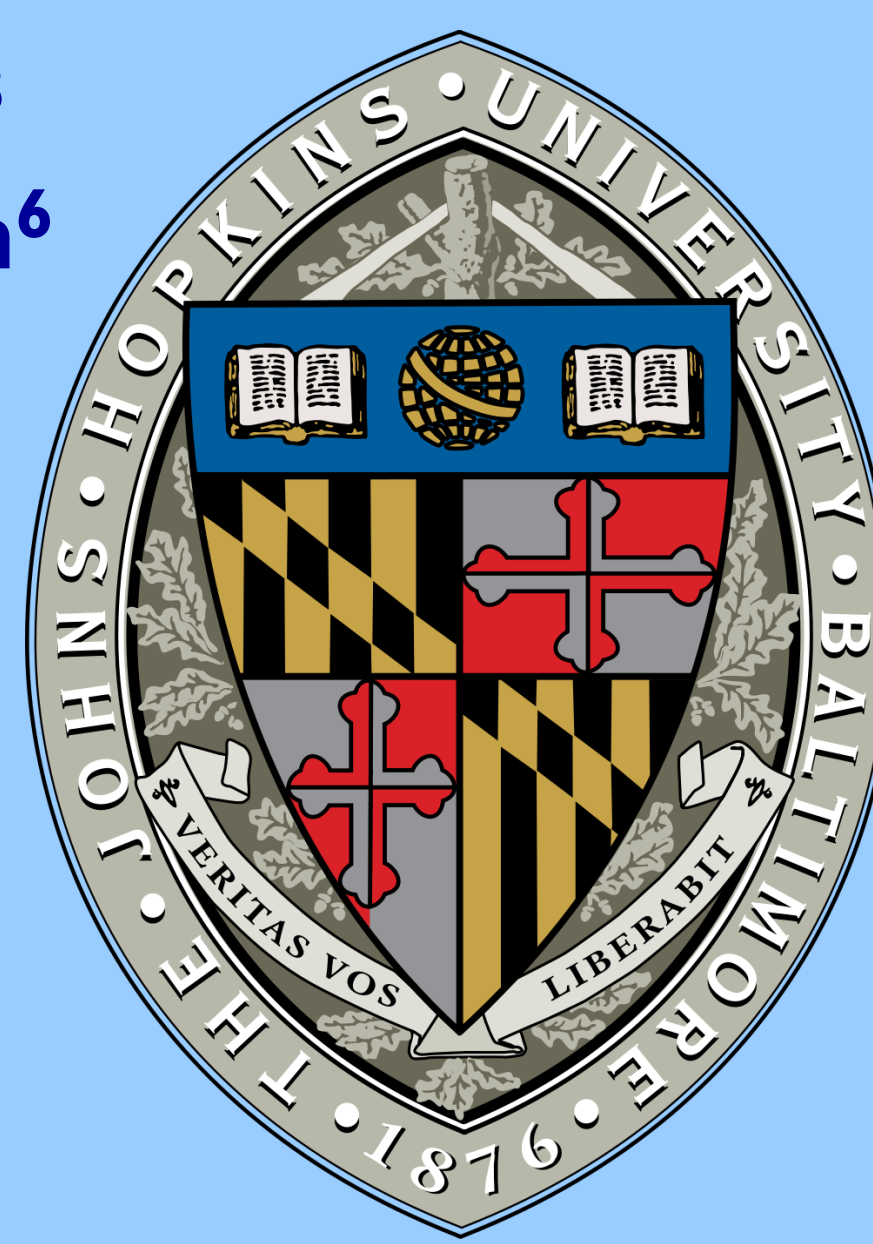


# Advancing the Mission of Infection Control on the Biocontainment Unit at the Johns Hopkins Hospital Through Research and Training

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## 3 Results

In advancing the mission of infection control on the biocontainment unit, there were four major categories of activity: Infection control training, multidisciplinary training and collaboration, PPE design and testing, and the built environment (Table 2).

### Infection Control Training

The JHH BCU has taken action in addressing the national statistics of hospital-acquired infections (HAIs).<sup>2</sup>

Using invisible gel, the Environmental Care (EVC) Department at JHH developed a hands-on training program that was conducted on the JHH BCU.

The EVC Department started a 100% EVC Cleaning Club for those who scored 100% on the training. Member of this club are rewarded monthly and serve as leaders for other EVC members.

### Multidisciplinary Training and Collaboration

The JHH BCU has been actively involved in multidisciplinary training and collaboration. Various professions across the hospital were carefully trained in PPE donning/doffing protocol (Table 1). Other essential trainings occur on the JHH BCU including interdisciplinary mock code simulations, annual reviews, and critical care nurse orientation training.

Profession	Number Trained
Respiratory Therapy	7
Laboratory Technician	8
X-Ray Technician	5
Physicians	42
Nurses	42

### PPE Design and Testing

In response to the Ebola virus disease outbreak, the team from John Hopkins University's Center for Bioengineering Innovation and Design (CBID) has worked to create new personal protective equipment (PPE) that is more protective, easier to use, and decreases the risk of contamination. The JHH BCU has been an integral part of the CBID PPE initiatives.

Observations of current PPE practices and protocols on the JHH BCU  
Feedback sessions of PPE designs  
Usability study

### The Built Environment

The combination of environmental infection-control strategies and engineering can prevent transmission and spread of infections.<sup>3</sup>

Bioquell room - This room allows for the testing of the Bioquell process, testing of equipment, water and air testing, testing of different disinfectants, and other unique studies  
Video communication system  
Supplemental heating and cooling systems  
Addition of chlorine dioxide levels in water to eliminate infectious organisms  
Integrated architectural floor plan with air pressure monitoring systems  
Training of facilities maintenance repair staff

### Results Summary:

Areas of research and training of the biocontainment unit	Major activities
Infection control training	Training of the Environmental Care Department (EVC) staff using invisible gel and a black light.
Multidisciplinary training and collaboration	Training of different hospital professionals in safe and effective PPE protocols. The JHH BCU is also a site of training sessions for other disciplines.
PPE design and testing	New PPE design in response to Ebola virus disease (EVD). Tested design and usability of the PPE.
The built environment	Testing and development of new technologies, systems, and training protocol. Also provides a controlled area for research studies.

Table 2. Four major areas of training and research of the JHH BCU

## 4 Conclusions

- The Johns Hopkins Hospital biocontainment unit is one of a small number of stand-alone units in the country.
- The JHH BCU is dedicated to its mission of infection control and patient safety while also striving to act as a leader for both current and future biocontainment units.
- This project serves as an informative description of the activities of the JHH BCU while the unit is not activated for patient care. These activities help advance the mission of infection control through research and training.
- The importance of infection control training, multidisciplinary training and collaboration, PPE design and testing, and the built environment cannot be understated and the JHH BCU plays an integral role in these areas.



Figure 3. The JHH BCU autoclave.

## 5 Future Directions

The JHH BCU will continue to be engaged in various initiatives across disciplines, working with professionals across the hospital. Some discussed future directions are listed below:

- Future EVD PPE testing: protective ability, human factors testing, technical evaluations
- Further PPE protocol training, particularly as protocols, designs, and technologies are changed.

## 6 References

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Figure 1. Floor plan of the JHH biocontainment unit

## 1 Background

The Johns Hopkins Hospital (JHH) biocontainment unit (BCU) was first opened in May of 2014 in response to the Ebola virus disease (EVD) outbreak in 2014. The JHH BCU is one of ten Regional Treatment Centers in the United States.

When there is no patient on the JHH BCU, it is actively engaged in **advancing the mission of infection control through training and research**. This project aims to outline how this is accomplished.

### Facts about the JHH BCU

7,900 square foot unit<sup>1</sup>

Capacity to hold four patients at a time<sup>1</sup>

Since opening, the unit has been activated three times<sup>1</sup>

## 2 Methods

Methods of the project:

- Observe and participate the activities of the JHH BCU for 7 months.
- Engage in JHH BCU trainings and research.
- Meet with the various JHH BCU partners to discuss roles and projects in the JHH BCU.
- Write a manual discussing the alternative uses of the JHH BCU.

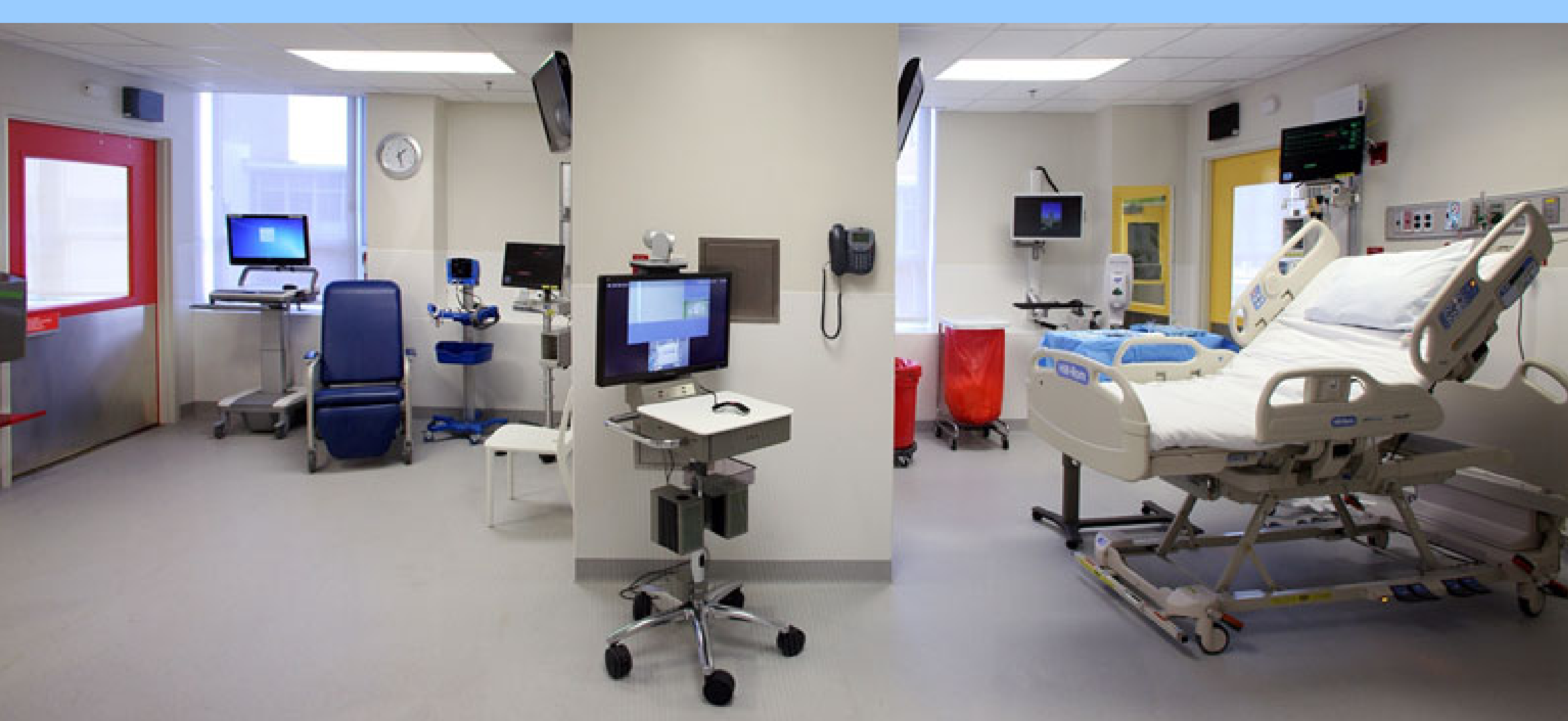


Figure . One of the rooms of the JHH biocontainment unit.