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A qualitative exploration of infection prevention and control guidance for Australian paramedics

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Research

A qualitative exploration of infection prevention and control guidance for Australian paramedics

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Abstract

Introduction

The paramedic work setting in Australia presents challenges for applying recommended infection prevention and control (IPC) practices. Our study had two aims: to describe the guidance provided across a range of documents used by Australian ambulance services; and to explore the views of health experts regarding the adequacy of guidance on IPC practices for Australian paramedics.

Methods

Content analysis was used to evaluate the degree of alignment between IPC operating procedures from four state ambulance services and the IPC guidelines issued by the National Health and Medical Research Council (NHMRC) in 2010. Semi-structured interviews were conducted to explore perspectives of 14 experts about IPC practices among paramedics and IPC guidance provided to them.

Results

While the ambulance operating procedures aligned well with the NHMRC IPC guidelines, we identified differences in the nature of advice provided that could lead to differing practices by paramedics across Australia. Experts identified several domains of IPC practices by paramedics that would benefit from closer scrutiny and/or more specific guidance, including hand and environmental hygiene, governance and surveillance, environmental challenges, vehicle design, cultural barriers and communication with state health regulators.

Conclusion

Our study has further highlighted unique challenges faced by paramedics in adhering to recommended IPC practices while providing healthcare in the mobile primary emergency environment. Two recommendations arise from our research. First, there is a need to adapt the current national risk-based framework for IPC in Australia to paramedicine. Second, that targeted research into staff compliance is required to identify the key barriers and enablers to the uptake of IPC practices in paramedicine.

Keywords:

infection prevention and control, allied health, paramedicine

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Introduction

Paramedics provide healthcare with limited resources in a work setting that has been described as both dangerous and stressful, and where the episodes of healthcare are unpredictable in time, nature and place (1,2). In Australia, the range and classification of paramedic roles has expanded significantly over the past two decades (3,4), with their scope of practice now including invasive medical procedures such as venepuncture, intravenous and intraosseous needle placement, needle thoracotomy, intubation, open fracture reduction, haemorrhage control and suturing (5,6). The performance of these procedures across the range of community settings encountered in paramedic practice presents challenges for the successful implementation of recommended infection prevention and control practices (7).

While the transmission of pathogens has been extensively researched in hospital and community settings, relatively little is known about the pre-hospital setting in which paramedics work. Reports suggest that paramedics have a limited understanding of infectious diseases (8-11) and may demonstrate poor compliance with IPC protocols when caring for patients (10-15). This is highlighted by a recent government report of a paramedic in Queensland who was infectious with measles and attended four hospitals and a wide range of public locations while on duty (16). Infection prevention and control is crucial for reducing healthcare acquired infections (HAIs) that have substantial physical, mental and economic implications (17). Patients with an HAI will most likely stay in hospital longer, lose some quality of life and be at greater risk of dying from an infection (18). Following discharge from acute services, these patients may suffer residual morbidity and are likely to use healthcare resources more intensively and incur out-of-pocket expenses (18). As up to 70% of HAIs are preventable (19,20), these burdens can be reduced.

In Australia, the National Health and Medical Research Council (NHMRC) provides extensive health advice and resources for local governments and health professionals. In 2010, the NHMRC released the Australian Guidelines for the Prevention and Control of Infection in Healthcare (17). This document adopted a risk-based approach and replaced the now rescinded Department of Health and Ageing Infection Control Guidelines for the Prevention of Transmission of Infectious Diseases in the Health Care Setting. In 2012, the now mandatory, National Safety and Quality Health Service (NSQHS) Standards were released by the Australian Commission on Safety and Quality in Health Care (21). These documents provide a basis for individual health disciplines to establish IPC protocols that are specific to their healthcare setting, such as in dentistry (22) and medicine (23). This has not been undertaken on a national scale for paramedicine; instead, individual ambulance services have assumed the responsibility of developing their own operating procedures for their workers.

Our study had two aims. First, to describe the guidance provided across a range of documents used by Australian ambulance services. Second, to explore the views of experts from a range of professional healthcare settings across Australia regarding the adequacy of current IPC guidance provided to paramedics.

Methods

The methods of data collection and analysis utilised in this study were directed by the two aims. For the first aim, the Australian members of the Council of Ambulance Authorities (CAA) – consisting of eight ambulance services – were invited to provide an electronic copy of their operating procedures (eg. guides, manuals, policy documents) that informed the recommended IPC practices for paramedics working under their jurisdiction. Content analysis based on dichotomous or presence-absence coding (24) was used to evaluate the degree of alignment of the ambulance operating procedures to the NHMRC 2010 guidelines. Documents were imported into NVivo Version 10 (QSR International) for analysis. A set of a priori codes were selected from the keywords and terms found on the contents pages of the NHMRC 2010 guidelines, specifically within Part B1 and Part B2, to serve as initial anchors within the data (24). This provided a broad base of issues around which to compare to documents. Inductive codes (25) were added as new themes emerged during data analysis.

For the second aim, semi-structured interviews were conducted to explore the views of experts about the IPC practices of Australian paramedics and the adequacy of the IPC operating procedures provided by ambulance services. Purposive sampling (26) was used to select individuals who had significant involvement with the development of relevant IPC operating procedures. The first experts invited to participate were prominent members of Australian professional associations for IPC. Thereafter, a snowball referral method (25) was used to recruit experts from academia, various levels of government and private consultants.

Semi-structured interviews were selected to develop in-depth accounts and perceptions of experts on a range of topics developed post a literature review and conducting the content analysis of operating procedures provided by ambulance services. The four major topics used to structure the interview were:

1. the scope and adequacy of the key documents that underpin IPC practices for paramedics in Australia
2. how the IPC practices of paramedics may differ from those within the hospital environment
3. hand and environmental hygiene practices in the primary-emergency healthcare setting, and
4. the adequacy of processes for the notification of paramedics who had been exposed unknowingly to patients with communicable diseases.

The semi-structured nature of the interviews enabled the interviewer to adapt, modify and add to the planned themes in response to the interview conversation (27). One-hour telephone or in-person interviews were conducted until no new information was gained (26,27). All interviews were recorded, transcribed verbatim and checked for accuracy before being imported into NVivo Version 10 (QSR International). Each interview was individually coded using both the a priori and inductive codes and then coded text was compared for points of consistency through an interactive process of describing, classifying and connecting information (24-26,28). The process described by Tashakkori and Teddlie (24) of grouping codes based on similarities to each other into concepts, and then concepts based on similarities with each other into themes was followed.

Ethics

Ethical clearance was obtained for the study from the University of the Sunshine Coast Human Research and Ethics Committee (S/10/252).

Results

Content analysis of ambulance IPC operating procedures

Four state ambulance services agreed to provide us with electronic copies of their IPC operating procedures. Content analysis indicated that substantial sections of these documents were consistent with the advice provided in the NHMRC 2010 guidelines, including the recommended practices to be undertaken following blood and body fluid exposure, and the management of body fluid spills. However, differences were identified between the nature of the advice provided in the ambulance operating procedures and NHMRC 2010 guidelines for both standard and transmission-based precautions, and organisational support. Key selections of these differences are provided in Table 1. There were also differences in how the information was presented in the operating procedures. For instance, they varied in length (28 to 50 pages), breadth of topics covered, and level of detail provided. The language used to indicate modality or obligation for compliance also differed, specifically in the use of modal verbs such as may, must and should.

Semi-structured interviews with health experts

Ten male and four female health experts were recruited to participate in an interview. The participants included senior ambulance managers (n=5; R1, R5, R6, R7, R8), public health specialists (n=3; R2, R3, R12), infection control practitioners (n=4; R4, R10, R13, R14) and university academics (n=2; R9, R11).

All experts agreed that there are numerous challenges for IPC during the provision of paramedic led healthcare in Australia. Four main themes emerged:

1. challenges of the paramedic work environment
2. factors influencing IPC practices in the paramedic work setting
3. the need for the development of national guidelines for IPC in paramedicine, and
4. barriers and enablers to improving IPC practices among paramedics.

Each of these themes has been highlighted in Table 2 and will now be dealt with in turn, noting where there was consensus and where views differed between experts. Selected quotes are included to illuminate key points.

The experts recognised that 'In the case of paramedics, they are dealing with situations which are not predicted, in most cases' (R9) and they work in a '...relatively hostile environment... the moving ambulance... the maintenance and handling of sharps, not having running water... there are obviously significant differences between the hospital and the pre-hospital environment' (R5). The experts described patient transport vehicles (eg. ambulances, rescue helicopters) as sophisticated healthcare platforms that are reliant on portable medical equipment and which can be difficult to clean. Several experts noted that the short turnaround times between cases due to operational pressures and design features of transport vehicles and patient care equipment impacted on the rigor of cleaning. One expert commented 'We've built these vehicles that are designed for the task of responding to calls and transporting patients, but not necessarily in being able to be cleaned appropriately or disinfected appropriately' (R11). Table 2 provides further examples identified by the experts of vehicle design issues that impact on IPC practices among paramedics.

Not all experts agreed about the suitability of recommended IPC practices for the paramedic work environment. On one hand, the senior ambulance managers and a public health specialist asserted that the recommended IPC practices in other healthcare areas should apply to paramedics regardless of the difficulties faced by them in their workplace.

'So what's the purpose of saying you're different? Is it that you don't have to practice the same high standards of infection control? Or is it a suggestion that you need ways of dealing with those special circumstances?' also 'you don't want to make life difficult but you have to be careful people don't use difference to excuse themselves from infection control...' (R1).

Table 1. Selected areas of discrepancy between the nature of the advice provided in the state ambulance IPC operating procedures when compared to the NHMRC 2010 guidelines for both standard and transmission-based precautions, and organisational support

Standard and transmission-based precautions

Hand hygiene:

Description of activities that cause hand contamination

- Level of emphasis placed on the importance for hand hygiene and hand care during operational work
- Indication for when and how to perform hand hygiene
- Gloving practices
- Recommendations for fingernail length and the wearing of artificial nails, jewellery such as wedding and other rings, and accessories such as watches and wrist bands

Environmental hygiene:

- Indications and rationale for when to perform environmental hygiene
- Types of chemicals recommended for different cleaning activities
- Routine and deep cleaning procedures for:
 - non-disposable portable essential clinical items (eg. stethoscopes, computers and extrication equipment)
 - ambulance interior surfaces, wall fittings and stretchers
 - maintenance of general cleaning equipment following cleaning activities
- Description of the contents of the spills kit carried in ambulances
- Handling and transport of contaminated linen

Aseptic non-touch technique (ANTT):

- Limited advice was provided about:
 - key components of ANTT for standard clinical procedures
 - ANTT for more complex clinical procedures, such as intravenous cannulation and treatment and dressing of large, deep open wounds

Organisational support

Governance and surveillance:

- Limited advice was available on:
 - infections that may spread among patients and healthcare workers
 - specific microorganisms
 - auditing against a defined standard
 - measuring adverse events, such as the detection of drug resistant microorganisms
- Limited advice was provided on reporting mechanisms for critical incident reviews

Facility design

- Limited advice was available about:
 - vehicle design, including materials for interior surfaces
 - maintenance of recirculating air-conditioning systems
 - storage of portable equipment, medical devices and general consumables to avoid cross-contamination

Staff health and safety

- Limited advice was available for:
 - overall screening of the health status of paramedic staff
 - minimum periods of exclusion for paramedic staff with an infectious disease
 - additional IPC precautions for staff who are pregnant or immunocompromised
 - immunisation guidelines and protocols

Table 2. Themes and examples arising from the semi-structured interviews with 14 health experts about IPC practices by Australian paramedics, and the IPC guidance that they are provided

Themes	Examples
Challenges of the paramedic work environment	<ul style="list-style-type: none"> • Unpredictability of the types of clinical cases • Often operating in a hostile work environment • Lack of running water to perform correct IPC practices • Possible pathogen contamination from dirty linen transport in ambulances • Operational pressures impacting on appropriate environmental cleaning
Factors influencing IPC practices in the paramedic work setting	<p>Hand hygiene:</p> <ul style="list-style-type: none"> • Unable to perform correct hand hygiene in some difficult clinical cases • Overuse of gloves, thereby affecting correct hand hygiene <p>Environmental hygiene:</p> <ul style="list-style-type: none"> • Varying cleaning standards among paramedic staff • Difficulties in the management of clinical waste • Difficulties in the cleaning of portable medical equipment such as computers, cardiac monitors/defibrillators and stethoscopes • Difficulties in cleaning the materials used to house patient care equipment • Advice about and surveillance of home laundering of uniforms • Difficulty with cohorting patients in multi-stretcher vehicles <p>Design considerations for vehicles and patient care equipment:</p> <ul style="list-style-type: none"> • Operating in a confined space with recirculated air, particularly when transporting patients with respiratory conditions • Air conditioners with filters and UV lights to treat recirculated air, especially in the setting of droplet and aerosol transmission of pathogens due to extended periods of time involved with a patient in a closed environment • Difficulty in transporting contaminated equipment and linen safely • Contamination of mobile patient care equipment
The need for the development of national guidelines for IPC in paramedicine	<ul style="list-style-type: none"> • Importance of developing national accreditation standards for IPC in ambulance services • Consistency in advice is required across ambulance services in risk assessment and management practices, immunisation protocols for employees, and trigger points to remove a vehicle out of service due to contamination • Scarcity of IPC experts within ambulance services • Lack of documentation required to log the cleaning of stations, vehicles or equipment and auditing
Barriers and enablers to improving IPC practices among paramedics	<ul style="list-style-type: none"> • Accepted cultural norms and general apathy among paramedics that are lowering compliance with recommended IPC practices • Lack of reporting near misses and breaches of IPC practices • Difficulty in enforcing policy, governance and surveillance of IPC in a semi-autonomous workforce • Difficulty with conducting infield audits of IPC practices in paramedicine • Inadequate communication between government health departments and ambulance services on important policy areas, such as the lack of follow up for paramedics post contact with infectious patients • In field aide memoirs

Alternatively, other experts from a range of fields recognised that paramedics often faced difficult emergency situations that may preclude their compliance with recommended IPC practices.

‘... if this is an urgent, emergency type of situation in my mind you’re there to save the person’s life ...are we going to do the five moments? Well, no, you save his life by doing whatever you need to do as safely and as minimising and preventing infection as much as possible’ (R10).

The need to develop a national risk assessment framework for IPC that is tailored for paramedicine was voiced consistently by experts from different backgrounds, with two experts commenting that ‘...there needs to be some kind of perhaps standard set by a relevant body for the ambulance service based on the NHMRC guidelines’ (R3) and ‘...when we transitioned into the healthcare system... all of our policies and procedures started to look like policies and procedures from the hospitals and they didn’t apply. The environment is different so we have to look at things a little bit different’ (R11). Some experts called for infield tools outlining IPC practices for paramedics such as... ‘a quick ready-reckoner... what to do when they get told they’ve got someone with a disease. They have no idea what it is and [how] it’s transmitted – they just want to know what to do’ (R1).

Most of the experts identified the need for ambulance services to link with the Australian health system in a broader context in respect to better inclusion in healthcare debate, policy and operational considerations. According to one expert, this could be achieved through... ‘accreditation for ambulance that would involve infection control... we’d be one of the few of the only healthcare providers, who don’t require some sort of accreditation from a national body’ (R1).

The senior ambulance managers were concerned that other government health departments have an insufficient understanding of the role of paramedics. One commented ‘... around manual handling, infection control, other types of issues, they always forget ambulance. When I say forget I strongly emphasise forget... We’ve had pandemics, pandemic meetings, and they completely forgot about ambulance’ (R7). They highlighted the potential physical and psychological harm to operational staff when a disconnection from health department advice occurs. For example, ‘the [health department] have traced ...back from an infected child back through the parents, the family, the day care centre, the school, wherever it might be, very effectively... however, on a number of occasions, the ambulance simply has [been] forgotten, despite the fact that they were in the middle of the whole process, and they were with the child at the time it was probably highly communicable’ (R5). The managers emphasised that paramedics ‘feel like they have been neglected and put at risk. They feel like they have fallen

between the cracks of the health care system... there is no policy around this’ (R13).

The culture of paramedicine was identified by senior ambulance managers as one barrier to IPC compliance. For instance, ‘...there’s generally a fairly apathetic approach or belief perception out there with regards to infection control. I don’t think a lot of our staff see it as a major issue’ and ‘...it’s not just about knowledge, it’s also about compliance... there are people who don’t understand, and then there are those who, whilst they understand, don’t follow and comply with procedures and certain policy’ (R5). The managers suggested that non-compliance was particularly problematic with donning some forms of personal protective equipment (PPE) such as facemasks, and undertaking environmental hygiene tasks. One manager commented: ‘I asked them if they could find for me their infection control kit. The interesting thing for me was the officers on duty – and I suspect they were typical of the cross-section of officers – looked at one another, scratched their heads. Neither of them was sure where to find that kit within the car’ (R5).

Social identity was recognised by some of the experts as being another barrier to the application of appropriate IPC practices by some paramedics.

‘...I think we still have the macho, adrenalin junkie, tough guy persona worldwide. We haven’t shifted, I think, from the old days of lights and sirens, rapid response... there’s a lot of that ‘we’re different, we’re tougher’, we don’t need to do all of these things that the nurses do’ (R11).

Nonetheless, two experts noted a marked change in attitude towards IPC practices among paramedics working during a time of heightened risk perception associated with a pandemic:

‘When SARS hit, [ambulance service] had poor hand washing, poor PPE compliance, poor infection control practices, and they couldn’t understand why so many staff were getting sick and they were in the heart of the SARS... they then concentrated on hygiene, washing their hands. They concentrated on the application of the P2 mask, protective eyewear, gloves. They reinforced the order in which you apply it and then the order in which you remove it... they immediately, absolutely immediately had a reduction of sick staff and they knew right then and there what the critical issue was. It was PPE and hygiene’ (R7).

‘... the H1N1 [swine flu] has been a real bonus in terms of changing people’s – the general population, not just paramedics’ – attitudes to washing their hands and so, you know, if you go to most workplaces now there’s hand hygiene stuff everywhere’ (R6).

All experts agreed that if paramedics are well resourced and undertake appropriate IPC practices routinely, they should be well protected during any major disease outbreak.

'If we were doing everything in our infection control procedures extremely well, then the impact, I think, of even a major issue, like a pandemic, would be minimal' (R5).

Discussion

This exploration of both documented guidance and expert views around IPC has revealed important barriers to best practice in paramedicine. It also found that, while there were some views that were shared by all experts, there were also areas of dissent.

The most consistent finding was the expressed need to adapt the current national risk-based framework for IPC in Australia to paramedicine. The rationale for this rests primarily on the unique attributes of paramedic work that bring a distinct set of challenges. The experts agreed that the paramedic work environment was quite different to what other healthcare workers encounter. It can be hostile in nature and is certainly unpredictable with respect to caseload, type or place of event. In other words, paramedics deliver 'unscheduled healthcare'. Nonetheless, it was still argued by most experts that ambulance services have to maintain adequate IPC standards in accordance with the recommended IPC guidelines. What is less clear, and requires further research, is whether any deviation in recommended IPC practices by paramedics should be allowed during emergency cases. The views of some of the experts were in alignment with Hand Hygiene Australia's statement that in some emergencies, such as 'hospital codes' or resuscitation, hand hygiene may become secondary to other clinical practice (29).

The lack of a consistent approach among the Australian ambulance services with regard to operating procedures for IPC was evident. Unlike other healthcare areas in Australia (22,23) there hasn't been a national approach to the development of IPC policy in paramedicine. This may have led to the variations in IPC operating procedures between the ambulance services in both structure and content when describing standard and transmission-based precautions, and organisational support. This further suggests that divergence in IPC practices may occur among Australian paramedics operating in different ambulance jurisdictions, even though they encounter similar work environments and clinical cases.

The development of national guidelines for IPC in paramedicine that is underpinned by current national IPC risk-based frameworks and standards may provide efficiencies not only

for Australian ambulance services, but also for public safety agencies and providers in non-traditional areas such as non-government first responders and the remote industrial and mining sector. They would facilitate effective standards and protections for all Australian paramedics and patients treated by them, as well as achieving reductions in the incidence of HAI transmission attributed to paramedics. The guidelines may also assist the compliance and regulatory burdens for service providers with operations throughout Australia.

The National Health Service in the United Kingdom and the Association for Professionals in Infection Control and Epidemiology in the United States of America have both published national IPC guidelines for their respective emergency medical service workers (30,31), similar to what this study is recommending for Australian paramedicine. The experts interviewed in this study called for practical and innovative ways to present advice on IPC practices for paramedics in the field. They recommended ready-reckoners and aide memoirs in the form of windscreen stickers, and the use of smart technology applications.

National guidelines for IPC in paramedicine will need to recognise the idiosyncrasies of the paramedic work setting. While the challenging features of the paramedic work environment were clearly identified in this study, the full consequences of these challenges and how to deal with them is less clear and requires further research. For instance, portable medical equipment items that may be considered non-critical under the Spaulding classification system (32) in the traditional healthcare setting may present issues in the mobile primary-emergency setting where patients with non-intact skin are treated in quick succession or simultaneously with limited clinical equipment. Furthermore, specific IPC advice is needed for paramedics when they are required to administer healthcare to multiple trauma patients simultaneously.

The development of national IPC guidelines in paramedicine will also need to be aligned with state/territory health departments to maintain communication and integration. It is clear that paramedicine as a profession should be more actively involved in the Australian healthcare debate or policy considerations (33). The senior ambulance managers in this study spoke of the feeling of being neglected as an industry at an operational level. Symptomatic of the disconnection from health, the adverse consequences of 'falling through the cracks' was raised in which the notification of staff exposed to communicable diseases has not occurred. In order for ambulance services to become more prominent in the healthcare discussion, one approach may be to develop national accreditation standards similar to hospitals and day procedure services, which are accredited to the NSQHS Standards (34).

The CAA is the representative body for the principal statutory providers of ambulance services in Australia, New Zealand and Papua New Guinea. It is also the accrediting agency for university programs offering entry-to-practice paramedic degrees. The CAA has a 'Clinical Forum' whose agenda covers clinical practice, current clinical research projects and related matters, including recommended IPC practices (35). Therefore, the CAA is well positioned to conduct the harmonisation of IPC practices for Australian paramedics, and develop and implement national guidelines for IPC in paramedicine.

The impetus for the continued commitment of ambulance services to quality reform is to ensure better outcomes for patients and healthcare workers at all times, including during pandemics. Managing risk and risk perception is critical as a recent study predicted a high level of work absenteeism among Australian paramedics in the event of an influenza pandemic, thereby causing disruption to the ability of ambulance services to operate effectively (36). The experts in our study agreed that if paramedics are well informed, resourced and undertake appropriate IPC practices routinely, then they should be well protected during any major disease outbreak.

This study has highlighted that there are cultural issues acting as disincentives to appropriate IPC practices in paramedicine that require further investigation. Poor compliance where guidance policies exist has been demonstrated to be an issue both in Australia and internationally (14,15,37-45). Evidence from hospital post-acute care areas suggests that accepted cultural norms that lower compliance with recommended healthcare practices (46) can be improved over time through collaborative interventions between staff and management (15,47). Previous studies have suggested that it may be effective to use staff to champion causes and promote transformational change (14,46). Two of the experts in our study noted that compliance with recommended IPC practices improved during a pandemic, which suggests that an increased perception of the threat of a serious infectious agent could be an important factor that influences behaviour change. There are many health theories used to explain ways to modify human behaviour. It would be useful to investigate these issues further with well-established theoretical frameworks for promoting behaviour change such as social learning theory and planning frameworks such as the PRECEDE-PROCEED model (48,49). The lens of such theories may facilitate the development of appropriate intervention strategies to create champions to counter the current cultural issues at play and to promote best practice for IPC in paramedicine that would lead to better outcomes for patients.

Limitations

First, four of the ambulance services declined to provide IPC operating procedures, thereby limiting the generalisability of the results to some extent. Second, the method used to compare coverage of issues was limited to dichotomous coding for the presence and absence of content. Although this reductionist approach risks important aspects of context being neglected (24), contextualisation was maintained by the authors identifying the codes and coding in recognition of the nature of the non-numerical material. These two limitations mean that further research of IPC areas specifically developed by state ambulance services is required before contextualised guidelines for IPC in paramedicine can be developed.

Conclusion

Two broad recommendations arise from this research. First, that there is a need to adapt the current national risk-based framework for IPC in Australia to paramedicine. Second, that targeted research is required to identify the key barriers and enablers to effective IPC practices in paramedicine. An essential component of this research will be to explore the current IPC practices of Australian paramedics, particularly in the areas of hand and environmental hygiene, vehicle design, communication with health regulators and governance and surveillance.

This study has identified considerable differences in the IPC operating procedures provided by four Australian ambulance services to paramedic staff under their jurisdiction. However, what they do have in common is their recognition of some of the unique challenges that occur when delivering healthcare in the mobile primary-emergency environment. National IPC guidelines for paramedicine will not only recognise the complex and unscheduled nature of paramedic work, but will also build resilience within the workforce nationally and offer risk management strategies for both routine and emergency clinical cases. While the experts interviewed in this study supported the development of national IPC guidelines for paramedicine, they also recognised that compliance failures with the recommended IPC practices would continue to be a challenge. This is an area that needs to be explored further.

Conflict of interest

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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