

GLOBAL BIOLABS

TRACKING MAXIMUM CONTAINMENT LABS AROUND THE WORLD

Maximum Containment Labs and Biorisk Management

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Bulletin
of the
Atomic
Scientists





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Run of Show

- BSL-4 lab data update.
- New data on BSL-3+ labs.
- National scorecards on biosafety, biosecurity, dual-use, governance and stability.
- Website demo.
- Recommendations.
- Q&A.

69 BSL4 Labs

Today, there are at least 69 BSL4 labs in operation, under construction or planned around the world, significantly more than 10 years ago.

Europe has 26 BSL4 labs, North America 15, Asia 20, Oceania 4, Africa 3 and South America 1. 51 of 69 BSL4 labs are in/planned for urban centres.



3 out of **5**

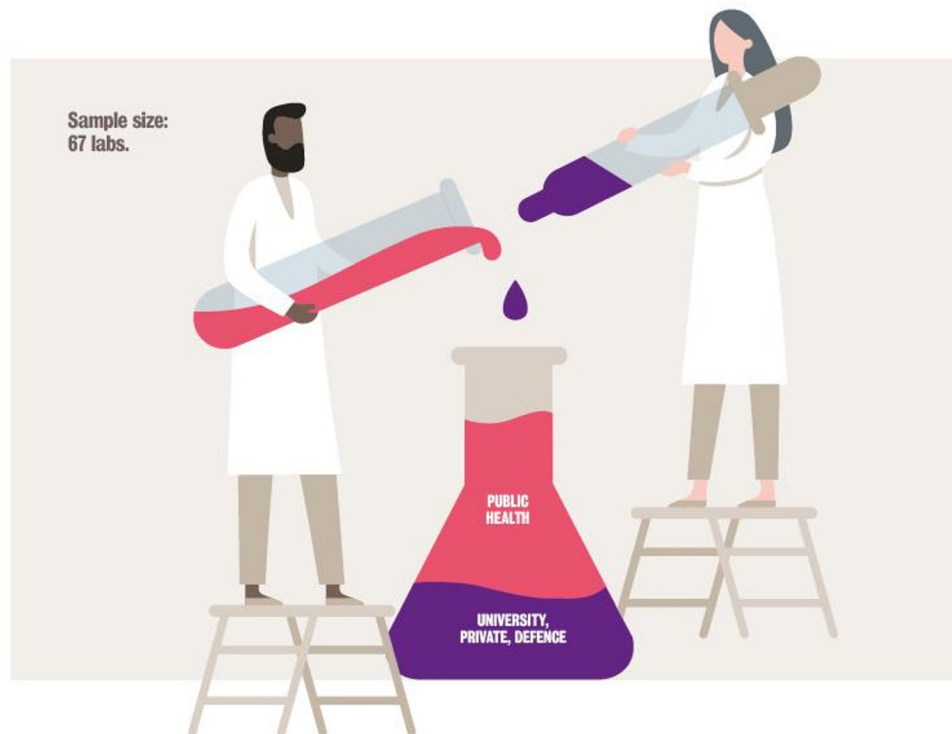
BSL4 labs are government-run public health institutions.

Less than 1/5 are university labs.

Less than 1/5 are defence labs.

Only 2 labs are wholly privately owned.

The vast majority focus on human health.



BSL-4 Lab Attributes

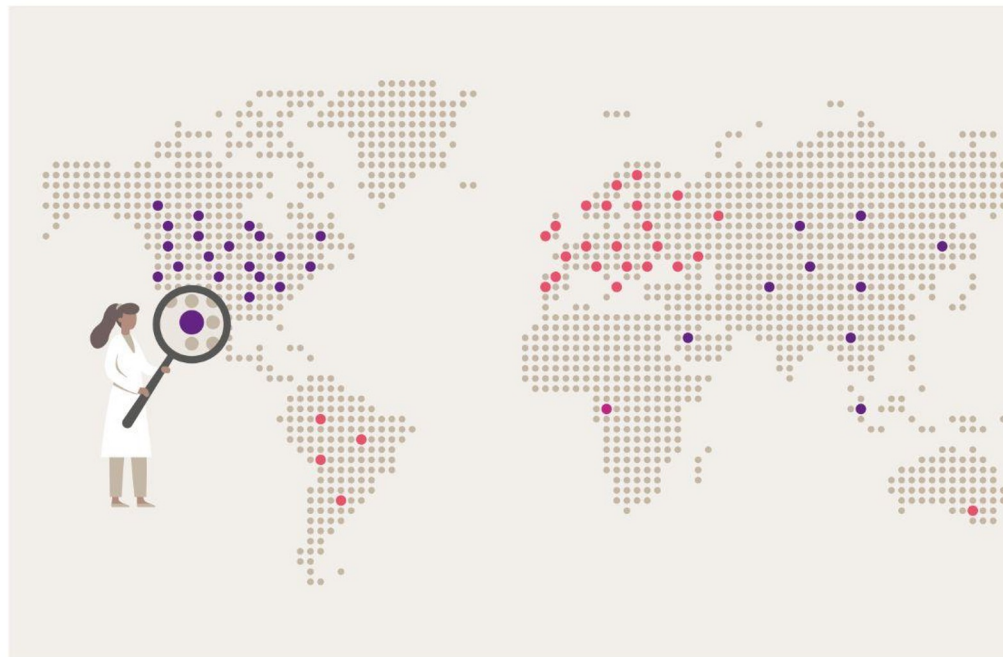
<i>BSL-4 (ABSL-4, ACL-4) Labs</i>		
Containment Type	Suit	41
	Glove box	7
	Both	1
BSL4 with arthropod (ACL4) facility	N°	2
BSL4s with animal (ABSL4) facility	N°	14
Status	Operational	52
	Under Construction	3
	Planned	14

55

BSL3+ Labs

Today, there are at least 55 BSL3+ labs in operation, around the world, significantly more than 10 years ago.

Europe has 21 BSL3+ labs, North America 19, Asia 9, South America 4, Oceania 1, and Africa 1. 41 of 55 BSL3+ labs are in/planned for urban centres.



2 out of **5**

BSL3+ labs are government-run public health institutions.

2/5 are university labs.

Less than 1/5 are defence labs or privately owned labs*

50% focus on human health, 25% on animal health, and 25% on both



Global Distribution of BSL-4 and BSL-3+ Labs

	BSL-4			BSL-3+			Total
	Per Region	Operational	Planned/Under Construction	Per Region	Operational	Planned/Under Construction	
Europe	26	24	2	21	21	0	47
Asia	20	9	11	9	9	0	29
Africa	3	2	1	1	1	0	4
North America	15	12	3	19	18	1	34
Oceania	4	4	0	1	1	0	5
South America	1	1	0	4	4	0	5
Total	69	52	17	55	54	1	124

Measuring Biorisk Governance



- **Biorisk Management**

- Biosafety
- Biosecurity
- Dual-use Research Oversight

- **National Context**

- Governance
- Stability

Biosafety (#/20)

Principles, technologies, measures and practices of containment that can be used to prevent inadvertent release or unintentional exposure to biological agents or biological material

Biosafety Governance Framework (#/4)

National Biosafety Legislation

National Biosafety Oversight Entity

National List

Whistleblower Protections

Biosafety Implementation (#/12)

Physical/Engineering Controls

Good Microbiological Practices

Biosafety Risk Assessments

Administrative Controls

Training

Personal Protective Equipment

Occupational Health

Inventory

Transportation Safety

Decontamination

Incident Response Plan

Incident Reporting

Biosafety Association (#/2)

National or Regional Biosafety Association

International Engagement (#/2)

Participation on global scale

Biosecurity (#/18)

Principles, technologies, measures and practices that can be used to prevent unauthorized access to or loss, theft, misuse, diversion or intentional release of a biological agent or biological material

Biosecurity Governance Framework (#/4)

National Biosecurity Legislation

National Biosecurity Oversight Entity

National List

Whistleblower Protections

Biosecurity Implementation (#/11)

Physical Security

Information and Cyber Security

Personnel Reliability

Biosecurity Risk Assessments

Inventory

Export Controls

DNA Screening

Training

Transportation Security

Incident Response Plan

Incident Reporting

International Engagement (#/3)

BWC

UNSCR 1540

Limited membership (AG, GP BSG, GHSA APP3, IEGBBR, JEE)

Dual Use Research (#/10)

Life sciences research conducted for peaceful and beneficial purposes that could provide knowledge, information, methods, products or technologies that could also be intentionally misused to endanger the health of humans, animals, or the environment

Dual Use Governance Framework (#/9)

National Dual Use Legislation

National Dual-Use Research Oversight

Awareness Raising

Whistleblower Protections

Stakeholder Management and Oversight (#/1)

Self-governance Measures

Biosafety (out of 20)	#/20
<i>Principles, technologies, measures and practices of containment that can be used to prevent inadvertent release or unintentional exposure to biological agents or biological material</i>	
Biosafety Governance Framework	#/4
National Biosafety Legislation	
National Biosafety Oversight Entity	
National List	
Whistleblower Protections	
Biosafety Implementation	#/12
Physical/Engineering Controls	
Good Microbiological Practices	
Biosafety Risk Assessments	
Administrative Controls	
Training	
Personal Protective Equipment	
Occupational Health	
Inventory	
Transportation Safety	
Decontamination	
Incident Response Plan	
Incident Reporting	
Biosafety Association	#/2
National or Regional Biosafety Association ¹	
International Engagement	#/2
Participation on global scale ²	

Biosafety (% of 20 possible points)			
Country	Score	Country	Score
Australia	100	Kazakhstan	80
Canada	100	South Africa	80
France	95	Switzerland	80
Germany	95	Hungary	75
Japan	95	Republic of Korea	75
United States	95	Russian Federation	75
Brazil	90	Belarus	70
China	90	Czech Republic	55
Italy	90	Philippines	35
Singapore	90	India	25
Spain	90	Côte D'Ivoire	15
Taiwan	90	Gabon	15
United Kingdom	90	Saudi Arabia	5
Sweden	85		

Biosecurity (out of 18)	#/18
<i>Principles, technologies, measures and practices that can be used to prevent unauthorized access to or loss, theft, misuse, diversion or intentional release of a biological agent or biological material</i>	
Biosecurity Governance Framework	#/4
National Biosecurity Legislation	
National Biosecurity Oversight Entity	
National List	
Whistleblower Protections	
Biosecurity Implementation	#/11
Physical Security	
Information and Cyber Security	
Personnel Reliability	
Biosecurity Risk Assessments	
Inventory	
Export Controls	
DNA Screening	
Training	
Transportation Security	
Incident Response Plan	
Incident Reporting	
International Engagement	#/3
BWC ¹	
UNSCR 1540 ²	
Limited membership (AG, GP BSG, GHSA APP3, IEGBBR, JEE) ³	

Biosecurity (% of 18 possible points)			
Country	Score	Country	Score
France	100	Sweden	67
United States	100	Czech Republic	61
Australia	94	Belarus	50
Canada	94	Brazil	50
Japan	94	Germany	50
United Kingdom	94	Italy	33
China	83	Switzerland	33
Taiwan	78	India	28
Kazakhstan	72	Philippines	22
Republic of Korea	72	South Africa	22
Singapore	72	Saudi Arabia	11
Spain	72	Côte D'Ivoire	6
Hungary	67	Gabon	6
Russian Federation	67		

Dual Use Research (out of 10)	#/10
<i>Life sciences research conducted for peaceful and beneficial purposes that could provide knowledge, information, methods, products or technologies that could also be intentionally misused to endanger the health of humans, animals, or the environment</i>	
Dual Use Governance Framework	#/9
National Dual Use Legislation	
National Dual-Use Research Oversight	
Awareness Raising	
Whistleblower Protections	
Stakeholder Management and Oversight	#/1
Self-governance Measures	

Dual Use Research (% of 10 possible points)			
Country	Score	Country	Score
Canada	90	Kazakhstan	10
United Kingdom	50	Republic of Korea	10
United States	50	South Africa	10
Germany	40	Sweden	10
Australia	30	Belarus	0
Taiwan	30	China	0
Hungary	20	Czech Republic	0
Italy	20	Gabon	0
Japan	20	Philippines	0
Switzerland	20	Russian Federation	0
Brazil	10	Saudi Arabia	0
Côte D'Ivoire	10	Singapore	0
France	10	Spain	0
India	10		

Overall Biorisk Management Score (% of 48 possible points)			
Country	Score	Country	Score
Canada	96	Republic of Korea	60
United States	88	Brazil	58
Australia	83	Russian Federation	56
United Kingdom	83	Italy	54
France	79	Switzerland	50
Japan	79	Belarus	48
Taiwan	73	Czech Republic	46
China	69	South Africa	44
Germany	67	India	23
Singapore	65	Philippines	23
Spain	65	Côte D'Ivoire	10
Kazakhstan	63	Gabon	8
Sweden	63	Saudi Arabia	6
Hungary	60		

Governance			
Country	Score	Country	Score
Sweden	94	Italy	50
Switzerland	91	Hungary	40
Canada	86	South Africa	34
Australia	83	India	30
Germany	81	Saudi Arabia	29
Singapore	77	Brazil	26
United Kingdom	76	China	25
Japan	74	Kazakhstan	22
Taiwan	71	Philippines	22
France	63	Côte D'Ivoire	16
United States	60	Belarus	12
Republic of Korea	57	Gabon	9
Czech Republic	56	Russian Federation	9
Spain	56		

Stability			
Country	Score	Country	Score
Switzerland	82	Italy	52
Czech Republic	80	Gabon	45
Sweden	80	Kazakhstan	42
Japan	79	South Africa	36
Singapore	79	United States	35
Taiwan	75	Belarus	26
Germany	72	China	26
Australia	68	Saudi Arabia	25
Hungary	67	Brazil	23
Republic of Korea	67	Côte D'Ivoire	18
Canada	66	Russian Federation	17
United Kingdom	63	India	15
Spain	58	Philippines	10
France	52		

Key Recommendations:

- Cultivate a culture of safe, secure, and responsible research.
- Adopt, implement, review, and update laws and regulations on biorisk management.
- Implement and share best practices.
- Coordinate across existing international biorisk management networks.
- Fulfill international reporting requirements.
- Establish international guidelines and oversight on high-risk and dual-use research.



Thank you!



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