

PREHOSPITAL CARE

The preparedness of emergency medical services against occupationally acquired communicable diseases in the prehospital environment in South Africa

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Background: Emergency medical care is performed in an uncontrolled environment and involves invasive procedures and life support measures. The performance of these duties places emergency care practitioners (ECPs) at risk of occupationally acquired injuries and communicable diseases. Although legislative guidelines exist for the protection of healthcare workers, little is known about the protective measures available for and utilised by ECPs in the pre-hospital environment in South Africa.

Objectives: To review the availability and implementation of emergency medical services (EMS)-specific infection control policies and standard operating procedures in the pre-hospital environment.

Methods: Interviews with key informants were used to collect data concerning policies on communicable diseases and infection control in the EMS, the operational aspects of these policies, and educational programmes on communicable diseases and infection control for ECPs.

Results: There is no national policy on communicable diseases and infection control in EMS. Only KwaZulu-Natal, Eastern Cape and Gauteng have EMS-specific standard operating procedures for communicable diseases and infection control. Formal education and in-service training is limited.

Conclusions: A national communicable disease and infection control policy specific to the EMS needs to be developed together with an accredited training module on communicable diseases and infection control for EMS in the pre-hospital environment.

The emergency care practitioner (ECP) provides the first link in the "chain of survival" of the critically ill or injured patient¹ by providing pre-hospital care. Pre-hospital care involves the resuscitation and stabilisation of patients, the prevention of further injuries and the transport of patients to hospital. This care is often delivered in an uncontrolled environment and involves time-sensitive, invasive procedures and life support measures that expose the ECP to physical, chemical, ergonomic, psychosocial and biological hazards during the course of their work.²

In addition to the above risks associated with the pre-hospital care and transport of patients, the HIV pandemic, tuberculosis, multi-drug resistant tuberculosis (MDR-TB) and the emergence of new pathogens (eg, severe acute respiratory syndrome (SARS) and avian influenza) expose the ECP to the additional risks of infectious and communicable diseases.³ This risk is particularly high in South Africa where HIV/AIDS, tuberculosis, malaria, hepatitis B, measles and diarrhoea are endemic. HIV and other infectious and parasitic diseases are significant contributors to the burden of disease and account for 40% of mortality.⁴

The National Health Act⁵ and the Occupational Health and Safety Act (OHSA)⁶ provide a general legislative and policy framework for the protection of healthcare service providers in South Africa. International and national policies and guidelines exist for preventing the transmission of infectious diseases in the healthcare setting.^{7–9} However, it is unclear to what extent these general policies have been translated into specific policies and programmes to particularly address the high risks facing emergency medical services (EMS) personnel.

The purpose of this study was to review the availability of EMS-specific infection control policies and standard operating procedures (SOPs) and the level of education and training of ECPs on communicable diseases and infection control.

METHODS

The study was conducted nationally in the public health sector in South Africa between January and June 2005, and utilised key informant interviews to describe the policies and programmes addressing communicable diseases and infection control for EMS in the pre-hospital environment. The national EMS and nine provincial EMS directorates participated in the study. In KwaZulu-Natal and Mpumalanga the EMS provincial director, chief medical officer and the EMS college principal participated in the interview, while in Gauteng the provincial director and chief medical officer were present. In Limpopo and Northern Cape, the EMS operational managers as well as the directors were interviewed. In Free State, North West, Western Cape and Eastern Cape only the provincial directors participated. The interviews were semi-structured (table 1) and conducted by the principal investigator. Informed consent was obtained prior to the interviews. All interviews were recorded using a tape recorder.

The information gathered was transcribed by an administrative assistant. A summary of the data was then compiled. The transcripts were explored for common themes and were coded for analysis. An official letter of permission for undertaking the study was received from the National Department of Health (NDOH). The study was approved by the Research and Bio-ethics Committee of the University of KwaZulu-Natal.

RESULTS

Although there is a general infection control policy for the prevention of transmission of infections in the healthcare

Abbreviations: EC, Eastern Cape; ECP, emergency care practitioner; EMS, emergency medical services; Gau, Gauteng; KZN, KwaZulu-Natal; NDOH, National Department of Health; OHSA, Occupational Health and Safety Act; SOPs, standard operating procedures

Table 1 Key questions used in the semi-structured interviews

- 1) Are you aware of any National Department of Health policy or regulations regarding prevention of contagious disease transmission in EMS work?
- 2) What percentage of these regulations have you implemented?
- 3) Have you developed a provincial policy on infection control specific to EMS?
- 4) Does your provincial EMS service provide personal protective equipment to protect active-duty personnel from contagious disease transmission? What types of PPE are provided? Is training provided on its use?
- 5) Does your province have a clearly prescribed procedure for post response decontamination of vehicles, disposal of linen and sharps containers?
- 6) How much of time is dedicated to infection control training in formal education for ECPs? Does your provincial EMS service provide in-service lectures, teaching active-duty personnel protection from contagious disease transmission?

setting, there is no EMS-specific national policy on communicable diseases and infection control in the pre-hospital environment in South Africa. A draft national policy document was circulated for comment in 2003, but no further action to implement this as a national policy was taken. KwaZulu-Natal (KZN), Gauteng (Gau) and Eastern Cape (EC) were the only provinces to have issued a document on infection control for EMS. However, a review of these documents revealed that they were SOPs rather than formal policy statements.

The current general national infection control policy for the prevention of transmission of infections in the healthcare setting has been developed by a team of academics under the auspices of the communicable diseases directorate of the NDOH and is based on the international guidelines of the Centers for Disease Control and Prevention in the USA.⁷⁻⁹ However, lack of adequate financial, personnel and equipment resources has hindered the implementation of the policy across all provinces.

Analysis of the availability, content and implementation of SOPs in the nine provincial EMS departments revealed that only three provinces, namely KZN, Gau and EC, have documented EMS-specific SOPs for communicable diseases and infection control. However, only the SOP in Gau has been revised and it was updated in 2003. The SOP in KZN was last updated in 1999. The SOPs in KZN, Gau and EC detail the exposure risks that EMS face with respect to communicable diseases, and describe disease-specific precautionary measures to be adopted. These are based on international guidelines.⁷⁻⁹ All other provinces utilise the general infection control SOPs for healthcare settings issued as circulars by the provincial health departments. Very little attention is paid to identifying and minimising risks to the ECP.

Personal protective equipment

The provision of standard precautionary measures was uneven across all provinces (table 2). Only six provinces provide all three forms of protective equipment (gloves, masks and eye protection). Northern Cape has still to acquire eye protectors for its personnel. Free State and Mpumulunga only provide

disposable latex gloves, although the managers in Mpumulunga indicated that eye protectors were on order.

Post-response decontamination procedures

Clearly marked bio-hazard sharps containers were available in all ambulances except in the Northern Cape and Mpumulunga. Currently, although the province is in the process of equipping all ambulances with sharps containers, only 50% of EMS vehicles in Mpumulunga actually have them. The Northern Cape department has still to acquire sharps containers and is awaiting finance for upgrading emergency vehicles. All provincial EMS have inter-departmental arrangements with hospitals for the disposal and replacement of sharps containers. Disposable linen bags for the storage of soiled linen are provided in all ambulances across all provinces. These bags are disposed of at designated hospitals where the linen is laundered. Most EMS services work on the principle of one clean sheet for every soiled sheet.

Although the number of ambulances available meant decontamination after each response was limited, detailed circulars describing various simple methods, frequency and indications for cleaning and decontamination of ambulances were available in the EC, KZN, Gau, North West and Western Cape (table 3).

Education and training

According to the provincial directors and the EMS college principals, only 1 week of the 12-month basic course is dedicated to the epidemiology of communicable diseases. Despite the national standardisation of training and protocols for EMS personnel by the Professional Board for Emergency Care Personnel, the college principals in Mpumulunga and KZN were of the view that very little of the curriculum is devoted to communicable diseases education and infection control training. Therefore, it is essential that continuous in-service training is provided to ECPs. However, there are no national guidelines on in-service training for ECPs specifically for communicable diseases and infection control, and the content of such training varies across the different provinces (table 4).

DISCUSSION

This study is the first national review of communicable diseases and infection control policy for EMS in the pre-hospital environment in South Africa. Although there are various general laws and regulations on communicable diseases and infection control in the healthcare setting, none directly address the high-risk EMS and pre-hospital environment. There are marked variations in the development, operationalisation and monitoring of SOPs for communicable diseases and infection control for ECPs across the nine provinces, with little time dedicated to communicable diseases and infection control training during the basic EMP course.

In 1994, health care in SA was "highly fragmented, biased towards curative care and the private sector, inefficient and inequitable".¹⁰ The newly elected democratic government faced the tremendous challenge of transforming an extremely uneven and unfair health care system. Key legislation was enacted and policies formulated to achieve a universal right of access to equitable health care for all sectors of the population in South

Table 2 Availability of personal protective equipment across the nine provinces

PPE	EC	FS	GP	KZN	LIMP	MP	NC	NW	WC	n (%)
Disposable gloves	✓	✓	✓	✓	✓	✓	✓	✓	✓	9 (100)
Face masks	✓	✓	✓	✓	✓	✓	✓	✓	✓	7 (78)
Eye protectors	✓	✓	✓	✓	✓	✓	✓	✓	✓	6 (67)

✓, present; EC, Eastern Cape; FS, Free State; GP, Gauteng; KZN, KwaZulu-Natal; LIMP, Limpopo; MP, Mpumulunga; NC, Northern Cape; NW, North West; PPE, personal protective equipment; WC, Western Cape.

Table 3 Availability of sharps containers, leak-proof linen bags and policy for ambulance decontamination

	EC	FS	GP	KZN	LIMP	MP	NC	NW	WC	n (%)
Sharps containers	✓	✓	✓	✓	✓	×	✓	✓	✓	7 (78)
Linen bags	✓	×	✓	✓	✓	×	✓	✓	✓	9 (100)
Ambulance decontamination	✓	×	✓	✓	✓	×	×	✓	✓	5 (56)

✓, present; ×, absent. EC, Eastern Cape; FS, Free State; GP, Gauteng; KZN, KwaZulu-Natal; LIMP, Limpopo; MP, Mpumalunga; NC, Northern Cape; NW, North West; WC, Western Cape.

Table 4 Distribution and content of in-service training programmes at provincial level

	EC	FS	GP	KZN	LIMP	MP	NC	NW	WC	n (%)
Orientation	×	×	×	✓	×	×	×	×	×	1 (11)
Updates	✓	✓	✓	✓	×	×	×	✓	✓	6 (67)
Refresher	×	×	✓	✓	×	×	×	×	×	2 (22)
Circulars	✓	✓	✓	✓	×	✓	✓	✓	✓	8 (89)

✓, present; ×, absent. EC, Eastern Cape; FS, Free State; GP, Gauteng; KZN, KwaZulu-Natal; LIMP, Limpopo; MP, Mpumalunga; NC, Northern Cape; NW, North West; WC, Western Cape.

Africa. During the first decade of democracy, much emphasis was placed on the development of broad policies at the national and provincial level. However, very few if any of these policies have been translated into sector-specific guidance.

SOPs are used to integrate departmental operations, linking the work of managers and planners with the activities of other personnel. SOPs provide a direct link between the tasks assigned to individual department members and the laws, regulations, standards and policies used to guide EMS operations.

A SOP for infection control needs to address such basic measures as infection control (ie, standard and additional precautions), the education and training of health care workers, the protection of health care workers (eg, immunisation), identification of hazards and minimising risks, routine practices essential for infection control (eg, aseptic techniques, single use of devices, sterilisation of instruments and equipment, antibiotic usage, management of blood/body fluid exposure, handling and use of blood and blood products), effective work practices and procedures (eg, environmental management practices including management of clinical waste), support services (eg, food, linen), use of therapeutic devices, surveillance, incident monitoring, outbreak investigation, infection control in specific situations and research.¹¹

Although, the EMS-specific SOPs of KZN, Gau and EC as well as the general SOPs of the other six provinces deal with the major components listed above, there are significant shortcomings in the SOPs regarding the identification of hazards, minimising risks, and effective work practices and procedures such as environmental management practices.

Well-written SOPs provide direction, improve communication, reduce training time and improve work consistency. SOPs used in combination with planned training and regular performance feedback lead to an effective and motivated workforce.

Knowledge and understanding of microbiology underpins the patient care practices as regards infection control. Recognition of the early signs of infection informs timely identification of the infectious disease, its aetiology and the precautions needed to prevent transmission. However, studies conducted in the USA and Australia have demonstrated that paramedic knowledge of infectious disease aetiology and modes of transmission was poor.¹² Therefore, it is essential that a considerable amount of time during training is dedicated to communicable diseases and infection control. No individual standards apply specifically to infection control education and training for ECPs in South Africa.

Limitations and further research

While the present study is the first of its kind in South Africa and provides important baseline data, it has been subject to selection bias in that the key informants for the study were at a provincial level. However, operations within EMS are controlled by district managers and the data therefore may not be an accurate reflection of the situation. A number of the provincial directors and operational managers were new appointees, thereby limiting the quality of information obtained.

It is recommended that the following additional research be performed to guide future policy:

- a) a survey of the knowledge and practices of EMS personnel with respect to communicable diseases and infection control,
- b) in-depth research on the design and accreditation of a communicable diseases and infection control policy module for EMS personnel.

CONCLUSION

The changing epidemiology of disease, the widening scope of practice of health care providers and the increased occupational risks associated with the provision of health care as well as the requirements of the National Health Act and the OHS Act, require the national EMS directorate to establish policies and guidelines to prevent or minimise the occupational exposure of ECPs to infectious material. Furthermore, an infection control module standardised across all provinces should be included in the curriculum of all EMS training institutions.

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Correction

O Mahomed, CC Jinabhai, M Taylor, et al. The preparedness of emergency medical services against occupationally acquired communicable diseases in the prehospital environment in South Africa. *Emerg Med J* 2007;24:497–500. In this article the fourth author Arthur Yancey was listed under an incorrect affiliation. His affiliation should have been listed as Section of Prehospital and Disaster Medicine, Department of Emergency Medicine, Emory University, School of Medicine, Atlanta, Georgia.

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