC). NBACC's operating model is unique among S&T labs as a Federally Funded Research and Development Center operated by Battelle National Biodefense Institute (BNBI).

MISSION



Provide the scientific basis for the characterization of biological threats and bioforensic analysis to support attribution of their planned or actual use.

NBACC requires dedicated resources to maintain modern capabilities and strategic investment in its infrastructure to support the dynamic DHS mission. Its facilities are national security assets to DHS components, law enforcement, and first responders.

EXPERTISE

NBACC's infrastructure and subject matter experts (SMEs) serve the broader Homeland Security Enterprise by providing:

- The only purpose-built maximum biocontainment laboratory to serve the DHS biodefense mission
- A national resource for 24/7 biodefense and bioforensic support to federal law enforcement
- Over 50,000 square feet of lab space (BSL-2, 3, and 4)
- One of only 13 operable or planned BSL-4 labs in the United States
- A Work for Others (WFO) program that makes the NBACC national security biocontainment capabilities more broadly available to federal agencies

- Unique expertise and capabilities in the field of aerobiology
- Regulatory compliance with Defense Security Service and Centers for Disease Control and Prevention and the U.S. Department of Agriculture Biological Select Agent and Toxin Program, among others
- ISO 17025 accredited genotyping using next generation sequencing



IMPACT

Since its inception, NBACC's work has played a key role in resolving America's most difficult biodefense challenges. The center's researchers and staff work in partnership with operational end-users to provide the scientific basis and operational capability necessary to detect events quickly and respond effectively.

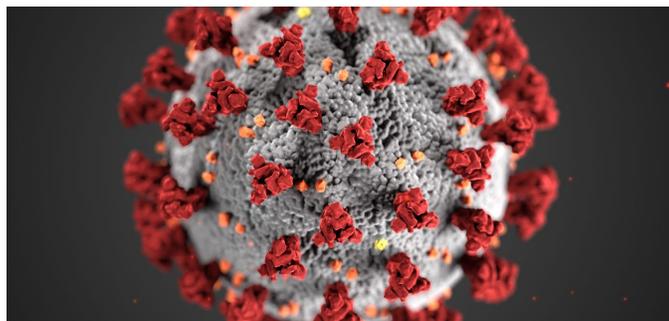
BIOLOGICAL THREAT CHARACTERIZATION

NBTCC operates at the direction of DHS S&T and conducts experiments and studies to better understand biological vulnerabilities and hazards. This work informs threat assessments and the resulting operational response for DHS, Health and Human Services (HHS), Department of Defense (DOD), and the intelligence community. From fiscal year (FY) 2011 through FY 2020, NBTCC transitioned products that

address 92 traditional agent knowledge gaps, providing timely and high-quality data on the characteristics of biological threat agents and dual-use technologies.

HALF-LIFE & DECONTAMINATION METHODS RESEARCH

NBTCC has conducted research to help scientists and decision-makers better understand the stability of dangerous pathogens. Its unique expertise and capabilities in aerobiology played a crucial role in the federal government's 2014 response to the Ebola outbreak and the most recent coronavirus pandemic. In 2020, NBTCC scientists greatly improved the understanding of SARS-CoV-2 (the virus causing COVID-19) and methods to prevent its spread. NBTCC produced a formula that predicts how the virus persists while suspended in the air and on surfaces, increasing scientific understanding of the virus's behavior under real-world conditions.



BIOFORENSIC ANALYSIS

NBFAC operates at the direction of the FBI's Laboratory Division and conducts 24/7 technical analyses for sensitive federal law enforcement investigations. Lab experts identify biological agents in evidentiary samples with simultaneous analyses that incorporate agent-based assays and feature bacterial and viral culture, polymerase chain reaction, and immunoassays. NBFAC provides methods-based capabilities, including whole genome sequencing and bioinformatics analysis, electron microscopy, and mass spectrometry.

TECHNICAL CAPABILITIES ASSIST WITH INVESTIGATIONS OF BIOCRIME AND BIOTERRORISM

NBFAC provides the FBI with bioforensic testing and analysis, performing work on samples for suspected biotreats using leading techniques, tools, and laboratory infrastructure.

NBFAC has built strong technical core capabilities with ISO 17025 accredited, agent-based methods and assays in bacteriology, virology, toxinology, and molecular biology. None of these capabilities existed prior to the Amerithrax attacks of 2001. More recently, NBFAC has established a high-performance computing infrastructure that will expand to support genomic analyses for use in federal investigations and prosecutions.



SPECIAL HIGHLIGHT: SARS-COV-2 NATURAL DECAY CALCULATOR



In 2020, S&T released an online predictive modeling tool to estimate natural decay of SARS-CoV-2 under a range of environmental factors that impact its stability. Leveraging the

results of research conducted by NBACC, the tool assists operators in the field by estimating environmental persistence of the virus under certain combinations of temperatures and humidity. Go to <https://www.dhs.gov/science-and-technology/sars-calculator> to interact with this free resource.