Proudly a CDC and NIH-DRM compliant BSL-3 facilty commissioned by Merrick Mexico since August 2023. Un instalación BSL-3 orgullosamente CDC y NIH-DRM certificada por Merrick México desde agosto 2023.



Perspectives of creating a BSL-3 lab in Mexico: From Decisión to execution.

SANIEREN Tech & Merrick Mexico

Abril 25, 2024



Dr. Christian A. García-Sepúlveda Laboratorio de Genómica Viral y Humana BSL-3 Facultad de Medicina Universidad Autónoma de San Luis Potosí





Pandemic preparedness and BSL3 laboratories

Post-COVID plans to build more than 40 high-containment laboratories around the world (especially in India, the Philippines, Kazakhstan and Singapore).

US building another BSL-4 in addition to the dozen it already has.

Russia announced in 2021 that it would build 15 BSL-4 labs.

Investments in biosafety labs often follow epidemics.

The lack of high-security labs in some regions became particularly apparent during previous pandemics (2009 Influenza and 2019 COVID).

Work with the live virus to characterize biology, sequence genomes and develop diagnostic and preventative (vaccine) strategies rely on BSL-3 or BSL-4 facilities.

India's plans are the most ambitious.

- Building **five** BSL-3 facilities
- Planning at least another **nine**.
- Four institutions interested in constructing BSL-4 labs.
- Indian government committed to building **four** new national institutes of virology (**two** with BSL-4 facilities).

Mallapaty S, Nature 2022



Pandemic preparedness and BSL3 laboratories

"These pandemics have exposed the weakness of REACTIVE health systems worldwide in recognizing and responding to emerging public health threats"....

....the critical element of any preparedness programme is lab preparedness.





Global BioLabs Report 2023

Kings College London & George Mason University School of Policy and Government (2021).

Follows trends in global BSL3+ and BSL4 laboratories and biorisk management.

Concerning boom of BSL3/4 lab construction in countries with weak biorisk oversight.

Concerns of Dual-Use Research of Concern (DURC).



>100 high containment facilities (BSL3/4) conducting high-consequence research in the world.

42% (45/106) of operational labs in Europe.

28% (30/106) in North America.

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BSL-3 facilities worldwide

Unlike for BSL4 labs, there is no requirement under the Biological Weapons Convention confidence building measures to declare such labs and their activities.

57 labs worldwide self-identify as BSL3+.

75% (21/57) in Europe 33% (19/57) in North America 17% (10/57) in Asia 7% (4/57) in South America 3.5% (2/57) in Africa 1.8% (1/57) in Oceania

40% Government run public health labs40% Uuniversity research labs7% Privately owned5% Defence programs

BSL-3+			
Per Region	Operational	Planned/Under Construction	Total
21	21	0	47
10	10	0	30
2	2	0	5
19	18	1	34
1	1	0	5
4	3	1	5
57	55	2	126

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Mapping BSL-3 labs around the world

Systematically identified and located 148 BSL-3 institutions that published in English from 2006–2021 from PubMed.



https://cset.georgetown.edu/wp-content/uploads/CSET-Mapping-Biosafety-Level-3-Laboratories-by-Publications.pdf

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Data Brief

Mapping Biosafety Level-3 Laboratories

by Publications



Mapping BSL-3 labs around the world



https://cset.georgetown.edu/wp-content/uploads/CSET-Mapping-Biosafety-Level-3-Laboratories-by-Publications.pdf

7



BSL-4 facilities worldwide

In 2021, 59 BSL4 labs in operation in 23 countries.

In 2023, 69 BSL4 labs

- 51 in operation,
- 3 in construction and
- 15 planned.

Most projected BSL-4 labs in Asia (4 India)

75% in densely populated cities.

60% are government run.

>50% ABSL-4 labs in the US.

50% BSL-4 labs <200 m².

Only 9 BSL-4 labs >1000 m².

Majority of BSL-4 labs are suit labs.

	BSL-4		
	Per Region	Operational	Planned/Under Construction
Europe	26	24	2
Asia	20	9	11
Africa	3	2	1
North America	15	12	3
Oceania	4	4	0
South America	1	0	1
Total	69	51	18





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There is no single definition of a 'maximum containment' lab.

Physical containment measures, as well as biosafety and biosecurity practices, vary across countries.

Define BSL4 labs as meeting WHO criteria for maximum containment (as specified in the WHO Laboratory Biosafety Manual).

Labs designed to work with Risk Group 4 pathogens that usually cause "serious human or animal disease and that can be readily transmitted from one individual to another, directly or indirectly. Effective treatment and preventive measures are not usually available."

A 'BSL3+ or BSL3enhanced' lab adopts additional physical and/or operational biosafety and biosecurity precautions.

Very limited national guidance, and no international guidance, on what constitutes BSL3+.

No research demonstrating that enhancements provide additional safety for these labs.



BSL-4 facility biosafety score

80% (21/27) countries with BSL4 labs score high on biosafety governance.

Biosafety & Biosecurity governance

- 1. Government biosafety system for human, animal, and agriculture facilities.
- 2. National biosafety legislation.
- 3. Biosafety enforcement agency.
- 4. National list of dangerous pathogens.
- 5. Whistleblower protection for lab staff.

Country	Score
Australia	20
Canada	20
France	19
Germany	19
Japan	19
United States	19
Brazil	18
China	18
Italy	18
Singapore	18
Spain	18
Taiwan	18
United Kingdom	18
Sweden	17
Kazakhstan	16
South Africa	16
Switzerland	16
Hungary	15
Republic of Korea	15
Russian Federation	15
Belarus	14
Czech Republic	11
Philippines	7
India	5
Côte d'Ivoire	3
Gabon	3
Saudi Arabia	1

Scoring metric	Number of countries
Governance Framework	
1. National biosafety legislation	23
2. National biosafety oversight entity	22
3. National list	22
4. Whistleblower protections	15
Implementation	
5. Physical/engineering controls	22
6. Good microbiological practices	20
7. Biosafety risk assessments	21
8. Administrative controls	21
9. Training	20
10. Personal protective equipment	19
11. Occupational health	22
12. Inventory	17
13. Transportation safety	22
14. Decontamination	21
15. Incident response plan	20
16. Incident reporting	21
17. Biosafety Association	
National	16
Regional	8
None	3
18. International Engagement	
Participation in 3 groups	7
Participation in 1 or 2 groups	14
No participation	6

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BSL-4 facility biosecurity score

Only 44% (12/27) countries with BSL4 labs score high on biosecurity governance.

Biosecurity (score out of 18)	
Country	Score
France	18
United States	18
Australia	17
Canada	17
Japan	17
United Kingdom	17
China	15
Taiwan	14
Kazakhstan	13
Republic of Korea	13
Singapore	13
Spain	13
Hungary	12
Russian Federation	12
Sweden	12
Czech Republic	11
Belarus	9
Brazil	9
Germany	9
Italy	6
Switzerland	6
India	5
Philippines	4
South Africa	4
Saudi Arabia	2
Côte d'Ivoire	1
Gabon	1

Biosecurity	
Scoring metric	Number of countries
Governance Framework	
1. National biosafety legislation	17
2. National biosafety oversight entity	16
3. National list	22
4. Whistleblower protections	15
Implementation	
5. Physical security	17
6. Information and cyber security	11
7. Personnel reliability	14
8. Biosecurity risk assessments	12
9. Inventory	15
10. Export controls	24
11. DNA screening	2
12. Training	16
13. Transportation security	20
14. Incident response plan	15
15. Incident reporting	16
International Engagement	
16. BWC	
Ratified and public CBM	9
Ratified and private CBM	16
Ratified but no CBM	2
Signed but not ratified	0
Not signed	0

Biosecurity	
Scoring metric	Number of countries
17. UNSCR 1540	
Part 1: Implementation of national legislation and domestic control measures: 66-100%	20
Part 1: Implementation of national legislation and domestic control measures: 34-65%	2
Part 1: Implementation of national legislation and domestic control measures: 0-33%	3
Part 2: National report and action plan	8
Part 2: National report but no action plan	16
Part 2: No national report	1
 Membership in International Biosecurity Initiatives 	
Member of 5 groups	6
Member of 4 groups	3
Member of 3 groups	4
Member of 2 groups	7
Member of 1 group	4
Member of 0 groups	3

Global BioLabs Report 2023



BSL-4 facility DURC governance score

Only one (3%) of the 27 countries with BSL4 labs scores high on DURC governance.



Two (7%) score medium.

24 (89%) score low on dual-use research governance.

Only one country has national DURC lesgislation.

Only 3 have funding agency review process.

81% (22/27) no oversight.

Dual-Use Research	
Scoring metric	Number of countries
Governance Framework	
1. National dual-use legislation	1
2. National dual-use research oversig	ht
Entity with national	2
oversight responsibility	
Funding agency review process	3
No oversight	22
3. Awareness-raising	3
4. Whistleblower protections	15
Stakeholder Management and Oversight	
5. Self governance measures	11

Dual-Use Research (score out	of 10)
Country	Score
Canada	9
United Kingdom	5
United States	5
Germany	4
Australia	3
Taiwan	3
Hungary	2
Italy	2
Japan	2
Switzerland	2
Brazil	1
Côte d'Ivoire	1
France	1
India	1
Kazakhstan	1
Republic of Korea	1
South Africa	1
Sweden	1
Belarus	0
China	0
Czech Republic	0
Gabon	0
Philippines	0
Russian Federation	0
Saudi Arabia	0
Singapore	0
Spain	0

Global BioLabs Report 2023



Global biosafety results

				/	/ /	-7	7	-7	_/	1	/	/ /	/ /	1	1	/	/ /		1	/ /	<u> </u>	1	/ /		/ /	
				-/		/	/	/	/	/	/ /				/ /		/	Jue -	/ /	_ /			_ /	/ /		. /
Figure 2. Scori	ng metrics by country			1~	/ /	/ /	/ /	/ /	ai ^{je}	Dub	/	1	1.1	/ /		1	1/8	/ 3/	/	8 0	2	· /	and		ate su	/
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Category	Sub-Category	Specific	4	n / a	B/a	Can.	Chin	Cot.	/ 3	E.	1 2	100 / H	ini,	lta)	1. as	100	Ren /	PLISS H	2ª/		Span /	2 / S	Sinii Lai	linit.	Unit.	
		National Biosafety Legislation	1	1	1	1	1	0	1 1	0	1	1	0	1 1	1	1	1	1 () [1	1	1 1	1	1	1 1	1	
Bio	Piecofety Covernance Framework	National Biosafety Oversight Entity	1	1	1	1	1	0	1 1	0	1	1	0	1 1	1	1	1	1 () 1	1	1 1	1	1	1 0		
	Diosarety Governance Framework	National List	1	1	1	1	1	0	1 1	0	1	1	1	1 1	1	1	1	1 () 1	0	1 1	0	1	1 1		
		Whistleblower Protections	1	0	1	1	0	0	0 1	0	1	1	1	1 1	0	0	1	0 (0 (1	0 1	1	0	1 1		
		Physical/Engineering Controls	1	1	1	1	1	0	1 1	0	1	1	0	1 1	1	0	1	1 () 1	1	1 1	1	1	1 1		
		Good Microbiological Practices	1	1	1	1	1	0	1 1	0	1	0	0	1 1	1	0	0	1 () 1	1	1 1	1	1	1 1		
		Biosafety Risk Assessments	1	0	1	1	1	0	1 1	0	1	1	0	1 1	1	1	0	1 () 1	1	1 1	1	1	1 1		
		Administrative Controls	1	1	1	1	1	0	1 1	0	1	1	0	1 1	1	0	1	1 () 1	1	1 1	0	1	1 1		
Riosafety		Training	1	1	1	1	1	0	0 1	0	1	1	0	1 1	1	0	1	1 0) 1	1	1 1	0	1	1 1		
Dissurery	Riosafety Implementation	Personal Protective Equipment	1	1	1	1	1	0	0 1	0	1	1	0	1 0	1	0	0	1 () 1	1	1 1	1	1	1 1		17
	biosarcey implementation	Occupational Health	1	0	1	1	1	0	1 1	1	1	1	0	1 1	1	0	1	1 () 1	1	1 1	1	1	1 1		
		Inventory	1	1	1	1	1	0	1 1	0	1	0	0	0 1	1	0	1	1 () 1	0	1 0	0	1	1 1		
		Transportation Safety	1	1	1	1	1	0	1 1	0	1	1	0	1 1	1	0	1	1 () 1	1	1 1	1	1	1 1		
		Decontamination	1	1	1	1	1	0	0 1	0	1	1	0	1 1	1	0	1	1 0	1	1	1 1	1	1	1 1		
		Incident Response Plan	1	1	1	1	1	0	0 1	0	1	1	0	1 1	1	0	1	1 () 1	0	1 1	1	1	1 1		
		Incident Reporting	1	1	1	1	1	0	1 1	0	1	1	0	1 1	1	0	0	1 () 1	1	1 1	1	1	1 1	- 1	
	Biosafety Association	National or Regional Biosafety Association	2	1	2	2	2	2	0 1	1	1	1	2	2 2	1	2	2	0 () 2	2	2 1	2	2	1 2		
	International Engagement	Participation on global scale	2	0	0	2	1	1	0 2	2 1	2	0	1	1 2	0	1	1	0 1	1	1	1 1	2	1	1 2		
	Biosafety Total Score		20	14	18	20	18	3	11 1	9 3	19	15	5	18 1	9 16	5 7	15	15 1	18	16	18 1	7 16	18	18 19		
		National Biosecurity Legislation	1	1	0	1	1	0	1 1	0	0	1	0	0 1	1	0	1	1 () 1	0	1 1	0	1	1 1		
	Biosecurity Governance Framework	National Biosecurity Oversight Entity	1	0	0	1	1	0	1 1	0	0	1	0	0 1	1	0	1	1 () 1	0	1 1	0	1	1 1		
		National List	1	1	1	1	1	0	1 1	0	1	1	1	1 1	1	1	1	1 () 1	0	1 1	0	1	1 1	- 1	
		Whistleblower Protections	1	0	1	1	0	0	0 1	0	1	1	1		0	0	2	0 0	0	1	0 1	1	0			
		Physical Security	1	1	1	1	1	0	1 1	0	0	0	0	0	1	0	2) [0	1 1	0	1			
		Information and Cyber Security	2	0	0			0	0	0	0	0	0	ן ט	1	0	2	0 0		0	1 0	0	2			
		Personnel Reliability	2	0	1			0		0	0	1	0		0	0	1			0						
Biosecurity		Biosecurity Hisk Assessments	2	U	0			0		0	0	U	0			0	0			0	0 0		1			
	Biosecurity Implementation	Inventory	1	1	4		1	0	11	0	0	0	0	0 I	1	0	1			0	1 0		1			
		Export Controls						0		0	0									0			0			
		UNA Screening	1	1	1	1	1	0	0 1	0	0	1	0	0 0	1	0	0	1 0		0	1 1		1	1 1		
		Transportation Socurity	4	4	1	1	4	0	1 1	0	1	4	0	1 1	4	0	1	1 (0	1 1	0	4	1 1		
		Incident Deconce Plan	1	0	0	1	1	0	0 1	0	1	1	0		1	0	1	1 0		0	1 1	0	1	1 1		
		Incident Reporting	1	0	1	1	1		1 1	0	0	1	0		1	0	0	1		0	1 1	0	1	1 1		
	International Engagement	BWC: LINSCR 1540: Membership of AG_GP BSWG_GHSA_APP3_IEGBBB_LIEE	3	2	1	3	2	1	2 7	1	3	2	2	2 3	1	2	2	1 0	$\frac{1}{2}$	2	2 0) 3	1	3 3		
	Riosecurity Total Score	איז, איז	17	9	9	17	2 15	1	11 1	8 1	9	12	5	6 1	7 13	4	13	12 2	13	4	13 1	2 6	14	17 18		
	Steeren ing lotal over e	National Dual Use Legislation	0	0	0	4	0	0	0 0	0 0	0	0	0	0 0	0	0	0	0 0	0 0	0	0 0	0 0	0	0 0		
		National Dual-Use Research Oversight	0	0	0	3	0	0	0 0	0	2	0	0	0 0	0	0	0	0 0	0	0	0 0	0	3	2 2		
Dual Use	Dual Use Governance Framework	Awareness Raising	1	0	0	0	0	0	0 0	0	0	0	0	0 0	0	õ	õ	0 0	0	0	0 0	0	0	1 1		
		Whistleblower Protections	1	0	1	1	0	0	0 1	0	1	1	1	1 1	0	0	1	0 0	0	1	0 1	1	0	1 1		
	Stakeholder Oversight	Self-governance Measures	1	0	0	1	0	1	0 0) 0	1	1	0	1 1	1	0	0	0 0	0 0	0	0 0) 1	0	1 1		
	Dual Use Total Score		3	0	1	9	0	1	0 1	0	4	2	1	2 2	1	0	1	0 0	0	1	0 1	2	3	5 5		
																	1									

Global BioLabs Report 2023



WHO Lab manuals

LABORATORY BIOSAFETY MANUAL FOURTH EDITION AND ASSOCIATED MONOGRAPHS

LABORATORY BIOSAFETY MANUAL FOURTH EDITION

World Health Organization

https://www.who.int/publications-detail-redirect/9789240011311



CDC lab manuals



https://www.cdc.gov/labs/pdf/SF__19_308133-A_BMBL6_00-BOOK-WEB-final-3.pdf



BSC placement requirements

Biosafety Cabinet (BSC) Placement Requirements for new Buildings and Renovations

> NATIONAL INSTITUTES of HEALTH Farhad Memarzadeh, Ph.D., P.E.

Division of Technical Recourses Office of Research Facilities

Refrence:

Merovladogiał Salety Coleberts: Reconvendantion for Caluar Landarion. Betto: Standards Institution, BS 5226-1026 Methodology: Or Optimalario et Laboratory Heod Convinsions: Menarzadeh, F. Nakada Institutes of Headha, 1966. SOTE: Metric system dimensions included in digital file by Laboratorio de Genómica Viral y Humana, Pacabad de Madicina I



Mational Institutes of Health (NIH) Biological Safety Cabinet (BSC) placement guidelines

Laboratorio de Genómica Viral y Humana, Facultad de Medicina UASLP (Aug 11, 2022, v1.0)



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https://orf.od.nih.gov/TechnicalResources/Bioenvironmental/Documents/BiosafetyCabinetBSCPlacementRequirements_508.pdf



NIH Design Regulations Manual



Design Requirements

Rev. 2.0: 3/8/2024



Division of Technical Resources Office of Research Facilities

The formulae స్టో స్టర్లు స్టోష్ (స్టోటు ఎ స్టో క్ష[...స్టిక్సి గారా for building స్టో క్ష[(గాస్టిక్సి) రాష్ట్ర రాష్ట్ర

high performance resinous paint applications must be inspected by an independent third party Coating Inspector Program (CIP) level 3 certified inspector.

4.4.3.2 Laboratory Floor and Base Finishes

A. Installation: Install floor finishes wall-to-wall, extending under casework and equipment.

B. Finish: Floor finishes shall be non-absorbent, allowing for decontamination with liquid disinfectants and spill containment. Vinyl composition tile is the most common flooring used in BSL-2 laboratories. A seamless floor with integral coved base (welded sheet vinyl or epoxy resin) is typically required in specialty or containment labs and labs requiring aseptic conditions. Other floor options may be required by the specific needs of the program, including raised access, static dissipative, and rubber flooring. Sustainability is another criteria for floor selection, but one which should not compromise durability or function.

C. Carpeting: Carpeting is not permitted in any area of the laboratory, including office areas that can only be accessed by passing through a laboratory.

4.4.3.3 Laboratory Wall Finishes

A. Paint: Low-luster acrylic or latex enamel paint shall be used as the primary interior partition finish. Epoxy paint and other specialized coatings are required in areas subject to high humidity, frequent decontamination, high impact and wear, and other conditions specified by program requirements.

B. Fabric Finishes: Wall coverings and fabric finishes on systems furniture, tackboards and other items are not permitted because they may delaminate and will not withstand laboratory conditions.

4.4.3.4 Laboratory Ceiling Finishes

A. Height: Minimum ceiling height shall be 2.7 m (9 ft.). Optimal ceiling height is 2.9 m (9 ft. 6 in.). Confirm unusual ceiling height requirements with program.

B. Acoustical Tile: Acoustical tile ceilings shall be hydrophobic, smooth surfaced, scrubbable units with a minimum noise reduction coefficient of 0.80. Tegular edges are not permitted. C. Open Ceilings (no finished ceiling; exposed structure): Open ceilings may be acceptable in laboratories under the following conditions:

- The ceiling structure is concrete or another material that is smooth and uniform and can be painted.
- The height of the ceiling structure will result in an acoustical tile ceiling that is unacceptably low.
- Ductwork, conduit and other ceiling-mounted mechanical and electrical items can be minimized, and configured in a way that is neat and visually organized.
- Acoustics are not a factor or are affectively addressed.
- The use and function of the laboratory is consistent with an open ceiling.

D. Moisture Resistance: Ceiling systems in glassware rooms, autoclave rooms, and other damp and highhumidity locations shall be moisture resistant.

E. Suspended Gypsum Board: Suspended gypsum board ceilings may be required in cleanrooms, containment labs, and other areas requiring a monolithic ceiling.

F. Paint: Paint may be acrylic enamel or epoxy, depending on the requirements of the program.

4.4.4 ARF Finishes

The following requirements for ARF partitions are in addition to the minimum requirements indicated in Sections 4.4.2 and 4.4.3.

4.4.4.1 General Requirements

A. Abuse Resistant: Finishes used throughout the operational portion of the ARF shall be abuse resistant, impervious to moisture, and resistant to degradation from chemical disinfectants and decontaminants used within the ARFs environment.

https://orf.od.nih.gov/TechnicalResources/Documents/DRM/DRM2.003122024.pdf



	NIVEL DE BIOSEGURIDAD				
	1	2	3	4	
Aislamiento ^a del laboratorio	No	No	Sí	Sí	
Sala que pueda precintarse para ser descontaminada Ventilación:	No	No	Sí	Sí	
 — Flujo de aire hacia el interior 	No	Conveniente	Sí	Sí	
 — Sistema de ventilación controlada 	No	Conveniente	Sí	Sí	
— Salida de aire con HEPA	No	No	Sí/No⁵	Sí	
Entrada de doble puerta	No	No	Sí	Sí	
Cámara de cierre hermético	No	No	No	Sí	
Cámara de cierre hermético con ducha	No	No	No	Sí	
Antesala	No	No	Sí	_	
Antesala con ducha	No	No	Sí/No ^c	No	
Tratamiento de efluentes	No	No	Sí/No ^c	Sí	
Autoclave:					
— En el local	No	Conveniente	Sí	Sí	
— En la sala de trabajo	No	No	Conveniente	Sí	
— De doble puerta	No	No	Conveniente	Sí	
CSB	No	Conveniente	Sí	Sí	
Capacidad de vigilancia de la seguridad del personal ^d	No	No	Conveniente	Sí	

^a Aislamiento ambiental y funcional respecto del tráfico general.

^b Según la localización de la salida de aire (véase el capítulo 4).

^c Según cuáles sean los agentes empleados en el laboratorio.

^d Por ejemplo, ventana, sistema de televisión en circuito cerrado, comunicación en dos sentidos.

HEPA: filtración de partículas aéreas de gran eficiencia (del inglés *High-Efficiency Particulate Air*). CSB: cámara de seguridad biológica.



There is no such a thing as a BSL-3 type lab.

BSL-3 labs are specially designed around specific work with specific pathogens.

There exists no BSL-3 lab capable of allowing safe handling of all RG3 pathogens.

Lab surfaces, equipment, protective equipment, infrastructure are specially made to withstand biodecontamination with pathogen-specific disinfectants and procedures.



Commissioning Phases

- 1-Design
- 2- Construction
- **3-** Functional tests



Commissioning Phase 1 Design



What pathogens and what procedures are expected for the lab?

Historically worked with risk group 2 and 3 pathogens.

Blood borne risk group 2 enveloped viral pathogens: HIV, HBV, HCV, CMV and HTLV

Aerosol transmitted risk group 2 enveloped viral pathogens: Influenza, RSV.

Arthropod-borne risk group 2 and 3 enveloped viral pathogens: DENV, ZIKV, CHIKV, WNV

Aerosol transmitted risk group 3 enveloped viral pathogens: A(H1N1)2009 influenza during initial phases of pandemic SARS-CoV-2 during initial phases of pandemic Hantavirus SNV in wild rodents and SEOV in lab rodents



Commissioning Phase 1 – Lab design





Commissioning Phase 1 – Lab design





Commissioning Phase 1 – Lab design





2D layout of final draft

	Descripción	M2
	AREAS DE LABORATORIO BSL-3	
	🗘 🖕 🗘 LAB. BSL-3	34.24
ALL STREE	PPR Y CAMBIO SUCIO	7.29
	DUCHA	2.39
	CAMBIO LIMPIO	3.79
	ESCLUSA DE DESCONTAMINACIÓN	5.15
1 million (million)	LAVADO	16.45
	LABORATORIO BSL2 Y VESTIBULO	35.45
	BLS2 RT-PCR	7.98
	BLS2 BIOLOGIA CELULAR	10.42
	CUARTO DE CONTROL	5.28
	CUARTO ELÉCTRICO	6.05
	ALMACÉN	15.73
	SALA DE ESTUDIANTES	13.34
	OFICINA 01	8.91
	OFICINA 02	8.86
	PASILLO Y VESTIBULO DE ACCESO	25.54
	COCINETA	5.26
	SANITARIOS	7.43
	TOTAL ÁREA M ²	219.56



2D layout initial drafts





Construction plans (walls)





Construction plans (lighting)





Construction plans (external staricase)





Construction plans (gas distribution)





Construction plans (air handling unit)





Construction plans (HVAC)





Construction plans (water distribution)





Construction plans (Furniture)





Construction plans (Intrusion alarm)




Construction plans (CCTV)





Construction plans (Access control)





Construction plans (Fire alarm)





Construction plans (Communications)





3D renderings





Demolition





Demolition





Demolition







































































































Design memoirs and specification sheets





CDC compliance letter

August 25, 2023	
Dr. Christian Albo Laborato Autonon Avenida Number Telephor	planning, design, and commissioning of the BSL-3 Laboratory. The facility is in compliance with international biocontainment standards for a BSL-3 laboratory and is capable of meeting key user needs for safe and reliable BSL-3 programs that include:
Autonon Bioconta Dr. Garci Merrick Viral and Level 3 (Laboratc As a glot planning standard • 1 • 1	 Hepatitis B virus (HBV) epidemiology and genomics Human immunodeficiency virus (HIV) burden, genomics, and drug resistance Influenza virus genomics and molecular epidemiology Research in special pathogens, emerging infectious diseases, and regional human diversity
	The project has been constructed by VRM Construcciones y Servicios, S.A. de C.V. to a proper level of quality and detail for these type of biocontainment facilities. Merrick verified that this laboratory meets all BMBL 6 th Edition requirements for a BSL-3 laboratory to include fan failure testing, boundary integrity testing, and verification of ventilation HEPA filters and Biological Safety Cabinet (BSC) certifications. With the successful completion of commissioning and verification testing, the facility satisfies the intent under:
The proj these typ BSL-3 lab Biologica facility sa	 Centers for Disease Control and Prevention (CDC) Biosafety in Microbiological and Biomedical Laboratories (BMBL) 6th Edition
The facil and oper facility.	The facility is ready for operational use and is deemed a "Suitable Facility" as being one whose design, construction, and operational functionality can achieve Laboratory Certification, meaning that it will be approved as a containment facility.
Sr. Project Manage	ger Director of Commissioning Propiedad de los Empleados lalme Balmes No.11 ol. Los Morales Polanco co D.F. Tel: +52 (55) 5906 3054 Millo@merrick.com www.merrick.com



Post-compliance chill-out




Challenges faced

Convey the importance and enthusiasm of receiving funds for the construction of a BSL-3 lab to institutional authorities.

Educate administrative staff (accounting, finance, legal and commercial offices) on the differences between a BSL-3 lab and a common teaching lab:

- Design requirements
- Construction requirements
- Equipment requirements
- Quality of material requirements

Difficulty in convincing biosafety officers to accept regulations which have not been cast into official regulations.

Difficulties in convicing established researchers of the need to adopt biosafety measures.

Breaking with the current trend of discrediting scientific knowledge and the scientist.



Social proximity

Many scientists worry about the difficulties of getting access to funds for BSL3 facilities.

Some lucky scientists worry about the huge cost of maintaining BSL3 facilities.

Most non-scientist worry about the risk that BSL3 facilities pose to the community.



Global BioLabs Report 2023

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Biosecurity practices cannot be built without a strong safety culture.

Training should be a precondition for starting work in specialized, safety- and securitysensitive BSL-3/4 laboratories.

Traditional laboratory culture of individual training.

Organized training is absolutely necessary and obligatory (as in the US).

Commercial courses provided (i.e., Health Protection Agency UK).

The European Cooperation in Science and Technology (COST) Action B28, 'Array technologies for BSL-3 and BSL-4 pathogens', provides training in Göttingen for laboratory scientists expecting to work in a BSL-3/4 environment.

- Limited to 10 trainees
- 3-day course
- Morning theoretical lectures (WHO or CDC Manual content, essentially)
- Practical afternoon exercises (PPE, dexterity training and inactivation procedures).

BSL-3 laboratory training is essential for moving on to work at BSL-4

Weidmann M, Nature Reviews Microbiology 2009



Commissioning team



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You Tube GenomicaUASLP

Commissioning team

Laboratorio de Genómica Viral y Humana BSL-3 Facultad de Medicina UASLP 0:04 / 4:55 53 2023 Viral & Human Genomics BSL-3 facility promotional video

https://www.youtube.com/watch?v=vYtXeigliBU&t=10s

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Proudly a CDC and NIH-DRM compliant BSL-3 facilty commissioned by Merrick Mexico since August 2023. Un instalación BSL-3 orgullosamente CDC y NIH-DRM certificada por Merrick México desde agosto 2023.



Perspectives of creating a BSL-3 lab in Mexico: From Decisión to execution.

SANIEREN Tech & Merrick Mexico

Abril 25, 2024



Dr. Christian A. García-Sepúlveda Laboratorio de Genómica Viral y Humana BSL-3 Facultad de Medicina Universidad Autónoma de San Luis Potosí



RVPVE Red de Vigilancia de Patógenos Virales Emergentes



Laboratorio de Genómica Viral & Humana, Medicina UASLP

Christian A. García-Sepúlveda — Investigador principal

Sandra E. Guerra-Palomares — Investigador asociado

Dulce Ma. Hernández Piña — Lab Manager

J. Manuel Mendoza Méndez — Doctorado, Evaluación de diversidad de hantavirus en roedores silvestres.

Claudio S. Ferrer Pérez — Prácticas profesionales, Evaluación de riesgo asociado a hantavirus Seoul.

Andreu Comas Garcia — Departamento de Microbiología, Medicina UASLP Mauricio Comas Garcia — Laboratorio de Microscopía de Alta Resolución, CICSAB Ciencias UASLP Guillermo Espinosa Reyes — Centro de Investigacion Aplicada en Ambiente y Salud) (CIAAS), Medicina UASLP Fernando Díaz-Barriga Martínez — Centro de Investigacion Aplicada en Ambiente y Salud) (CIAAS), Medicina UASLP Juan Carlos Cuevas Tello — Grupo de Bioinformática, Ingeniería UASLP Ignacio Amezcua Osorio — Comité Estatal para el Fomento y Protección Pecuaria de San Luis Potosí.



