

Developing and implementing a personal protective equipment training programme for high consequence infectious disease preparedness

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Disclosure

- I have no actual or potential conflict of interest in relation to this presentation

Acknowledgements

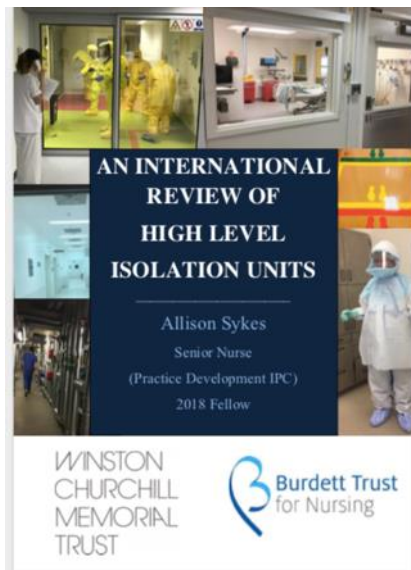
- Dr Mary Wyer, Westmead Institute for Medical Research and WSLHD
- State of Biopreparedness Committee, Westmead Hospital
- Infection Prevention and Control Team WH
- Westmead staff who trained in high-level PPE
- Professor Lyn Gilbert, University of Sydney

Background

- Using video-reflexive ethnography to improve PPE use
- Invited to use VRE in high-level PPE training
- IPC and educator expertise
- Developed a comprehensive training programme for high-level PPE
- Current roles are federal-funded positions for NSW biopreparedness

Key influential documents

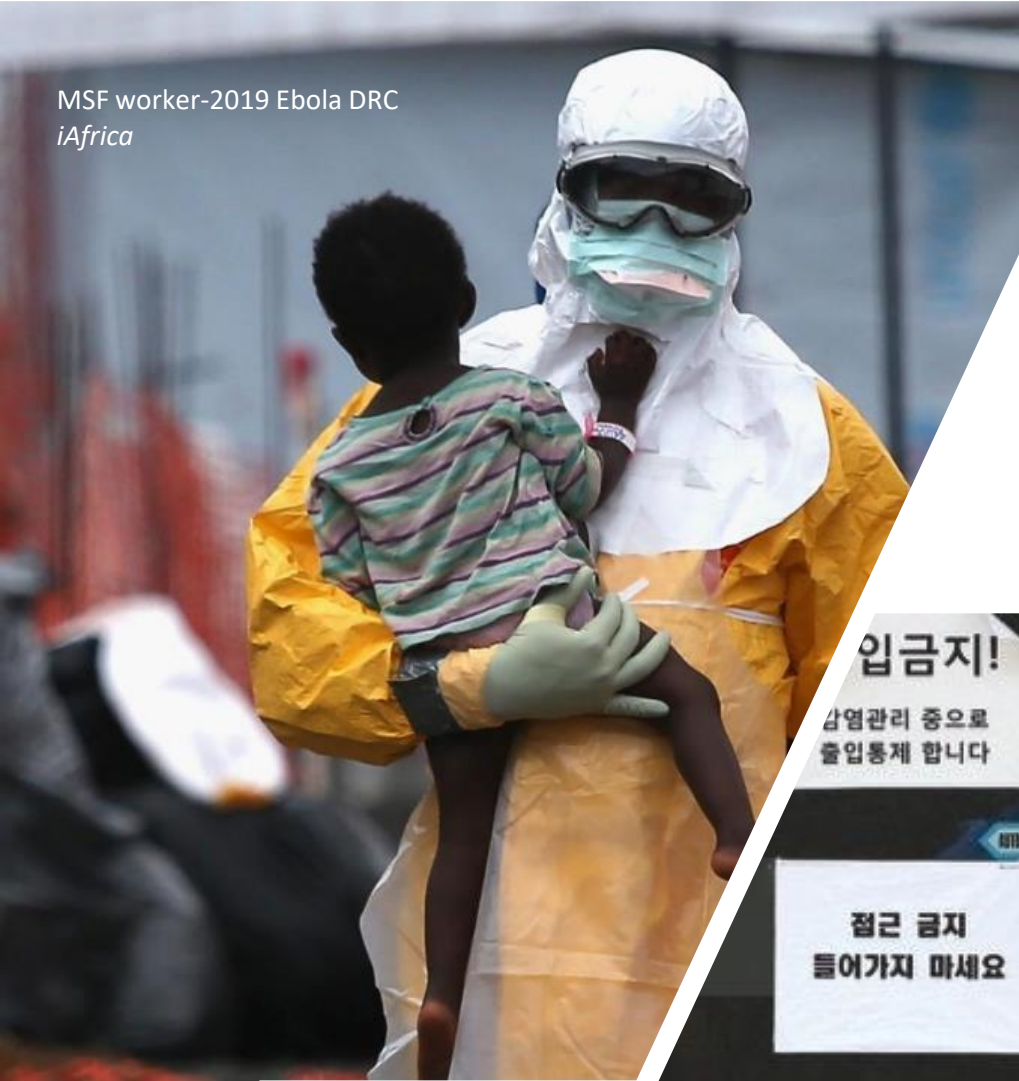
- Alison Sykes 2019: *An International Review of High Level Isolation Units*
- Alberta Health Services & University of Calgary 2015: *Human Factors Evaluation of Simulated Ebola Virus Disease Patient Scenarios: System Factors Associated with Donning and Doffing During Triage, Treatment and Transport*
- NETEC - The National Ebola Training and Education Center - <https://netec.org/>
- Numerous research articles related to safe doffing and PPE



Outline of presentation

- Introduction to HCID
- What we have done so far to prepare for HCID
 - Hierarchy of controls
 - Facility
 - Policy
 - PPE
- Developing and implementing the training programme

MSF worker-2019 Ebola DRC
iAfrica



South Korea - 2015 MERS outbreak
Korea Financial Times

High Consequence Infectious Diseases (HCID) ¹

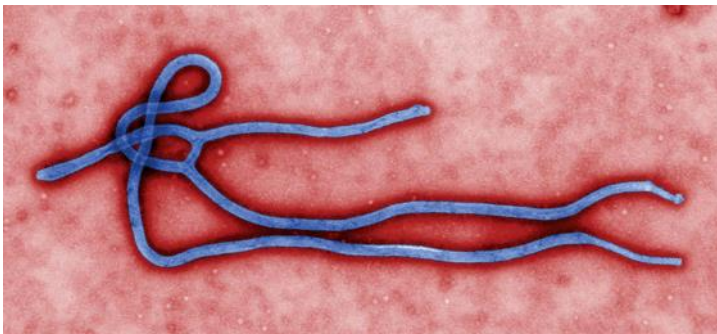
- Acute infectious disease
- Typically has a high case-fatality rate
- May not have effective prophylaxis or treatment
- Often difficult to recognise and detect rapidly
- Ability to spread in the community and within healthcare settings
- Requires an enhanced individual, population and system response to ensure it is managed effectively, efficiently and safely

¹ UK Government 2019

HCID

Contact transmission

- Viral Haemorrhagic Fevers
 - Ebola virus disease (EVD)
 - Lassa fever
 - Marburg virus disease (MVD)



Airborne transmission

- 2019-nCoV acute respiratory disease
- Avian influenza A
 - H5N1
 - Other novel human pathogenic influenza
- Severe acute respiratory syndrome (SARS)
- Middle East respiratory syndrome (MERS)
- Monkeypox

HCID threat

- *2014-2016: West Africa Ebola Zaire outbreak*
 - *28,616 people affected, 11,310 deaths*
- 2014: MERS outbreaks
 - Middle East but also S Korea
 - Hospital transmission
- 2018 – present: EVD Democratic Republic of the Congo
 - Public Health Emergency of International Concern (WHO 2019)
 - 3421 cases / 2242 deaths / 1154 survivors (as of 28/1/20)
- 2019 – present 2019-nCoV acute respiratory disease

Local HCID preparedness

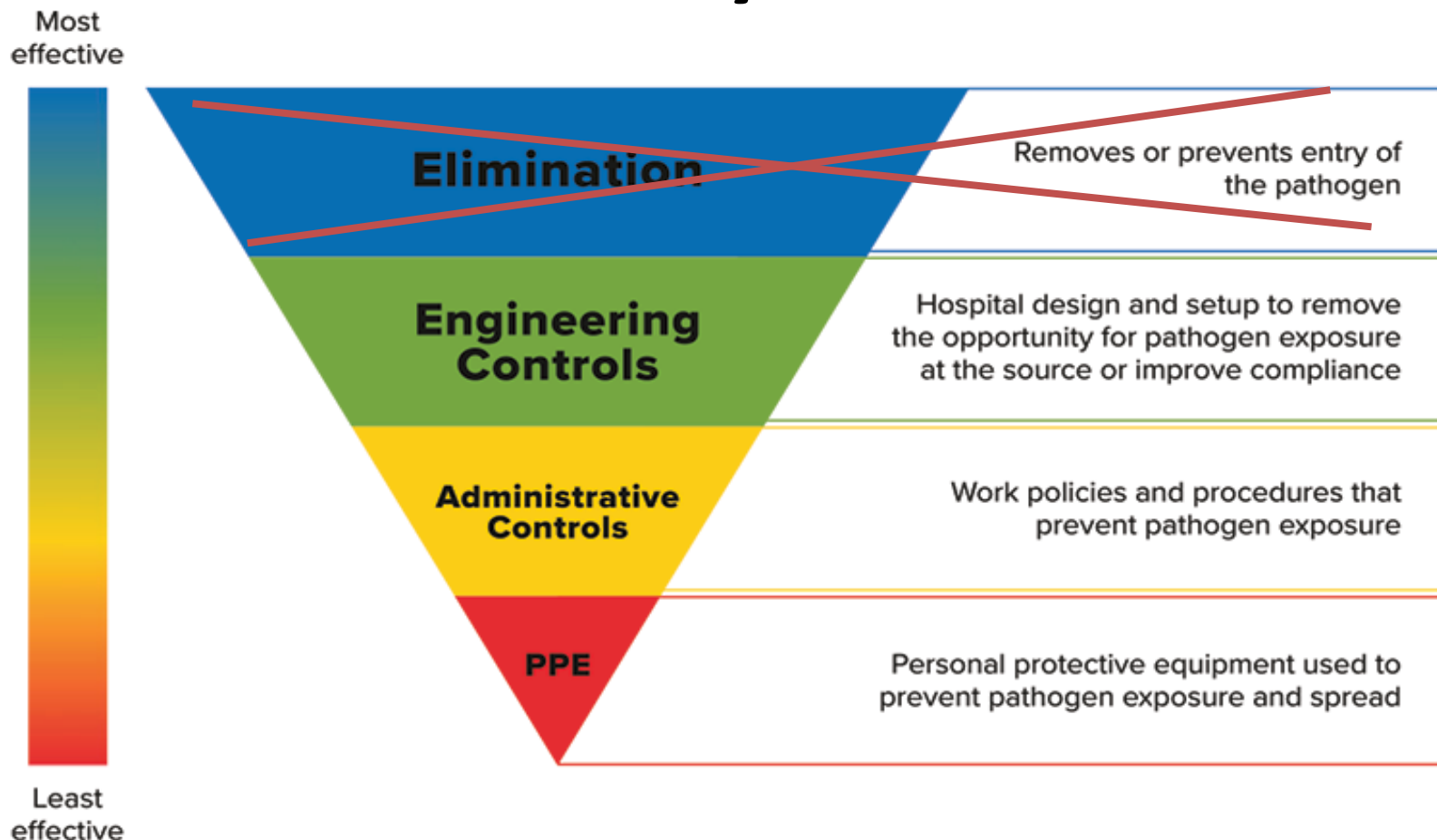
- Westmead Hospital in Sydney – state facility for NSW (adults)
- Isolation facilities - existing and new
- HCID policies and procedures
- PPE
- Staff training



Local HCID preparedness

- Build on work done in 2014-2015 and with SOB project team
- DRC outbreak renewed efforts to be prepared as the state facility
- Training programme linked to other HCID preparedness activities e.g. policies revised
- Appointment of small multi-disciplinary team

Preventing transmission – hierarchy of controls



Engineering controls

- Europe - high level isolation units
 - 4 in UK
- USA - biocontainment units
 - 10 regional
- Australia – infectious disease units / biocontainment units
 - 1 per state
- NZ – 1 purpose built

Trexler isolator – Royal Free Hospital, UK



Westmead engineering controls

- Current: 2 Q-class rooms for adults
 - Dedicated beds in the ICU
 - Anteroom, patient room with ensuite
 - Utility room A
 - Staff shower
 - Utility B for transfer of waste, blood samples etc.
- New: state of the art biocontainment unit
 - Paediatric and adult beds

Q-class rooms



Engineering controls

- Organisation of PPE supplies in donning area
- Build upon existing dirty and clean zones
- Tape on floor for doffing
- Minimal equipment/supplies in room
 - Checklist with photos
- Signage
- Hands free ABHR dispenser
- Cuff first gloves dispenser

I64 BINS

(used for patients with high-consequence infectious diseases)

RED labelled I64 Bins **MUST NOT** leave the Q-Class rooms without being double bagged in hazardous waste bags



High Consequence Infectious Diseases | Westmead Hospital | September 2019

Administrative controls

- Operational procedures to prevent/minimise exposure
 - Buddy system
 - Change in practice to minimise entries
 - ↓ number of people exposed
 - ↓ doffing risks
 - Clinical interventions – radiology, IV, dialysis
 - Waste
 - Environmental cleaning
- Training
 - Donning and doffing PPE
 - Procedures

Operational procedures – doing the job

- The safety of staff **MUST** take precedence over patient safety
 - **BUT**, the patient is a person
- Confidence in PPE protection
- Understanding transmission routes
- Adapting IPC principles to the physical space
- Using a Buddy



Buddy responsibilities

- Being vigilant in spotting defects or breaches in PPE while HCWs are in the patient room
- Observing HCWs for heat stress or fatigue related to PPE
- Monitoring compliance with PPE protocols
- Guiding, correcting, and assisting during donning and doffing
- Adhering to the **Call / Do / Respond** method
- Warning HCWs of potential risky actions (e.g., touching face)
- Being informative, supportive and well-paced in issuing instructions or advice
- Protecting themselves through proper PPE use during doffing
- Anticipating and planning for risks

Specific procedures

- Cleaning up a blood or body fluid spillage
- Phlebotomy and preparing the samples for transport to the laboratory
- Transferring waste bags from the dirty zones
- Procedure for changing outer gloves



Training

Train specifically for knowledge and skills relating to:

- **Self-awareness** of habitual behaviours and the importance of minimizing them
- **Hazard identification**, awareness of where contamination may occur and knowledge of how to respond appropriately should contamination occur.
- **Familiarity with PPE**, specifically how it will affect HCW mobility and dexterity, as well as how their body reacts to heat stress.
- **Procedural competency**, repetitive training including appropriate technique for the motions associated with doffing PPE and checklist use.
- **Buddy roles** that support HCW including the management of PPE breaches, minimising the spread of contamination, and avoiding high risk behaviours.

Personal Protective Equipment

- PPE based models of delivery
 - Different PPE ensembles
 - No global consensus on individual PPE items
- PPE is unfamiliar and constraining
- High probability of error when doffing – self contamination



PPE checklists

- Checklists used for both donning and doffing
 - Used video reflexivity to improve checklists and doffing procedures
 - Learn from healthcare workers
- Buddy system used (trained observer)
 - Consider a third person if resources allow
- **CALL, DO, RESPOND** method
 - Physically tick the check list
 - Include regular reassurance (doffing)
- Minimise steps that require the Buddy to touch the HCW when doffing

Selection of PPE

- Availability – currently / in global emergency
- Gowns versus coveralls with mask or PAPR
- Adequate coverage
- Protection for mucous membranes
- Ability to move and work in PPE
- Ease in doffing – minimises breaches
- Staff acceptance

PERSONAL PROTECTIVE EQUIPMENT

1. Hospital scrubs	2. Non-slip socks
	
3. Rubber clogs	4. Booties
	
5. N95/P2 mask	6. Hood
	
7. Inner gloves	8. Gown
	
9. Face shield	10. Outer gloves
	

Gowns & Coveralls

Gown

- Surgical gown
 - knitted cuffs
 - wrap around (coverage)
- AAMI 4 level - whole gown
- Weight - comfort
- Length
- Fit & sizing
- Neck fastening (doffing)

Coverall

- Protection level
- ? Hood or no hood
- Integral finger loops (middle finger)
- No integral feet (trip hazard)
- Covered zipper
- Zipper cord

Additional plastic apron or gown?

Gloves

- Different colours for inner and outer
- Long cuffs e.g. chemotherapy gloves
- Thickness – dexterity
- 2 pairs or 3 pairs
- Taping of gloves
 - ease of removing tape – no scissors
 - longitudinal or circumference
 - risk of tearing gown
- Glove dispenser – cuff first



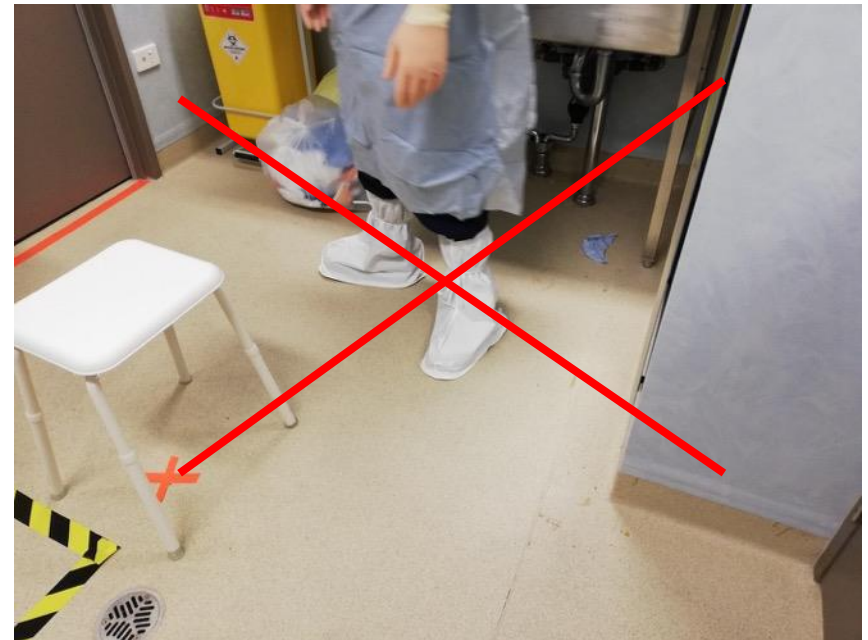
Face and head cover

- Mask over or under hood
- Goggles and/or face visor
- Hood with shroud
 - Material
 - Fit
 - Availability
- PAPR
 - Availability of suitable hood
 - Motor outside or concealed
- Disposable versus reusable



Foot coverings

- Plastic shoes
 - Colour coded for size
 - Easily disinfected
- Booties
 - Long enough with gown
 - Non-slip sole
 - Ties versus elastic
 - 2 sizes



Note: The booties are the trickiest item to remove

Other PPE items

- Scrubs – disposable scrubs were transparent
- Sports bands for personal glasses
- Non-slip socks
- Hair ties and clips
- Anti-fog spray
- Tape
- Permanent marker



Training programme

- Aims and learning outcomes
 - To equip participants with the ability to understand and demonstrate safe donning and doffing of high-level PPE
 - To give clinicians the experience of performing common procedures while wearing full PPE
 - To understand the role of the Buddy
- Use of WSLHD lesson plans
- Incorporate video-reflexive ethnography as a learning tool

Video reflexive ethnography

- Video clinicians working in and doffing PPE
- Show the footage to them individually or in groups for reflexive discussion
- Makes explicit the complex reality of high-level PPE
- Assists clinicians make sense of their own PPE practices and contexts – self-awareness
- Leads to improvements in individual behaviour and procedures



Planning

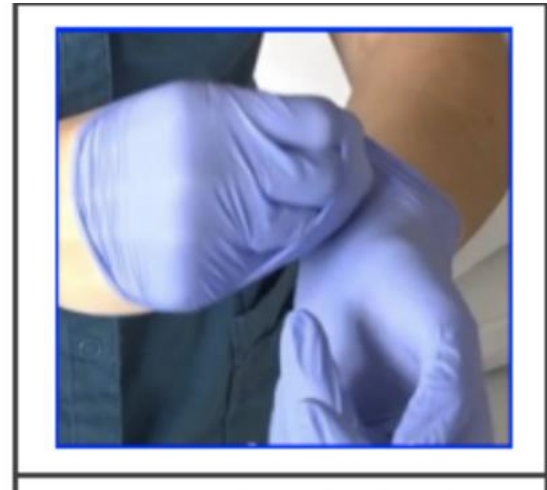
- Attendees
 - Emergency Department
 - Infectious Diseases
 - Critical Care
 - Public Health
 - IPC
- Content:
 - Theory
 - Classroom
 - Simulation
 - Debrief
- Numbers limited by:
 - Space for demo and practical component in classroom
 - Opportunities in Q-class rooms
 - Expert feedback



Planning (cont.)

- Training time:
 - Pre-training - watch video for safe glove removal methods
 - 8 hours initial training day
 - 4 hours credentialing session
 - 1 hour 3-month refresher
- Admin
 - Training day preparations
 - Data entry – PPE sizes, credentialing etc

Beak method of glove removal

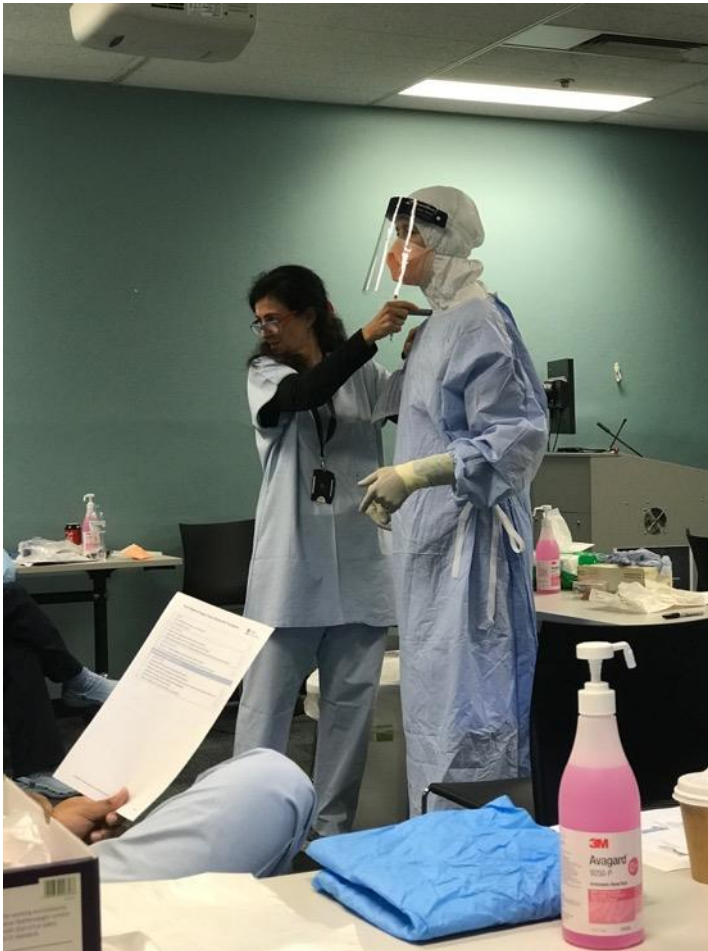


8-hour day - morning

- PPT intro – 1hr
- PPE sizing and collection of items & brief tour of Q-class rooms
- Demonstration of donning and doffing PPE then practice
- Videos of procedures

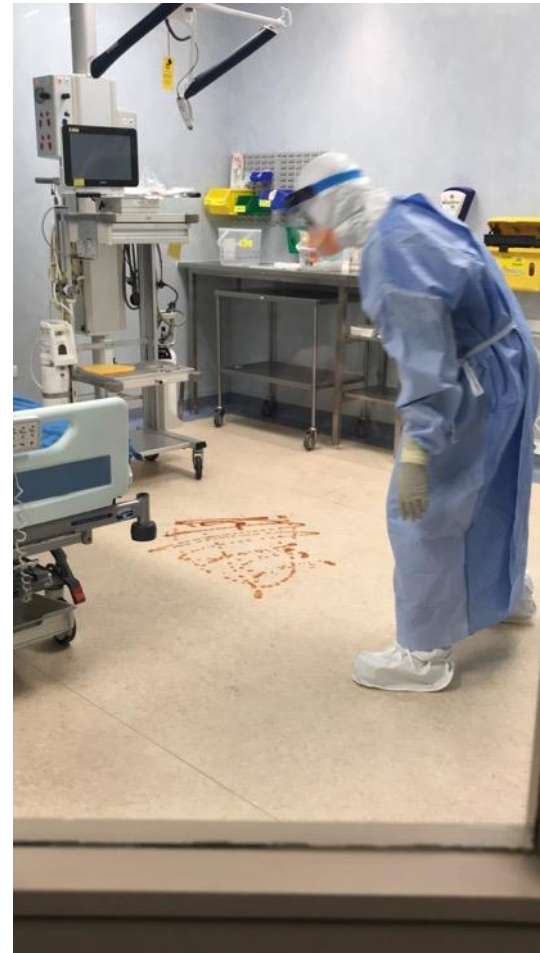


Classroom demo and practice



8-hour day - afternoon

- Practice donning and doffing in real space
- Practice being a Buddy
- Practice undertaking procedures in PPE
- Debrief
- Evaluation



4 hours for credentialing

- Requires 5 practices
 - 1 counted from 8-hour day
- Don and doff 4 times
 - Assessed on final
 - Re-use gown, hood, visor and booties
- Maximum 4 people
 - 2 persons per session per Q-class room
 - 2 assessors (experts)
- Competency tool based on state but revised in-house
- Include research follow up



Refresher training

- 3 month in normal time
 - More frequently if alert locally/nationally
- Don and doff x 1
- Act as doffing Buddy
- Ideally 2 persons
- In real space
- Incorporate other procedures if time allows
- Minimum 1 hour



Summary

- >50 people have now completed the initial training, credentialing and 3-month refresher
- Resource intensive – time!
- Benefit by having a dedicated space always available
- Inclusion of research useful and clinician opinion critical to confidence of staff in using PPE

Conclusion

- Preparation for HCID is important for public health and protection
- Training in routine and high level safe donning and doffing PPE is an essential component of preparedness
- Planning should allow for resources and sustainability

A bit of fun – a pandemic limerick

- There was an infectious disease
- Which brought the whole world to its knees
- When they sneezed and they coughed
- We donned and we doffed
- And survived with barely a sneeze



February 27, 2020	<u>ANTIBIOTIC STEWARDSHIP IN NURSING HOMES</u> Speaker: Prof. Patricia Stone , Columbia University, School of Nursing <i>(European Teleclass)</i>
March 3, 2020	<u>THE EFFICACY OF INFECTION PREVENTION AND CONTROL COMMITTEES IN AFRICAN SETTINGS</u> Speaker: Eltony Mugomeri , Africa University, Zimbabwe <i>(FREE Teleclass)</i>
March 12, 2020	<u>THE BUZZ AROUND MOSQUITOES AND MOSQUITO-BORNE DISEASES</u> Speaker: Dr. Marcia Anderson , Environmental Protection Agency
March 19, 2020	<u>INFECTION PREVENTION AND CONTROL IN HOME CARE AND HOSPICE: COMMON COMPLIANCE ISSUES</u> Speaker: Mary McGoldrick , Home Health Systems, Inc.
April 16, 2020	<u>WATERBORNE PATHOGENS: WHY IS THEIR PROFILE CHANGING?</u> Speaker: Prof. Syed A Sattar , Centre for Research on Environmental Microbiology, Canada <i>(South Pacific Teleclass)</i>
April 29, 2020	<u>SHARPES INJURIES – WHY AREN'T WE AT ZERO?</u> Speaker: Terry Grimmond , Grimmond and Associates, New Zealand <u>BEYOND HIGH-TOUCH SURFACES: PORTABLE EQUIPMENT, FLOORS AND</u>

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