



WHO Consultative Meeting on High/Maximum Containment (Biosafety Level 4) Laboratories Networking

Venue: International Agency for Research on
Cancer (IARC), Lyon, France, 13–15 December
2017

Meeting report

WHO/WHE/CPI/2018.40

© World Health Organization 2018

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that WHO endorses any specific organization, products or services. The use of the WHO logo is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: “This translation was not created by the World Health Organization (WHO). WHO is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition”.

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the mediation rules of the World Intellectual Property Organization.

Suggested citation. Report of the WHO Consultative Meeting on High/Maximum Containment (Biosafety Level 4) Laboratories Networking, Lyon, France, 13–15 December 2017. Geneva: World Health Organization; 2018 (WHO/WHE/CPI/2018.40). Licence: [CC BY-NC-SA 3.0 IGO](https://creativecommons.org/licenses/by-nc-sa/3.0/igo).

Cataloguing-in-Publication (CIP) data. CIP data are available at <http://apps.who.int/iris>.

Sales, rights and licensing. To purchase WHO publications, see <http://apps.who.int/bookorders>. To submit requests for commercial use and queries on rights and licensing, see <http://www.who.int/about/licensing>.

Third-party materials. If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

General disclaimers. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by WHO in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by WHO to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall WHO be liable for damages arising from its use.

The WHO Consultative Meeting on High/Maximum Containment (Biosafety Level 4) Laboratories Networking was supported by the Global Partnership Program of Canada (GPP Canada) as part of a project on biosafety and biosecurity. The views expressed herein can in no way be taken to reflect the official opinion of GPP Canada.

Contents

Abbreviations.....	vi
Executive summary.....	viii
Introduction.....	1
Global BSL-4 laboratories – unprecedented opportunities and unique challenges	2
Update on the revision of WHO’s <i>Laboratory biosafety manual</i>	3
Varying approaches to high-containment facilities	4
Update on BSL-4 facilities.....	5
Planned high-containment laboratories	5
Nagasaki University, Japan.....	5
Chinese Center for Disease Control and Prevention BSL-4 Laboratory, China.....	6
Public Health England, United Kingdom	6
High-containment laboratories under construction	6
Research Centre for Emerging Pathogens with High Infectious Risk, Pasteur Institute Côte d’Ivoire	6
National Bio and Agro-Defense Facility, United States of America.....	7
Facilities at the Pirbright Institute, United Kingdom.....	7
National High Containment Facilities for Animal Diseases Control and Prevention, Harbin, China.....	8
Recently constructed BSL-4 laboratories that are operational.....	9
National High-level Biosafety Laboratory, China	9
Korea Centers for Disease Control and Prevention BSL-4 Laboratory, Republic of Korea	9
Victorian Infectious Diseases Reference Laboratory, Australia.....	10
BSL-4 laboratory at the Robert Koch Institute, Germany	10
Established high-containment laboratories – moving to the future	11
Australian Animal Health Laboratory, Australia.....	11
US Army Medical Research Institute of Infectious Diseases, United States of America	11
New laboratories and public opinion: earning public trust and support	12
National Emerging Infectious Diseases Laboratories, United States of America.....	12
National Institute of Infectious Diseases Laboratory, Japan.....	13
Activities of other organizations and high-containment laboratory networks.....	14
World Organisation for Animal Health.....	14

International Experts Group of Biosafety and Biosecurity Regulators.....	15
Biosafety Level 4 Zoonotic Laboratory Network	15
Group of High Containment Laboratories Directors.....	16
Efficient response to highly dangerous and emerging pathogens at EU level	16
European Research Infrastructure on Highly Pathogenic Agents	17
Unique opportunities to advance global health enabled by high-containment facilities	18
Integrated Research Facility, National Institute for Allergy and Infectious Diseases , United States of America	18
Microbial Containment Complex, National Institute of Virology, India.....	19
Centre de Recerca en Sanitat Animal, Institut de Recerca i tecnologia Agrolimentàries, Spain.....	20
Issues in biosafety and biosecurity in high-containment laboratories	21
Establishing and maintaining biosafety and biosecurity: the National Bio and Agro-Defense Facility, United States of America	21
Cooperation between scientists and engineers on laboratory design: National Biosafety Laboratory, Hungary	21
Cabinet line systems: Public Health England, United Kingdom	22
Evidence-based biosafety: BSL-4 OIE laboratory at the Institute of Virology, Centre for Research in Veterinary and Agronomic Sciences, National Institute of Agricultural Technology, Argentina.....	23
Surge capacity: Animal and Plant Health Agency, United Kingdom	24
Training for high-containment laboratories: networks, requirements and opportunities	25
BSL4ZNET	25
Public Health Agency of Sweden.....	25
IEGBBR member countries	26
High-containment laboratories in Novosibirsk, Russian Federation	26
BSL-4 laboratory oversight.....	27
Introduction	27
Federal Select Agent Program, United States of America.....	27
Regulators and institutional review committees in the promotion of responsible science, Switzerland	28
Regulators' perspective	28
Operators' perspective.....	30
Pressing issues in sharing pathogens	31
Nagoya Protocol	31

Shipping of Category A Infectious Substances.....	33
MTAs	33
Building confidence between high-containment laboratories and the global community: cultivating a safety-oriented culture.....	34
Public Health Agency of Sweden.....	34
KCDC, Republic of Korea	35
CDC, United States of America	36
Biosafety controls for newly emerging pathogens in a limited-resources setting	37
Collaboration between high-containment facilities and WHO: moving forward.....	38
Creation of a community of practice.....	38
Facility sharing	39
Mapping of training opportunities.....	39
Sample sharing	39
International recognition of BSL-4 laboratories	39
Suggested future roles and responsibilities for WHO.....	40
Annex 1. Agenda	41
Day 1: Wednesday, 13 December	41
Day 2: Thursday, 14 December.....	42
Day 3: Friday, 15 December	45
Annex 2. Summary of biosecurity level 4 (BSL-4) laboratories in the planning or operational phases as of December 2017, based on available information	46
Annex 3. Participants	50
Argentina.....	50
Australia	50
Brazil	50
Canada.....	50
China	50
Côte d'Ivoire	51
Czech Republic	51
Denmark.....	51
France	51
Germany.....	51
Hungary.....	51
India.....	52

Italy.....	52
Japan.....	52
Netherlands.....	52
New Zealand	52
Republic of Korea	52
Russian Federation	52
Saudi Arabia.....	53
Senegal	53
South Africa	53
Spain.....	53
Sweden	53
Switzerland.....	53
United Kingdom.....	53
United States of America	54
Other organizations	54
International Expert Group on Biosafety and Biosecurity Regulation (IEGBBR).....	54
World Organization for Animal Health (OIE).....	55
WHO Collaborating Centre for biosafety and biosecurity	55
Rapporteur	55
World Health Organization	55
Headquarters	55
Regional Office for Europe.....	56

Abbreviations

AAHL	Australian Animal Health Laboratory
ABSL-4	animal biosafety level 4
ACDP3	Advisory Committee on Dangerous Pathogens level 3
ASTM	American Society for Testing and Materials
BBSRC	Biotechnology and Biological Sciences Research Council (United Kingdom)
BSL4ZNET	Biosafety Level 4 Zoonotic Laboratory Network
BSL-4	biosecurity level 4
BSL-3Ag	biosafety level 3 agriculture
BMBL	<i>Biosafety in microbiological and biomedical laboratories</i>
Cat A	Category A (Infectious Substances)
CCHF	Crimean Congo haemorrhagic fever
CDC	Centers for Disease Control and Prevention (United States of America)
CEN	European Committee for Standardization
CEPRIS	Research Centre for Emerging Pathogens with High Infectious Risk (Côte d'Ivoire)
CICVyA	Centre for Research in Veterinary and Agronomic Sciences (Argentina)
China CDC	Chinese Center for Disease Control and Prevention
CLC	community liaison committee
CL4	containment level 4
CL4 Ag	Containment Level 4 Agriculture
CReSA	Centre de Recerca en Sanitat Animal (Spain)
CT	computed tomography
ELISAs	enzyme-linked immunosorbent assays
EMERGE	Efficient Response to Highly Dangerous and Emerging Pathogens at EU Level
ERINHA	European Research Infrastructure on Highly Pathogenic Agents
EU	European Union
HEPA filters	high-efficiency particulate air filters
HPAI	highly pathogenic avian influenza
HVAC	heating, ventilation and air conditioning

IEGBBR	International Experts Group of Biosafety and Biosecurity Regulators
INTA	National Institute of Agricultural Technology (Argentina)
IRF	Integrated Research Facility
ISO	International Organization for Standardization
KCDC	Korea Centers for Disease Control & Prevention (Republic of Korea)
MRI	magnetic resonance imaging
MTAs	material transfer agreements
NEIDL	National Emerging Infectious Diseases Laboratories (United States of America)
OIE	World Organization for Animal Health
PCR	polymerase chain reaction
PET	positron emission tomography
PIP Framework	Pandemic Influenza Preparedness Framework
PPE	personal protective equipment
PC4	Physical Containment Level 4
PHE	Public Health England
RG	Risk Group (1 through 4)
R&D Blueprint	Research and Development Blueprint (WHO)
SAPO4	Special Animal Pathogens Order level 4
SARS	severe acute respiratory syndrome
SOPs	standard operating procedures
SPECT	single photon emission computed tomography
SPF	specific pathogen free
URS	user requirement specification (document)
USAMRIID	US Army Medical Research Institute of Infectious Diseases

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_26007

