



**RISK GROUP (RG), BIOSAFETY LEVEL (BSL) AND PATHOGENICITY FEATURES OF LIVING MODIFIED MICROORGANISMS (LMO), PRACTICES AND EQUIPMENT**

<b>Risk Group (RG)</b>	<b>Pathogenicity Features</b>	<b>Biosafety Level **</b>	<b>Laboratory Practice</b>	<b>Safety Equipment</b>
<b>RG1</b> low individual and community risk (BSL1)	A microorganism that is unlikely to cause human disease or animal disease of veterinary importance.	Basic: Biosafety Level  <u>Examples:</u> Basic Teaching, Basic Research Lab	Good Microbiological Techniques (GMT)	None, open bench work
<b>RG2</b> moderate individual risk, limited community, livestock or environment risk (BSL2)	A pathogen that can cause human or animal disease but is unlikely to be a serious hazard to laboratory workers, the community, livestock or the environment. Laboratory exposure may cause serious infection. Infectious risk is via direct contact, ingestion or inhalation. Effective treatment, preventive and control measures are readily available and can be implemented to control disease transmission. Risk of spread to a community is limited.	Basic: Biosafety Level 2  <u>Examples:</u> Primary health services, diagnostic services, research laboratory	GMT plus protective clothing, biohazard sign	Biosafety cabinet Class II for potential aerosol
<b>RG3</b> high individual, low community risk (BSL3)	Organism, which may be an exotic or indigenous agent with potential to transmit disease mainly via aerosols. Disease caused is severe and may result in death. It could present a risk if spread in the community however effective treatment, preventive and control measures are available	Containment – Biosafety Level 3  <u>Examples:</u> Special diagnostic services, research laboratory	Level 2 plus special clothing. Controlled access, directional air flow	BSC Class III and other primary devices for all activities.

<p><b>RG4</b> high individual and community risk (BSL4)</p>	<p>Organism, which may be an exotic agent or new agent usually able to cause life-threatening human disease. The infectious disease is readily transmissible from one individual to another. Infectious disease may be transmitted via aerosol or via an unknown route. Effective treatment, preventive and control measures are not readily available.</p>	<p>Maximum containment Biosafety Level 4</p> <p><u>Examples:</u> Dangerous pathogen units</p>	<p>As Level 3 plus airlock entry, shower exit, special waste disposal.</p>	<p>Class III BSC, positive pressure suits in conjunction with Class II BSCs, double ended autoclave (through the wall), filtered air</p>
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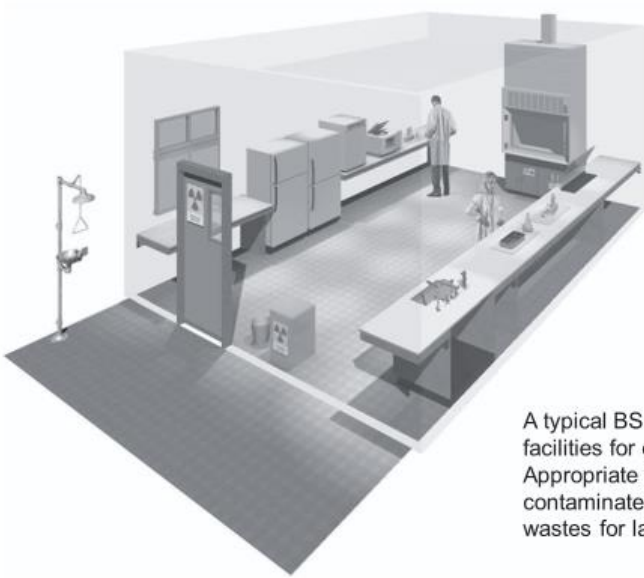
\*\* However, the absence of an agent summary statement for a human pathogen does not imply safety at BSL-1 or without a risk assessment to determine the appropriate containment level.

Ref:

1. WHO Laboratory Biosafety Manual 2004
2. Biosafety Guidelines for Contained Use Activity of LMO 2010

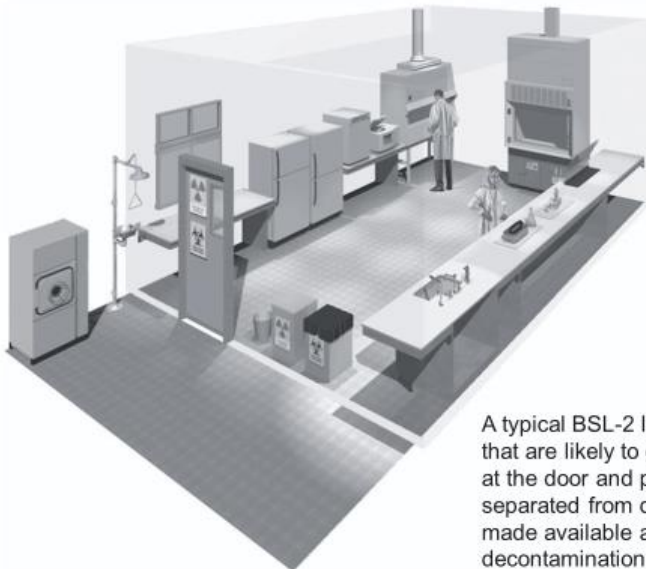


## BIOSAFETY LEVEL



A typical BSL-1 laboratory provides sufficient space and facilities for effective Good Microbiological Practices. Appropriate hazard signs at the door and potentially contaminated wastes are separated from domestic wastes for landfill. (Image from WHO BSM 3<sup>rd</sup> Ed.)

### Layout of BSL 1



A typical BSL-2 laboratory is installed with BSC-2 for works that are likely to generate aerosols. Appropriate hazard signs at the door and potentially contaminated wastes are separated from domestic wastes for landfill. The autoclave is made available at appropriate proximity for means of decontamination. (Image from WHO BSM 3<sup>rd</sup> Ed.)

### Layout of BSL 2