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# Veterinary Biodefense Research Operations in Biocontainment

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# Objectives

- Present examples of laboratory animal husbandry operations in traditional biocontainment facilities
- Present examples of animal necropsy operations in traditional biocontainment facilities

# Disclaimer

- The views, opinions and findings contained herein are those of the author and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other documentation.

# Laboratory Animal Usage

- Research was conducted in compliance with the Animal Welfare Act and other federal statutes and regulations relating to animals and experiments involving animals and adheres to principles stated in the Guide for the Care and Use of Laboratory Animals, National Research Council, 1996.
- The facility where this research was conducted is fully accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International.

# Working in Biocontainment

- Important to develop safe work habits
- Facilities are designed to be as fail-safe as possible (engineering controls)
- Burden rests on end user to use meticulous techniques
- Obligation to report promptly any mishap or deviation from proper microbiological procedure

# Animal Biosafety Level 3 (ABSL-3)

- Documented initial and periodic refresher training on standard and special procedures
- Biosafety manual readily available to employees
  Proper use of primary and secondary barriers (engineering controls)
- Use of administrative controls and personal protective equipment
- Medical surveillance program
- Biohazard sign posted on animal room door

# Medical Surveillance Program

- Obtain baseline and periodic serum samples
- Offer vaccines, if available, to employees
- Report immediately any mishap or potential exposure to safety office and to on-call physician
- Medically evaluate any illness with fever above 100.4°F as possible occupational exposure

# Animal Biosafety Level 3 (ABSL-3)

- Facilities described in BMBL, 4th edition
- Self-closing, self-locking door
- Double-door entry with change room and shower(s) to animal room
- Airlock and double-door autoclave may be provided
- Doors to animal rooms open inward and are self-closing
- Water-resistant interior surfaces and sealed penetration
- Hands-free washing sink

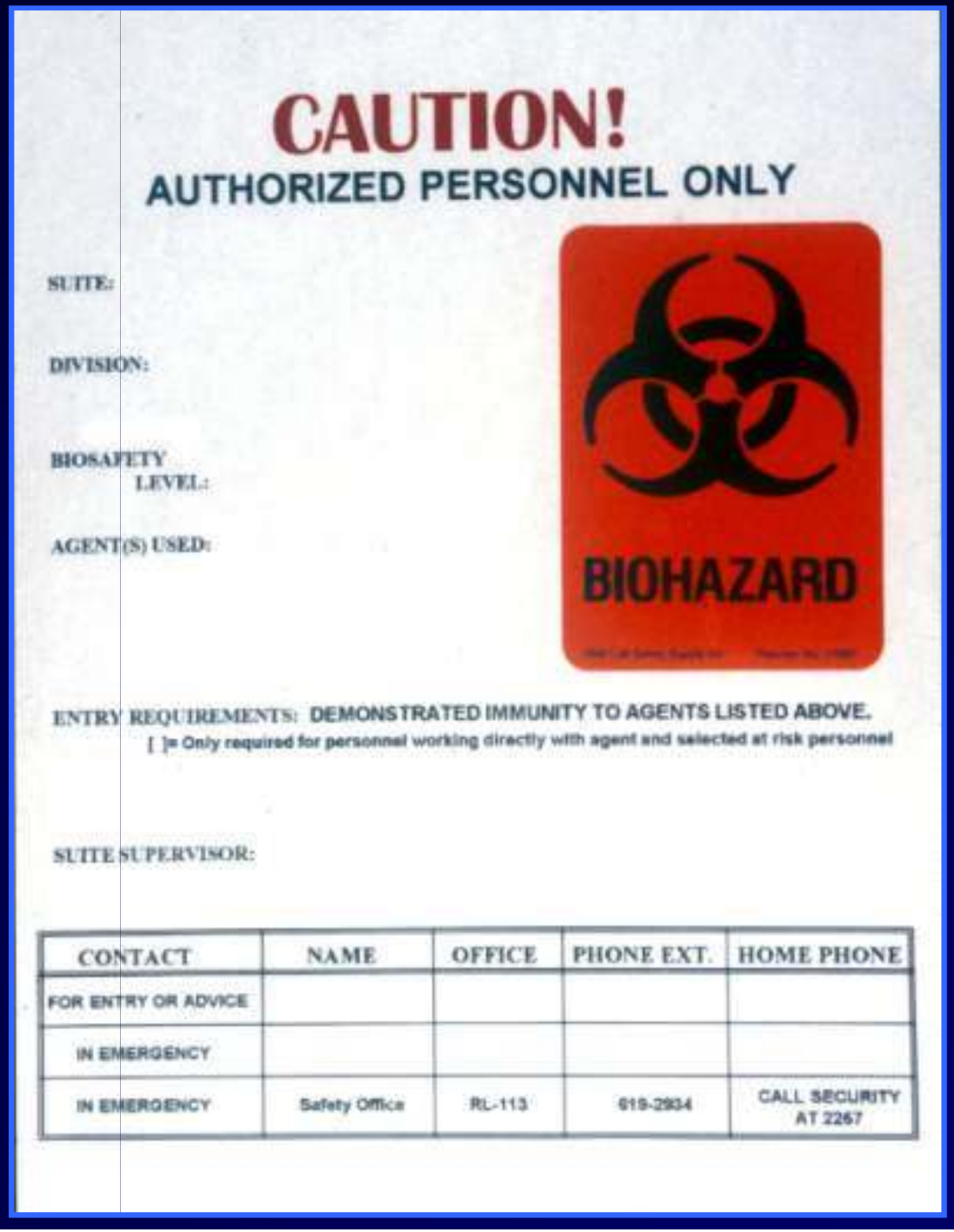
# ABSL-3

- Ventilation IAW Guide for Care and Use of Laboratory Animals
- Ducted exhaust air ventilation with directional airflow from clean to contaminated areas; not recirculated
- Filtration should be considered
- Visual monitoring of directional air flow
- Cages washed in cage washer
- Adequate illumination

# ABSL-3 Enhancements

- Consider installing HVAC control system to prevent sustained positive pressurization of animal spaces
- Personnel showers
- HEPA filtration of exhaust air
- Containment of other piped services
- Provision of effluent decontamination

# Placard for Laboratory Door



**CAUTION!**

**AUTHORIZED PERSONNEL ONLY**

SUITE:

DIVISION:

BIOSAFETY LEVEL:

AGENT(S) USED:

BIOHAZARD

ENTRY REQUIREMENTS: DEMONSTRATED IMMUNITY TO AGENTS LISTED ABOVE.
[ ]= Only required for personnel working directly with agent and selected at risk personnel

SUITE SUPERVISOR:

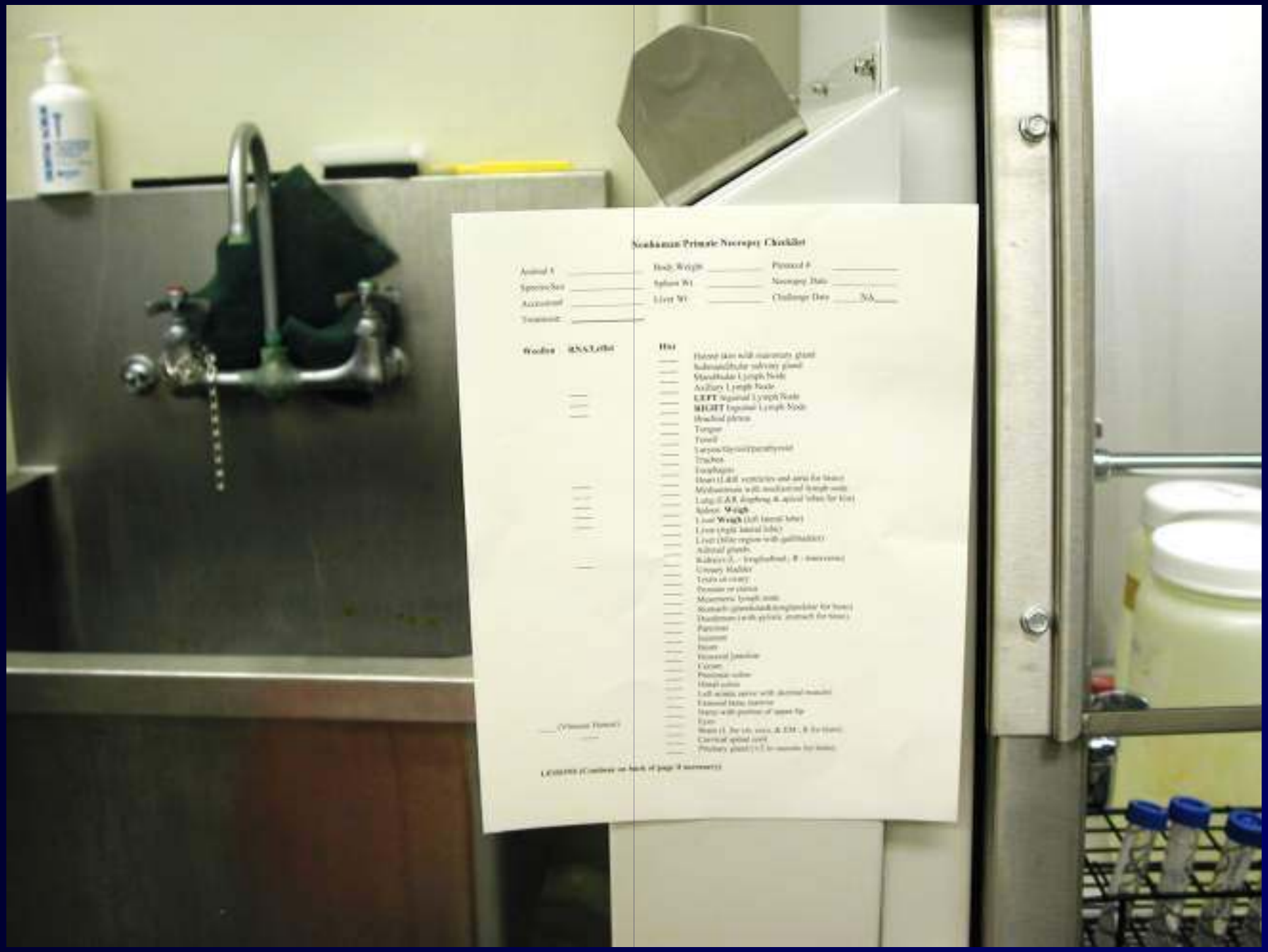
| CONTACT | NAME | OFFICE | PHONE EXT. | HOME PHONE |
|---|---|---|---|---|
| FOR ENTRY OR ADVICE | | | | |
| IN EMERGENCY | | | | |
| IN EMERGENCY | Safety Office | RL-113 | 619-2934 | CALL SECURITY AT 2267 |


FIRE
PUSH IN
THEN
PULL V DOWN


SterilGARD III
Advance


StentCARD III


SterilGARD III
Advance


Nonhuman Primate Necropsy Checklist
Animal #
Species/Sex
Accession#
Treatment:
Body Weight
Spleen Wt
Liver Wt
Pretest #
Necropsy Date
Challenge Day ____NA____
Weeden
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The Baker Company

# Conclusion

- In existing facilities, operations are largely dictated by current facility design
- Future facilities should be designed around anticipated operations
- Design flexibility into the facility to accommodated changing mission

# Acknowledgements

I thank the following individuals for their assistance with the illustrations in this presentation:

USAMRIID: K. Davis, M. Martinez, T. Larsen, D. Fritz, N. Twenhafel, P. Fogel, C. Rice, R. Linn, L. Hoffman, L. Ostby, L. Farinick, S. Ferendo

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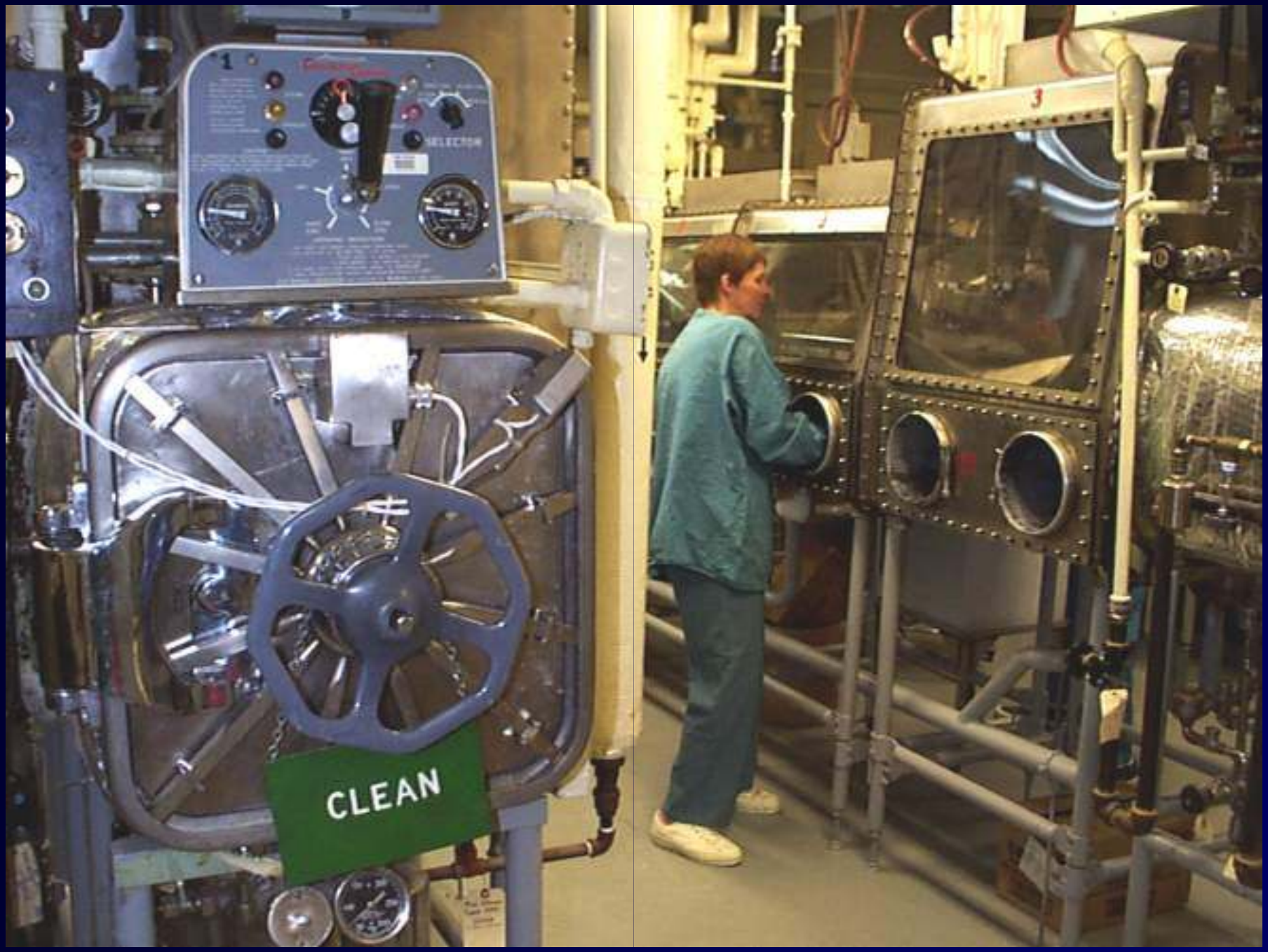
# Animal Biosafety Level 4 (ABSL-4)

- In an ABSL-4 cabinet laboratory, laboratory animals infected with BSL-4 agents are housed in Class III biosafety cabinet
- In a ABSL-4 suit laboratory, personnel wear one-piece, positive-pressure suits ventilated with a life-support system
- In a ABSL-4 suit laboratory, laboratory animals infected with BSL-4 agents should be housed in a partial containment system


CLEAN


L
M
S


Brain


G DOVER, INC.

# Necropsy Issue That Needs to Be Resolved

- The need, if any, for primary containment of the powered bone saw in ABSL-4 suit laboratory necropsy room
- The prosector and necropsy room assistant are protected by wearing positive-pressure, ventilated suits
- Potential contamination of necropsy room by powered saw-generated infectious aerosols
- Use Class I or II biosafety cabinets, clear plastic bags, HEPA-filtered vacuum or “elephant trunk” to contain aerosols?

**Katheryn Kenyon:**

Define PPE.

# Including Time- and Labor-saving Devices

- Increase efficiency, reduce worker fatigue, and time spent in a potentially contaminated environment
- Reduce repetitive motion injuries by ergonomic design
- Include automated processes in design (mechanical cage wash within containment; automatic drain flushing)
- Use engineering controls rather than PPE to reduce occupational exposure to allergens and pathogens
- Consider use of robotics in design

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