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Published in:
The Australian Hospital Healthcare Bulletin

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Recommended citation(APA):
Murphy, C. (2017). How ready are you for mandatory respiratory protection? *The Australian Hospital Healthcare Bulletin*, (WINTER), 60-61. <https://www.hospitalhealth.com.au/content/clinical-services/article/how-ready-are-you-for-mandatory-respiratory-protection--742570454#axzz5RQShb4j4>

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How Ready Is Your Organisation For The Next Major Outbreak of Serious Infectious Disease That Requires Mandatory Respiratory Protection?

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Experts recognise that infectious diseases can be spread through droplets, respiratory aerosols, or direct and indirect contact with contaminated surfaces. Some however, suggest that pathogen transmission is actually much more complex than the current paradigm upon which personal protective equipment (PPE) selection is based.¹ The 2003 global epidemic of Severe Acute Respiratory Syndrome (SARS) highlighted the lack of competence and excess of confusion among healthcare workers (HCWs) in regard to selection, application, safe use and disposal of PPE.² So too did the 2014 Ebola outbreak.¹ Both epidemics lead experts to question the mode(s) of transmission of the respective diseases. Experts now debate which combinations or specific pieces of PPE are critical to prevention of occupational transmission.

Despite more than a decade between the two pandemics reports published subsequent to the 2014 West African Ebola outbreak suggest that many HCWs, including those from countries such as the United States where systems of infection prevention and control are assumed to be robust, were unable to either appropriately select, access or use respiratory PPE³. In fairness to these HCWs it is worth noting that even the world's two most powerful and respected public health agencies contradicted each other in their PPE advice for Ebola prevention.

The World Health Organisation (WHO) recommended and continues to recommend use of medical masks for all tasks other than aerosol-generating procedures. For aerosol-generating procedures WHO recommends N95 or equivalent respirators. WHO's recommendation was consistent with the US-based Centers for Disease Control and Prevention's (CDC) initial advice. However, in October 2014 following transmission of Ebola among nurses based in the US, CDC upgraded their recommendation to routine use of N95 or equivalent respirators. For aerosol-generating procedures CDC recommends either a powered air purifying respirators (PAPR) or disposable, NIOSH-certified N95 respirator. One advantage of PAPRs with a full-face covering and head-shroud is that they make accidental self-contamination during care more difficult. Some speculate that HCW transmissions are often the result of accidental self-contamination.

In 2015 MacIntyre and colleagues drew attention to HCW misuse of PPE suggesting that despite PPE the numerous HCWs who contracted Ebola did so through respiratory transmission.⁴ Edmond and colleagues added to this theory by highlighting the need for extensive PPE practice to enable HCWs to gain proficiency and precision with PPE.³ MacIntyre also reminds us of the discomfort, restriction and fatigue that often accompanies extensive use of PPE.⁴ Her reminder suggests that along with PPE proficiency and precision HCWs must also practice PPE perseverance. This is especially important when caring for a patient with Ebola where some episodes of direct care can involve several consecutive hours of direct contact. The current Australian Infection Prevention and Control Principles and Recommendations for Ebola Virus Disease which can be accessed at <http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-ebola-Information-for-Health-Professionals> acknowledge and accommodate HCW discomfort associated with prolonged use of PPE by suggesting PAPRs as a replacement for P2 mask, goggles or face shield, and a head cover. They describe them as being more comfortable due to their constant supply of fresh, cool air to the HCW's face.

Concerned by the ambiguity, vagary and contradiction of existing global infection prevention and control advice for respiratory protection when caring for an Ebola patient in late 2016 I conducted a

global survey of HCWs to better understand their behaviours and motivations around respiratory protection particularly PAPRs. This brief Report describes that process, its major findings and some of the recommendations it produced.

PAFTEC, an Australian-based manufacturer of respiratory protection commissioned the survey but had limited input to its design and no access to individual responses. Respondents were invited to complete the 15-item, web-based survey which was accessible through Survey Monkey. Invitations were issued to 286 Australian College of Infection Prevention and Control (ACIPC) members who had opted to share their email details with attendees of the 2016 ACIPC Conference. An identical invitation was also emailed to 100 US-based infection control professionals belonging to an informal virtual network of Corporate Infection Prevention Directors. An additional invitation and link to the survey was posted on Infection Control Plus' Facebook page. All invitation recipients were encouraged to share the link to peers and colleagues. Data was collected for six weeks up until the 31st January 2017.

The total number of respondents was 35 and their respective bases were Australia (48.6%), USA (28.6%), New Zealand (17.1%) and one each from Canada and the Netherlands. Almost all (91.4%) of respondents reported being responsible for or part of the team directly responsible for their organisation's infection control and prevention program. Only 5.7% of respondents were frontline care providers.

The most commonly reported piece of respiratory protection used for patients under airborne precautions was disposable P2/ N95 or equivalent masks which were used in the hospitals of 91% of respondents. The next most common was reusable PAPRs which were used in more than a quarter (26.5%) of respondents' hospitals.

Respondents gave a variety of reasons for not routinely using PAPRS when caring for patients under airborne precaution isolation. The three most frequently cited reasons were PAPRs not being available, PAPRS being too expensive and PAPRs requiring disinfection after each use. Almost a quarter of respondents found PAPRs too difficult to don and doff and just under ten percent believed PAPRs to be more dangerous than a disposable mask.

Respondents reported similar rates of specific respiratory protection use by disease when performing an airborne generating procedure on a patient as they did when providing routine care ie. non-airborne generating procedure.

When questioned about their preference to wear a PAPR when providing routine care to or in direct contact with a patient isolated under Airborne Precautions and known or suspected to be infected with Ebola, MERS, Tuberculosis, Varicella or Measles almost all (93%) preferred a PAPR for an Ebola patients and the majority (79%) preferred a PAPR for a MERS patient. Fewer than 20% preferred a PAPR for Tuberculosis (17.9%), Varicella (14.3%) or Measles (14.3%).

Almost all (97.1%) respondents indicated that a PAPR designed to be lightweight and comfortable would influence their decision to routinely use a PAPR for Airborne Precautions care.

Nearly all respondents (94.1%) had worn an N95/ P2 or equivalent single use mask to provide direct care to a patient being isolated under airborne precautions. In contrast, just over a ¼ (26.5%) had worn a PAPR to provide direct care to a patient being isolated under airborne precautions.

The major limitation of these findings is that the usable sample size is likely too small to draw any reliable or valid conclusions. It also limits the ability to generalise the findings beyond the sample group. It is also a concern that nearly ¾ of the respondents had never worn a PAPR while providing

direct care to a patient isolated under airborne precautions as their perceptions of PAPR comfort, weight, design, battery life, ease of use, application and removal may not reality based.

The variability in responses regarding disease-specific PAPR use is unsurprising given the ambiguity and difference in national and even international guidelines and the lack of rigorous science comparing in vivo PAPR and N95/P2 mask efficiency in prevention of infectious disease transmission.

The similarity between responses for PAPR use in both routine care and that involving aerosol generation is surprising given the well accepted notion that aerosol-generation increases the likelihood of respiratory disease transmission to healthcare workers. It is prudent to think about how the respondents' lack of real-world PAPR use may have biased this set of responses

Whilst the small number of respondents limit the usefulness of this survey's findings it does highlight room for improvement in HCW preparedness for the next, likely inevitable, outbreak of serious infectious disease spread by respiratory transmission. Proper preparation must include PPE proficiency, precision and practice. This includes HCWs being familiar with and having easy access to the safest level of respiratory protection possible and in a size and fit sufficient to give them total protection over several consecutive hours of continual wear. Our results suggest that for care of an Ebola patient almost all HCWs believe that it is a PAPR rather than any other form of respiratory PPE which offers that safest level of protection. We look forward to a time soon when global recommendations align with each other and reflect the wishes of HCWs to be afforded the best and safest degree of protection. Only then will organisations truly be ready for the next major outbreak of serious infectious respiratory disease.

Conflict of Interest

Associate Professor Cathryn Murphy is a casual consultant to medical industry and device manufacturers including PAFTEC. The findings and conclusions in this presentation are solely those of the author and her information resources and do not represent the views, position nor the policy of any organisation except as may be specifically noted.

References

1. MacIntyre CR, Chughtai AA. Facemasks for the prevention of infection in healthcare and community settings. *BMJ*. 2015;350:h694.
2. Murphy C. The 2003 SARS outbreak: global challenges and innovative infection control measures. *Online J Issues Nurs*. 2006;11(1):6.
3. Edmond MB, Diekema DJ, Perencevich EN. Ebola Virus Disease and the Need for New Personal Protective Equipment. *JAMA*. 2014;312(23):2495-2496.
4. MacIntyre CR, Chughtai AA, Seale H, Richards GA, Davidson PM. Uncertainty, risk analysis and change for Ebola personal protective equipment guidelines. *International Journal of Nursing Studies*. 2015;52(5):899-903.