

INTERNATIONAL BSL-3 LABORATORY TRAINING PROGRAM SUPPORT

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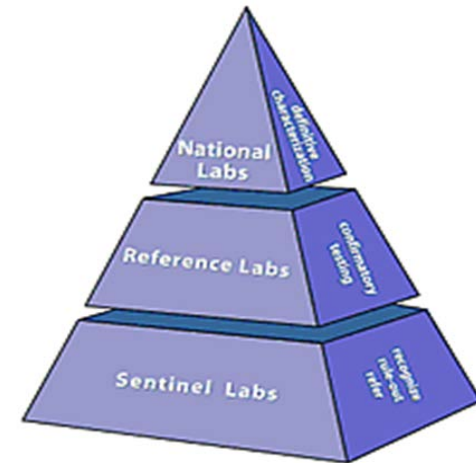
Introduction

- ❑ Communicable diseases and emerging infectious diseases threaten global public health.
- ❑ One of the major means of addressing the concerns about communicable diseases in both industrialized and less-developed countries is through the development of strong surveillance systems.



Introduction

- Global laboratory services are the essential elements of these surveillance systems.
- ▣ Development of global laboratory capacities
 - BSL-2/3 and ABSL-2/3 laboratories
 - Global laboratory networks—WHO, CDC, and OIE (World Organization for Animal Health)



Example: BSL-3 Laboratory Capabilities Contribute to Global Disease Surveillance

**Middle East Respiratory
Syndrome**

**New Avian Influenza A (H7N9)
Virus in China**

**Highly Pathogenic Avian
Influenza A (H5N1)**

**Severe Acute Respiratory
Syndrome (SARS)**

Novel Coronavirus Cases and Deaths, April 2012 - May 2013

CURRENT AS OF MAY 23, 2013

Countries	Cases (Deaths)
France	2 (0)
Jordan	2 (2)
Qatar	2 (0)
Saudi Arabia	32 (17)
Tunisia	2 (0)
United Kingdom (UK)	3 (2)
United Arab Emirates (UAE)	1 (1)
Total	44 (22)

For more information, see the **World Health Organization (WHO)** [link](#).

Example: Improving Global Capacities for Infectious Disease Surveillance and Detection

Major zoonotic events
over the past 72 years

Disproportionate
numbers/distribution

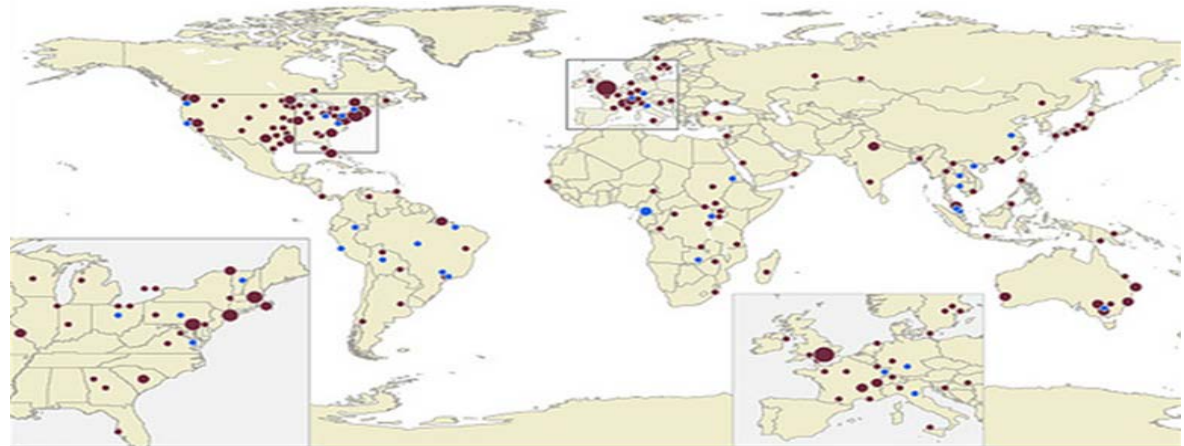
Improvement

Emerging Zoonotic Disease Events, 1940-2012

Potential Hotspots in US, Western Europe, Brazil, Southeast Asia

Most emerging human diseases come from animals. This map locates zoonotic events over the past 72 years, with recent events (identified by an ILRI-led study in 2012) in blue. Like earlier analyses, the study shows western Europe and western USA are hotspots; recent events, however, show an increasingly higher representation of developing countries.

• 1 EVENT • 2-3 EVENTS • 4-5 EVENTS • 6 EVENTS • EVENTS IDENTIFIED IN 2012 (recent emergence)



Map by IOZ, published in an ILRI report to DFID: *Mapping of Poverty and Likely Zoonoses Hotspots*, 2012.

BSL-3/ABSL-3 Laboratories Around the World Involved in Surveillance Activities

- Examples:
 - ▣ Thailand, Indonesia, Myanmar, Bangladesh, China, and India
 - ▣ Kenya, South Africa, and Nigeria
 - ▣ Kazakhstan and Georgia



Challenges to Effective Surveillance: BSL-3 Training in Less-Developed Countries

- Challenges faced by these countries that impact effectiveness and safety:
 - ▣ Lack of training and skills needed to safely operate BSL-3 facilities according to international guidelines
 - ▣ Local regulations vs. international guidelines
 - Lack of, outdated, and contradictory

BSL-3 Training in Less-Developed Countries

- Local regulations vs. international guidelines
 - Example: Pathogen-based laboratory safety requirement
 - Personal Protective Equipment (PPE) requirement
 - Ultraviolet light requirement
- Inexperience in biorisk-based laboratory management
 - Biorisk assessment and management



BSL-3 Training in Less-Developed Countries

- ❑ Lack of more in-depth, sustainable training linked to areas of professional responsibility
- ❑ Limited resources
 - Qualified and experienced trainers to provide training
 - To focus on biosafety professional and career development
- ❑ Unstable job market
 - High turnover rate



BSL-3 Training in Less-Developed Countries

- Solutions to these challenges:
 - ▣ Provide innovative and easily accessible training
 - More targeted training (country-facility and worker-specific) provided by international funding agencies and training providers
 - Establishing sustainable local training program supported by local government and international funding agencies



BSL-3 Training in Less-Developed Countries

- Solutions to these challenges:
 - ▣ Professional development
 - Biosafety officer, BSL-3 laboratory manager, biosecurity specialist
 - ▣ Buy-in
 - Government, organization, and institute
 - ▣ International BSL-3 training program must be cost-effective



International BSL-3 Training—MRIGlobal Approach



Staff Training



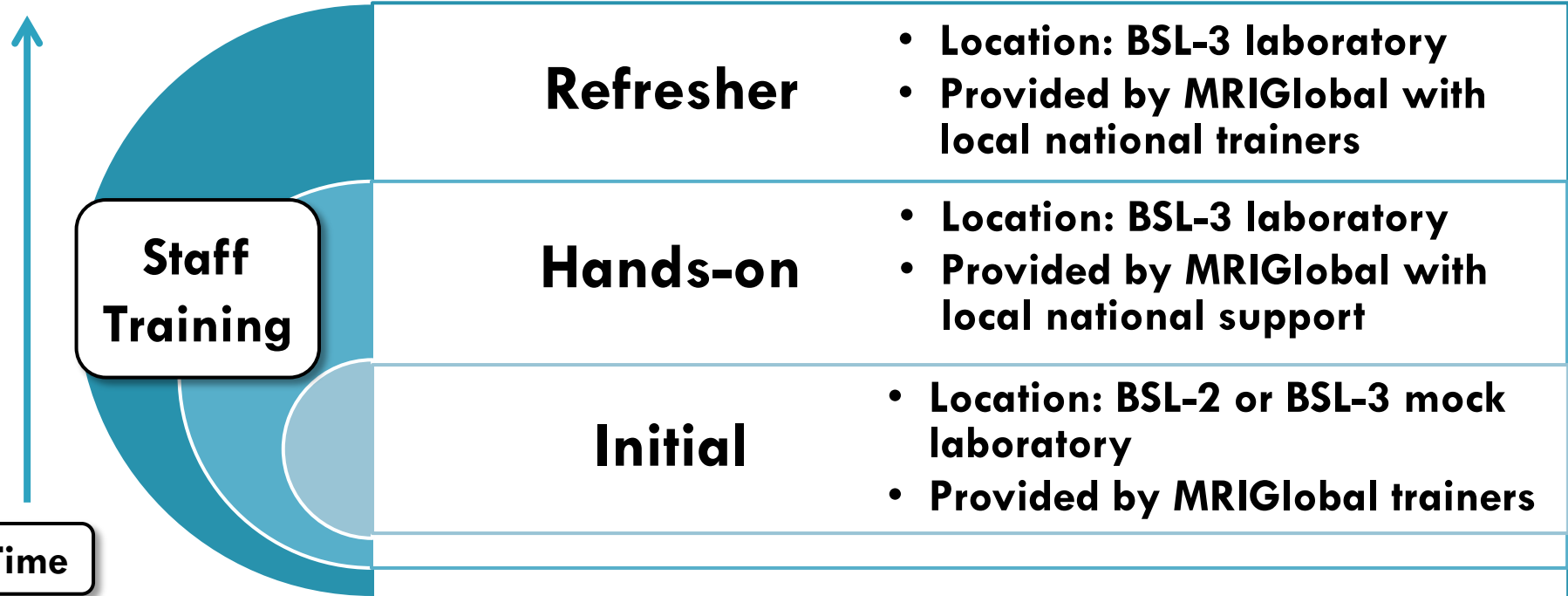
Mentorship



**Local National
Biosafety Programs**



BSL-3 Laboratory—Staff Training



BSL-3 Training—Mentoring Program

- International mentorship
 - ▣ Not just a train-the-trainer program
 - ▣ Professional development program
 - ▣ Start from pre-existing local biosafety training/education programs
 - Existing public health and education systems
 - Local laboratory, hospital, university/institute



BSL-3 Training—Mentoring Program

- International mentorship
 - Fellows from the program will acquire the knowledge and skills:
 - Provide technical recommendations/solutions to government agencies, laboratory managers and international collaborators according to local and international regulations



European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung



World Health
Organization

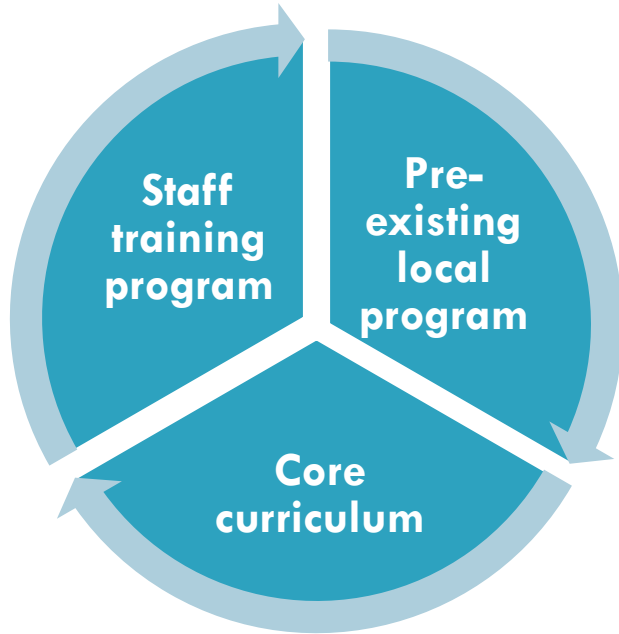


World Organisation for Animal Health

BSL-3 Training—Mentoring Program

- Fellows from the program will acquire the knowledge and skills to:
 - Develop and implement a facility-specific BSL-3 biosafety/ biosecurity training program
 - Conduct training
 - Perform training evaluation and improvement

Major Mentoring Activities



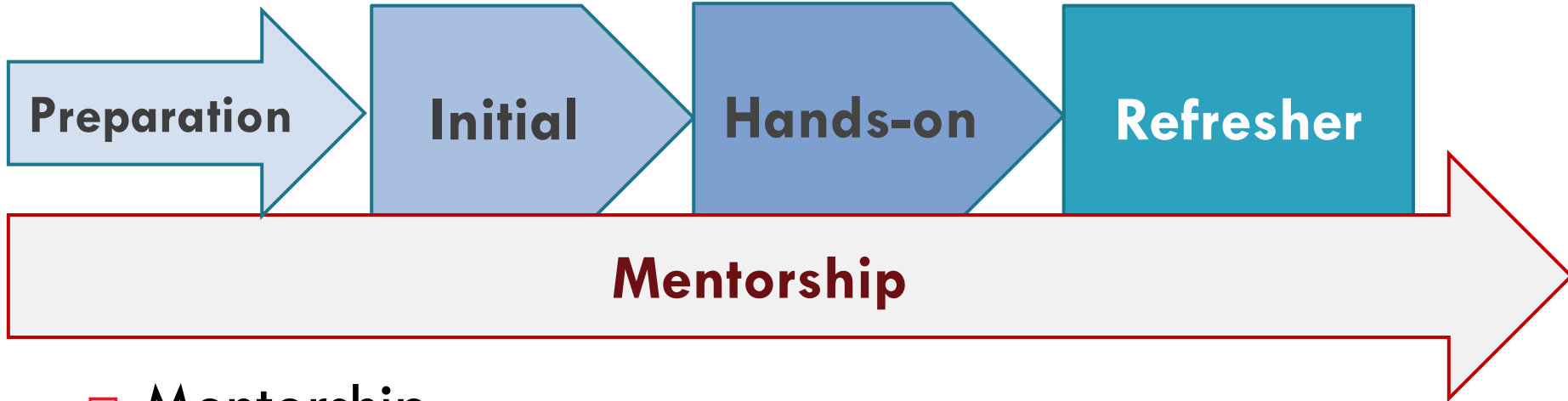
- ❑ Mentor core curriculum delivery
 - ❑ Long-distance learning
 - ❑ Mentoring at MRIGlobal BSL-3 facilities
 - ❑ Publication and presentation
- ❑ Improve pre-existing local biosafety regulations/programs or establish a program
- ❑ Support/provide staff training

Activity Highlights



Staff Training and Mentorship Timeline

- Staff training



- Mentorship

Key Steps in Training Program Development

- Training needs assessment
 - ▣ Information collection
 - Facility features and involved biological activities
 - Regulations/guidelines and (biosafety) training programs
 - Safety culture

Key Steps in Training Program Development

- Communication with stakeholders
 - ▣ Government agencies, laboratory directors, funding organizations, contractors, and others
- Program development and finalization
- Training outcome evaluation
 - ▣ knowledge, skills, and performance

Example: Mentoring Program Evaluation

Knowledge, Skills, and Performance Areas

- Biosafety/biosecurity regulations and guidelines: WHO Laboratory Biosafety Manual/CEN Workshop Agreement/CDC Biosafety in Microbiological and Biomedical Laboratories (BMBL)
- Biological risk assessment
- Document development: Biosafety manual and Standard Operating Procedures (SOP)

Example: Mentoring Program Evaluation

Knowledge, Skills, and Performance

- **Training:** Design, material preparation, training, evaluation, improvement, and documentation
- **Improving local biosafety/biosecurity programs:** Management, problem solving, and communication
- **Promoting biosafety/biosecurity awareness:** Public speech, publication, and presentation

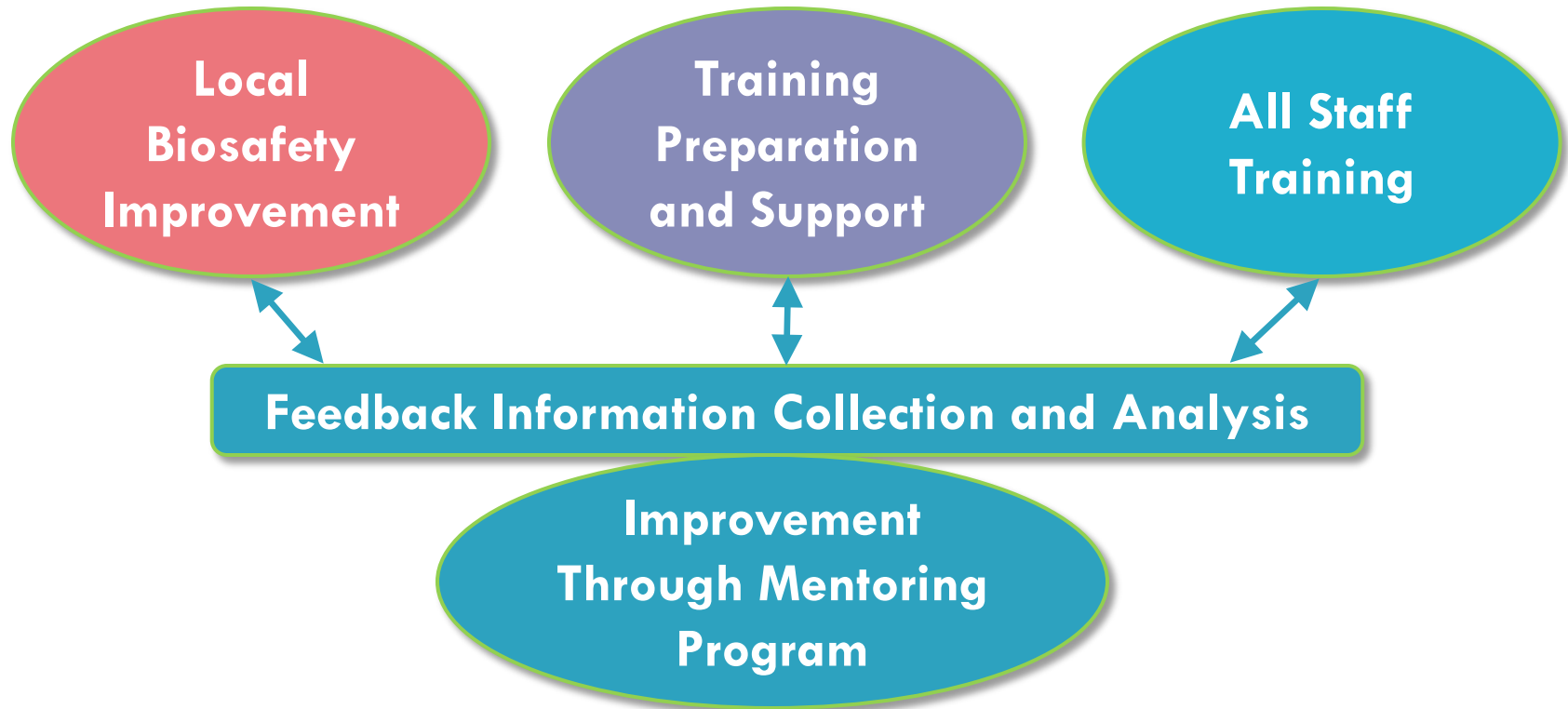
Example: Mentoring Program Evaluation

Evaluation Methods

- Observation
- Interview
- Examination
- Document review



Continuous Improvement and Monitoring System



Results of Successful Engagements

- The international BSL-3 training program provides:
 - ▣ Facility-specific, cost-effective, and sustainable capacity-building solutions for research and diagnostic laboratory facilities throughout the world

Results of Successful Engagements

- Comprehensive approach provides initial and refresher training concurrent with development of local training capability within the existing public health and education systems.
- Strategic approach results in sustainable, regionally appropriate local capacity to independently provide laboratory training and technical solutions for international facilities.

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