Health Information and Quality Authority

An tÚdarás Um Fhaisnéis agus Cáilíocht Sláinte

Identification of guidance for pre-hospital emergency services and patient transport services in the context of COVID-19 and beyond

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Version history

Version	Date	Specific updates
V1.0	22 June 2020	Date of first review

The Health Information and Quality Authority (HIQA) has developed a series of guidance reviews to assist the Acute Operations sub-group of the Expert Advisory Group (EAG) in supporting the National Public Health Emergency Team (NPHET), in their response to COVID-19. This review of guidance was developed to address the following research question:

> **What guidance is available for the conduct of pre-hospital emergency and intermediate care in the context of COVID-19 and beyond?**

The processes as outlined in HIQA's Draft Protocol: *'Identification of guidance for pre-hospital emergency services and patient transport services in the context of COVID-19 and beyond'* were followed. Below is a summary of relevant guidance identified up to and including 12 June 2020.

Key points

- This review identified 149 documents relevant to pre-hospital emergency services and patient transport services. These comprised 122 documents which contained guidance, recommendations or lessons learned, and 27 documents which described measures without explicitly providing guidance or recommendations.
- Ninety-one authoritative documents from official sources were identified. Eighty-four of these were guidance documents and seven described measures without explicitly providing guidance or recommendations regarding their implementation.
- The academic database search identified 58 articles from non-authoritative sources. Thirty-eight of these were classed as descriptive reports of experiences during COVID-19 or other respiratory epidemics or pandemics that offered recommendations or 'lessons learned'. The remaining 20 articles described measures without explicitly providing guidance or recommendations regarding their implementation.
- The most comprehensive guidance documents in terms of scope were identified from Public Health England, NHS England, the Pan-American Health Organisation, agencies within the US (CDC, US Fire Administration, and a private provider 'Global Medical Response Inc.'), the Indian Ministry of Health and the Swedish Neonatal Association.
- The topic areas most commonly addressed by guidance documents included personal protective equipment (PPE), disinfection and transport. Several documents also detailed approaches towards staff wellbeing and provided guidance on arrangements within call centres.
- No documents were identified which specifically provided a medium-term to long-term view of the operation of pre-hospital emergency services or patient transport services post COVID-19.
- Academic guidance with respect to specific clinical scenarios, such as resuscitation, has at times been conflicting or unclear. Overall, while clinical societies aimed to provide guidance on clinical scenarios, no position papers or consensus guidelines specific to the areas of pre-hospital emergency services or patient transport services were identified.
- A quality assessment of the included documents, including assessment of the evidence basis, was not formally undertaken for this review due to the large number and wide variety of document types identified. Authoritative documents included were typically short with no clear evidence underpinning the guidance, while non-authoritative articles, particularly clinical recommendations, were more likely to cite existing evidence and opinion.

Background

Pre-hospital emergency services and patient transport services play an essential role in managing the public health emergency that is COVID-19.

The role of the National Ambulance Service (NAS) with respect to COVID-19, and steps to be taken to support the mission of the service, were outlined in Ireland's National Action Plan in response to COVID-19.(1) Action 5, 'Caring for people in acute services' described several steps completed, or that were in the process of being completed, to expand pre-hospital care capacity. These included the NAS providing home/community COVID-19 testing services, the provision of clinical advice using support desks within the National Emergency Operations Centre of NAS, the continued enhancement of paramedic-led mobile medical services, and the harnessing of support from the Defence Forces, and of voluntary and private ambulance providers.

On 1 May 2020, the Irish government published the 'Roadmap for Reopening Society and Business' and on 5 June agreed to accelerate this plan.(2) This Roadmap was informed by the Public Health Framework Approach provided by NPHET to assist in informing decisions in responding to the emergency, specifically regarding changes to public health physical distancing and other measures introduced in response to COVID-19.(3) This framework document described progress in controlling the spread of the virus, as indicated by a reduction in the reproductive number (R) to below 1. However, the document also underlined the ongoing threat of COVID-19, stating that '*…the most plausible future scenario in the dynamic of COVID-19 may involve recurring epidemic waves interspersed with periods of low-level transmission.'*

As Ireland moves beyond the initial mitigation phase of COVID-19, there is a need for ongoing planning to prepare for potential recurring epidemic waves of infection, and to enable healthcare services, including pre-hospital emergency and transport services, to operate in a manner that minimises infection risk while optimising patient care. As COVID-19 represents an unprecedented challenge to modern health systems across the world, little scientific evidence is available on the most effective approaches for the operation of services in this emerging context. However, as global jurisdictions navigate the challenge of COVID-19, lessons may be learned from guidance issued elsewhere, or from reflections of experts on how services were successfully adapted.

This review identifies international guidance to support the conduct of pre-hospital emergency and patient transport services in the context of COVID-19 and beyond. The focus of this review is on guidance published by national level health and

emergency service authorities and professional associations, and lessons learned from the conduct of pre-hospital emergency and patient transport services in the midst of COVID-19 or other recent respiratory virus epidemics or pandemics.

Methods

A protocol outlining the methodology of this evidence summary was developed by HIQA: *'Draft Protocol: Identification of guidance for pre-hospital emergency services and patient transport services in the context of COVID-19 and beyond'.* This protocol was followed throughout the conduct of this review. Literature searches were performed between 27 May 2020 and 12 June 2020.

Results

Documents identified

The search process identified 149 documents relevant for the present review. Due to the large volume of documents obtained through the search, full details of the documents identified have been extracted into the accompanying Excel workbook to this report, to allow for the sorting of documents by particular characteristics, and for the easy identification of the main setting (e.g., patient treatment, transfer, service enabler) and primary topic (e.g., PPE, fleet design, call centre arrangements) to which each document relates. As per the review protocol, documents were categorised as follows:

- Category 1: "**Authoritative**" guidance documents produced by official sources which may be considered to hold authoritative opinion, such as national level providers of emergency medical or medical transport services or professional/civil associations representing emergency medical services.
- Category 2: "**Non-Authoritative**" recommendations, or lessons learned, for the conduct of emergency medical services or medical transport services in the context of COVID-19 or other respiratory pandemics, including descriptive reports of local experience or of the conduct of services.

  Non-authoritative sources were considered to include authors not representing an official association or authority, but providing guidance based on departmental or institutional experience in emergency medical services or patient transport services.

- Category 3: Descriptions of approaches or measures introduced in the context of pandemic settings, published as information rather than as part of guidance or recommendations.

The following describes a high-level summary of the results, and details examples of guidance or measures which were identified during the data extraction process.

A total of 122 documents were identified which were considered to represent 'guidance', 'recommendations', or 'lessons learned' and were included in Categories '1' or '2' (Table 1). Twenty-seven documents were identified which described approaches or measures introduced in the context of relevant epidemic/pandemic settings, published as information rather than as guidance or recommendations, and were therefore included in category '3'. Overall, this review identified 91 authoritative documents and 58 non-authoritative documents.

Table 1: Total documents found by guidance type

	Categories 1&2 Guidance, recommendations, or lessons learned	**Category 3** Descriptions of approaches or measures introduced	**Total:**
Authoritative source: **Guidance, lessons learned or descriptions of approaches.**	84	7	91
Non-authoritative source: **Recommendations, lessons learned or descriptions of approaches.**	38	20	58
Total:	122	27	**149**

Documents identified from authoritative sources

Ninety-one documents were identified as being from authoritative sources, including 84 guidance documents (Category 1) and seven documents which described measures without explicitly providing guidance or recommendations regarding their implementation (Category 3).

Category 1 guidance

Category 1 guidance, which by definition considered the context of COVID-19 only, was found to have been published between 20 February 2020 and 9 June 2020 inclusive. Among the 84 guidance documents identified, guidance was found from authorities tasked with governing or providing emergency medical services for the

following countries: Ireland, England, Wales, Italy, Luxembourg, Norway, Spain, Sweden, USA, Canada, New Zealand, Australia and India. Specific authorities within countries are listed in Table 2. Supranational guidance was identified from the European Centre for Disease Prevention and Control,[4] the United Nations,[5] the WHO,[6-8] and the Pan American Health Organization/WHO Americas.[9]

Table 2: Agencies within countries issuing guidance

Country	Authority or agency
Ireland	Health Protection Surveillance Centre (HPSC)[10]
England	NHS England[11-13] Public Health England[14, 15]
Wales	Welsh Government & Emergency Ambulance Service Committee[16]
Italy	Italian Higher Institute for Health Care[17]
Luxembourg	CGDIS - Corps Grand-Ducal d'Incendie et de Secours[18-21] Ministry of Health[22]
Norway	Norway Institute of Public Health[23]
Spain	Ministry of Health[24-29]
Sweden	Socialstyrelsen (Health and Medical Care and Social Services, Sweden)[30] Svenska neonatalföreningen/Swedish Neonatal Association[31]
USA	Centers for Disease Control and Prevention (CDC)[32, 33] Department of Health and Human Services[34, 35] Federal Healthcare Resilience Task Force[36-51] Federal Emergency Management Agency[52] National Highway Traffic Safety Administration (NHTSA)[53] Interagency Board for Emergency Preparedness and Response[54-57] National Highway Traffic Safety Administration[53] US Fire Administration[58-61] Global Medical Response Inc. (*private provider*)[62]
Canada	Government of Canada[63]
New Zealand	Ministry of Health[64-67]
Australia	Department of Health[68, 69]
India	Ministry of Health[70]

The following professional associations, considered to be authoritative sources, also provided guidance or reports of members' experience of operations within the context of COVID-19: The National Emergency Number Association (NENA, USA),[71-74] the European Emergency Number Association (EENA),[75, 76] the National Association of Emergency Medical Technicians (NAEMT, USA),[77] the Pre-Hospital Emergency Care Council (Ireland),[78] the College of Paramedics (UK),[79] the Australasian College for Emergency Medicine,[80, 81] the International Liaison Committee on Resuscitation (ILCOR),[82-84] the Faculty of the Resuscitation Academy,[85] the European Society for Emergency Medicine,[86] and a collaboration of clinical associations including the American College of Emergency Physicians and the American Association of Critical Care Nurses and National EMS Physicians.[87] Within this group, one position paper was identified.[86] However, this paper was focused on the emergency department setting with a minor section on making contact with the pre-hospital system. The remaining documents included general lists of actions to be taken, [73, 74, 85] guidance on specific clinical scenarios such as cardiac arrest,[79, 82, 83, 87] and advisories on transport concerns.[80, 81]

Scope of guidance

Considering the comprehensiveness of guidance, the documents listed in Table 3 were identified as covering the broadest scope of guidance across the topics of interest. All of these documents referred to the immediate COVID-19 mitigation phase.

Table 3: Guidance documents identified as providing the broadest scope of guidance across the topics

Country	Organisation	Title
England	Public Health England	COVID-19: guidance for Ambulance Trusts[14]
	NHS England	COVID-19 Ambulance Case Transport Response Service Framework[11] COVID-19 Patient Transport Services: Requirements and Funding[12]
(Pan America)	Pan-American Health Organization, WHO Americas	Pre-hospital Emergency Medical Services COVID-19 Recommendations[9]
USA	CDC	Coronavirus Disease 2019 (COVID-19). Interim Guidance for Emergency Medical Services (EMS) Systems and 911 Public

		Safety Answering Points (PSAPs) for COVID-19 in the United States[32]
	United States Fire Administration	Maintaining Emergency Medical Services Capabilities During a Pandemic[58]
	Global Medical Response Inc. *(private provider)*	COVID-19 Guidelines for Preparation & Response (Revision – March 4, 2020)[62]
India	Ministry of Health	Coronavirus Disease 2019 (COVID-19): Standard Operating Procedure (SOP) for transporting a suspect/confirmed case of COVID-19[70]
Sweden	Swedish Neonatal Association	Neonatal transport of children with suspected/verified COVID-19[31]

Little guidance was found with respect to planning for the medium-term or long-term. However, four guidance documents were identified from the United States Fire Administration which referred to different stages of planning with respect to COVID-19.[58-61] These included a document on devolution planning, that is, planning for when resource availability is misaligned with community need,[60] and a short document on post-disaster recovery planning. The latter described how 'in a perfect world', short and long-term recovery planning should occur while the disaster is still active and response activities are underway or winding down.[61] Seven brief points were outlined on how to prepare such a post-disaster recovery plan, and included aspects such as strengthening relationships and changing organisational policy.

Specific topics covered by Category 1 guidance

Within particular topics, across the guidance, the area most commonly addressed was advice with respect to **PPE**; over 70% of documents referred to this topic. US guidance included multiple documents relating to PPE, including guidance for the preservation and decontamination of PPE supplies.[54] The Faculty of the Resuscitation Academy's list of 'Ten Steps to Help Patients While Staying Safe' included mnemonics to aid personnel in approaches for donning and removing PPE.[85] Documents also referred to staff's **mental or emotional wellbeing**; a number of guidance documents from within the US were specifically focused on approaches to support staff resilience.[33, 34, 40-43]

With respect to **transport**, the New Zealand Ministry of Health provided four documents considering different scenarios of transport involving air and road, and patients suspected or not suspected as being a COVID-19 case.[64-67] The Australasian College of Emergency Medicine also provided guidance on transport

issues; a 14-point list of recommendations for transport of patients is provided, including guidance on inter-hospital and intra-hospital transfers.[80] Guidance points referred to avoiding aerosolising procedures during transport and to the masking of patients, and the bypassing of emergency departments with patients being transported directly to inpatient bed locations where possible. This organisation also provided a list of eight principles for the interface between the ambulance and emergency department.[81]

Several documents provided guidance on arrangements for within **call centres**.[36, 73, 74] For example, NENA published checklists with information on physical distancing, policy writing, employee health arrangements (physical and mental), messaging the public, cleaning, and supplies.[73, 74] The US Federal Healthcare Resilience Task Force provided guidance on best practices for call screening and modified response, though this was limited to basic screening of patients for COVID-19 symptoms and appropriate infection control procedures, such as PPE, for dispatched EMS personnel.[46] The US Fire Administration also provided guidance for maintaining dispatch capabilities during a pandemic, listing groups of points around managing expectations of service users and arrangements for workforce, including staff vaccination policies.[59]

In addition to guidance documents, some authorities surveyed members and provided **reports** of lessons learned. EENA noted that in one location, triage procedures changed 12 times over the space of two months,[76] NENA produced two relevant reports on the topic of '9-1-1 & COVID-19'. The report, dated 3 April 2020, noted observations from emergency service call centres within the US.[71] These included increased calls relating to domestic violence during 'stay-at-home' orders, and the fact that most call centres received calls where the person calling described having symptoms of COVID-19, despite the public being recommended to call entities other than "9-1-1" to discuss symptoms. The document also reported on survey results regarding service changes in response to COVID-19. Survey results found that the vast majority of telecommunication personnel were unable to work from home and that anxiety within call centres was a concern; nearly 75% of call centres had taken measures to support personnel wellbeing initiatives.

The second report by NENA, dated 8 May 2020, confirmed and built on insights from the previous report.[72] This report reiterated that call centres are experiencing widespread increases in calls for psychological issues and domestic violence. For employees, the use of, and access to, face coverings or other PPE within call centres was inconsistent, and staff were inconsistently included within lists of 'essential workers'. Also, staff wellbeing initiatives were increasingly rolled out to mitigate staff distress. Where available, the use of new technologies (e.g., remote call handling

and dispatch operations) and thorough contingency planning (e.g., backup call centre sites, for use where a primary site requires cleaning and disinfection) were reported as successful. Challenges reported included the quarantining of staff members displaying COVID-19 symptoms, and cancellation and postponement of employee training and hiring, both of which contribute to staffing shortages; online education was stated as a mitigator of the latter challenge. Also, some technology upgrades were delayed for infection control reasons, with the potential for long-term service impacts noted.

Category 3 documents

Seven Category 3 documents were identified from authoritative sources. Sources included the Italian Ministry of Health,[88] the Korean Centers for Disease Control and Prevention,[89] Israel's national pre-hospital and emergency medical organisation ('Magen David Adom'),[90, 91] the Swedish medical care service ('Socialstyrelsen')[92] and Austrian emergency medical services.[93] Approaches of relevance included descriptions of innovative fleet design approaches (Italy,[88] Israel[90] and Sweden[92]) and lessons learned from arrangements for call centres (Austria[93]).

Documents identified from non-authoritative sources

The search identified 58 articles relevant to this overview from non-authoritative sources. Thirty eight articles were classed as 'Category 2' documents, that is descriptive reports of the experiences or the conduct of emergency medical or emergency transport services during COVID-19 or other respiratory pandemics, and which offered recommendations or 'lessons learned' to help guide services in the event of future outbreaks or surges.[94-131] A further 20 were classed as 'Category 3' documents, which provided descriptions of EMS experiences of pandemics or of measures introduced in the context of a pandemic.[132-150] Ten of these articles considered specific clinical scenarios, including intubation and airway management,[98, 102, 104] out-of-hospital cardiac arrest and CPR,[97, 99, 115, 118, 123] STEMI care[94] and intravascular access in patients with suspected or confirmed COVID-19.[124] The remaining nine journal articles comprised brief correspondences or letters to the editor.[95, 97, 103, 116, 118, 122, 125, 129, 131]

The 58 journal articles included settings in the US,[94, 96, 109, 110, 112, 130, 135, 141, 146, 150] Canada,[98, 100, 104, 106, 126, 132, 133, 136] Italy,[113-115, 118, 120, 125, 139] Switzerland,[116, 117, 142] Singapore,[103, 134, 149] the UK,[95, 105] China,[104, 151] Israel,[127, 145] France,[97, 122] Taiwan,[137, 144] Australia,[99, 138] Saudi Arabia,[121] or were not specific to any one country.[101, 102, 108, 119, 123, 124, 128, 129, 131, 140, 143, 148] The majority of articles related to COVID-19. Among those which considered other epidemics/pandemics, nine were

specific to the SARS (SARS-CoV-1) pandemic,[102, 106, 132-134, 136, 137, 144, 149] and one study each related to the MERS[121] and Influenza A(H1N1) contexts.[141]

Three of the 58 articles were published in the health sciences preprint server 'MedRxiv' and therefore have not as yet been subject to formal peer review.[114, 135, 148] Five articles were published in the Journal of Emergency Medical Services (JEMS).[109, 110, 112, 150, 152] Two of these five appeared to represent news articles as opposed to academic descriptions;[150, 152] as such it is not clear whether the remaining articles have been peer-reviewed.

The main settings considered by the journal articles were patient treatment,[97-99, 101, 102, 104, 105, 109-112, 115, 118, 121-124, 126, 129, 135, 140, 142, 143, 145, 153] transfer,[95, 100, 103, 107, 108, 113, 114, 116, 117, 119, 130, 132-134, 137, 141, 144, 148-150, 152, 154, 155] specific service enablers (such as staffing and service management),[96, 120, 125, 127, 136, 139] or more general settings including call screening or infection control.[106, 128, 131, 146]

'Category 2' documents identified; recommendations or lessons learned from non-authoritative sources

Thirty eight studies provided descriptive reports of the experiences or the conduct of services during COVID-19 or other respiratory pandemics, and offered recommendations or 'lessons learned' to help guide services in the event of future pandemics.[94-131] Articles set in the context of COVID-19 were published between 28 February 2020 and 5 June 2020.

Fourteen of these studies referred to patient transport.[95, 100, 101, 103, 107, 108, 112-114, 116, 117, 119, 121, 130] The most frequently mentioned patient care measures were PPE (n=27), aerosol generating procedures (n=18), and cleaning and disinfection (n=15). Topics relating to interactions with the healthcare system were less frequently mentioned, with eight documents referring to interactions with the Emergency Department. Service enablers most frequently involved staff training (n=14) and collaboration with other agencies (n=14). For full details of the 38 studies identified, please see the tab named "Category 1 & 2" in the accompanying Excel workbook and all rows marked 'NA' under column B ('Authoritative / Non-authoritative'). The following details examples from within this group of articles.

Examples of 'Category 2' documents

Two studies discussed **paramedic intubation** in the context of a pandemic. Verbeek et al. argued that, following the SARS outbreak, patients with SARS-like symptoms should not be intubated in the pre-hospital setting due to concerns over paramedic safety, recommending that these patients should be transported to the

nearest emergency department.[102] However, several responses to this paper have been published, with some commentators suggesting that intubating low-risk patients, particularly in communities without a current outbreak, does not present unacceptable risks to paramedics using precautions,[156] and that the decision on whether or not to intubate patients with SARS-like symptoms should be made by the paramedics performing the procedure.[151] More recently, Armour et al. reviewed the guidelines for paramedic-led intubation during the COVID-19 pandemic, noting significant changes in out-of-hospital care since the SARS outbreak, including in the requirements for PPE.[98] The authors highlighted that many guidelines made infrequent reference to the out-of-hospital setting.

Whitfield et al. provided an overview of Australian state and territory recommendations for **paramedic cardiac arrest management** during the COVID-19 pandemic, highlighting risks to EMS personnel.[99] Lemoine et al. discussed out-of-hospital responses to paediatric cardiac arrest, and suggested that in all cases, children should be considered as potential carriers of COVID-19, highlighting the need for adequate precautions for EMS workers.[122] Cavaliere et al. considered EMS-initiated refusal, and described the implementation of an 'ALS (advanced life support) Viral Syndrome Pandemic Triage Protocol for Emergency Department Transport'.[112] The authors suggested that such a protocol could help to prevent a surge of non-urgent COVID-19 patients. Similarly, Maguire et al. considered the ethics of the refusal of care by EMS workers in the context of insufficient PPE. They called for the development of an **EMS-focused ethical framework** to guide and support transparent ethical decision-making, and to improve preparedness in anticipation of future pandemics.[109]

Ciminelli et al. reported that COVID-19 mortality increased significantly with distance from the nearest intensive care unit (ICU) in Northern Italy, with the strongest effect seen in the epicentre of the outbreak and during periods when the volume of calls to emergency lines was particularly high.[114] According to the authors, it is likely that medical staff may have prioritised serving more patients, with a reduced geographical coverage. Dami and Berthoz, building on the experience of Lausanne medical dispatch centre's response to COVID-19, provide a number of recommendations.[116] These include the establishment of a national helpline to divert non-urgent calls from emergency call lines, limiting access to the dispatch centre and introducing remote dispatch desks to protect staff from infection, and the use of seated transport for non-urgent cases to preserve ambulances for more serious cases.

Category 3 articles

Within non-authoritative sources, in addition to guidance documents, recommendations and "lessons learned", 20 studies were identified that provided descriptions of EMS experiences of pandemics or of measures introduced in the context of pandemic settings.[132-150] Of these, nine related to patient transport, although the content of these studies varied widely. For example, Otto et al.[141] discussed patient movement policies during the influenza A(H1N1) pandemic, considering the merits of patient transfer vs. treat in place policies. Zhang et al. described a hybrid algorithm that was used to address the challenge of vehicle scheduling for the transfer of high-risk individuals during outbreaks of COVID-19.[147] Tsai et al. detailed the use of a portable isolation unit for the transfer of suspected SARS patients in Taiwan during the SARS outbreak.[144] MacDonald et al. described the development of a medical decision algorithm to inform interfacility patient transfers during the SARS outbreak in Toronto.[133] Sechi et al. utilised Business Intelligence (BI) to support EMS management during the COVID-19 pandemic, and suggested that BI can be used to identify clusters and patterns of the SARS CoV-2 infections.[139]

Gardiner et al. employed a modelling approach to investigate surge capacity for aeromedical retrievals for COVID-19 by the Royal Flying Doctor Service in Australia,[138] while Murphy et al. described strategies to reduce exposure to COVID-19 among EMS providers.[135] Ventura et al. conducted a survey of EMS personnel in the US.[146] EMS providers reported limited access to N95 respirators, with 31% of those with access to respirators reporting having to use the same mask for a week or longer at a time. EMS staff reported receiving little to no benefits from work related to COVID-19, as well as a lack of institutional physicaldistancing policies despite CDC recommendations. Regular decontamination of EMS equipment following each patient contact did not appear to be regular practice, and a third of participants reported being unsure of when a COVID-19 patient is infectious. All category 3 documents are outlined in the 'Category 3' tab of the accompanying Excel file.

Discussion

This review identified a large number of guidance documents relevant to pre-hospital emergency services and patient transport services, and articles published by non-authoritative sources which provide recommendations or 'lessons learned' from this setting with respect to a respiratory virus epidemic or pandemic.

Overall, guidance identified was largely practical in nature, focusing primarily on infection control; the majority of documents referred to the use of PPE by staff, disinfection measures, and transport infection control. Several documents referred to arrangements for call centres and dispatch centres, and organisations such as NENA published the results of surveys of the experiences of their members during the

COVID-19 peak. Some reports of innovations in fleet design or fleet management were described.

While some documents referred to the need for management of scarce PPE resources, no document considered concerns such as cost-effectiveness or the budget impact of particular guidance or interventions. Little guidance was available for medium-term to long-term planning beyond the immediate COVID-19 mitigation phase, though some documents referred to the need for discussion of ethics around paramedic-initiated refusal of care, including in the context of scarce PPE resources. No guidance documents were identified which specifically provided medium-term to long-term guidance for the operation of pre-hospital emergency services or patient transport services post COVID-19.

It is apparent particularly from the academic literature that guidance with respect to specific clinical scenarios such as resuscitation has at times been conflicting or unclear. Whitfield et al. alluded to the difficulty in providing clear messaging: *'The frequent updates to guidelines, processes and recommendations have left many healthcare providers, paramedics included, struggling to keep up with the changes'*.[99] Overall, while clinical associations aimed to provide guidance on clinical scenarios, no position papers or consensus guidelines specific to the areas of pre-hospital emergency services or patient transport services were identified.

The information contained within this review should be considered in light of its limitations. This review involved categorisation of documents as 'authoritative' versus 'non-authoritative' and categorisation of documents as representing guidance or recommendations versus descriptions provided without guidance; these categorisations are subject to interpretation. Also, it is possible that not all guidance relevant to the remit of the review was included; the search process excluded documents where they were not targeted to pre-hospital emergency or patient transport services (or synonyms thereof) and general guidance was therefore not included. Furthermore, as the information relevant to this review is typically released by national-level bodies, a truly systematic search of guidance was not possible. However, a concerted effort was made to include guidance from ministerial, national and professional associations relevant to the Irish healthcare setting. Importantly, quality assessment of the documents included was not undertaken, due to limited capacity given the large volume of search results returned.

Conclusion

Overall, this review identified 84 guidance documents relating to COVID-19 from authorities with responsibility for the provision of pre-hospital emergency and patient

transport services, and 38 non-authoritative documents containing recommendations or lessons learned relevant to this context. A further 27 documents described approaches or measures introduced in the context of relevant epidemic/pandemic settings, published as information rather than as guidance or recommendations. Guidance and recommendations largely focused on the immediate COVID-19 setting rather than focusing on recovery and future preparedness. The most commonly considered topics included PPE, infection control and transport-related approaches.

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