

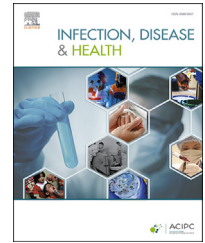


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Research paper

# Education and training in infection prevention and control: Exploring support for national standards

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## KEYWORDS

Personal protective equipment;  
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**Abstract** *Background:* Effective infection prevention and control (IPC) programmes comprise a hierarchy of preventive measures, one of which is appropriate use of personal protective equipment (PPE). A poor understanding of the role of PPE and sub-optimal use may fail to prevent or even increase pathogen transmission during routine care or an infectious disease outbreak. Variability in delivery and content of IPC and PPE education and training across organisations can lead to confusion, unsafe practice, and lack of confidence among clinicians. In a national survey we explored the perspectives of Australian and New Zealand IPC professionals on the value and feasibility of a national IPC training and monitoring programme to improve and standardise PPE practice and raise the profile of IPC.

*Methods:* A population-based online survey that examined hospital PPE training programmes was distributed to members of three major Australasian organisations representing IPC professionals. Quantitative results of the survey have been reported previously. This paper is a qualitative analysis of responses to two open-ended questions about a national approach to training in IPC and the use of PPE.

*Results:* Most respondents agreed that standardising IPC and PPE training could achieve more consistent practice nationally, supported through the provision of educational resources. Including competency in the use of PPE in mandatory IPC standards would assist in improving the practice and raising the profile of IPC more generally.

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*Conclusion:* The results of this study suggest that there is support for national programmes and standards for use of PPE in Australia and New Zealand.

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### Highlights

- There is strong support, among IPC experts, for a national PPE programme.
  - Standardised PPE training can address national inconsistency and confusion in PPE use.
  - Education and training resources would be useful.
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## Introduction

Strategies to protect patients and clinicians from healthcare-associated infections (HAIs) involve a hierarchy of controls, of which the use of personal protective equipment (PPE), in isolation, is one of the least effective [1] and, although important, is often sub-optimal in some healthcare settings [2–4]. The COVID-19 pandemic, like previous infectious disease emergencies [5], has exposed deficiencies in clinicians' knowledge and understanding of IPC and raised concerns about their preparedness to respond [6,7]. Global, national and local variations in the use of PPE, in the context of COVID-19, have caused confusion and anxiety and led to clinical craft groups developing their own guidelines and training programmes [8,9].

In Australia and New Zealand, education and training in PPE use is mandated by workplace health and safety legislation [10,11] and hospital accreditation standards [12,13] but, there is no requirement to monitor compliance. A more comprehensive approach to IPC training and performance monitoring is needed. However, a "one-size-fits-all" approach will be unsuitable for some organisations [14] or exceed IPC resource capacity [15], especially in Australasia, where IPC is often a relatively low priority for clinical and organisational leaders [15–17]. Targeted IPC professional development/leadership programmes are more likely to achieve the goals of a national IPC training programme. Promoting IPC within an organisation and engaging clinicians at all levels in IPC 'ownership' would help to position IPC clearly within the framework of patient and occupational safety [18].

The frequency and content of PPE education and monitoring in Australasian hospitals vary [19]; standardisation would improve staff and patient safety. There is limited published research or information, on the perspectives of IPC professionals about nationally consistent IPC/PPE training and standardisation programmes.

This paper presents an analysis of responses to open-ended questions and free comments from a survey on PPE training programmes within healthcare facilities in Australasia [19]. These questions aimed to seek participants' views about possible nationally consistent PPE training and standards, and the profile of IPC, to inform future stakeholder consultations on national IPC standards in healthcare.

## Methods

### Study design, participants and recruitment

A cross-sectional, population-based, on-line survey of members of three Australasian IPC professional societies and colleges was undertaken over an eight-week period from August to October 2019. These organisations were the Australasian College of Infection Prevention and Control (ACIPC - 1143 members), the New Zealand Infection Prevention and Control Nurses College (IPCNC NZNO - 630 members), and the Healthcare Infection Control Special Interest Group (HICSIG - 250 members) of the Australasian Society for Infectious Diseases. An unknown number of individuals are members of more than one of these organisations.

### Study instrument

The survey tool has been previously described in detail [19]; it comprised four sections. Section 1 gathered data about respondents' roles in, and characteristics of, the facility/organisation in which they worked. Sections 2 and 3 included detailed questions about training for routine and high-level PPE. Section 4 comprised two open-ended questions and an 'Other Comments' field:

1. "What are your thoughts about whether a national programme or national standards for training in the use of PPE would be feasible? If yes, what form might it take?"
2. "Do you think the profile of IPC in general needs to be raised and if so, have you any suggestions as to how this can happen at a national level?"

### Data collection

Study data were collected via an anonymous, online survey and managed using REDCap™ electronic data capture tools hosted at University of Sydney [20]. Invitations to participate were distributed by each society or college to its own members via organisational websites, members' discussion forums, social media pages and Presidents'/Chairpersons' e-newsletters. Only those respondents who indicated they were employed in an active IPC role in a healthcare facility were invited to participate.

## Data analysis

Content analysis was used to evaluate responses to the two open-ended questions and related content from the 'other comments' box. A code framework was devised, and codes were assigned to the comments using NVivo© (QSR International Pty Ltd) software.

## Ethics

The project was approved by the University of Sydney Human Research Ethics Committee (2019/614). The survey was accepted for dissemination by the three professional organisations after review by their research committees. Individual informed consent was inferred by participants' completing and submitting the survey.

## Results

Data from Sections 1 and 4 of the survey, along with the 'other comments' box is reported below. Results from Sections 2 and 3 have been previously reported [19].

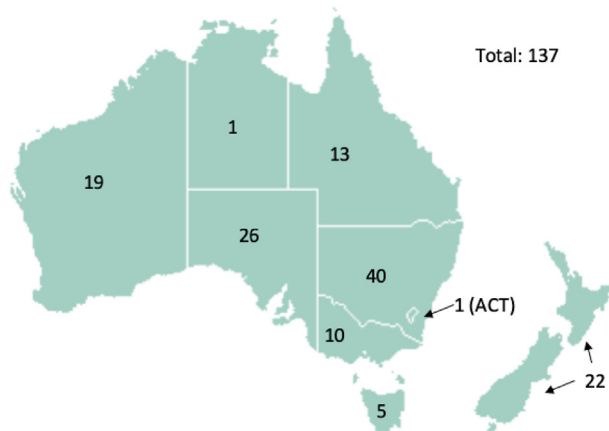
### Section 1. Respondents and facilities

The geographic distribution of 137 survey respondents and the facilities they identified with are shown in Fig. 1.

Respondents had worked in IPC for an average of 8.5 (range 0.5–43) years. Seventy-seven (56%) reported working in a public hospital, 36 (26%) in a private hospital and 24 (18%) mixed public/private or non-inpatient facilities/services.

### Section 4. Open-ended questions and 'other comments'

There were 107 and 96 responses, respectively, to the two open-ended questions which ranged from one to three lines each. Twenty-two additional related comments were



**Figure 1** Geographical distribution of 137 survey respondents in Australia and New Zealand.

identified from the 'other comments' box. The themes arising from this qualitative data are summarised below. (Refer Supplementary file for examples of responses).

1. Would a national programme or standards for training in the use of PPE be feasible and what form would it take?

The majority (90%) of respondents were strongly in favour of a national PPE training programme and/or standards. Several commented that a national programme was particularly important to ensure the country's preparedness for an infectious disease threat. Content analysis of respondents' statements identified the following common themes.

#### Consistency and standardisation

Respondents stated that differences in PPE practice were encountered among staff who are transient or who have worked in other healthcare facilities or states. Many welcomed a national PPE training programme, which would provide consistency and standardisation of PPE protocols and practices across Australia. In New Zealand, where no national IPC guidelines currently exist, respondents felt that national standards would be beneficial and practical.

Several respondents gave specific examples of PPE protocols where consistency would be desirable at a national level, e.g., hand hygiene and appropriate gloves use; PPE requirements for symptomatic patients with respiratory virus disease. Others commented on the benefits of a standard PPE approach across all sectors, including rural health, private and public. Four respondents pointed out that variability in the availability and use of PPE items are challenges to standardisation that would need to be resolved.

#### The delivery and content of a national programme

Most respondents included suggestions about how such a programme could be delivered. A few referred to the national hand hygiene and aseptic technique programmes as suitable models, with several suggestions for train-the-trainer programmes. Ten respondents commented that PPE training should be mandatory and incorporate regular practical or online assessment e.g. annually.

The most common mode of delivery suggested (26 responses) was online learning using interactive videos and assessments. However, there was also strong support for workshops, face-to-face or classroom learning, where attendees had the opportunity to practice donning and doffing PPE. Several suggestions were made for virtual reality and simulation, especially in the context of training with high-level PPE. A combination of on-line and practical learning was commonly favoured.

Respondents indicated that a national programme should provide standardised, user-friendly, downloadable and nationally branded resources and tools including videos, interactive on-line modules or games, PowerPoint presentations, webinars, and promotional materials. Several respondents suggested specific content that might be included e.g. clarification about PPE for visitors, or examples of appropriate PPE for performing specific clinical and non-clinical tasks. One respondent suggested that

additional modules for high consequence diseases, such as viral haemorrhagic fevers, might be useful for departments such as Intensive Care or Emergency.

### Governance

Several responses suggested that a national PPE training programme would signal the importance of IPC at organisational level, although mandatory training would require support from senior management. Standardised PPE training and auditing was identified as a quality improvement measure, which would be supported through a national monitoring programme; one respondent indicated that their facility had already identified a lack of PPE training as an organisational risk.

Respondents in both countries proposed strengthening the requirements for PPE training within their respective IPC safety and quality standards, i.e. Standard 3 of the National Safety and Quality Health Service (NSQHS) Standards in Australia and NZS 8134.3:2008 Health and Disability Services (infection Prevention and Control) Standards in New Zealand. There were also suggestions that national Colleges be asked to support the programme. Another approach suggested, was for PPE competency to be legislated as a work health and safety requirement.

### Barriers

A number of barriers to introducing a national programme were identified, including the national cost of producing and administering the programme. Local implementation costs, particularly of human resources, would be more easily met by larger organisations:

Several respondents identified that the time required for training - whether online or in person - would be a barrier for clinicians, in the current climate when they are required to complete multiple mandatory healthcare training courses.

2. Do you think the profile of IPC in general needs to be raised and if so, have you any suggestions as to how this can happen at a national level?

The second question explored participants' views on the profile of IPC in general and how it could be raised, if that was thought to be necessary. 90% of 96 respondents believed that the IPC profile needed improvement at local and national levels. Common themes were:

### Perception of the IPC role

Some respondents perceived that other clinical staff often under-valued their role as IPC professionals, either by not appreciating its scope and breadth or diminishing its importance. This narrow perspective can be exacerbated by the media, which often portray IPC activity as limited to outbreaks or multidrug resistant pathogens. Several responses referred to negative perceptions of the IPC role, such as 'boring', 'giving orders' or 'being the bearer of bad news'. Suggestions to overcome this included closer collaboration with other medical and nursing specialities and marketing of IPC as a positive problem-solving activity. Other participants proposed that a culture change in

healthcare was required so that all staff take responsibility for IPC.

### Local profile

There were mixed responses about the local IPC profile. Seven respondents stated that their local IPC profile was good; they suggested that availability, visibility, post graduate qualifications and working closely with IPC link staff helped them gain respect and executive support. Others found it challenging to engage staff or do their job adequately due to lack of IPC staff. A few respondents believed that they were only supported by executive management when things were going wrong; one suggested that revising reporting lines for local IPC teams would address this.

### Raising the national profile

Many responses indicated that more work was needed to raise the profile of IPC at national level, although a few commented that it was improving through measures such as implementation of national accreditation Standard 3 in Australia, informative documentaries on multidrug resistance with key microbiologists and national surveillance reporting. In New Zealand several respondents believed that strengthening the national IPC standards would improve the profile. Several respondents recommended promoting awareness of IPC in the community to encourage the general public to take more responsibility for infection prevention. Suggestions included campaigns on social media, TV, radio and the press; recruiting GPs to promote IPC with patients; more IPC education in schools; and visual exposure in healthcare settings for patients and staff.

A number of respondents proposed better IPC training and education for all clinicians, in undergraduate curricula and professional development, would raise awareness of IPC. Other respondents argued that the IPC profile would only be improved if more full-time equivalent (FTE) resources were provided, including in rural and community healthcare, either locally or through state or federal funding. Several responses called for a written national standard for the required ratio of IPC professional FTEs to bed numbers.

Ensuring that IPC specialists sit on relevant national committees and working parties was deemed important to increase the national profile of IPC. Nine responses commented that the IPC profile is raised only during a pandemic emergency or outbreak, such as SARS or measles, although by then it may be too late if IPC teams are under-resourced.

## Discussion

The qualitative data from this study provides an insight into the perspectives of Australasian IPC professionals on a possible national PPE training programme and standards and the current profile of IPC. The lack of IPC resources was perceived as a barrier to an effective PPE training programme; several respondents called for a national statement on IPC FTE requirements to support the

profession. Previous Australasian research has highlighted inadequate IPC resourcing in some organisations, whilst acknowledging difficulties in determining appropriate FTE for all healthcare facilities [15], because of differences in case mix and IPC roles and qualifications. The profile and influences of IPC would be increased by requiring additional training and appointment of appropriately credentialed IPC professionals.

This study was performed before the COVID-19 pandemic began. Even then, the absence of standardised PPE training was recognised as a threat to bio-preparedness. Our experience has been that the COVID-19 pandemic - like previous infectious disease emergencies [21,22] – has exacerbated uncertainty and lack of confidence in the use of PPE, especially masks and respirators [23], among clinicians. COVID-19 has also provoked discussion about possible occupational health and safety legislation around technical aspects of PPE training, such as fit-testing of particulate filter (e.g. N95) respirators [23]. If enacted, such a requirement would be a minor component of an effective national IPC/PPE training, which would need to provide an understanding of, for example, context-specific risk assessment, the role, limitations and appropriate choice of PPE, as well as technical aspects of its use.

Arguably the Australian National Hand Hygiene Initiative (NHHI) and the inclusion of hand hygiene monitoring in hospital accreditation standards has ensured standardisation and its place in organisational quality and safety programmes [24]. Many respondents indicated they would like to see a comparable national programme for PPE training and compliance incorporated into national IPC standards, which would also serve to raise the profile of IPC. Alternatively, the NHHI model could be adapted to a more comprehensive IPC training program. It would require assessment methods that could be applied to IPC compliance more broadly and take account of criticisms of hand hygiene compliance monitoring [25]. Jeanes et al. [26] have proposed an innovative approach to monitoring several aspects of IPC using an audit tool for isolation practices in a single room, which could be applicable in Australasia.

The authors recognise several limitations with the study. Our conclusions cannot be applied to residential or community healthcare settings, due to low number of responses from these healthcare sectors.

## Conclusions

This study identifies strong support from IPC professionals for a national programme and/or standard for PPE training. The study findings can help to inform further discussion about any proposed national standards for training and auditing PPE within healthcare facilities in Australia and New Zealand.

## Ethics

Ethical approval was granted by the University of Sydney Human Research Ethics Committee (2019/614).

## Authorship statement

RB: Conceptualization, Methodology, Formal Analysis, Investigation, Writing - Original Draft, Review and Editing, Visualization. Project Management.

GLG: Conceptualization, Writing - Review & Editing, Supervision, Funding acquisition. Both authors approved the final version of the manuscript.

## Conflict of interest

GLG is a member of the International Editorial Board of *Infection, Disease and Health* but had no role in peer review or editorial decision-making of the manuscript. The authors declare no other conflict of interest.

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## Provenance and peer review

Not commissioned; externally peer reviewed.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.idh.2020.12.002>.

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