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HIGHLIGHTS OF THIS ISSUE

Child Safety

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A message from our Primary Care Medical Advisor

Square pegs and safety nets: Clinical reasoning in paediatric practice

By **Amanda Burnside**, General Practitioner; Deputy Director – Quality and Safety, VVED; Primary Care Medical Advisor, AV

In medicine, clinical assessment is both a science and an art. The prehospital environment adds its own complexity, and when the patient is a child, the stakes and challenges rise even further. Children present differently from adult patients: they have unique disease patterns, developmental needs, and communication requirements. They require care that is specifically adapted to their age, size, and context.

Clinical Practice Guidelines (CPGs) are essential tools, but they cannot capture every nuance. Medicine is full of grey zones, the square pegs that don't fit neatly into round holes. That's where clinical reasoning and judgement come in. As paramedics, you draw on your knowledge, skills, and experience to deliver the safest and most appropriate care, using the supports and safety nets available to you.

As Professor John Murtagh, a giant in General Practice, said:

"More mistakes are made by not looking than by not knowing."

Thorough history gathering, careful examination, clear communication, and an open mind are critical, especially in children, where rare conditions and subtle signs can easily be missed. As Dr Claire Wilkin and A/Prof Ben Meadley explore further, no one expects you to know everything. Staying curious, actively avoiding cognitive biases, and listening deeply to the child and family can make all the difference.

Biases such as anchoring, confirmation bias, or premature closure can lead to missed diagnoses and patient safety events. Many of us have fallen into these traps. For example, assuming a febrile child has a simple viral illness without considering sepsis, or attributing lethargy to dehydration without checking for hypoglycaemia.

When a child needs hospital care or time-critical intervention, **escalate early**. Patient care and safety is a team sport. Whether it's **MICA**, the **AV Clinician**, **AV DOC**, or **PIPER**, give the other players a chance to step in and support you early. You should never feel isolated or alone in these cases. In this issue, James Yates shares valuable insight into the neonatal care journey, and Tara Ralph provides an excellent overview of neonatal and paediatric OHCA. While these are low occurrence events, heightened clinical awareness is essential. The workforce should remain 'Resus Ready'.

> "More mistakes are made by not looking than by not knowing."

In my early years as a GP trainee, I lay awake wondering, *"Should I have sent that child to ED?"* Over time, I've learned to manage uncertainty better. I've come to accept that I won't have all the answers, but I do have supports, tools and strategies to help me communicate effectively, and build safety nets around patients. My sleepless nights have improved too.

Context matters. The same diagnosis can lead to different dispositions depending on:

- Who the child lives with
- Cultural factors
- Safeguarding considerations
- Geographic location and transport access
- Health literacy and family support

When you're **not transporting**, safety netting is vital. Use all your available resources, phone a friend, consult the **VVED**, the **AV Clinician** or **AV DOC** if you are unsure. Don't forget to use patient education sheets to help with safety netting and to support family recognition of deterioration and red flags. It's now **mandatory to consult VVED for any non-transported patient under 28 days old**, and is strongly recommended for those under three months. James Shuttleworth has shared excellent insights into what VVED can offer.

This issue features highly valuable contributions from paediatric experts and leaders. I've learned a great deal, and I'm sure you will too. But don't forget the wisdom within your own team, debrief, reflect, and share cases with each other. If you identify patient safety risks or improvement opportunities, please share them with the **Patient Safety Team**. Patient safety improvement is about learning from our own experience, and those of others, to improve clinical practice and prevent and minimise harm in the future.

As a GP, primary and preventative care is close to my heart. You, as paramedics, are privileged to be there not only in the emergencies, but often as the **first point of contact** for families navigating a very complex health system. Even in brief interactions, offering simple health education to a family can lead to long-term improvements in paediatric health and safety.

Let's speak up for safety, especially **child safety**. It's everyone's responsibility. At Ambulance Victoria, paramedics play a vital role in ensuring safe, high-quality care for children. This year's **World Patient Safety Day** theme *'Patient safety from the start!'* is a powerful reminder of that responsibility.

Let's continue to champion paediatric safety from the very first contact, and ensure every child receives the care they deserve.

Listening is life-saving

Child safety and the power of parental insight

By **Tegwyn McManamny,** Executive Director Quality and Clinical Innovation

Every year on 17 September, World Patient Safety Day brings global attention to the importance of safe healthcare. Initiated by the World Health Organisation, the day encourages patients, families, healthcare workers, and communities to unite in efforts to improve safety and reduce harm in healthcare settings.

This year's theme is 'Safe care for every newborn and every child – Patient safety from the start!', recognising the unique risks newborns and children may face. WHO's message is clear:

"Every child, regardless of background, has the right to safe, quality care from birth onwards".

As health professionals, we share the responsibility to work with caregivers, communities and fellow healthcare providers to ensure that the healthcare environments we operate in support the provision of safe and effective care.

At Ambulance Victoria, we demonstrate this commitment in many ways, and I have chosen one incredibly important one.

Partnering with families: parents, caregivers and families are not an accessory, they are fundamental members of the care team. If there was one single take-home message from me, it would be **"listen and act on parental concern."** The delayed recognition of deterioration remains a leading cause of preventable morbidity and mortality in children, and multiple patient safety incident reviews and coronial inquests have called for enhanced early warning systems and improved communication with families.

You may be familiar with "Ryan's Rule", introduced by the Queensland Government to support patients, families and caregivers to raise concerns if a patient's health condition is getting worse or not improving as well as expected. Ryan was an active 3-year-old boy who presented to hospital with fevers, general malaise, and severe pain in September 2007, after a previous misdiagnosis of mumps by a GP in the community. It was recognised too late that Ryan was suffering from a severe infection (streptococcus A, probably originating in his throat) and he tragically died of toxic shock syndrome. Ryan's parents shared at inquest that they had escalated their concerns about Ryan's condition to a number of nurses and doctors but felt that they were ignored. Ryan's Rule provides a pathway to escalation, however, does still rely on families to assert themselves, often in environments unfamiliar to them.

A recent local study conducted at the Monash Children's Hospital asked whether caregiver concern for clinical deterioration can predict serious outcomes in hospitalised children, and whether it is more useful than abnormal vital signs alone. The researchers asked parents/caregivers a proactive question into routine vital sign observations:

"Are you worried your child is getting worse?".

The findings were startling – children whose parents/caregivers expressed concern were four times more likely to be admitted to the Paediatric Intensive Care Unit (PICU) and nearly five times more likely to require mechanical ventilation. Importantly, only 4.7 per cent of all caregiver concern responses were 'yes', suggesting that families are not alarmist, but are selective and avoid over-reporting. Parental/caregiver concern had a positive predictive value of 6.9 per cent for PICU admission and a negative predictive value of 98.2 per cent. Also importantly, is the positioning of parental/caregiver concern as an early warning sign of deterioration: in nearly 1 in 5 cases, caregiver concern was documented before any physiological deterioration.

This research adds weight to the recommendations of the 2023 Safer Care Victoria white paper *See Me, Hear Me*, which aimed to improve emergency health care for Victorian children: ensuring that parents concerns are heard and acted upon was one of the key recommendations. In addition, under the National Safety and Quality Health Service (NSQHS) Standards, all health services must have processes for patients, carers or families to directly escalate care: what does this look like for paramedics?

"Every child, regardless of background, has the right to safe, quality care from birth onwards."

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What listening looks like in practice

Resource	Might look like …
Clinical Flags/Patient Safety CPG P0108 – parental concern is emphasised here as a valid reason for a child to see a medical practitioner and should not be discounted.	*Caregiver: "I'm really worried about her, she's not herself."* *Caregiver: "Um … I'm not really comfortable about us staying at home – something is not right with my son."*
Assessment Introduction CPG P0101-1 • Caregiver level of concern is a valid symptom when assessing a child and it should not be discounted. • Children presenting with abnormal vital signs must be transported to hospital.	*Paramedic: "How is your child different from normal today? Are they getting any worse or any better since calling us."*
Escalation of Care CPGA0113 Abnormal/deteriorating vital signs or high-risk criteria must be escalated to MICA, with specialist resources/ consult following as applicable.	• Early request for MICA/AAV. • Escalate care to provide senior clinical review or intervention, specialist consultation or specialist resources. • Team consensus to escalate care is not required. Any team member can trigger escalation of care.
VVED paediatric service Paediatric Emergency Physicians and Paediatricians are usually available 24 hours a day, where they are not available, skilled paediatric emergency doctors and nurse practitioners will be available. VVED are able to provide follow up to patients in the Rapid Access Clinic, or if required and suitable, patients can be admitted to the virtual observation ward for closer monitoring.	• Children who would normally be transported to ED for medical assessment and receive an ED triage category of 3 - 5. • Children who require a medical review within the next 24 hours, but no other healthcare provider is available (e.g. GP). • Parents concerned. • There are other yellow clinical flags. • Children who would normally be transported to ED for monitoring post medication administration (for non-red-flag conditions) and are likely to return to almost baseline condition post administration.

Parental concern is a vital sign

In cases of uncertainty, **share the care**. Phone the AV Clinician or call VVED. In the prehospital setting, there are not many opportunities for patients, carers or family members to access help independently of the team that is directly providing care to the patient, so it is more important than ever that we hear concerns, and act on them. Parental/caregiver concern can be thought of as another valuable vital sign – never ignore it.

My journey into neonatal transport as an Advanced Paramedic Practitioner

By **James Yates**, Specialist Paramedic (Prehospital Critical Care), Advanced Paramedic (Neonatal Retrieval), United Kingdom and co-host of The Resus Room podcast

Disclaimer: *This article has been generously contributed by James, who writes from the perspective of a UK-based clinician. While the clinical insights are valuable, readers are reminded to continue applying Ambulance Victoria Clinical Practice Guidelines (AV CPGs) when caring for neonatal patients.*

Sitting at my desk, anxiously clicking my pen top, I methodically review the service SOPs, the network policies, national guidelines, and prescribing etiquette. Drinking in the information despite reading them many times before. I stare at the phone. Am I ready? Then shrill tones ring out and I'm transported into an Eminem track: "His palms are sweaty, knees weak, arms are heavy..." only instead of a microphone, I have a pen in one hand and a phone in the other.

The initial months were extremely challenging. Information coming in thick and fast, gestational age, birth weight, antenatal history, interventions, ventilation settings, blood gases, X-ray findings. I struggled to keep up. Synthesising the referral into a diagnosis and management plan while recording the salient points, acutely aware of missing critical details. And all before I'd even left the building.

Joining the South West Neonatal Advice and Retrieval Team marked a stark transition from the structured familiarity of prehospital critical care, where years of experience had fostered confidence. In the neonatal setting, I was a novice again, relearning, recalibrating, and adjusting. The contrast was striking, and at times I felt completely out of my depth. Yet this was a challenge I had actively sought. Prehospital clinicians, myself included, often regard 'birth imminent' calls with trepidation. I wanted to confront that discomfort head-on. This role represented a deliberate step toward addressing those fears and advancing my clinical practice.

Learning to hold the world's smallest patients

My journey into neonatology was both humbling and transformative. While I had anticipated the need to acquire new knowledge in neonatal medicine, I had underestimated the extent to which it required a different skill set and clinical mindset. One early and profound lesson was simply learning how to handle sick babies, especially preterm ones. Everything felt alien: their fragility, size, and the equipment used. The clinical environment also demanded adaptation. Dimmed lighting, access through incubator portholes, and humidity condensing on their walls clouded visibility and confidence. Scrupulous attention to aseptic procedures made even routine tasks feel daunting. Every action became conscious, and I was faced with a constant stream of micro-decisions.

Neonates are exquisitely sensitive to temperature, light, noise, and touch. Developmental care is a central concept, with a focus on minimising stress and optimising the environment to promote healthy brain development. Avoiding sudden fluctuations in these senses is key. This demanded a shift in my thinking. The goal was no longer just resuscitation or stabilisation, it was preservation and protection. It is care in the present but with one eye on the future. I had to learn to slow down, to be intentional in every movement. A real challenge coming from the fast-paced world of prehospital critical care.

And yes, the medicine is different. Neonates aren't just small adults, or even small children. Their anatomy and physiology are specific to the neonatal period and many pathologies are exclusive to this stage of life. The physiological targets of resuscitation and management options differ. Familiar interventions, applied differently, don't always yield familiar results, and pharmacological strategies vary from those I was accustomed to. Integrating investigations and imaging to guide diagnosis and treatment was a major change to the resource-poor prehospital setting.

Bridging two worlds: Critical care meets neonatology

Developing my neonatal practice did not mean discarding everything I had previously learned. The challenge lay in blending the rigour and complexity of prehospital critical care with the precision and nuance of neonatal practice. Many skills translated effectively. There were familiar challenges, just in a new context.

Human factors, those ever-present considerations of communication, situational awareness and teamwork are as vital at the cotside as at the roadside. Structured assessment, defined roles, clear clinical plans, and calm, coordinated leadership, remain essential whether the patient is 100 kg or 1 kg. Decision-making remains grounded in evidence but supported by experience. Echoing prehospital demands, interventions are prioritised in a life-saving pyramid of importance, whilst balancing on-scene stabilisation with timely transfer.

Retrieval medicine necessitates a high level of technical proficiency, coupled with a comprehensive understanding of transport-specific equipment. Many components aligned with my prior experience, but the neonatal setting introduced new and highly specialised elements. These required structured education, targeted simulation, and close mentorship to ensure the safe and effective delivery of care.

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Knowledge translation

Although this journey began as a personal endeavour, my aim was always to bring the profession along with me. Professional development is empowering and rewarding, yet its direct impact is often limited to individual patient encounters. In contrast, the dissemination of knowledge serves as a force multiplier, amplifying our collective impact. Presenting at conferences, contributing to textbooks and developing the new *Out of Hospital Newborn Life Support* course for the UK Resuscitation Council have offered meaningful opportunities to advance this objective. In that context, I would like to highlight four key principles, essential to effective prehospital neonatal care.

1. Warmth and oxygenation is key

It may seem simple, but if one principle should be remembered above all, newborns require warmth and adequate oxygenation and ventilation. Hypothermia and hypoxia are critical threats that develop rapidly.

Thermal care starts from the moment of birth, tailored to gestational age and clinical condition. Interventions such as drying, skin-to-skin, a thermal mattress, hats, blankets, plastic bags and bubble wrap should be selected to provide optimal thermal conditions. If positive pressure ventilation is required, follow the resuscitation guidelines closely. Do not proceed until chest rise or heart rate increase is seen.

2. Delayed cord clamping

Delayed cord clamping is a simple but highly effective intervention in a well newborn. Optimal timings aren't clear but waiting 30–60 seconds (3 mins in the AV CPG) before clamping allows for greater placental transfusion. In term infants this improves circulatory stability and haemoglobin levels, but in preterms we see reduced mortality along with a reduction in rates of hypotension, blood transfusions and inotropic support.

If the newborn requires support to transition, the cord should be clamped and cut immediately to facilitate resuscitation.

3. Safe transport is more than moving from A to B

Neonatal transport is not just a logistical task, it's a continuation of care. Newborns are exquisitely sensitive to noise, vibration, temperature and light. Safe transport means meticulous planning. Considering the route to and from the ambulance, preparing the environment accordingly, using appropriate restraint systems (where available), maintaining optimal thermal management, and communicating clearly with the receiving team.

4. Family engagement is fundamental

One of the most profound lessons in neonatology is recognising the central role of the family. Parents are not passive observers but active partners in their infant's care. Involving them in practical aspects, such as assisting with nappy changes, whilst providing clear and timely updates, and maintaining the emotional connection to their baby is essential. If resuscitation has been required, the experience can be deeply distressing. A compassionate word, transparent communication, and a commitment to keeping them informed can significantly alleviate their anxiety. Neonatal care is not solely about the infant; it is about supporting a family.

Final thoughts

Today, as part of the neonatal transport team, I no longer feel like the lost paramedic on the end of the phone. I am a contributor, a bridge between disciplines, a valued member of the team. Working in neonatal transport has reminded me why I became a clinician. It's a world of high stakes and quiet triumphs, where our smallest patients demand our greatest efforts. It has challenged much of what I thought I knew and enriched my practice in ways I never imagined.

To my colleagues across the ambulance service: don't hesitate to embrace the unfamiliar. Confront your fears, expand your skills, and share your experiences. Neonatal intensive care is complex and specialised, but at birth, newborns have a small set of fundamental needs. Do not fear them—you possess the skills necessary to care for them and their family.

Partnering for paediatric safety: Parents, paramedics, and practice

World Patient Safety Day

By **Claire Wilkin**, Clinical Director, PIPER; Paediatric Medical Advisor, AV and Paediatric Emergency Physician, The Royal Children's Hospital

Every child deserves safe, effective, and compassionate healthcare. Children and newborns are only 10 per cent of the ALS caseload on average, so managing their care can be unfamiliar and sometimes daunting. In recognition of the World Health Organisation's theme for World Patient Safety Day *'Safe care for every newborn and every child'*, I'd like to outline some of the tools that paramedics use to provide safe, confident, and high-quality care.

Trusting your assessment skills and your CPGs

Children aren't just little adults. We can't take the adult guidelines and minimise them until they fit the small humans. Children, and especially neonates, have different physiology and anatomy that impacts illness and injury patterns, and their treatment.

Even without daily paediatric exposure, your core clinical instincts are valuable. After more than 10 years working with AV, I believe that most paramedics underestimate their ability to assess children.

Simple observations are always the most useful. Take a step back and ask yourself:

- Does this child look well or unwell?
- Are they breathing normally?
- Are they alert and interactive?

These simple questions often provide the clearest clues. Allow yourself the time to engage your clinical instinct. Combining this first impression with a structured approach to assessment helps ensure nothing important is missed.

Clinical practice guidelines provide structure, clarity and reassurance for clinicians. However, they don't replace your clinical judgement – they are there to support it.

Knowing when to ask for help

One of the most powerful safety tools you have is recognising when to ask for help. Children can look reasonably well one moment and deteriorate rapidly the next. That's why picking up the phone to the AV Doctor on Call (DOC) is an important option to remember. They can advise you over the phone and connect you with paediatric and neonatal subspecialists if needed, which can be potentially lifesaving.

Listening to parents

"The hardest part about paediatrics is the parents"

Paediatricians hear this frequently during our training. But the truth is the parents are our best resource in caring for the child.

Each patient comes with a very dedicated and motivated carer – imagine how much easier adult medicine would be if this was the case. Parents have all the information about the child's history. So take the history and then, take it again. I don't mean the developmental or birth history (unless it's a newborn), but rather the history of the current issue and concerns. Most of the information you need for your assessment exists in the parent's mind but you must ask the right questions to access this patient super-computer.

This isn't to say parents can't be tricky or come across as hostile, tangential, unhelpful, or even aggressive. We should assume a parent is doing their best in whatever circumstances they find themselves. It's easier to keep perspective if you remember that parents are always advocating for their child, above all else. Focusing on the child will often also allow the parent to refocus too.

We hear that we should listen to a worried parent. However, no-one calls 000 unless they are worried, so all of the parents we respond to are worried at baseline. How do you differentiate the anxious parent with the well child from the anxious parent with the unwell child? The key is to always listen - parents know their child better than anyone. If they tell you something's not right, it's worth taking seriously. They won't always be correct, but they deserve to feel heard. Their perspective often provides the missing piece of the puzzle.

> …the truth is the parents are our best resource in caring for the child.

Parents of medically complex kids are especially experienced, and they know what good care looks like for their child. As a paediatrician, but also as a parent to two medically complex kids, I've sat on both sides of

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this fence, and I understand the challenge for both parents and clinicians.

If you are called to a patient with a syndrome you've never heard of, what do you do? Will the parent think you don't know medicine if you admit you don't know? Or should you put the name of the syndrome in Google and pretend that you know? Phrased that way, the answer seems obvious. These parents don't expect you to know about the specifics of their child's condition, but they will expect that you will listen, record what they say accurately, and ask questions if you don't know.

Don't pretend, I promise you they can tell immediately. And they don't need you to know the details, they've got those covered and ready to share. We need you for your medical knowledge and assessment skills, and we need you to use them to the best of your ability, every time, using our support to engage best with the child.

Some questions that help in this scenario, regardless of the condition:

- Can you tell me how your child's condition affects them every day and on days when they are unwell?
- What's different about your child today, compared to their usual self?
- What are you most worried about?
- What do you think needs to happen?

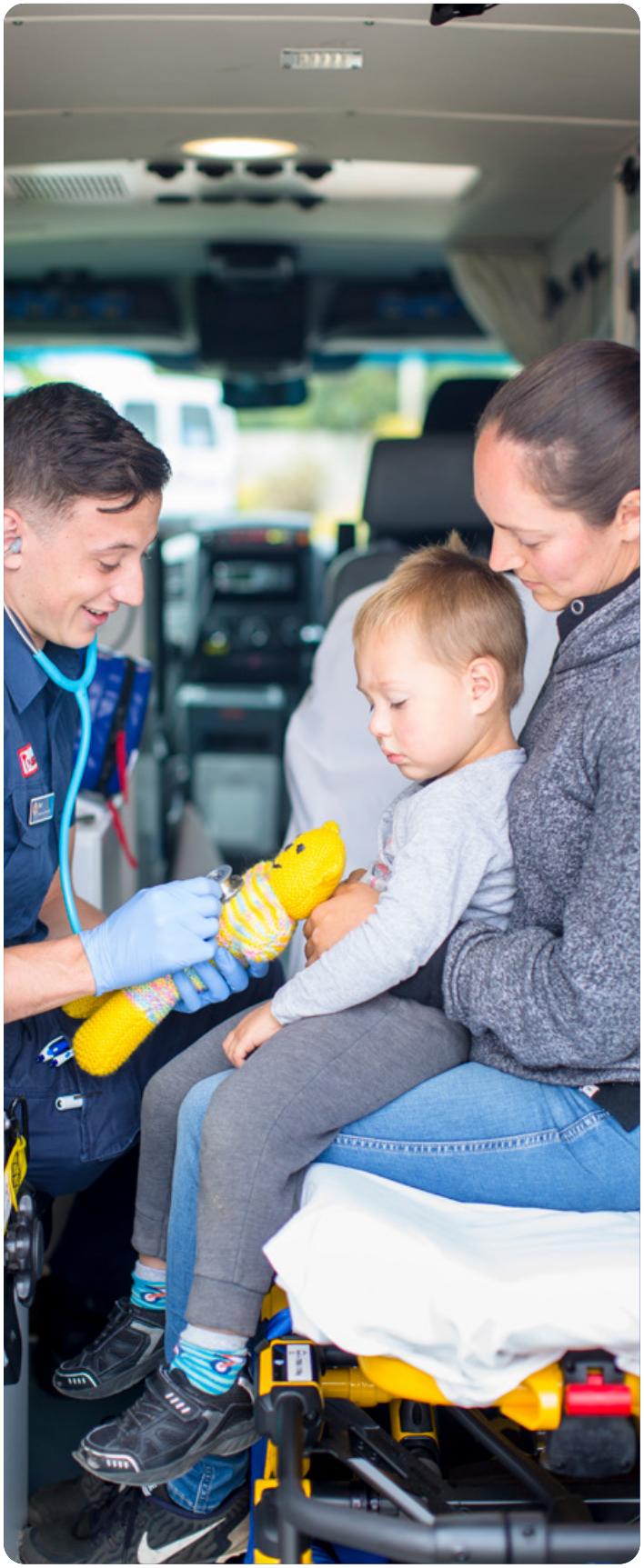
When you come to treatment options, these questions can be helpful:

- What has worked before?
- What hasn't worked?
- Has your child returned to baseline? (This one is particularly helpful in non-speaking patients, or patients in whom their baseline functioning might differ from a typical child of the same age)

Parents' answers can guide the urgency of your response and can be illuminating about the actual source of concern.

In summary

Safe care for newborns and children isn't about being a paediatric specialist. It's about careful observation and appropriate escalation of care. When in doubt, ask for help. Let guidelines guide you. Trust your assessment skills. And above all, listen to parents.



Smaller patients, larger risks: Challenges in paediatric paramedicine

Appreciating the roles of physiology, assessment, and collaboration when caring for sick children

By **Ben Meadley**, Director Paramedicine

Paramedics face unique challenges when caring for children. While adults comprise most of our emergency cases, children present less frequently, and when they do, their illnesses or injuries often create a greater sense of urgency. For many paramedics and first responders, managing a critically unwell child is one of the most difficult aspects of the role. The combination of infrequent exposure, limited diagnostic capability, and the inherent vulnerability of children, makes such cases both complex and demanding.

Most children are generally healthy, and serious illness in this group is relatively uncommon. As a result, a first responder or paramedic's day-to-day practice rarely involves paediatric emergencies. This lack of regular exposure reduces the opportunity for clinical familiarity, meaning we are often required to rely on fundamental principles, guidelines and protocols, rather than accumulated experience.

Even in specialist pre-hospital practice, exposure to critically unwell children is quite low, and we've undertaken several studies over the years at AV to better understand this[1,2,3]. For example, we know that our team of approximately 50 MICA Flight Paramedics (MFPs) working in HEMS can often see the sickest patients across Victoria, but collectively perform paediatric rapid sequence intubation (RSI) about 20 times a year. This means that any one MFP can expect to perform a paediatric RSI once every 2.5 years. For our 500 or so operational MICA Paramedics, about 40 paediatric intubations are performed service-wide each year, about three quarters of which are for cardiac arrest. This means a MICA Paramedic may expect to perform one paediatric intubation every 11 years or so. Whilst these average numbers don't bear out in reality for individual clinicians, we can nonetheless appreciate the infrequency with which these procedures are performed, and the challenges that come with credentialling and safe practice.

When it comes to clinical assessment, you all appreciate that diagnostic capability in the prehospital setting is also limited. Paramedics must make rapid decisions with minimal tools, usually without access to laboratory tests or imaging. In children, this challenge is compounded by the fact that normal physiological values vary significantly by age. A heart rate or respiratory rate that is appropriate for a toddler might be alarming in an adult. Subtle changes may therefore carry great significance in children, and missing these early warning signs can lead to rapid deterioration.

Recognition and responding to clinical deterioration are core principles that are highlighted in national health care standards[4], and are critical in children. One of the fundamental considerations we are all taught is that children can compensate well until they suddenly don't. Unlike adults, who may exhibit a gradual decline, and as mentioned by Dr Wilkin in her article, children may appear relatively stable before experiencing a steep and sudden deterioration. This means that we must be constantly alert to the potential for rapid changes, particularly in children with comorbidities, or significant underlying illness or injury.

Time to Hemoglobin Desaturation with initial F_AO_2 = 0.87

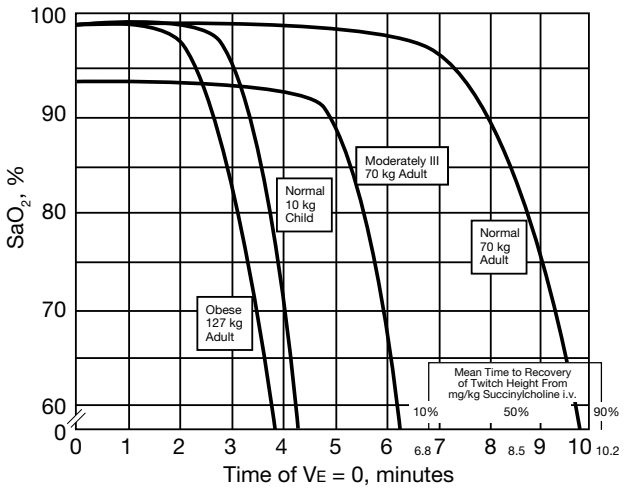


Figure caption: This figure shows how a **well** 10-kilogram child can desaturate to critically low levels within minutes, while a healthy seventy-kilogram adult retains a much larger margin of safety. In an unwell child, the time to critical desaturation is substantially lessened. For paramedics and first responders, this reinforces the principle that children are far more vulnerable to hypoxia due to their higher metabolic rate and cellular oxygen consumption. Source: Critical Hemoglobin Desaturation Will Occur before Return to an Unparalyzed State following 1 mg/kg Intravenous Succinylcholine. Anesthesiology. 87(4):979-982, October 1, 1997.5

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By involving caregivers, presuming illness until excluded, respecting paediatric physiology, and seeking team support, paramedics and first responders can navigate these challenges more effectively.

One of the most striking lessons from clinical literature is the extremely narrow margin of tolerance children have for abnormal physiology. A study by Benumof et al. (1997)[5] illustrates this point vividly. The study specifically explored haemoglobin desaturation following paralysis with succinylcholine (suxamethonium), a paralytic historically used in RSI, and the figure below demonstrates how quickly oxygen saturation can fall in children compared to adults. During my own practice when managing very unwell children, especially those on the precipice of deterioration, I mentally visualise this figure to remind myself of the limitations of physiology in unwell young children, guiding me to provide the most appropriate care.

While this example may be specific to an anaesthetic context, the principles apply broadly across paediatric emergencies. Whether managing respiratory distress, shock, or sepsis, the margin for error is small. Vital signs in children are not just numbers; they represent thresholds where very small deviations can indicate significant compromise.

In my own practice, I have found four key approaches helpful in recognising and caring for sick children:

1. Involving caregivers and family members

Parents and caregivers know their child best. What may appear normal to an unfamiliar clinician could, in fact, be a significant change. By asking families what is typical for their child, paramedics and first responders gain invaluable insight into what represents illness versus baseline status. Collaborative care enhances assessment and ensures subtle but important clues are not overlooked

2. Presumption of illness until proven otherwise

Given the potential for rapid deterioration, I approach children with the presumption that illness is present until it is ruled out (or not). This mindset reduces the risk of underestimating a child's acuity and keeps clinical vigilance at the forefront. It is safer to assume illness and be proven wrong than to miss the opportunity for early intervention.

3. Recognising the complexities of paediatric physiology

Children's physiology and metabolism require careful consideration. Personal interactions, medication dosing, and thermoregulation, are just a few examples of other elements that differ markedly from adult care. Awareness of these differences is essential for safe practice.

4. Seeking support and valuing team input

We want to support you in your practice as best we can and ensure you know that no paramedic or first responder works in isolation. The reality of paediatric emergencies is that they often test the limits of individual knowledge and comfort. Seeking help from colleagues with more experience, consulting clinical support systems such as the AV Clinician, AV Doctor on Call, VVED, and PIPER, and working collaboratively is not a flaw but a marker of professionalism. Safe practice requires acknowledging limits and using available resources effectively.

Caring for sick children as a paramedic is both demanding and profoundly important. The relative infrequency of such cases, combined with potential for children's rapid physiological deterioration, creates an environment where vigilance and preparation are essential. By involving caregivers, presuming illness until excluded, respecting paediatric physiology, and seeking team support, paramedics and first responders can navigate these challenges more effectively.

Finally, I want to acknowledge the remarkable work of paramedics and first responders at AV in caring for all members of the community, particularly children with mild, moderate, or significant illness. Each case represents both a challenge and an opportunity to make a lasting difference. By continuing to learn, adapt, and support one another, we strengthen our collective ability to meet this responsibility.

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Mental Health Information Plans for complex paediatric presentations

By **Emily Kurowski** A/Patient Management Lead

Overview

Mental Health Information Plans are comprehensive resources designed to support Communications and Triage Services, as well as Regional Operations, during mental health crises involving young people. Accessed via the Field Referral line, these plans contain critical information such as:

- Triggers and de-escalation strategies
- Communication techniques for rapport building
- Background, medical history, and key contacts
- Referral options and common themes in presentation

They aim to promote safer care and consistent responses across services.

Complex paediatric cohort

This vulnerable group includes young people who may present with:

Mental health diagnosis	Communication difficulties
Complex medical history	Potential for safety risks to our people
Challenging behaviours	Intersectionality
Potential high risk of misadventure and exploitation	Potential forensic history

Some may require physical restraint or sedation. A tailored, consistent approach is essential to support their wellbeing.

Stakeholder collaboration

The Patient Management Team monitor these patients, build stakeholder relationships, and develop patient-centred plans to promote continuum of care. Collaboration includes:

Internal referrals:	**External referrals:**
Triage Services	Child Protection Services
Mental health nurses	Department of Families, Fairness and Housing (DFFH)
Communications staff	Hospitals including ED staff, specialists, social workers and care coordinators
Team Managers in Regional Operations	Mental Health Services
	Specialist support coordinators who assist with a young person's disability, or provide out of home care
	National Disability Insurance Scheme (NDIS)

When receiving a referral, we alert Safeguarding Care for their oversight and input.

CONTINUED OVER

Plan development and integration

Plans are developed collaboratively through regular care team meetings and shared decision-making. Open communication pathways are maintained with internal and external stakeholders, which may include previously mentioned services, emergency services and specialist community supports such as drug and alcohol services and Spectrum.

Each plan is aligned with existing documentation to ensure consistency and continuity of care, including:

- Behavioural support plans
- Enhanced treatment plans
- Emergency response plans
- Hospital management plans

Once reviewed and approved by the Office of the Medical Director, the plans are distributed to all relevant stakeholders. Where appropriate, patients may also be referred to the Special Priority Patient System (SPPT) for safety or medical alerts.

Supporting safe decision making

Mental Health Information Plans play a critical role in guiding communication and clinical decision making during secondary triage. These plans are readily available to mental health nurses and triage practitioners, who can use them to provide expert crisis management and de-escalation support.

They enable clinicians to assess the situation and determine whether a young person requires intervention via emergency ambulance or emergency department, or if they can be safely managed within the community.

The detailed background information and listed support services within each plan empowers clinicians to refer to appropriate care pathways when ED attendance may not be necessary. This may include:

- Informing parents or guardians
- Reconnecting with support coordinators and care workers
- Alerting Child Protection Services if the young person is missing or at risk.

This information is especially valuable when a young person is not actively presenting in crisis, offering proactive guidance and continuity of care.

Acknowledging risk and upholding a patient centred approach

We recognise that complex paediatric patients present significant management challenges. These young people may exhibit behaviours that include:

- Risk-taking and substance misuse
- Occupational violence toward staff
- High vulnerability and potential exploitation by adults
- Absence from guardians or out-of-home care facilities

Paramedics can access Mental Health Information Plans on scene by contacting the Field Referral line, where a Triage Practitioner or Mental Health Nurse can guide them through the plan.

While the Patient Management team typically follows a referral criterion to initiate plan development, a more flexible approach is applied for complex paediatric cases. Young people with lower call volumes may receive a plan due to their elevated risk and vulnerability.

To prioritise our work, a risk scoring matrix is used that evaluates:

- Age (patients under 18 score highest)
- Use of sedation and physical restraint
- Known disabilities
- Safeguarding concerns
- Frequency of presentations

Patients who have received multiple doses of sedation or restraint are proactively identified and prioritised.

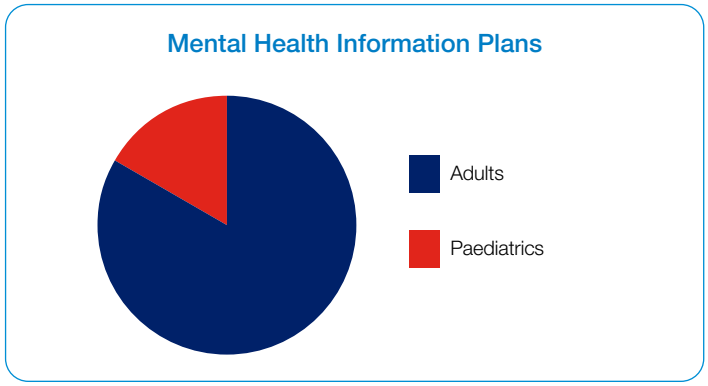
All plans are approved by the Office of the Medical Director, reviewed annually, and audited at the three and six month marks post implementation to assess effectiveness.

Given the dynamic nature of this cohort, frequent changes in contact details, addresses, and support team, auditing ensures plans remain current and relevant. This process helps maintain accurate information and ensures that all members of the care team are informed and aligned.

Conclusion

Mental Health Information Plans exemplify best-practice care by fostering collaboration across services, promoting consistency during crises, and reconnecting young people with their support networks. By partnering with a young person's care team and sharing tailored plans, we ensure safer, more coordinated responses that prioritise wellbeing.

If you know a young person who may benefit from a Mental Health Information Plan, please submit a referral via the Patient Management Team on the OneAV page Patient Management Team.



Child Information Sharing Scheme (CISS)

By **Ishelle Pollard,** Safeguarding Care Program Lead

Supporting paramedics in protecting vulnerable children

The Child Information Sharing Scheme (CISS) was introduced by the Victorian Government to enhance the safety and wellbeing of children by enabling authorised professionals to share relevant information when concerns arise.

Under this scheme, information can be shared without consent if a child's safety or wellbeing is at risk. The key objectives of CISS are to support the early identification of risks to children, enable timely intervention, and support and foster improved collaboration across sectors such as health, education, and child protection.

Ambulance Victoria's role as an Information Sharing Entity (ISE)

AV is a prescribed Information Sharing Entity (ISE) under both the Child Information Sharing Scheme (CISS) and the Family Violence Information Sharing Scheme (FVISS). This designation acknowledges AV's unique frontline role in safeguarding children. This includes our ability to observe living environments during emergency responses, identify both immediate and emerging risks to children, and support early intervention by reporting concerns to Child Protection Services (CPS).

Safeguarding Care program at AV

The Safeguarding Care Lead serves as AV's central contact for coordinating information sharing under the CISS and the FVISS.

This role provides critical support to paramedics and triage practitioners. This allows us to review and audit flagged cases, facilitating timely and appropriate reporting to Child Protection Services (CPS), and ensuring that AV's practices remain aligned with Victorian child safety legislation.

In addition to these responsibilities, the Safeguarding Care Lead also reviews cases involving family violence and elder abuse, advocates for vulnerable patients, and ensures appropriate follow-up is undertaken where required.

Responding to external requests

When agencies such as The Orange Door, Child Protection Services, hospitals or Victoria Police request information about a child or parent, the CISS request is directed to the Safeguarding Care Lead. In some cases, particularly when a full household history is needed for court proceedings, requests may be referred to Freedom of Information (FOI) for access to complete VACIS/ADASTRA reports.

Flagging a case with Safeguarding Care

When paramedics or triage practitioners flag a case, the Safeguarding Care team undertakes a thorough review of previous AV attendances, VACIS and ADASTRA reports, and event registers related to the household. This process helps establish a clear understanding of the concerns raised.

If needed, the team may request additional information from the referring crew to clarify or expand on the initial report. Once sufficient information is gathered, the Safeguarding Care team proceeds to report the matter to Child Protection Services (CPS) where appropriate.

What we can do at point of care

If child safety concerns are identified during care or triage, please ensure the following:

- **Document basic details:** Child's name, date of birth, and sex at birth.
- **Use a second patient VACIS:** where possible. If not, include details in the notes section of the primary VACIS.
- **Clearly outline concerns:** in the report or send a follow-up email to: safeguarding.care@ambulance.com.au

Flagging in VACIS and ADASTRA

- **VACIS:** Navigate to **Scene Findings > Reportable Case > Safeguarding Care**. This automatically sends the case to the Safeguarding Care team within 24 hours.
- **ADASTRA:** Add relevant notes and the CAD event number in the notes section. Select the **Safeguarding Care tab** under "Refer to ASP" to send the report.

Thank you

Your vigilance and care play a critical role in protecting some of the most vulnerable members of our community. Thank you for your continued commitment to child safety and wellbeing.

Neonatal/maternity care – Unplanned out of hospital birthing in a rural environment

Assessing specialist medical advice for shared decision making and improved clinical care

By **Brendan Kinderis**, Clinical Support Officer, **Tim Kennett**, MICA Paramedic, **Matt Humar**, MICA Paramedic, **Daria West**, A/Patient Review Specialist Lead

Newborn resuscitation in the out-of-hospital setting is infrequent. Maintaining familiarity with guidelines, routinely practicing the required skills, and revising access processes for escalation of care pathways is essential. This allows shared decision making with experts available through Paediatric Infant Perinatal Emergency Retrieval (PIPER) to enhance patient care.

An out of hospital birth that has not progressed as planned may be difficult. In addition to providing assessment and neonatal resuscitation as well as advanced care of unwell post-partum mothers, the dynamic nature of these cases and the late involvement of paramedics makes the work incredibly challenging.

In this article, we will discuss and present a case that was attended by AV paramedics. The case has been chosen as it highlights the situational awareness of communications staff, the excellent clinical care provided by paramedics, and the use of both neonatal and postpartum/maternity guidelines in conjunction with specialist advice from PIPER, demonstrating a high standard of multi-disciplinary teamwork.

Unplanned out-of-hospital birthing

Accessing specialist medical advice for shared decision-making and improved clinical care.

Dispatch information

A Triple Zero (000) call was received, with the caller reporting a 39-year-old woman who was in her third trimester, in labour, experiencing a breech birth with the 'body out and head stuck'. The case was in a small rural town and there was a patient in cardiac arrest at another location concurrently approximately 25 km away, so ALS and MICA resourcing was limited. An ALS single officer was dispatched from approximately 30 km away, however following review by the Communications Support Paramedic (CSP), a Medium Acuity Transport Service (MATS) crew was also dispatched and authorised to drive under Code 1 conditions. The CSP reviewed the information available and made the decision to cancel the ALS crew responding to the cardiac arrest and reassign them to this case, given they were less than three kilometres from the scene.

On arrival

The ALS Paramedics arrived to find the mother (Mrs J) cradling a limp newborn child, with the umbilical cord still attached to the un-birthed placenta. As well as the mother, a doula and several family members were in attendance. They were hesitant to accept assistance and reluctant to allow paramedic intervention, which added to the scene's complexity. It was obvious to the crew that the newborn was non-vigorous and required resuscitation and the paramedics were required to rapidly gain the mother's trust to move the child to the bedroom where they commenced resuscitation.

The history of the event leading up to the Triple Zero (000) call was conflicting and included a foot on show for up to 30 minutes prior to delivery versus a cephalic presentation where the head was stuck for up to 5 minutes prior to delivery. It was noted the newborn had bruising on the left leg, possibly from manual traction during birth, suggesting that this had been a footling breech.

Doulas

When attending a planned home birth with a doula, it is important to understand that while doulas can be certified, their role is to support women on an emotional and practical basis and to interact sensitively with all those involved with pregnancy and birth. They may have no formal medical or obstetric knowledge. Of note, they do not perform clinical or medical tasks, diagnose medical conditions or give medical advice, even if trained as a health professional whilst practicing as a doula. This is in their Code of Practice.

Many doulas are well known to hospitals and work closely with them. The intention of highlighting this is that some women may not have received the ante-natal care that is prescribed, and these situations can be challenging, and at times, catastrophic. Once you've arrived on scene you may consider escalating care to PIPER if required. While you may view PIPER's role as one of advice, they should also be considered for sharing the responsibility of all decisions regarding paediatric and neonatal care. This is an invaluable prehospital resource, particularly when working in remote locations.

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Primary survey

- Non-vigorous newborn
- Airway patent, nil respirations
- AVPU = U

Immediate management

The umbilical cord was immediately clamped and cut, to enable rapid resuscitation and the baby was dried. CPR and BVM ventilation were commenced at a ratio of 3:1 and using 5 cm H_2O PEEP. At this point, communication issues arose due to poor radio signal in the house, requiring one paramedic to leave to relay information and escalate care.

***Reminder: The locking of the pressure relief ('pop off') valve is necessary in both adult and paediatric ventilation and required in newborn resuscitation. The new paediatric BVM provides approximately 150 mL delivered ventilation. For newborns, aim to deliver approximately 30 mL. Rise and fall of the chest is the best indicator of effective ventilation in newborns, with increasing heart rate and activity being further positive signs. Finally, remember that when time permits its application, the SpO2 probe must be placed pre-ductal, e.g. on the right wrist and target saturations are >90%. SpO2 measurements in the newborn are a poor measure of effective resuscitation and this should only be applied once initial tasks have been completed.*

Figure 2. Mercury Medical neonatal self-inflating resuscitator (BVM) bags (left) are being replaced with the Ambu SPUR II models (right). Please check which version you have in your kit and your ambulance at the start of each shift to ease your cognitive burden at these case presentations.

The ALS Paramedics provided a SitRep: "Baby born but not breathing, request MICA Code 1".

Early and timely communications and SitRep information meant that a two-person MICA unit was able to be diverted from another case to assist. They were only 15 km away and arrived approximately 10 minutes later.

After 5 minutes of resuscitation the baby was found to have a respiratory rate (RR) of 4/min and an auscultated heart rate (HR) of 40 bpm. Resuscitation efforts continued. After a further 6 minutes, the baby had a HR of > 100 bpm, and CPR was ceased. Ongoing ventilation support was still required. Paramedics found the baby's temperature was 35.7°C and BGL was 5.23 mmol/L so further temperature control measures were initiated.

What is the normal BGL for a newborn and what is the management if found to be hypoglycaemic?

Answer: If BGL < 2.6 mmol/L, consult with PIPER for administration of IV 10 per cent Dextrose or IMI Glucagon

What else can be done to support maintenance of normoglycaemia in the newborn?

Answer: Ensure baby remains warm.

Further management of newborn in consultation with PIPER

Given the need for continuing respiratory support, the ALS crew inserted a Size 1 supraglottic airway (i-gel) with 5 cm H_2O PEEP and this was effective. Following MICA's arrival approximately 20 minutes later, the baby's APGAR had improved from 1 to 3, continuing to require ongoing assisted ventilation with an inherent RR of only 2/min. Logistically the closest hospital was still 30 minutes away so a collaborative decision with PIPER was made for the MICA Paramedic to perform an unassisted intubation.

This was successful using a size 3.5 mm ETT and confirmed with $EtCO_2$ capnography. PIPER suggested a SpO_2 target of 90 - 95 per cent (reducing O2 as required and safe to do so) and a respiratory rate of 40/min with 5 cm PEEP. The baby was subsequently transported to a regional hospital with a secondary transfer to The Royal Children's Hospital via Air Ambulance Victoria with PIPER occurred later that day. (see Figure 1)

Further management of the mother in consultation with PIPER

Following the birth of the placenta, Mrs J was noted to be very pale and complaining of ongoing contractions and abdominal pain. Further assessment revealed a HR of 160 bpm with labile blood pressure, and resultant syncopal or near syncopal episodes. With consideration of a suspected primary postpartum haemorrhage (PPH), she was repositioned to a safe area. Despite no obvious blood loss externally, she looked unwell and fundal massage was required.

Mrs J initially stated she did not wish to be treated with medication, however in consultation with PIPER and once she was informed of the risks associated with not consenting to the mediation, she accepted management and was treated with Oxytocin 10 U and 500 mL of Normal Saline. She was subsequently transported to hospital in a stable condition. During transport, the attending paramedics gained enough rapport with Mrs J that she did state that her baby had a footling breech presentation.

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APGAR

APGAR scores should not be used as a guide for resuscitation. The time intervals used for resuscitation are contained elsewhere with this CPG.

The APGAR should be conducted at 1 minute and 5 minutes post birth, then repeated at 5 minute internals until APGAR score >7.

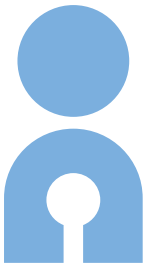
	0	1	2
Appearance	Blue/pale	Body pink, extremities blue	Totally pink
Pulse	Absent	< 100	> 100
Grimace	None	Grimaces	Cries
Activity	Limp	Extremity flexion	Active motion
Respiratory Effort	Absent	Weak/gasping/ineffective	Strong cry

7-10 Satisfactory **4-6** Respiratory depression, may require ventilation **0-3** Requires ongoing resuscitation

Figure 1. APGAR score (Source CPG N0101)

Informed consent

Australian law considers that persons with decision-making capacity have the right to make decisions about their own health care. This includes, but is not limited to, the right to agree to or refuse medical treatment, assessment, and other care, to seek alternative options and to self-determination. The Paramedicine Board of Australia Code of Conduct requires that registered paramedics provide care that recognises and respects 'the rights of patients or clients to make their own decisions.' From a practical perspective, this involves discussion the options, risks and benefits of treatment, **including consequences of refusal**, *and then acting in a way that is consistent with the wishes expressed by the patient. (Medication Safety Standard PRO/OPS/285).*



Decision making – logistical, clinical and crew resource management

The CSP made the critical decision to redirect an ALS crew—originally assigned to a Priority Zero cardiac arrest—to this Priority One case, anticipating the need for neonatal resuscitation. Although the case was coded as Priority One, it was effectively treated as Priority Zero due to the high risk and the proactive work by AV Communications teams (WIN OPS 072 Altering Event Priority).

This case involved multiple high-level challenges, including complex case dynamics, limited local MICA resources, scene isolation, and two concurrent high acuity patients. This decision improved the response time and teamwork required to deliver advanced life support care to both the baby and mother.

Both neonatal resuscitation and management of PPH were performed simultaneously. They were managed effectively, with the PIPER team's support playing a crucial role. The PIPER team providing timely, expert guidance, decision making confidence and reducing the on-scene crews' cognitive load.

"PIPER were excellent in terms of support and guidance at the time as there was so much happening at once". ALS Paramedic

"I remember feeling heightened when the HR began deteriorating, PIPER really calmed and reassured me which was invaluable at the time." MICA Paramedic

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Outcome

The baby was discharged home after a 6 week stay in hospital and was meeting milestones at this time. This positive outcome highlights the exceptional multi-disciplinary care and teamwork delivered by AV Regional Operations, Specialist Operations and Coordination and PIPER teams. These teams should be incredibly proud of their work.

Lessons learnt

- The first crew attending the scene had recently reviewed neonatal resuscitation at a Continuing Education workshop and mentioned that this was invaluable to them. This is a reminder that practicing and reviewing high-risk low frequency natured cases is crucial and will contribute to real time procedural confidence and competence.
- Being “Resus Ready” by ensuring vehicle preparation and familiarity with preparing resuscitation equipment is key to positive outcomes.
- Early communication with PIPER is an invaluable resource. The team may provide advice, but more than likely provides support which contributes to confident decision making and shared responsibility for outcomes.
- Concise communication between crews on scene and AV Communication Centre allows for more timely and appropriate resource management. This case involved coordinating seven AV resources plus PIPER.

Additional resources

- Please review the link below to AV’s Newborn Resuscitation CPG Walkthrough - https://player.vimeo.com/video/1010840300

Acknowledgements

We extend our gratitude to the paramedic crews and clinical teams whose expertise and dedication made these case studies possible. Their commitment to safe, compassionate care for newborns and children continues to inform and inspire best practice across our service.

Atom IncuArch has arrived

By **Brent Driscoll**, Operations Equipment Lead

Introduction of the ATOM IncuArch neonatal cot across AV

Over the past 13 years, Ambulance Victoria has relied on the ATOM V808 neonatal transport cot for both ground and air transport of neonates. This cot has also served as the primary non-specialist platform across our health services.

In collaboration with PIPER and Parker Healthcare, a new statewide initiative is underway to introduce the ATOM IncuArch Neonatal Transport Cot across all Victorian neonatal services. This transition presents a timely opportunity to replace our end-of-life ATOM V808 units.

As part of this initiative, AV has acquired two new IncuArch cots, which will soon be delivered to Air Ambulance Victoria. Alongside the cots, a new custom-designed harness, developed by Amtek specifically for the IncuArch has been introduced. Through engagement with Manual Handling Coordinators and Air Ambulance crews, this harness has been further modified to meet AV-specific requirements. The updated design enhances safety during transport and provides protection for onboard controls and sensors.

A key benefit of the new harness is its versatility. It is compatible with both the ATOM V808 and the new IncuArch cots. While some health services will continue using the ATOM V808 during the transition, all sites will receive two AV-version harnesses to support safe and consistent transport practices. The Equipment team will also maintain a pool of loan harnesses to assist with the statewide rollout.

To support staff during this transition, Manual Handling has developed a Quick Reference Guide (QRG) and an exemplar video demonstrating the correct loading and securing procedures for the new cot and harness. These resources are available via the QR codes.

Newborn out-of-hospital cardiac arrest: A retrospective cohort study

Prevalence and outcomes of newborn out-of-hospital cardiac arrest in Victoria

By **Tara Ralph**, Resuscitation Coordinator

Background and purpose

Paramedics often report a shared sense of discomfort when faced with the prospect of attending an out-of-hospital birth, particularly when the newborn presents in cardiac arrest. These events are classified as high acuity, low occurrence cases, and to date, few studies have characterised the epidemiology and outcomes associated with newborn out-of-hospital cardiac arrest (OHCA). It is important to recognise the distinction between a *newborn and a neonate*, as defined in the AV Clinical Practice Guidelines (CPGs). A *newborn* refers to an infant aged from birth up to 24 hours, whereas a *neonate* is aged from 24 hours to 28 days, this distinction is clinically significant, as the assessment and management strategies differ between these two groups in the prehospital setting. While current literature predominantly focuses on neonates, there is limited data specific to newborns in the context of out-of-hospital cardiac arrest.

Data from the Australian Institute of Health and Welfare (AIHW) highlights the infrequency of both planned and unplanned out-of-hospital births in Victoria. In 2023, of the 73,128 births recorded in the state, only 951 (1.3 per cent) of births occurred in the out-of-hospital setting[1]. Additionally, a recent study examining unplanned out-of-hospital births attended by first responders in Victoria reported that AV responded to 324 out-of-hospital births over a 12-month period, with nearly two thirds (n = 190, 59 per cent) of the deliveries occurring prior to ambulance arrival. Among these cases, 31 patients presented with obstetric complications and there were nine neonatal deaths, with three of these less than 24 weeks gestation at the time of delivery[2].

Although out-of-hospital births represent a small proportion of total births in Victoria, and newborn OHCA remains rare, these cases present considerable clinical, operational, and emotional challenges for paramedics and first responders. These events demand rapid, skilled intervention under high pressure circumstances, often with limited resources. Given the limited available literature, the Victorian Ambulance Cardiac Arrest Registry (VACAR) have provided data to describe the prevalence, characteristics and outcomes associated with newborn OHCA in Victoria. This poses a unique opportunity to improve our understanding of these events to inform future practice, training, and organisational response, further enhancing performance and survival outcomes in this vulnerable patient cohort.

What we did

We conducted a retrospective cohort study on all newborn patients, defined as birth to 24 hours old, who presented in OHCA between 6 February 2007 and 31 December 2024 in Victoria, Australia. The inclusion criteria defining OHCA in this cohort was the absence of a palpable pulse or auscultated heart rate upon initial assessment, or the presence of severe bradycardia with a heart rate < 60 bpm necessitating the initiation of resuscitation in accordance with AV clinical guidelines and the International Liaison Committee on Resuscitation (ILCOR) Consensus on Science with Treatment Recommendations (CoSTR)[3].

Case identification was achieved through a targeted search within the VACAR, AV's population-based registry that captures detailed OHCA data. The study period was selected to align with the availability of electronic patient care records, introduced by AV in 2007.

Newborns less than 22 weeks' gestation at the time of birth were excluded, in accordance with clinical guidelines recommending withholding resuscitation attempts in this non-viable population.

Outcome data were obtained from both hospital records and the Registry of Births, Deaths and Marriages. To ensure data accuracy and consistency, two authors independently reviewed and manually recoded variables for each case.

Key findings

Prevalence and setting

- 79 patients ≥ 22 weeks gestation presenting in OHCA between 6 February 2007 and 31 December 2024 in Victoria were included in this study.
- The majority of patients received a resuscitation attempt by EMS (n = 66), and for those where resuscitation was withheld (n = 13), this was due to presenting obviously deceased and non-viable on arrival.
- Paramedics were present for the delivery of the newborn in only one third of these cases (n = 25).
- Births occurred in the home in 66 (87 per cent) cases, on the roadside in eight (ten per cent) cases, and 2 (3 per cent) cases occurred in a birthing centre or health clinic.
- Planned home births (PHBs) occurred in 21 (28 per cent) births, and a midwife was in attendance for 11 (52 per cent) of these cases.

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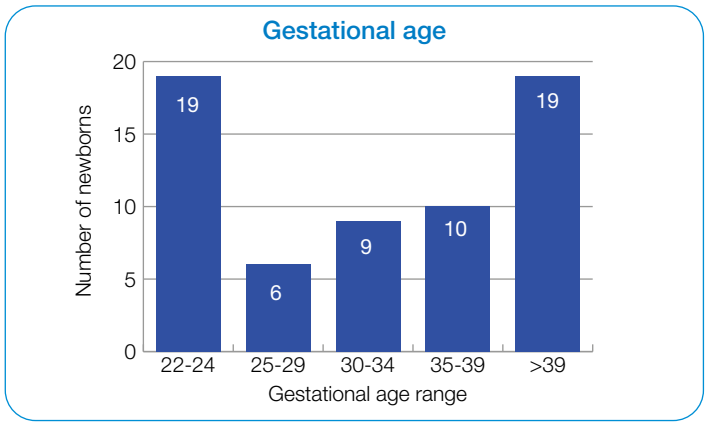
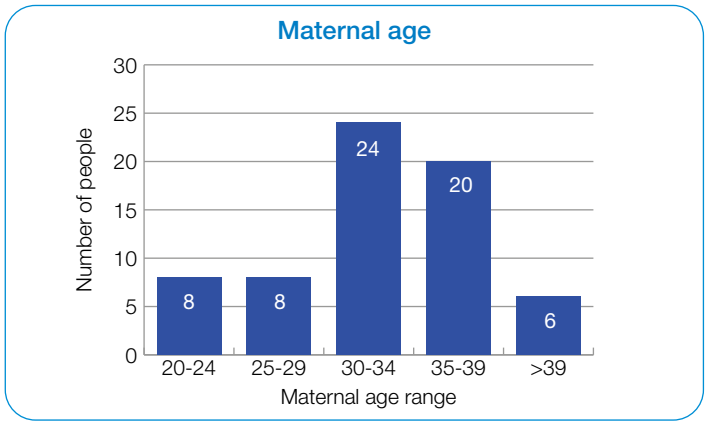
- Of the 21 PHBs presenting in OHCA, 31 per cent (n = five) were described as breech or footling presentation.

Maternal and newborn characteristics

- Maternal age ranged from 21–48 years. Advanced maternal age, defined as ≥35 years old, was present in 39 per cent (n = 26) of cases.
- Gestational age ranged from 22–41 weeks, with bimodal peaks at 24 and 40 weeks.
- The gestational age was unknown in 16 (20 per cent) cases due to cryptic pregnancies, no patient care record available, or no antenatal care.
- There were 13 (18 per cent) reported cryptic pregnancies overall, defined as a pregnancy that a person is unaware of until labour begins or birth occurs[4].





Newborn presentation

- Only two (three per cent) newborns were described as initially vigorous at birth, while 24 (31 per cent) were non-vigorous and the majority presented with no signs of life (n = 51, 66 per cent).
- Asystole was the most common presenting rhythm in 66 per cent (n = 40) of cases, followed by pulseless electrical activity (PEA) in 34 per cent (n = 21) of cases. There were no cases of ventricular fibrillation (VF) or ventricular tachycardia (VT) and there were 18 unknown rhythms due to no ECG/pads applied or available to view after the case.

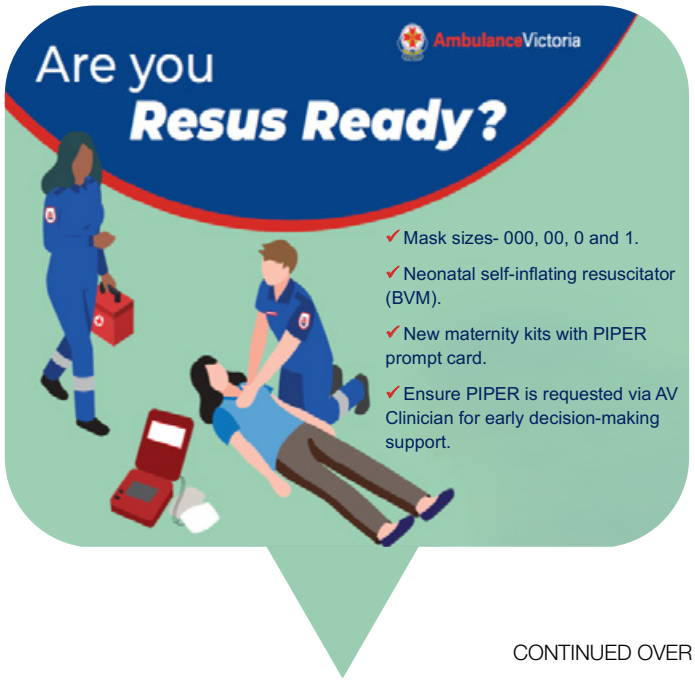
Outcomes

- Return of spontaneous circulation (ROSC) was achieved in 24 (30 per cent) patients.
- Nine (13 per cent) patients survived to hospital discharge from a total of 70 patients with known outcome data.

Conclusion

This study reinforces that newborn OHCA is a high acuity, low occurrence event. Over an 18-year period, AV attended only 79 cases of OHCA involving newborns, with survival outcomes being poor. Our population of newborn OHCA was characterised by advanced maternal age, planned home births, cryptic pregnancies, extreme prematurity, and late gestation. In addition, no newborns in the study presented with a shockable rhythm, supporting current clinical emphasis on prioritising thermal management, effective ventilation, and oxygenation over rhythm analysis. These findings warrant heightened clinical awareness in paramedic practice.

Cases of newborn OHCA are extremely rare, often complicated by adverse baseline characteristics, and their management differs significantly from paediatric and adult resuscitation. Paramedics and first responders should ensure they remain *Resus Ready* to respond effectively to these challenging cases and actively seek support during and after the case to optimise patient outcomes. Early escalation of care to PIPER (Paediatric Infant Perinatal Emergency Retrieval) is critical in helping to support multidisciplinary decisions.



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Helpful Resources

- In 2024, the Continuing Education (CE) team implemented a comprehensive training program for paramedics focused on the care and resuscitation of the newborn., A collection of video resources were developed for this workshop. These are available in the Learning Hub course below, with practical activities and further resources in the 2024 Newborn Resuscitation Self-directed workbook.
- There are further CE resources available via the AV Learning Hub including:
- COO OPY CET 2024 Newborn Resuscitation.
- COO OPY CET 2024 Newborn and Paediatric Supraglottic Airway (i-Gel) Insertion
- Newborn Resuscitation MAC paper.
- 2025 International Liaison Committee on Resuscitation Consensus on Science with Treatment Recommendations (ILCOR CoSTR) for Neonatal Life Support.
- Royal Children's Hospital (RCH) Paediatric Infant Perinatal Emergency Retrieval (PIPER) neonatal education resources.
- Although there is minimal existing literature on this topic, there are population-based cohort studies published within the last 10 years that explore preterm birth outcomes in the out-of-hospital setting and preterm birth outcomes in the non-tertiary hospital setting.

Research Corner

Pre-hospital mixed methods research: An updated methodological review

By **Tegwyn McManamny,** Executive Director Quality and Clinical Innovation

Ambulance Victoria (AV) takes great pride in the research contributions made across the organisation, with ongoing efforts to advance knowledge, refine clinical practice, and improve patient care.

In this edition, we're pleased to feature a recent publication from our team: 'Pre-hospital mixed methods research: An updated methodological review' co-authored by Tegwyn McManamny, this article explores evolving approaches to mixed methods research in pre-hospital settings, highlighting its relevance and practical application in paramedicine.

Pre-hospital mixed methods research: An updated methodological review

Abstract

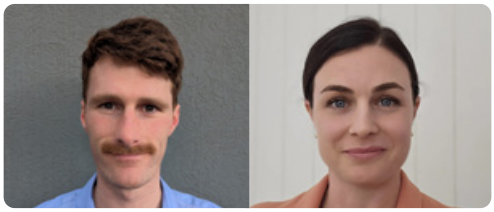
Mixed methods research, a methodology that integrates both qualitative and quantitative data in order to gain a more comprehensive understanding through drawing upon the strengths of each method, is increasingly used in the pre-hospital context. Despite its growing prevalence, little is known about how mixed methods research is conducted and reported in this unique setting. This methodological review builds on our prior systematic review and examines mixed methods studies in the pre-hospital context, mapping and describing how mixed methods research is conducted and reported.

We searched MEDLINE, CINAHL Complete, Embase and Scopus bibliographic databases from 1 January 2012 to 3 June 2025, using an updated pre-hospital search strategy. Study screening was undertaken in duplicate. Articles reported in English, explicitly stating the use of 'mixed methods' in the pre-hospital ambulance setting were included. Data related to underpinning philosophical or theoretical framework, rationale for utilising mixed methods, background of the corresponding author, mode of data integration, model of publication and adherence to reporting standards, utilising the good reporting of a mixed methods study (GRAMMS) guidelines, was extracted and analysed. A range of pre-hospital mixed methods research was identified (n = 110).

Reporting standards varied, with some studies demonstrating strong integration of qualitative and quantitative data, while others lacked clarity in methodological rationale. Diversity in subject and design reflects the need for flexibility in dynamic pre-hospital environments. This methodological review highlights opportunities for improvement in mixed methods research in pre-hospital care. While the approach supports comprehensive inquiry, it is largely not underpinned by philosophical frameworks which may support methodological rigour. In many cases, mixed methods research in the pre-hospital context is used for practical reasons, and the influence of the pre-hospital setting is observed in adaptable methodologies and a diverse range of subject matter. Our findings offer new insights and guidance for future research design and reporting in this field.

Read the research paper: Pre-hospital mixed methods research: An updated methodological review - Tegwyn McManamny, Scott Munro, Paul A. Jennings, Georgette Eaton, Marishona Ortega, Gregory Adam Whitley, 2025

Evaluating ambulance demand following the COVID-19 pandemic



By **Liam Hemingway,** Lecturer, Department of Paramedicine, Monash University and **Emily Nehme**, Research Governance Manager

Drivers of demand pre COVID-19 pandemic

Before the COVID-19 pandemic, global ambulance utilisation rates were increasing faster than population growth, putting strain on emergency health systems universally.[1]

Similarly, a study led by AV prior to the COVID-19 pandemic showed Victorian ambulance utilisation was increasing faster than population growth.[2] Between 2008 and 2015, an analysis of 2,443,952 consecutive ambulance cases attended by AV showed emergency ambulance demand increased by 29.2 per cent. This increase was most pronounced among patients with mental health histories (annual increase of 5.8 per cent), alcohol or drug abuse (annual increase of 6.1 per cent), and those with high comorbidity (annual increase of 4.5 per cent). Demand grew faster among younger patients, those from socioeconomically disadvantaged or lower-education backgrounds, and among individuals without preexisting conditions. While cases requiring transport rose by about 1.2 per cent annually, cases involving patients who did not need paramedic medical intervention increased by 6.7 per cent per year. The study concluded that ambulance use was driven not only by clinical acuity, but a complex mix of demographic and psychosocial factors, highlighting the need for targeted demand management strategies.

The publication has received global interest from the scientific community, attracting almost 170 citations across 41 countries. Since that time, however, it is possible that the impacts of the COVID-19 pandemic, and the rise of alternative health services for urgent care needs, has altered the patterns of ambulance use in Victoria. Australians have shifted how they seek urgent care: Telehealth and the Victorian Virtual Emergency Department (VVED) have become a lasting fixture in primary care delivery, supported by government funding. Additionally, the establishment and expansion of bulk-billed Urgent Care Clinics and enhanced GP billing incentives have provided new, accessible alternatives to hospital EDs and ambulance services in some areas, easing pressure on the health system and lowering financial barriers for patients.

Drivers of demand after the COVID-19 pandemic

New research from AV and Monash University aims to evaluate more recent trends in Victorian ambulance demand, using data between 2016 and 2023.

This research involved a retrospective cohort study design to describe trends in demand after the COVID-19 pandemic and thus elucidate the enduring impacts of COVID-19. Using negative binomial segmented time series regression models, adjusted for population growth and seasonality, changes in demand patterns across clinical and demographic subgroups were estimated after the COVID-19 pandemic, relative to the pre-pandemic period (2016 - 2020). Rurality and socioeconomic advantage were categorised based on the patient's residential postcode. The research analysed 5,239,378 calls, with the following key findings:

1. Ambulance demand increased annually by 4.3 per cent [95 per cent 3.6,5.1] pre-COVID-19 but slowed to 2.7 per cent [95 per cent CI 0.9,4.5] post-pandemic. At the end of the study period, demand was 12.6 per cent lower than projected based on pre-COVID-19 trends.
2. There were decreasing trends in demand from children, rural residents, patients with lower socioeconomic advantage, and calls for suspected cardiac/respiratory arrest.
3. Calls for chest pain and breathing problems increased rapidly during the pandemic but quickly declined post-COVID-19 to be in line with projected levels.
4. There was an increasing trend in demand by older adults and for caller complaints including headaches, heart problems, and traumatic injuries. Calls for psychiatric complaints showed continued growth before and after the pandemic, despite a rapid decrease during COVID-19.
5. Results suggest post-pandemic changes in the way that people are using emergency ambulances.

Conclusions

Post-COVID-19, demand for ambulance was lower than expected based on pre-pandemic predictions, and patterns of ambulance utilisation were altered. Reduced demand growth may reflect a diversion toward urgent care centres and the growing role of telehealth. Although the observed increase in chest pain and breathing problems calls during COVID-19 aligns with global observations, the return to expected levels likely reflects the restoration of preventative care and decreased prevalence of COVID-19. Ongoing increases in calls for psychiatric complaints highlight the need for additional system-level interventions to manage mental health presentations.

These findings are preliminary and the full details are expected to be published in a research article in coming months.

References

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2. Andrew E, Nehme Z, Cameron P, Smith K. Drivers of Increasing Emergency Ambulance Demand. Prehosp Emerg Care. 2020;24(3):385 doi:10.1080/10903127.2019.1635670

Alternate care pathways

“Hang on, is that normal?”

By **James Shuttleworth**, Alternate Service Lead

At the start of this article, I’m going to indulge in a personal moment, one that’s had a profound impact on my life. Recently, my partner and I welcomed our first child, a baby daughter. The whole process of the birth was one of the most wonderful, joyous, and stressful experiences of my life. Then two days after that wonderful, joyous event, something happened that I had not planned on. The midwife said, “you can go home now”.

I sat there expecting to be delivered a ‘how-to-parent manual’ but nothing was forthcoming. It became obvious relatively quickly that, in fact, the midwife was not kidding, that there would be no manual, and yes, we did have to go home. So, home we went to experience the most monumental change we have experienced in our lives.

Largely, this change has been amazing, filled with wonder and learning as we adapted to being a larger family. However, I’d be lying if I said it’s all been smooth sailing. As I have learned, babies are unique little critters that have a wide spectrum of normal. Intensely caring for this new member of the family has been both a blessing and a curse. Sometimes I feel I know just enough to diagnose my child with an array of symptoms and conditions. For instance, I have found myself at the wee hours of the morning leaning over a change table asking myself how much mucous is too much mucous to find in a poo? Or the time my daughter twitched in tummy time, and I thought to myself, now is that just one of those things that kids do, or does she have West Syndrome, a rare form of infantile epilepsy? I confided in my partner (note life partner, not work partner) about these thoughts I was having, and found that she was having similar feelings. Speaking to other new and first-time parents, I have found they also have similar thoughts.

I now understand WHY these parents call for our help. The most important thing in their life is potentially sick: no wonder they called Triple Zero (000).

So how does this relatively self-centred story relate back to alternative services, paramedicine, and AV? Well, because it sparked a moment of reflection about the paediatric cases I have attended as a paramedic. Cases in which someone else’s child has twitched, had a fever for the first time, or had a poo with too much or too little mucous, and then called an ambulance. Even though my anxieties didn’t lead to calling an ambulance or making a trip to the emergency department, I now understand WHY these parents call for our help. The most important thing in their life is potentially sick: no wonder they called Triple Zero (000).

Historically, when I attended these cases and the parents brought up a non-descript symptom and then asked me for my opinion on what to do next, my answer was reasonably universal. Something along the lines of *“My opinion is I don’t know, but what I do know is that your child is small and vulnerable, and we should probably go to the hospital just to be on the safe side.”* Now, at the time, that was probably the correct decision that appropriately safety netted the patient and addressed understandable parental concern (of which I now have lived experience).

But in our modern ambulance service, we have some alternative options for the care of paediatric patients, particularly if they do not fit the criteria for immediate ambulance transport to hospital.

- Firstly, children who meet red flag criteria (see the special notes for VVED use in paediatrics with borderline abnormal vital signs) or meet a specific part of a clinical practice guideline (i.e. severe croup) **must** be transported to ED.
- Secondly, if paramedics are considering non transport for a newborn (under 28 days old), a VVED consult is **mandatory**.
- Finally, for many cases, the Victorian Virtual Emergency Department (VVED) should be the go-to option. VVED isn’t new to our organisation, but it may not be routinely used to safety net children. Importantly, **VVED has a dedicated paediatric department where specialists provide tailored advice to ensure appropriate care**.

Sometimes, a VVED consult will result in ambulance transport to hospital, and that’s okay. At least then, I know we’re taking the child for a good reason, not just to wait in a busy emergency department. More often, though, the outcome is specialised safety netting advice that allows the child to remain at home with a clear plan.

List of potential cases to refer to VVED

- Newborn concerns – mandatory consultation if < 28 days (low threshold if < 3 month) if not wanting to transport
- Croup
- Fever, provided other vital signs don't trigger mandatory transport
- Simple febrile convulsion
- Low risk falls and head injuries
- Rashes in the otherwise well child (i.e. not blanching/ suspect meningococcal)
- Mild/moderate asthma and bronchiolitis
- Cellulitis
- Vomiting illnesses/gastro
- Mild allergic reactions - not anaphylaxis
- Pulled elbows
- OR SIMPLY when you are not sure if this is something that should go to hospital - let VVED help you decide.

Recently, in the western suburbs of Melbourne, a MICA Paramedic crew attended a little boy with croup. With the help of VVED and some expert rapport building by the crew on scene, he received a dose of dexamethasone, some safety netting advice, and was left safely at home. So great was the care in fact, the parents wrote to AV expressing their thanks about the care their son was given and that it avoided them having to go to the hospital. Fantastic holistic care that not only fixed the patient's primary problem but likely also educated the family about VVED and its potential for direct use in the future.

Drs. Burnside, Al-Rawi, and Lawrence from the VVED Paediatric Department have been kind enough to provide us with the following list of the type of paediatric conditions and presentations VVED would like to see referred to them:

Excitingly, the average wait time to see a VVED paediatric specialist is **ONLY nine minutes**. That's still plenty of time to discuss to latest Bluey episode or your favourite Wiggles banger, but a lot less time than taking that child to the hospital. Furthermore, if you want more information on paediatric VVED referral, check out Clinical Conversations: Paediatric assessment, consultation and virtual emergency care or episode 5 of the Alternative Services Podcast

In summary, next time I ask myself, whether it be in my role as a paramedic or parent, a version of the question "is that normal?" and I'm comfortable the child in front of me is not in a life-threatening state, my answer is going to be "should we try VVED?".

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