Reducing Biological Threats Using Unique Approaches to Biorisk Management Training and Capacity Building

Abstract

Biorisk management is vital to any comprehensive strategy to reduce biological threats. Effective biorisk management requires stakeholder involvement at multiple levels including ministerial decision-makers in animal health and public health, laboratory personnel, and veterinary professionals. We report the design, development, and application of novel training methods – tailored to the needs of specific stakeholder groups – to raise awareness and comprehension of biorisk management and its application to biological threat reduction. These methods share several common principles, including the application of brain-friendly adult learning technologies, alignment with international best practices, the incorporation of hands-on exercise and practice, customizability for local relevance, multi-lingual availability, and ease of access and transfer to local experts for their independent utilization.

We illustrate our approach through three examples. First, we created a Veterinary Training Series focused on training public and private sector veterinarians on specific topics of relevance to biological threat reduction and biorisk management. The curriculum supports improvement in veterinary capacity to detect, control and prevent infectious diseases of livestock. Second, we designed the Global Biorisk Management Curriculum (GBRMC) to align with international best practices and competencies in biorisk management, and validated brain-friendly training methods. The GBRMC library is freely available online to trainers around the globe. Third, we present a new tool, PREP™ (Portal for Readiness Exercises and Planning) for use by exercise planners to facilitate scenario-based exercises and planning. PREP™ provides evaluators with real-time data, allowing them to track 12 scenarios simultaneously during the in-person event. For example, PREP™ was utilized in six countries to support concurrently held exercises.

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Methods

Veterinary Skills Training Series

ICBR’s Veterinary Skills Training Series consists of five one-week courses on clinical skills, pharmacology, infectious diseases, and sample collection and transport aimed at professional veterinarians and para-veterinarians. Courses focus on training public and private sector veterinarians in clinical examination, differential diagnoses, surveillance, zoonotic disease control, BPR, and safe and secure sample collection. The curriculum can be delivered in multiple phases following a “Train the Trainer” methodology so participants can extend the training to other veterinarians. The goal is to strengthen veterinary skills while emphasizing BPR principles and practices.

GBRMC – Global Biorisk Management Curriculum

The Global Biorisk Management Curriculum (GBRMC) library offers easy-to-use, adaptable course materials covering a range of topics to help instructors in the veterinary and human health fields train on laboratory BPR. The GBRMC was designed using international best practices in BPR, published biosafety and biosecurity (BS&S) desired competencies, the BPR system approach detailed in CWA 15793, and validated brain-friendly training methods. The library is a technically relevant and consistent resource addressing existing and emerging BS&S training needs around the world. Through the GBRMCNet portal, the library of materials is available free of cost, in a growing number of languages, to anyone conducting BPR training.

PREP™ - Portal for Readiness Exercises & Planning

PREP™ provides simple tools for emergency, security, and veterinary and human health professionals to design and conduct tabletop exercises (TTXs), drills, and training workshops to evaluate preparedness and response for incidents involving dangerous pathogens. As an online platform, PREP™ allows remote engagement, enabling participants anywhere with an internet connection to participate in PREP™-facilitated activities. The platform features multi-lingual capabilities; automatic, immediate report development; in-exercise communication; secure data collection; flexible adaptable templates; a video game activity remote and in-person usability; and a multi-year strategic planning tool with built-in email notifications. PREP™ utilizes a unique exercise methodology encouraging participant-led evaluation and role-based scenarios.

Results

Veterinary Skills Training Series
2017 Veterinary Training in Afghanistan

IBCTR conducted a series of skills trainings in three provinces in Afghanistan. Top students from these trainings were later recruited to participate in a train-the-trainer workshop. The new trainers then conducted a series of their own skills trainings for local veterinarians and para-vets. These trainings strengthened important skills and built local capacity to detect and manage dangerous outbreaks of animal disease. Training materials were also provided to the Kabul University veterinary faculty to facilitate continuity.

GBRMC – Global Biorisk Management Curriculum

A growing number of students have been trained using GBRMC materials, and an expanding community of trainers is utilizing the GBRMC library as core material for BPR training. As of September 2017, there are 1047 trainers on GBRMCNet representing 62 countries, and 900 students are trained using the GBRMC every year. Approximately 50 courses have been developed thus far, and some courses are available in several of 11 languages: English, Spanish, French, Arabic, Russian, Ukrainian, Turkish, Bahasa Indonesia, Khmer, Lao, Vietnamese.

PREP™ - Portal for Readiness Exercises & Planning

PREP™ has been deployed in person and/or remotely in Southeast Asia, South Asia, Africa and the Middle East in English, Arabic, and Vietnamese. PREP™ is also being used to mentor newly trained exercise designers in three countries. For example, PREP™ was employed during a 2016 South Asia Pandemic TTX that involved 12 missions from 6 countries and evaluated cross-sector, cross-border, One Health readiness for a pandemic of an unknown pathogen. PREP™ provided evaluators with real-time data, allowing them to track 12 scenarios simultaneously during the in-person event. Participants used PREP™ from their offices across 6 countries during two follow-on remote exercises. PREP™ facilitated a timely completion of country-level and regional-level reports for the remote and in-person engagements.

Table 1: GBRMC – Global Biorisk Management Curriculum

<table>
<thead>
<tr>
<th>Region</th>
<th>Trainers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>115</td>
</tr>
<tr>
<td>South and East Asia</td>
<td>70</td>
</tr>
<tr>
<td>North America</td>
<td>188</td>
</tr>
<tr>
<td>Middle East and Central Asia</td>
<td>70</td>
</tr>
<tr>
<td>Europe</td>
<td>172</td>
</tr>
<tr>
<td>Central and South America</td>
<td>48</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1047</td>
</tr>
</tbody>
</table>

Conclusions

The successful management of biological risks requires effective training. Often, animal and human health organizations lack the materials and tools with which to engage in effective BPR training. Sandia National Laboratories’ ICBTR Program has been active in the development of such training materials and tools, and in implementing training programs, to help countries improve their management of biological risks and meet international requirements for biothreat reduction.