



Clinical Insights

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Respiratory

David's top 10 tips for assessing and managing respiratory problems



 By **Assoc. Prof. David Anderson**, Medical Director

Shortness of breath makes up 10% of all calls attended by paramedics in high income countries. This makes it first equal with chest pain as the most common call type for paramedics. Therefore the assessment, diagnosis, and management of respiratory problems should be bread and butter for paramedics — an area of expertise for us.

Aptly, as we move into cooler weather where respiratory problems are more common, we are sharing some expertise and tips with you in this respiratory focused Autumn edition

of *Clinical Insights*. We will be following up with our next Ambulance Victoria Grand Round which will also focus on respiratory complaints, so please dial into that event and get your questions ready for the panel.

One of the best ways of learning in healthcare is vicarious learning through the experience and stories told by more senior and experienced clinicians. That's certainly how I've learned most of what I know about prehospital care and intensive care medicine. So I thought I would share with you some of the tips that have helped me manage the many thousands of patients with respiratory problems that I've looked after over my career both in their homes, on the roadside, on the way to hospital, and in the intensive care unit.

Here are “David's top 10 tips” for the assessment and management of respiratory conditions:

- 1. Respiratory rate is the most important vital sign.** Every adult patient with a respiratory rate of greater than 30 must be assumed to be critically ill until proven otherwise. No exceptions. Early escalation of care for tachypnoeic patients is paramount unless it is clear that the patient has a presenting problem which is likely to respond quickly to prehospital management, such as an exacerbation of COPD.
- 2. If a patient is short of breath but has normal oxygen saturation and a clear chest, check their blood sugar.** It is still possible that they may have a primary respiratory condition such as a pneumothorax or a pulmonary embolus, but they may also be generating their tachypnoea in order to compensate for a severe metabolic acidosis, such as in a patient with DKA, or a patient with septic shock. Patients with severe metabolic acidosis will hyperventilate to generate a respiratory alkalosis — these patients are often sicker than patients with primary respiratory failure and at very high risk of sudden deterioration.



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3. If you mobilise a patient who has shortness of breath before initiating any management, be prepared for them to dramatically deteriorate.

When we refer to a patient with shortness of breath as being time critical, that means they need immediate management, not immediate transport. I can't think of any respiratory problem that cannot be effectively stabilised on scene by paramedics before transport to hospital. There is no reason (other than a safety threat) why patients should be moved from where they are before they have been provided with oxygen and they have had a thorough assessment of their respiratory status and any specific management initiated.

4. Expose, expose, expose. You cannot perform a thorough respiratory status assessment on a patient who is wearing several layers of clothing.

It is impossible to assess chest wall movement, to auscultate the lungs effectively, to see any scars from previous chest surgery, and to do an ECG to look for a cardiac cause if you do not appropriately expose patients with shortness of breath (of course with consideration of their dignity while doing this).

5. Sudden onset shortness of breath is almost always cardiac in nature.

Respiratory causes of shortness of breath usually develop over minutes or hours, shortness of breath that develops over seconds to minutes should be considered APO until proven otherwise.

6. Early and aggressive adrenaline can be lifesaving in asthma.

There is increasing recognition of the significant overlap between asthma and anaphylaxis, particularly in children and adolescents. If a patient, particularly a younger patient, is seriously or critically ill with asthma or if you are unsure if there is an element of anaphylaxis, there is no harm in administering a dose of intramuscular adrenaline as soon as possible.

7. Your own safety is paramount when dealing with patients with a respiratory problem.

One of the biggest takeaways from the pandemic for me is how blasé we used to be about our own

self-protection when managing patients with undifferentiated respiratory failure. I now never approach an undifferentiated respiratory patient and I never perform any kind of airway manipulation (like intubation) without wearing an N95 mask and I accept that it will be this way for the rest of my career. It's likely that we will soon move away from routine mask wearing however I would strongly encourage all of you to always keep an N95 in your pocket like I do and don it before approaching any patient with an unknown respiratory problem. The next pandemic *will* come one day.

8. If you're thinking of diagnosing an anxiety or panic attack in a patient with unexplained shortness of breath, you must ask yourself "Could this be a PE?"

Any patient with unexplained shortness of breath should be either transported or referred to Virtual ED. It is very, very common for patients with PE to be misdiagnosed with anxiety or panic attack in the prehospital and emergency setting. Think about why the ambulance was called on this occasion? What is different to usual? Have a very high index of suspicion in a patient who has no history of anxiety – I personally would transport all of these patients or discuss them with another senior clinician before deciding not to transport.

9. We all know that oxygen saturation can be inaccurate in patients with cold peripheries or poor perfusion, but did you also know that it can be inaccurate in people with darker skin colour?

One of the things that many of us learned during the pandemic was that a pulse oximeter will often give a falsely high oxygen saturation in a patient with darker skin, therefore if you are attending a patient who has dark skin and who is short of breath, but their oxygen saturation appears normal you should treat them as though they are hypoxic.

10. Shortness of breath is scary – be kind.

Reassuring your patient is more than just being nice, it can be therapeutic. Remaining calm and coaching your patients breathing can go a long way toward relieving their symptoms.

I hope you found my tips useful, let me know if you have any of your own, there's always more to learn! For the next few months I'll be working with the CPG team on reviewing and revising our current suite of respiratory guidelines. If any of you have any thoughts on what's working

well or what can be done better in the respiratory guidelines or have any ideas for a guideline that might be missing please don't hesitate to get in touch with me or any of the CPG team via [Viva Engage](#)





Spotlight: Paediatric asthma



By **Richard Armour**, MICA Paramedic

The imminent arrival of winter heralds the return of the respiratory illness season – respiratory conditions are consistently among the top 10 presentations for AV annually.

Particularly, with most pandemic measures discontinued we can expect respiratory infections to return to pre-pandemic prevalence, which will have a resultant impact on presentations related to asthma.

In Australia, approximately one in nine people have a diagnosed form of asthma. At AV, we have recently noted an increase in presentations related to paediatric asthma. Overall we generally manage approximately 150 cases per year of paediatric asthma, but in 2022 we noted approximately 250 cases related to paediatric asthma. With the beautiful autumnal colours decorating the state, it is timely to re-visit the assessment and management of paediatric asthma.

Rapid assessment and paediatric-specific considerations

Your initial assessment of a paediatric patient can provide a lot of information regarding the urgency of the presentation. Many paediatric patients may be initially hesitant with paramedics as unfamiliar faces – thankfully the use of the Paediatric Assessment Triangle (CPG P0101-1) requires very little (if any) physical contact and can be completed with careful observation. Any abnormality in the Paediatric Assessment Triangle or clinician concern on initial assessment should prompt escalation of care to Mobile Intensive Care Ambulance (MICA) Paramedics, the AV Clinician or Medical Advisor, or the Paediatric Infant Perinatal Emergency Retrieval (PIPER) service.

More detailed paediatric respiratory assessment should follow the principles outlined in CPG P0103-1, with a few specific practice points in mind:



- Most paediatric patients will have significant physiologic reserve and will effectively mask how well they are compensating for their illness – regardless of how well a child appears initially a full assessment is required. If you do not look for subtle signs, you will not find them.
- Paediatric patients will generally be wrapped up tightly but you **must** expose the chest as part of the respiratory assessment. Winter jackets will do a good job masking critical identifiers of respiratory distress such as intercostal recessions, diaphragmatic breathing, and subcostal recessions. These signs (or lack thereof) are critical in identifying the current status of the patient and monitoring clinical trajectory and can't be replicated by any other type of monitoring – **you must expose the chest**.
- Paediatric patients will often not present with a typical "tripod" posture as we see in adults with severe respiratory distress. Look instead for the patient self-positioning in the "sniffing position" we use for airway management, or "head bobbing" with respiration, which can be considered equivalent to tripod posturing.
- It can take some time for paediatric patients to become comfortable with the SpO₂ monitor – this is fine. An isolated SpO₂ value is less important than the holistic assessment you perform and can be integrated into your assessment once the child settles.
- Food allergy, asthma, and anaphylaxis often co-occur, with bronchospasm common between presentations. Do not labour distinguishing between asthma or anaphylaxis – if there is any suggestion the presentation may be related to anaphylaxis progress to care under this CPG immediately.

Some risk factors which place paediatric patients at risk of severe asthma exacerbations which should be sought as part of your focused clinical history include:

- Previous severe asthma exacerbations, particularly intensive care admissions or use of non-invasive or invasive mechanical ventilation
- Two or more hospital stays related to asthma in the preceding 12 months
- Use of reliever medications on two or more occasions in the past month (or depletion of three or more reliever MDIs within the past year)
- Exposure to tobacco smoke
- Previous allergic rhinitis, food allergies, or hay-fever.

Adrenaline

The side-effects of adrenaline are miniscule compared to the harms associated with delayed adrenaline administration. If there is any suggestion the bronchospasm may be related to anaphylaxis, **immediately** provide adrenaline and manage





Spotlight: Paediatric asthma *continued*

as per the anaphylaxis CPG. In patients with critical asthma, the early administration of adrenaline is a key component of management and should not be delayed. Where intravenous (IV) or intraosseous (IO) access is delayed or not available, intramuscular (IM) is a viable alternative and often more rapid means of achieving bronchodilation in children with poor respiratory efforts.

When calculating adrenaline doses, use the page per age calculator. This is an incredibly stressful situation – reduce your cognitive overload by using the tools available.

All Paramedics: IM ADRENALINE 10mcg/kg – Repeat at 5 – 10 minutes as required (max 30mcg/kg)

MICA: 1mcg/kg IV/IO (max 50mcg) – Repeat at 3 minute intervals and if no improvement commence infusion at 0.05mcg/kg/min (max 0.5mcg/kg/min or 15mcg/min)

Assisted ventilation

The main cause of death in asthma is hypoxic brain injury, often related to the profound hypoxia that occurs in the first few minutes following respiratory arrest. An unconscious patient with asthma requiring airway management and assisted ventilations is among the most physiologically deranged patients paramedics are likely to see. Children in particular may teeter on the precipice of respiratory failure before rapid and critical desaturation – making your initial and continued assessments critical in identifying and preparing for deterioration, including through early escalation of care.

The decision to transition to assisted ventilation can be complicated, particularly as there will likely be some hypoxia-related agitation during the critical desaturation period. It is important to note that waiting for a deteriorating SpO₂ should not be used as a sole indicator for assisted ventilation – normal saturations can be maintained very late in the course of critical asthma. Agitated or bizarre behaviour, reductions in work of breathing without clinical improvement, and increasing ETCO₂ should alert clinicians to an imminent need for assisted ventilation.

Ventilation of an unconscious patient with asthma is incredibly complex – clinicians should consult with the AV Medical Advisor or PIPER where required for real-time, expert support. The most important concept to remember when ventilating a patient with asthma is the concept of dynamic hyperinflation. Patients with asthma requiring ventilation will have incredibly high airway resistance and require equally high inspiratory pressures (from bag-valve mask or mechanical ventilation) to overcome this. However,

the expiration of this inhaled gas is as complex as getting it in, in the first place!

In normal lungs, end-expiratory alveolar pressure and airway pressures are zero relative to the atmosphere, with negative pleural pressures, allowing for the diffusion of gas down a concentration gradient. Severe asthma exacerbations, though, produce such an increase in airway resistance that expiratory flow is dramatically reduced and alveolar pressures remain positive during expiration, leading to the development of auto-positive end-expiratory pressure (auto-PEEP).

So when ventilating patients with asthma, we need to be conscious of how we are providing both assisted inspiration as well as expiration. We can do this by:

- Lowering respiratory rate and tidal volumes and prolonging expiratory time to promote exhalation and reduce auto-PEEP.
- Generating enough inspiratory pressure to overcome airway resistance (look for chest rise).
- Tolerating extremely high ETCO₂ values up to **120mmHg** (attempting to rapidly over-correct ETCO₂ will result in over-distension and paradoxical worsening of gas exchange).
- Applying gentle lateral chest pressure in accordance with CWI/OPS/064 where there is clear evidence of dynamic hyperinflation.

Key points

- If any element of the Paediatric Assessment Triangle is deranged, escalate care early – paediatric patients compensate well, for long periods, but deteriorate incredibly rapidly.
- If MICA assistance is not immediately available, consider consultation with the AV Clinician or Medical Advisor or PIPER while initiating treatment and moving towards hospital.
- If there is any possibility of anaphylaxis, escalate to adrenaline therapy rapidly – the side effects are minimal compared to the harms of delayed adrenaline.
- The holistic respiratory assessment is more useful than a single SpO₂ value – do not wait for hypoxia to begin management.
- Ventilation of a patient with asthma involves extreme values and is the most complicated ventilated patient paramedics are likely to encounter. Remember: high inspiratory pressure, low tidal volumes, low ventilation rate, and long expiration times.





Infection prevention and control precautions—respiratory patient considerations

By **Kristy Austin**, National Standards Accreditation Lead



Standard precautions apply to all patients regardless of their diagnosis or presumed infection status. *PRO/QPE/010 Infection Prevention and Control Standard* is the framework to support clinical practice and provides a structured, comprehensive approach to infection prevention strategies.

In some situations, the use of standard precautions alone will not be sufficient to limit the spread of infection. When this occurs, **transmission-based precautions** are also required.

There is no one size fits all approach to the application of infection prevention and control (IPC) strategies. The appropriate type or combination of transmission-based precautions should be determined through dynamic risk and patient assessment to establish actual or potential infection transmission risk.

Transmission of infectious agents occurs via three modes, **contact**, **droplet** and **airborne**. Some organisms may be transmitted by more than one route. *CWI/OPS/184 Infection Prevention and Control – Transmission Based Precautions* outlines infection prevention strategies for each mode of transmission.

Extract from *CWI/OPS/184*

In the context of respiratory illness, it is common that more than one type of transmission-based precautions will be required. The degree of respiratory activity is a key consideration in making this determination.

Contact precautions are often indicated; however, respiratory illness most often requires the application of droplet and/or airborne precautions. Respiratory droplets generally transmit over short distances and are limited by the force of expulsion and gravity. Airborne transmission occurs where particles remain

infective over time and distance, and can be created during normal breathing, talking, coughing, and sneezing. Poorly ventilated environments can exacerbate aerosolization and disbursement.

Some clinical procedures and patient behaviours increase the risk for aerosolization. Clinical Work Instructions indicate where

transmission-based precautions are indicated: these should be applied anytime the specified procedures/interventions are carried out.

If a respiratory illness outbreak was to occur specific infection prevention and control guidance will be provided to staff, as occurred during the COVID-19 response.

*DURING AN OUTBREAK SCENARIO, PLEASE APPLY THE RELEVANT OUTBREAK'S INFECTION TRANSMISSION PRECAUTIONS.

INFECTION TRANSMISSION PRECAUTIONS

STANDARD PRECAUTIONS

AS REQUIRED

GLOVES IF RISK OF BODILY FLUIDS EXPOSURE

PROTECTIVE EYEWEAR IF RISK OF BODILY FLUIDS EXPOSURE

SURGICAL MASK IF MILD RESPIRATORY SYMPTOMS AND PATIENT IS COMPLIANT

P2/N95 MASK IF RISK OF AEROSOL PRODUCTION AND PATIENT IS NOT COMPLIANT

ALWAYS

PERFORM HAND HYGIENE AND ROUTINE CLEANING OF YOUR ENVIRONMENT (WHICH INCLUDES PATIENT ASSESSMENT EQUIPMENT) USING DISINFECTANT WIPES.

SAFELY AND APPROPRIATELY USE AND DISPOSAL OF SHARPS, WASTE, AND USED LINEN.

PLUS

CONTACT PRECAUTIONS

GASTROINTESTINAL SYMPTOMS
INFECTED WOUNDS

MASK IF REQUIRED FOR
ANOTHER INDICATION

GOWN

DROPLET PRECAUTIONS

RESPIRATORY SYMPTOMS IF
PATIENT IS COMPLIANT

SURGICAL MASK

GLOVES

PROTECTIVE EYEWEAR

FACE SHIELD IF RISK OF BODILY FLUIDS EXPOSURE

AIRBORNE PRECAUTIONS

RESPIRATORY SYMPTOMS IF
PATIENT IS NOT COMPLIANT

P2/N95 MASK

GOWN IF RISK OF BODILY FLUIDS
EXPOSURE

*IF IN ANY DOUBT, APPLY THE HIGHEST LEVEL OF PRECAUTIONS.

Decoding sepsis

Distinguishing between life threatening sepsis and mundane infection remains a challenge

By **James Oswald**, Clinical Practice Development Specialist



What is sepsis?

The Ancient Greek physician and philosopher Hippocrates was the first to use the term sepsis clinically. It related to the body rotting – its essential functions failing – due to infection. The late 19th and 20th century saw public health measures, vaccines and antibiotics dramatically change the impact of sepsis. Despite all these advances, reliably distinguishing between life threatening sepsis and mundane infection is still very challenging for clinicians.

Two and a half millennia after Hippocrates, the Third International Consensus Definitions for Sepsis and Septic Shock offered the most recent definition of sepsis, *“life-threatening organ dysfunction caused by a dysregulated host response to infection”*. In some ways, this is not a lot more helpful to clinicians than the original description.

Prof. Mervyn Singer (the lead author of the definition) somewhat controversially said, *“nature deals with most infections, with or without a short course of antibiotics”*. But for some, the body responds to infection in a way that could be charitably described as counterproductive. Without intervention this dysregulated response can go on to kill the patient. To identify sepsis, we need to be able to tell the difference between patients experiencing a normal response to infection, from those with a dysregulated response and organ dysfunction.



Medical Director A/Prof. David Anderson with Prof. Mervyn Singer

If we over triage, we use up scarce healthcare resources and expose patients to all sorts of risks like adverse reactions to antibiotics. Perhaps more importantly, on a grander scale, it contributes to antibiotic resistance. On the other hand, if we under triage, people with unrecognised sepsis may be left at home to die. So, it's very important we get it right. Unfortunately, this is easier said than done. The two groups can often look very similar.

So how do we identify who is and who isn't at risk?

What about vital signs?

Abnormal vital signs are more common among patients with sepsis than those with minor infections. But not all patients with abnormal vital signs have sepsis and not all patients with sepsis have abnormal vital signs.

There is, of course, a reasonable chance that patients with hypotension and symptoms of an infection are septic. But that is not most patients. Plenty of patients with sepsis, or who go on to die of sepsis, do not present with the more obvious signs of critical illness. Much to everyone's disappointment, there does not appear to be any single vital sign that reliably rules sepsis in or out. Unfortunately, it is not as simple as setting simple vital signs thresholds like “BP less than 100 equals sepsis”.

Is lactate a “sepsis test”?

In short, no. It has certainly seen a lot of discussion in recent years. Lactate, however, is not the “sepsis test” we're looking for. What an elevated blood lactate tells you is that a decent number of cells are going about their business without enough oxygen (anaerobic metabolism). In this sense, it can be a marker of hypoperfusion that isn't yet reflected in the patient's blood pressure. But there are many things that cause hypoperfusion, other things that elevate lactate and not all patients with a significantly dysregulated response to infection have hypoperfusion at the very moment you assess them. Lactate has its uses but it's not a silver bullet either.

Early warning and risk scores

If one vital sign, symptom, or test can't tell you much, sometimes several of them combined in certain ways can tell you more. There are literally dozens of early warning scores

and sepsis risk scores that try to do just this. Unfortunately, none of them is a clear winner.

There are, however, two worthy mentions: **qSOFA** and **NEWS2**.

qSOFA

The “quick sequential organ failure assessment”, or qSOFA, does what it says on the box. It’s a quick way of identifying patients at higher risk of a bad outcome from sepsis. It has three simple criteria, hypotension, tachypnoea, and altered conscious state. The evidence on qSOFA is pretty clear. When 2 or 3 of these things are present in a patient with an infection, there is high chance they have sepsis and might die¹⁻³. Now, it’s hardly a shock that a patient with multiple aberrant vital signs might be sick. Nonetheless it offers us a way of taking a wider group of patients with abnormal vital signs and narrowing it down a bit to a group who is really at risk. This is useful when we’re talking about things like prehospital antibiotics where limiting administration to people who really need them matters quite a lot.

While qSOFA is very specific for sepsis, it is unfortunately not very sensitive. Put another way, when qSOFA criteria are present, the patient is probably very sick. But it doesn’t work the other way – the absence of qSOFA criteria doesn’t rule out sepsis. This is a problem because that’s really the main challenge we face – we sit in front of patients with some symptoms and a fever, and we need a tool to help us say for sure that they’re safe to be treated in the community. qSOFA is not that tool.

NEWS2

The National Early Warning Score 2 (NEWS2) is the most recent iteration of the UK National Health Service’s attempt to standardise the recognition of at-risk and deteriorating patients. It’s a more complex risk score that awards points for vital signs abnormalities (RR, SpO₂, SBP, HR, conscious state, temp) that then add up to a total score. It gives you a better overall sense for how sick the patient might be. Anyone from the UK will know it is controversial as a tool for escalation of care. I think everyone would acknowledge it’s not perfect, but most people would also begrudgingly admit it’s probably better than any single vital sign alone. A recent systematic review out of the UK essentially found that it’s probably the best tool we have to help identify sepsis in the prehospital environment⁴. It also has uses outside of sepsis. Across the ditch, our colleagues have published interesting data demonstrating that the New Zealand version of NEWS (which functions very similarly) is reasonably reliable in discriminating the risk of dying in the next 48 hours⁵.

Whether it’s NEWS2 or something similar, it’s fair to say a risk score of some kind is coming soon and probably not just for patients with suspected sepsis.

The future

This year, we will launch a sepsis guideline. It will include tools that help you judge risk – probably NEWS2 and qSOFA. But none of these tools replace the need to understand the disease, the cure, and why the patient is asking for help in the first place. Earlier, I used the phrase “help identify sepsis” very intentionally. Both NEWS2 and qSOFA are imperfect tools. They work best when paired with good clinical judgement and a clinical suspicion of sepsis.

A risk score is more like a blood pressure cuff. It’ll give you a number, but it won’t give you answers. What we do with the number is a different question entirely and, within reason, the same number can mean different things in different situations. At a point – if that score is very high – it probably makes sense to mandate certain actions like escalation of care. But more generally, the right answer depends a very great deal on the context, the patient, and your judgement.

Hippocrates also supposedly wrote, “*It is more important to know what sort of person has a disease than to know what sort of disease a person has.*” Perhaps this focus on understanding the patient’s unique characteristics, risk profile and goals of care remains just as true today as it did two thousand years ago.



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Enhancing paramedic and patient experience with alternate care pathways

Alternate care pathways have become a crucial part of Victoria's healthcare system in the past five years. Using technological advances allows patients to receive a more appropriate level of care than presenting to an emergency department.



By **Sam Peart**, Alternate Services Lead

Some of the alternate service providers (ASP) most used at AV include:

- Victorian Virtual Emergency Department (VVED)
- Priority Primary Care Centres (PPCCs)
- GPs
- Palliative Care Advice Service
- Residential-in-Reach and Field Referral through Triage Services, which can link patients to home visiting nursing services
- TelePROMPT
- Transportation services such as taxi and non-emergency patient transport (NEPT).

In the evolving landscape of healthcare, ambulance services offer a critical link between the community and the immediate care patients require. Recognising the diverse spectrum of patient needs, AV has embraced the integration

of ASP into our healthcare framework to allow for a range of pathway options. This strategic move, spearheaded by advancements in technology, has significantly enriched the Victorian healthcare system. Notably, the VVED has set a benchmark globally, inspiring international models aimed at mirroring the comprehensive care models available within our system.

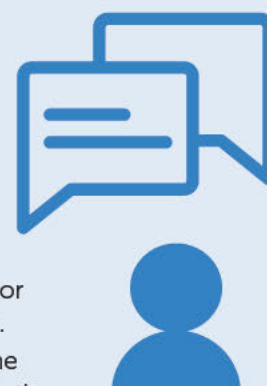
Despite the advancements, the journey towards optimising the use of alternate care pathways reveals opportunities for enhancement. AV have committed to the uplift of Alternate Care pathways as a key initiative through the Safe in Place Strategy, which underpins our strategic commitment to ensure all patients receive Best Care and improved health outcomes and experiences. To do this, we have a team dedicated to improving the availability, processes and systems that support the daily operation of our alternate care pathways, and how these services interact with paramedics and first responders, and patients. We also understand that refining and improving our Alternate care pathways should be driven by the valuable feedback provided by patients and our teams.

What you've told us so far

- **Inconsistent feedback mechanisms:** Paramedics encounter varied feedback avenues concerning alternate care pathways, leading to underreported suboptimal experiences and altered practices around alternate care pathway use. Ongoing and regular paramedic feedback is vital to ongoing improvement.
- **Information gaps:** There is a notable lack of clear, regularly updated information on alternate care pathway capabilities and services, particularly in unfamiliar territories for paramedics.
- **Operational inefficiencies:** Clinicians have encountered challenges include prolonged registration times with VVED and inconsistent interactions with PPCCs.
- **Reduced Field Referral interaction:** There has been reduced engagement with Field Referral, likely resulting from a lack of awareness of the Field Referral service via AV Triage Services. Through Field Referral, crews can access several valuable services, that may be an

appropriate alternative to transporting patients to ED.

- **Misalignment with patient needs:** Instances of clinicians being requested to Residential Aged Care Facilities (RACF) for patients better suited for VVED or Residential-In-Reach programs.
- **Safe options:** A key theme of the Safe in Place workforce consultation was a view that culture prioritises transport to ED as the safest option for both patient and the clinician. This is distinct from providing Best Care and was found to be influenced by several factors including: limited guidance on criteria or pathways for community-based care, gaps in positive feedback culture, and limited clinical monitoring mechanisms.




Forward-thinking initiatives

In response to these challenges, AV is implementing key initiatives to streamline alternate care pathway interactions:

- **FARL-App launch:** The introduction of the Feedback After Referral Link Application (FARL-App) aims to facilitate an integrated alternate care pathway feedback process post-referral, regardless of the outcome of the referral. This tool is designed to collect vital data on service interactions and referral outcomes, allowing us to improve these services moving forward. FARL-App will supersede all other existing alternate care pathway feedback forms and should be used in conjunction with local manager interactions and Riskman reporting where appropriate.
- **Dedicated ASP education series:** We are rolling out a series featuring alternate care pathway representatives to tackle common questions and incorporate clinician feedback.
- **OneAV page for ASP information:** A dedicated page will now centralise alternate care pathway information, making it easily accessible to our staff.
- **ASP-specific mobile app:** To directly support clinicians both in the field and on the phone we are scoping the development of an app tailored to provide crucial alternate care pathway information and live updates on service availability.
- **Residential aged care facility (RACF) engagement:** This is an ongoing initiative to assist RACF staff with government grant funded technology to facilitate VVED consultations. Providing training to better understand the process of using VVED and other non-emergency providers when appropriate to ensure best care for their residents.
- **Clinical Practice Guidelines:** ongoing enhancements to existing CPGs as well as creation of new guidelines with a strong focus on alternate pathway options to support clinicians to ensure patients can be safely managed in the community.

These initiatives aim to enhance staff experience and optimise use of alternate care pathways when safe and appropriate. Additionally, there is extensive work underway directly with the ASP to further improve the services they provide, which goes towards ensuring our patients continue to receive best care.



Currently, approximately four per cent or 80 patients attended by an emergency ambulance are referred to VVED each day

Looking ahead

Currently, approximately four per cent or 80 patients attended by an emergency ambulance are referred to VVED each day, with 78% of referrals diverted away from emergency departments. Further, since expansion of VVED in AV Triage Services in November 2023, an additional 4,259 patients have been referred to VVED. Ambulance transportation rate to hospital following referral to VVED is significantly lower in comparison to cases not referred to VVED (24.6% vs 79.8%). This not only translates to overall time-savings per case, but also ensuring patients receive the most appropriate care in the most appropriate place.

Through the continued expansion of VVED, combined with the AV alternate care pathway and Safe in Place initiatives, we aim for a minimum 50% increase in ambulance referrals to VVED by mid-2024 (approximately 120 daily referrals). This ambition is set to significantly improve appropriate patient healthcare access, ambulance resourcing, and both clinician and patient experiences.

AV remains committed to evolving our practices to meet the dynamic needs of our community and healthcare system. Through innovation and dedicated improvement, we aim to assist our clinicians to continue to provide patient-centred care.



Feedback After Referral Link Application



How big a net are you weaving?

 By **James Shuttleworth**, Statutory Duty of Candour Coordinator

Firstly, an apology to my colleagues who enjoy angling or survival television shows. The nets you see in these contexts will not be discussed below. Rather I want to discuss patient safety netting in situations when the patient may not need hospital care and make a case for you asking patients and yourself three very important questions.

Let's frame these questions by discussing a case I attended many years ago before registration, before VVED and even before ALS 12-leads. I met a lovely lady who we will call Margaret. She lived on her own in a three-bedroom yellow brick house that she and her husband 'Clive' bought after they returned from the war. (We can all picture that house, right? They have a look and feel about them from another time).

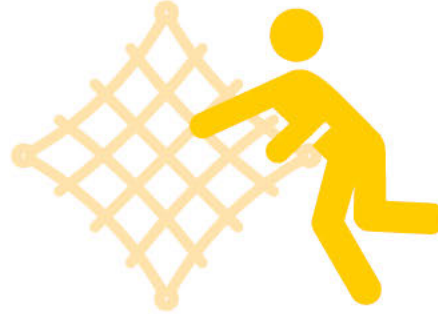
Clive unfortunately passed away five years ago, leaving Margaret alone. As I walked into the house, I remember thinking Margaret is clearly quite adept with a crochet needle (due to various doilies and teddies around the place) and that this house is weirdly clean from about my waist up and quite dirty below that.

Anyway, Margaret has called because she has a cough. She tells me that she hasn't had a cough since the 70s. I make a joke about Woodstock and this era...thankfully it goes over her head. After some discussion and assessment, we decided (retraction: I decide) that she doesn't need the hospital. It's a good decision (truly it is), she's afebrile, the cough only a little yellow, she's not overtly short of breath and her blood pressure is fine. An accurate and fine assessment, Dr David Anderson approved. We tell her to see her GP, after all, she loves Dr Richardson. He's been her GP for 30 years. We leave...

Here's a question for you the reader (if you are still here) how big a net have I left Margaret? Could it catch a goldfish or marlin? Would it stand up to the rigours of the Canadian wilderness in a season of *Alone*? I think not. This plan is not robust enough to capture Margaret's potential deterioration. I hypothesise with the power of retrospection that the goldfish might have been too big for this net.

I know this now because Margaret was taken to hospital three days later with a quite severe case of sepsis...with a chest origin. She couldn't get to the GP. Her condition slipped quite easily past my net causing her condition to worsen. Now Margaret left the hospital and returned home but it was a week later. Unfortunately, she was a lot frailer and it's likely things were tough for Margaret.

So, what didn't I ask? What didn't I consider? Simple isn't it, I didn't truly address *her context*. I didn't consider her ability to follow through on the plan. Margaret doesn't drive, Margaret is on a pension (and payday was three days away), Margaret can't pick up the rubbish on the floor, and Margaret doesn't



want to bother her daughter Jenny. This and a whole bunch of other things define Margaret's context, which is different and unique to Olive's, Caden's, Sadie's, Mohammed's, Gwen's, and everyone else's context. I didn't consider this...

So, what are the three easy questions to make that deterioration net Moby-Dick sized (I reference *Moby Dick* here, but I don't believe my story is as unique as a white whale)?

1. **Ask yourself:** 'What is this person's context?' If you need more information about this, it's okay to ask. Think about potential barriers to a person enacting a plan you have made.
2. **Ask the patient:** 'Are you happy/comfortable with this plan?' If there is a moment of hesitation, stop and explore. Make sure you let them know it's ok if they are unsure.
3. **Ask yourself and your partner:** 'What else haven't we considered?' If the vital signs are normal, remember the risk for deterioration is in the history.

I learned more from Margaret than all the other patients in my career that went well. Today I can tell you that at the scene I pull out the non-transport checklist to guide the conversation, Margaret gets VVED, and she might get a script for some antibiotics (which are then delivered), I leave her a health information sheet, geez I might have even called Jenny with Margaret's permission and suggested seeing the GP about an ACAS assessment. This casts a broader net that captures and cuts off serious deterioration. Most importantly this leads to Margaret not being as affected by this illness. All this gets written about and recorded.

Now you might argue that will take ages. What about other members of the community? I agree, but Margaret needed a second ambulance, an avoidable ambulance. They probably suffered from hospital ramping. Margaret took a bed upstairs in a ward for days preventing flow out of the ED. This held up other ambulances on other days. All because I didn't ask and truly consider three very simple questions. We have all been to a Margaret. The broader question then, is it time for each of us to truly reflect on this?

PANDA Trial

The efficacy and safety of noradrenaline and adrenaline for the management of patients with cardiogenic shock



By **Dr Amminadab Eliakundu**, Honorary Research Fellow, AV Centre for Research and Evaluation

Background

Cardiogenic shock (CS) is a complex haemodynamic state, characterised by end-organ hypoperfusion due to cardiac dysfunction¹. Morbidity and mortality associated with CS remains unacceptably high at 50%². Pharmacologic therapy with the use of vasopressors and inotropes are an essential element of this treatment strategy. In patients with a diagnosis of CS, 90% of those admitted to an intensive care unit (ICU) and 55% of patients treated in the pre-hospital setting receive at least one vasoactive medication.^{3,4} Here, we briefly explore the safety and efficacy of adrenaline and noradrenaline for the management of patients with CS.

Vasoactive medications use in intensive care units

The use of vasoactive medications in CS is common. In the intensive care unit (ICU) setting, approximately 25% of admitted patients receive at least one vasoactive medication, increasing to over 90% in patients with CS^{4,5}. Although comparative studies assessing these agents are limited, noradrenaline is increasingly administered for patients requiring haemodynamic support with CS⁴.




Vasoactive medications use post-ROSC

The Advanced Cardiac Life Support guidelines recommend initiation of either adrenaline, noradrenaline, or dopamine

to sustain adequate haemodynamic support after return of spontaneous circulation (ROSC) is attained⁶. However, considerable uncertainty remains over the first-line vasoactive therapy selection due to paucity of robust clinical data⁷. Importantly, survival rates after cardiac arrest remain poor - even after achieving ROSC, approximately 60% of patients admitted to the hospital after cardiac arrest die from complications⁸. Despite this, evidence from observational studies indicate that noradrenaline is associated with favourable outcomes when compared to adrenaline for patients with ROSC after out-of-hospital cardiac arrest. A majority of these studies have reported increased rates of re-arrest^{9,10}, increased refractory shock¹⁰, or a combination of both with administration of adrenaline¹¹. Importantly, these observational studies are limited by small sample size, retrospective data, and a range of unmeasured confounders that make comparisons of the safety and efficacy of noradrenaline and adrenaline difficult.

Evidence for use of vasoactive agents in cardiogenic shock

Despite vast improvements in our understanding of vasopressors, there remains considerable uncertainty in their use for CS, which is largely driven by the historical challenges in conducting randomised controlled trials in this challenging patient population¹². As a result, current international guidelines provide inconsistent recommendations for the

**AmbulanceVictoria**
PANDA
PAramedic Randomised Trial of NoraDrenaline Versus Adrenaline in Cardiogenic Shock
A phase III multi-centre, open-label, randomised controlled trial.


Over the next 24 months, MICA Paramedics across the state will randomly assign over 1,100 patients with CS to receive either intravenous adrenaline or noradrenaline infusion.



first-line vasoactive medication to be used in patients with CS¹. Despite the lack of consensus, there is an emerging body of data to support the use of noradrenaline in patients with CS⁴.

For instance; the OPTIMA CC¹³ and CAT clinical trials¹⁴ compared adrenaline to noradrenaline for the management of the patients with shock. The authors of these studies reported increased rates of refractory CS and higher rates of metabolic derangements in the adrenaline-treated arm, respectively. Additionally, the SOAP-II trial was an ICU based trial that compared the use of dopamine with noradrenaline in all-comers with shock and found that dopamine was associated with increased risk of arrhythmia compared to noradrenaline¹⁵. These earlier studies are hypothesis-generating and warrant further investigations to establish noradrenaline's superiority over adrenaline as the first-line therapy in CS. Furthermore, the generalisability of these studies to other clinical settings may be limited as they were conducted in hospital ICUs. Therefore, it is yet to be determined whether noradrenaline or adrenaline administered in the pre-hospital setting reduces short-term mortality and myocardial injury, and improves clinical outcomes in patients presenting with CS.

Implications for paramedics

Like elsewhere in Australia, current clinical practice guidelines from Ambulance Victoria recommend paramedics administer adrenaline for patients presenting with cardiogenic shock, despite limited evidence supporting the superiority of this agent over alternative medications.

The Paramedic randomised trial of Noradrenaline versus Adrenaline in the Initial Management of Patients with Cardiogenic Shock (PANDA) trial seeks to definitively establish if noradrenaline improves clinical outcomes, compared to adrenaline, in the initial resuscitation of patients with suspected CS. Over the next 24 months, MICA Paramedics across the state will randomly assign over 1,100

patients with CS to receive either intravenous adrenaline or noradrenaline infusion. The results generated from this trial will be translatable to a range of clinical settings and serve to inform clinical practice and guideline recommendations for the management of patients with CS.

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Differentials: Shortness of breath



By **Penny Grattan**, Specialist Paramedic Educator, Continuing Education



This activity uses a **problem-based learning model**. This encourages innovative and critical thinking, problem solving, and clinical reasoning skills. This aims to extend your understanding and identify knowledge gaps.

It does not matter what level of knowledge or experience you have. You can make this as complex or as simple as you like.

Using a pen and paper please think outside the box as you practice your critical thinking and clinical reasoning using the following case study. It will take just a few minutes, but might have you thinking for a while longer.

You are dispatched to a 50-year-old person complaining of shortness of breath.

What comes to mind in terms of possible causes of the shortness of breath?

Write down a list on a piece of paper or whiteboard — you will be adding to or removing possibilities as you move through the questions. Test groups have provided an average of 13 possible causes.

Now you have created a list, please proceed through the following questions systematically.

You arrive on scene to a house with an access ramp and are greeted by a person who appears breathless with a wet sounding cough. There is a strong smell of cigarette smoke, and the walls appear smoke stained. You note there are items on the floor in the hallway and around the front veranda which may impact access/egress.

Does this information support any of your possible causes? Are there any you would like to add?

You ask the person their name and if they would like to sit down.

The person replies that their name is J and they have called you for their friend who is visiting for lunch. They lead you to

the patient who is sitting at the kitchen table. The patient's name is D, they live alone independently an hour away. They do not have mobility problems and do not smoke.

Are there any possible causes you would like to remove or add to your list?

You find the patient, D to be alert, pale, and speaking in sentences when asked what happened to lead them to call triple zero. They state that they have been feeling 'off' and short of breath when they walked in from the car.

Which possible causes would be supported by this information? Are there any you would like to remove or add to your list?

D provides a booklet that contains their medical history as follows.

Past medical history: High cholesterol, chronic knee pain.

Medications: Panadol osteo, Lipitor, Multivitamin supplement.

No known allergies.

When asked, D denies any recent trauma, surgery, or illness including fevers or cough. Stating "I went to the doctor last week because I'm just so tired. I had a blood test, but they haven't told me anything. I don't have time to be sick, I'm a school teacher and average 11,000 steps a day".

Are there any possible causes you would like to remove or add to your list?

D provides consent to examination. After completing a vital sign assessment, you have the following additional information:

- GCS 15
- BP 140/80 mmHg
- HR 86 bpm
- 12 lead ECG shows a normal sinus rhythm with an occasional ectopic beat.
- SpO2 98 % on room air
- RR 20/min with normal tidal volume, normal work of breathing, denies pain on inspiration and expiration, and chest sounds are normal to bases bilaterally on auscultation
- Temperature: 36.9oC
- BGL: 6 mmol/L

Are there any possible causes you would like to remove from or add to your list?





A full physical examination/secondary survey reveals the following:

Their skin is pale, and they are reporting ongoing lethargy of late. D states they feel lightheaded on standing with transient HR elevation to 98 bpm (you note they are taking notably deeper breaths when standing). D also states has had episodes of nausea, decreased appetite for their usual diet as well as loose bowels.

No other signs noted by you, or symptoms reported by D.

Are there any possible causes you would like to remove from or add to your list?

What is your provisional diagnosis and why? What care pathway would you choose?



Learn something new or refresh your knowledge.



Reflect on how you are going to incorporate that learning into your practice.

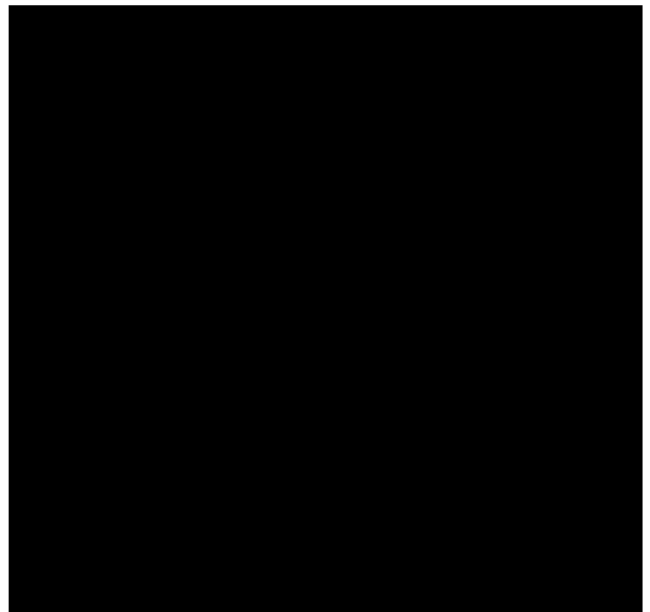


Log your reflections and remember to keep your records for five years.

Grand Rounds

Coming up: Respiratory

The next Grand Round will continue the respiratory theme, timely for the winter season.



Watch back: The Deteriorating Patient

Acute deterioration may occur at any time during a patient event. Recognising acute deterioration relies on detecting, understanding, and interpreting abnormal vital signs and other observations, and escalating care appropriately to prevent further deterioration or serious outcomes. This can be a complex process.

This topic was given depth and light by expert speakers Dr Joshua Allen (Senior Lecturer, University of Melbourne) and Belinda Delardes (Resuscitation Coordinator). ALS Paramedics Paisley Smith and Luke Sproules shared a case study that demonstrated the importance of situational awareness and patient experience.



I'm pleased to provide another update in this second edition of *Clinical Insights*.



 By **Nicola Reinders**, Executive Director Quality and Patient Experience

We were happy to get some great feedback on the first edition of *Clinical Insights* and the recommencement of the Grand Rounds. Many of you said that you found the newsletter and subsequent event a positive addition to your clinical learning and development calendar. We had a couple of suggestions on topics that we have included in this season's edition, on alternative services and an APO/COPD query that Medical Director David Anderson picks up in his editorial.

If you weren't able to join us for the Grand Round event live, I do encourage you to [look back on the recording](#). One of the highlights for me was the reflective discussion led by paramedics Paisley Smith and Luke Sproules, who spoke about an emotional and difficult case they attended. Sharing cases and learnings in this way contributes to the positive and learning environment we are trying to create and normalise at AV, because there will always be things we can take away and adopt in our practice. This is the essence of Best Care.

"After seven years we have gone back to review and refresh our Best Care Framework to make sure it builds on our strengths and addresses areas we can improve on. Look out for the new framework which will be coming out in June."



Paisley and Luke and all involved, both on scene and remotely, used all their clinical skills, experience, teamwork, compassion, empathy, and fabulous communication, in a dynamic situation to provide the right care, personalised for that patient, connecting them to the care they needed and achieving the best outcome for them.

For me this exemplified what we have been building at AV for over seven years since we introduced *Best Care: Every Patient, Every Time* at AV. It started with some simple questions. *What was the experience you would want for a loved one who needed care abroad, when you weren't there? What characteristics of the paramedics caring for them you would want, to achieve that experience? What systems would be needed to support them?*

The answers became the standard we now aspire to for every patient, every time, every day — an experience that is Safe, Caring, Effective and Connected.

We know that achieving this relies on the evidence-based knowledge, skills and competency, compassion and empathy and great communication of our frontline clinical staff — whether on-road, on the phone, in the communications areas, on video, or in the air.

And for our clinical staff to deliver their best care they need to be supported by our systems across every role and every part of the organisation: from our Board and Executive, management and support staff. Whether it be in HR or payroll, communications or finance, education or research, health and safety or patient safety, risk management or our digital systems. Best care is the core purpose for AV and it requires us all working together, continuing to improve our systems, and working with our partners across emergency services and health so that you at the point of care can do your jobs safely and deliver best care to the community.

After seven years we have gone back to review and refresh our Best Care Framework to make sure it builds on our strengths and addresses areas we can improve on. Look out for the new framework: *Best Care Everywhere 2024-2028* which will be coming out in June. It will help us better embed our vision, common purpose and focus across our organisation so we can improve the quality, safety, efficiency, timeliness, equity, and person centredness of our care. Working together is the key to achieving this.

All the very best and thanks for your service.

