

INNOVATING CROSS-DOMAIN SOLUTIONS TO DETECT EMERGING BIOLOGICAL THREATS

The Five Research And Development (5RD) Council's Global Biodefense Network (GBDN) Approach To Synchronizing And Sharing Research In The Fate Of Emergent Biological Agents In The Environment (FATE)

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During the COVID-19 pandemic, the DHS S&T's Five Research and Development (5RD) Council's Global Biodefense Network (GBDN), consisting of Australia, Canada, The United States, The United Kingdom, and New Zealand, recognized the need to maintain technical exchanges between countries on topics relating to natural and intentional biological hazards and improve the ability to address global biosecurity impacts. The complexity of hazard characterization studies requires the use of specialized facilities (BSL 3+) and unique subject matter expertise. The 5RD GBDN established an international working group titled The Fate of Emergent Biological Agents in the Environment (FAtE) with the goal of establishing standardized requirements, strategy, and study methodologies across participating scientific institutions. Establishing common methods and capabilities in advance of incidents improves the ability to collaborate across multiple institutions by harmonizing critical data collection efforts and closes any gaps in data requirements and capability to avoid misleading, contradictory, or unnecessarily duplicative data and experiments during a time-critical response.

In order to role-play and get a better understanding of each participating institution's capabilities, a table-top exercise using a fictional scenario involving an emerging global biological incident was developed. The group defined critical data requirements needed to inform operational policies during such an event from sectors and expertise including public health, military, agriculture, and homeland security. The exercise resulted in over 150 questions, ranging from laboratory experiments to policies regarding the governmental responses to an emerging crisis.

The follow-on session assessed the types of technical data needed to answer the data requirements resulting from the table top exercise. Methods that were commonly discussed include classical microbiology, virology, molecular biology techniques, decontamination, and aerosol science. This was followed up with meetings that assessed and catalogued the country capabilities, expertise, and resources from within the GBDN. The identified method commonalities were organized by specific technical methodology within each category and compiled into a resulting Country Capability Map.

The FAtE Country Capability Map summarizes competencies that can be leveraged by the GBDN members collaboratively in the event of another pandemic or major biological incident. The map categorized country capabilities in topic areas of identification, transmission, treatment development, epidemiology modeling, and decontamination. Common capabilities include agent identification by multiple microbiology, virology, and molecular techniques, as well as surface stability with and without decontaminants.

The FAtE international working group identified significant areas of overlapping and complimentary areas of expertise between the 5RD GBDN members. The lessons learned and capability map developed from the exercise will allow members to execute a more synchronized response to biological incidents. The planned next step of the working group is to perform complimentary testing of shared samples under identical conditions to exercise capabilities and demonstrate method alignment. International sample sharing agreements, as well as methods for synchronization on growth, identification, and quantification of biological agent protocols, and data sharing are required. The continuation of the FAtE working group will provide a demonstration of international collaboration, and lead to a more rapid and unified response to future biological incidents.