

Recommendations to ensure staff safety when receiving vital signs absent patients presenting to the emergency department by paramedics during COVID-19 pandemic

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INTRODUCTION AND RATIONALE: Protection of frontline healthcare workers (HCW) during the coronavirus disease pandemic (COVID-19) is essential. During the severe acute respiratory syndrome (SARS) outbreak in 2003 HCW accounted for 21% of victims worldwide and 43% of SARS patients in Toronto were HCW¹. This was likely multifactorial, including a lack of personal protective equipment (PPE), unrecognized cases or inadequate PPE used^{1,2}. This risk was greatest to nurses working in the emergency department (ED) and intensive care units². The purpose of this paper is to provide recommendations to enhance staff and patient safety during COVID-19 by reducing unnecessary exposure to aerosol generating medical procedures (AGMPs) for ED staff, paramedics and other ED patients when receiving patients vital signs absent (VSA). We suggest hospitals and emergency medical services engage with appropriate stakeholders and adjust accordingly for local practice.

SUMMARY OF EVIDENCE: Available evidence supporting which specific procedures are AGMP are all of low level of evidence and sometimes have conflicting results. Much of the data regarding risk of aerosolization and transmission of pathogens causing acute respiratory infections comes from the severe acute respiratory syndrome (SARS) outbreak in 2003³. Many of these studies were retrospective, making it challenging to draw conclusions from which specific procedures had risks of transmission³. To aid in justification of our recommendations, we present a brief summary of available evidence regarding common AGMPs that occur during cardiopulmonary resuscitation (CPR) and the risks of transmission to HCW.

Intubation – Yes, evidence of increased risk of transmission to HCW. A systematic review found a pooled odds ratio of 6.6 (95% CI 2.3 - 18.9) for risk of SARS transmission to HCW if exposed to intubation³. Furthermore, Fowler et. al found that HCW that had any involvement with intubation had a relative risk of developing SARS of 13.29 (95% CI 2.99 – 59.04) despite all intubations being done in a negative pressure room with N95, gown, gloves and hairnets being donned by all HCWs (eye protection/face shields had variable use)⁴.

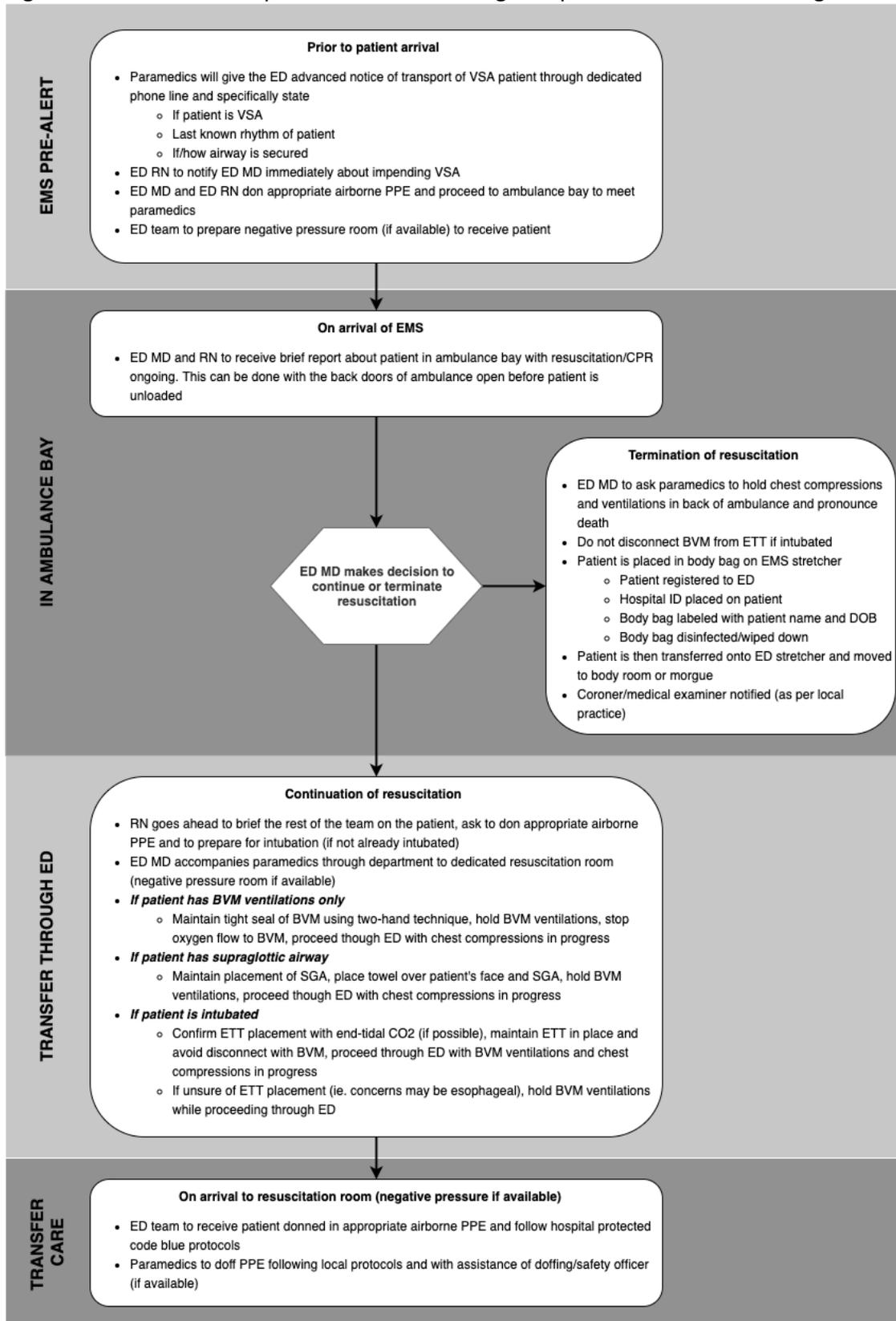
BVM ventilation – Yes, evidence of increased risk of transmission to HCW. A single cohort study demonstrated nurses who assisted in BVM ventilation prior to intubation had a higher likelihood of developing SARS compared to nurses who did not assist with BVM prior to intubation (OR 2.8 95% CI 1.3 – 6.4)^{3,5}. A systematic review found that manipulation of an oxygen mask had a pooled estimate of 4.6 (95% CI 0.6 – 32.5)³ for risk of transmission with one study of nurses who manipulated the oxygen mask of SARS patients having an odds ratio of 17.0 (95% CI 1.8 - 165.0) of developing SARS⁶.

Chest compressions – Some, limited evidence of increased risk of transmission to HCW.

One case control study from China with 477 HCWs, of whom 15 of them did chest compressions demonstrated increased risk of transmission of SARS (OR 4.5, 95% CI 1.5-13.8)⁷. There are two cohort studies available with a pooled estimate of 1.4 (95% CI 0.2 – 11.2)³. The first of these studies had a total of 9 HCWs in Toronto who performed chest compressions on SARS patients, with one HCW developing SARS (OR 3.0, 95% CI 0.4 - 24.5)⁵. The second study had a total of three nurses who performed CPR on SARS patients and none of them developed SARS (OR 0.4, 95% CI 0.01 - 7.8)⁶. In summary, two of three studies demonstrated risk of transmission during chest compressions with the outlier study having an N of three exposed patients. There is a lack of granularity on details of whether these HCWs were exposed purely to chest compressions or if airway management also occurred in this context, making the accuracy of determining AGMP risk of chest compressions difficult with the above evidence.

In SARS 2003, the outbreak was transmitted almost exclusively to HCW in a healthcare setting and it wasn't until near the end of the outbreak, that the means of transmission and measures to mitigate it were understood. The evidence gathered to support these recommendations was gathered in a time of crises, and often retrospective so the quality is low. However, this does form a foundation to make these recommendation and lay the groundwork for collecting data to validate or refute them in the COVID 19 outbreak (Figure 1).

Figure 1: Recommended procedure for receiving VSA patients from EMS during COVID-19



CONSIDERATIONS FOR TERMINATION OF RESUSCITATION: We recognize that pronouncement of death in an ambulance or ambulance bay is a considerable shift from normal practice for many emergency physicians. The justification of this procedure is to reduce the exposure of further HCW and other ill patients in the context of an expected futile resuscitation. Placement of the patient in a body bag in the ambulance or ambulance bay is potentially a significant way to contain the virus and reduce environmental contamination early; something that may be a silent contributor to transmission. Registration of the patient to the ED, along with appropriate identification and tagging of the body, will allow for medical documentation surrounding termination of resuscitation (TOR) and ensure proper identification of the patient. Specifically, we suggest that a hospital ID band be placed on the patient's arm before the body bag is closed in the ambulance bay, the bag should be clearly labelled with a sharpie with the name and date of birth and the bag should be disinfected or wiped down with anti-viral wipes or a bleach solution prior to transfer into the hospital.

AGMP RISK FOR PARAMEDICS: If there is an expected delay of more than 5 minutes for the ED physician to meet paramedics in the ambulance bay, paramedics should proceed to the identified resuscitation room with guidance from the ED nurses. Ambulances are small enclosed spaces without negative pressure capabilities and prolonged AGMP exposure puts paramedics at unnecessary risk.

THE NEED FOR A SYSTEMIC APPROACH: Local and regional base hospital physicians that can advise paramedics on TOR in the field or en route should review the indications for doing do.

Hospitals and EMS should work together to reduce unnecessary delays and ensure that dispatch notifies the hospital of any inbound VSA or pre-arrest patients with as much notice as possible. It is very possible that TOR may have taken place during transport to the ED based on a patch to a base hospital physician so by the time the ambulance arrives, paramedics are no longer doing resuscitation. This does not constitute a legal certification of death, so the ED physician may still be required to do this.

Pandemics can overwhelm the capacity of a region to provide both critical and basic care. In this setting in order to preserve resources to provide care for those most likely to survive, advance discussions as a regional health network are needed to consider the threshold or indications to withhold CPR for VSA patients and have pre-made directives that can be activated to support this. Lastly, development of a protocol and an agreement with local paramedics services should be worked out before any practice is put in place.

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