



Containment labs – Who wants them, ~~Who funds~~^{SAND2011-4600C} them, and Why

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*Anticipating Biosecurity Challenges of the Global
Expansion of High Containment Biological Laboratories*

11 July 2011
Istanbul, Turkey

Sand Number 2011-4600C



Growth in Containment Labs - US

- **2009 Determination of High Containment Labs found in US by Government Accountability Office**

Year	Number of Entities	Number of BSL3 Laboratories
2004	150	415
2005	210	782
2006	237	1086
2007	238	1176
2008	242	1362



Growth in Containment Labs - US

- **Pre Laboratory Response Network**

- 1998 – 12 States had public health labs with BSL3 lab space (As opposed to 46 in 2007)

- **Laboratory Response Network**

- 2005 – 120 Labs with BSL3 Capabilities

- **Federal Public Health Laboratories (CDC, USDA, FDA)**
- **State and Local Public Health Laboratories (Departments of Health)**
- **Military (NMRC)**
- **Food Testing (FDA, USDA)**
- **Environmental**
- **Veterinary (USDA)**
- **International (Canada, UK, Australia)**

- 2011 – LRN increased to 150 Labs with BSL3 Capabilities



Growth in Containment Labs - Global

- **Bangladesh –**
 - 2008 – Epidemiology, Disease Control and Research Procurement of Prefabricated BSL3 via World Bank funding.
- **India – Government of India is funding the construction of BSL3 and 4 Laboratories.**
 - BSL4 being constructed at NIV, Pune and an additional planned.
 - Six health sector BSL3 exist (as of 2008), three additional planned.
 - Total as of 2008 is 14 with an additional six planned (including above mentioned)
- **Indonesia –**
 - At least Six BSL3 functional.
 - Completion of BSL3 at the National Institute for Health Research & Development, Jakarta and Eijkman Institute BSL3 since 2006
- **Additional Established But Nonfunctional**
 - Bangladesh
 - Sri Lanka



Growth in Containment Labs - Global

- ***China: National Accreditation Board for Laboratories***
 - 2011 – 30 BS₃ and two BS₄ facilities
 - 2008 – Twelve BS₃ and one BS₄ facility
- **Brazil**
 - 2010 – Thirteen BS₃ and one BS₄
 - **BS₃ facilities open for integrated health network**
 - 2006 – Twelve new BS₃ Public Health Laboratories under construction
- **Mexico**
 - 2009 – Two BS₃ facilities functioning
 - 2010 – The H1N1 outbreak caused an increase in BS₃ capability needs
 - **At least three BS₃ planned in Mexico City, most likely more**
 - **BS₃ planned in Reynosa, Tamaulipas**
 - **New BS₃ in Sonora**



Challenges to Defining a Containment Lab

- **Do the laboratories work on Select Agents?**
 - (...and therefore Registered if within the US)
- **Are the laboratories not working on Select Agents properly included?**
 - How do you locate these?
- **Many do NOT know their biosafety level**
 - Asia: 21%
 - Eastern Europe: 35%
 - Latin America: 19%
 - Middle East: 44%



Challenges to Defining a Containment Lab

- **What does a “laboratory” mean?**

- Is the suite of BSL3s ONE laboratory or is it MULTIPLE laboratories?
- Is this laboratory determination case by case or standardized? If case by case, how do you standardize the responses?
- Are there certain size restrictions for a single laboratory?
- How do you define higher containment areas within lower containment laboratories (e.g. Class III BSCs)



Why build them? Postulations

- **Decision Drivers**

- Political
- Diagnostic and Scientific
- Safer High Containment Laboratories
- Competition Between Universities for External Funding
- Competition Between Countries
- Lack of Trust Between Countries
- Logistical Needs



Why build them? Examples

- **Political motivations**

- High prevalence of Emerging Infectious Diseases in country
- Burgeoning Biotechnological sector
- Research Capacity Research pathogens for vaccines or treatment
- National Prestige



Why build them? Examples

- **Lack of Trust Between Countries – 2009 H1N1 Influenza A**
 - September 2009:
 - Nine Countries promised 10% of Produced Vaccine to low-income countries
 - UN System Coordinator for Avian and Human Influenza promised 10% as well
 - October 2009:
 - US postpones its vaccine donation because of shortages in domestic population
 - December 2009:
 - Donation pledges of vaccine, supplies, and funds had not been met need
 - Vaccine orders had been placed for Afghanistan, Azerbaijan, and Mongolia
 - Indicative of the inability of a country to count on other countries in emergency situations. Therefore need own facilities for self sufficiency.



Is a BSL3 still necessary?

- **Diagnostic Capability**
 - Improvements in rapid test diagnostic tests may offer a sufficient alternative
- **Comparison of BSL3 and Low Containment Rapid Techniques**

Consideration	BSL3	Diagnostic
Facility Construction	Extremely Costly	Relatively Inexpensive
Operational Costs	High Costs	Relatively Inexpensive
Utilities	High Energy Reliance	Low Energy Reliance
Biosafety Hazard	Culturing large quantities	Low volume of pathogen
Chemical Acquisition	Relative Ease	Potentially Difficult
Test Reliability	Considered High Fidelity	Potentially Less Reliable; New Technology
Testing Capability	Flexibility to Test Culture via Multiple Techniques	Limited Scope by Diagnostic Technique Selection
Becoming a Target	High Value Target	Low Value Target



Questions and Discussion

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