JOURNEY MAP
AMBULANCE ILLUSTRATIVE SCENARIO (Hypothetical)

The following scenario is hypothetical only and is meant to reflect the typical issues faced by any Ambulance service in any jurisdiction across Australia for this type of incident. The actual practices and devices used by the relevant Ambulance Service in any individual situation may vary.

Cardiac Arrest

This story is a hypothetical scenario illustrating a Cardiac Arrest call out for two Advanced Life Support ambulance and one Intensive Care ambulance; they are among the most senior paramedics on the road, trained to handle complex cases.

Toward the end of their shift, shortly before 3.30pm, they are in the hospital building and available, when they receive a call out over the radio from dispatch. It is a suspected cardiac arrest at a nearby RSL club (a known cellular blackspot). At this point, there are no more details on where on the premises it happened or who the patient is.

Critical aspects for Ambulance

Mission critical process are currently built around radio (voice) as the primary channel for communications and information due to the lack of PSMB.

Without the PSMB, in most cases, **data connectivity serves as a backup** to radio communication. Additionally, certain medical devices rely on connectivity to transmit and receive data. However, there is an ever increasing demand for broadband data to be able to use the latest technologies to save lives.

Time is of the essence, so we need to ensure that our people have connectivity whenever and wherever they need it.

Connected technology utilised during this incident

Radio communication is the **primary voice communication channel** for operational purposes. The crews have fixed radio in the vehicle as well as portable radios on their person (including a duress button).

Mobile phones
Each ambulance is equipped with at least one mobile phone. These provide fallback communication and can be used for voice calls, text messaging, and accessing various applications and resources.

The Mobile Data Terminal (MDT) is in the vehicle. The MDT acts as a communication and information hub, enabling real-time communication, such as receiving emergency call details, providing updates on patient status, and receiving instructions from dispatch.

Connected medical devices
Devices such as the Heart Rhythm Monitor rely on data connectivity to transmit to hospitals or medical professionals in real time. Devices like the Monitor – that require a reliable data connection – will likely become more prevalent in the future as they save lives.

Electronic Patient Record Device (eg. laptop)
Outside of the emergency call, Paramedics also use an Electronic Patient Record Device to record case patient details, symptoms and any other treatment provided.

Disclaimer for Illustrative Photos: Photos used are for illustrative purposes only, and are sourced from the NSW Ambulance and Ambulance Victoria.

SETTING THE SCENE

What happens regarding communication

The emergency call is made from the scene by a member of the general public (or as a request for backup)

- The call later receives an emergency call and documents the call details into the Computer Aided Dispatch (CAD) system.
- The Dispatch unit assess each emergency and manage the Dispatch and movement of ambulance resources accordingly.
- If additional information is received from the scene, such as further patient details, the call centre will add this to the CAD.

Dispatch typically maintains contact with ambulance crews and knows their locations during a shift. To further support this process, **Ambulance GPS tracking can be used to determine the closest available ambulance to an incident accurately.**

RECEIVE CALL

Setting the scene photos

A call comes in on the Paramedic's portable radio. Dispatch tells them there is a suspected cardiac arrest at a nearby RSL club – a known blackspot for cellular coverage. This is the only information provided. Paramedics reach their vehicle and check the Mobile Data Terminal (MDT) for details.

They head off towards the RSL.

"Notification gets more and more challenging the less connection you have. We just need to start moving ASAP."

RECEIVE CALL | 8 MINUTES

This is a category one job, which means lights and sirens and travelling as expediently and safely as possible.

They are able to get directions via the MDT as it does not rely on data and has the inbuilt standalone GPS route-finding capability.

They will be getting clarification and updates from Dispatch over the radio.

"Whilst driving we need a steady stream of info to stay up to date. You might just have the address and the patient name. But can't get the important details like they are 50 years old or 5 years old. That changes your response."

The crews arrive to find the incident is inside the RSL, but the ambulance is too big to drive in past the car park. There is radio coverage and limited mobile signal once they get inside the car park.

They grab all the equipment they may need at the scene and leave the vehicle. They move swiftly and safely. In some instances they are carrying up to 50kg of gear.

"Time is the most critical factor for us. There is no time to assess if there is connectivity, no time to set up additional solutions or time to troubleshoot issues."

17 MINUTES

A 49-year-old man lies unconscious on the ground after collapsing onto another customer outside the back of the RSL. There is a group of intoxicated males arguing nearby.

As they determine treatment, another male from the nearby group collapses amid a scuffle. They call for backup. Police and another ambulance arrive in 6 minutes.

"Radio and data connectivity is vital to our job. From talking to the dispatcher and updating our status, to sending an ECG through to the hospital, our job is very dependent on communication and connection. Without this we can't help our patients effectively."

27 MINUTES

Now on a stretcher, the man is quickly moved into the ambulance, and the paramedics take turns administering CPR.

The Heart Rhythm Monitor detects a critical issue. He needs treatment from the Cardiologist team at a specialist Hospital. The paramedics must send his data to that team and alert them they are on their way ASAP. They drive under lights and sirens. Every second counts for the patient's outcome.

"It's stressful when we get dispatched to a case in a known communication black spot. We have to plan ahead knowing we will be without communications, and it makes certain parts of our work impossible. Better connectivity in these situations would lead to better safety for us, and improved patient outcomes."

"If you don't have that vision of what's happening in the background you are walking in blind."

"At a job we need to think about so many things at once, safety, treatment, medication calculation and logistics. It's reassuring to know we can rely on our communication equipment and know we'll get a good connection. That takes the pressure off, and we know we can get backup should we or that they have hurt themselves."

"We need to make sure we have the basics systems in place that enable paramedics to do the job safely - if they don't have comms they can't get the message out, for example feeling unsafe or that they have hurt themselves."

"If you don't have a data connection at the scene you can't share information with specialists, which may delay the treatment of that patient. It's phenomenal what they can do - but minutes count for those patients, delays can cause long term issues."

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1. Notification & Turnout

Receive notifications and gather critical information to inform the response.

The emergency call is made from the scene by a member of the general public (or as a request for backup)

- The call later receives an emergency call and documents the call details into the Computer Aided Dispatch (CAD) system.
- The Dispatch unit assess each emergency and manage the Dispatch and movement of ambulance resources accordingly.
- If additional information is received from the scene, such as further patient details, the call centre will add this to the CAD.

Dispatch typically maintains contact with ambulance crews and knows their locations during a shift. To further support this process, **Ambulance GPS tracking can be used to determine the closest available ambulance to an incident accurately.**

Dispatch communicates initial case information to paramedics through radio. In cases where radio communication is not available, such as in hospitals, it is not uncommon for Dispatch to notify paramedics via mobile phones.

Details of the emergency are transmitted from the CAD to a Mobile Data Terminal (MDT) (with a SIM in it). This is a touch screen device in the cabin of the ambulance. It relays all the information that is given by the dispatcher to the paramedics, including:

- Case address
- Time of call
- Patient details
- Case nature (chest pain, stroke, sick person etc.)
- Dispatch code
- Notes provided by the caller, such as risks and safety concerns of the scene

2. Transit to the Incident

Get moving towards the location quickly and prep for arrival with the correct information.

The Paramedics get directions to the incident.

- The MDT has route-finding capabilities in-built that do not require connection to a cellular network.
- Some vehicles also have an in-vehicle navigation system on the steering wheel column.
- Paramedics may also use a map app on their Mobile Phone if needed.

Paramedics are thinking about what they will need and what they will do when they get there.

- They use apps on their phones to inform the treatment they may provide, such as dosage calculation (these are also not reliant on connectivity to work).
- They are also thinking about what equipment they may need to take from the ambulance for the incident they are responding to.

Paramedics update their status via the MDT as they progress to and arrive at the job.

Control Centre staff may continue receiving information on the incident and add further notes to the CAD whilst the paramedics are enroute. These are shared with paramedics over radio and also through the onboard MDT. More detailed information can be shared over the MDT than by radio.

Examples of updates enroute include:

- **Changes to the incident** e.g. multiple casualties or triage information from attending Paramedics already on site.
- **Changes in the condition of the patient** - for better or worse.
- **Important patient details** such as their age or other comorbidities
- **Arrival instructions**, such as where to wait for an escort, where it is safe to leave the ambulance, or specific details on how to get access to the premises.
- **Updates to risk at the scene** to warn them of any potential risks.

3. Arriving at the incident

Triage the scene to determine the response required, gather the right equipment and get to the patient safely ASAP.

The first ambulance on the scene triages the scene. They call for backup or other agency assistance if needed (and not already enroute).

They carry necessary equipment to the patient to ensure they have the right resources at the scene. In some instances they are carrying up to 50kg of gear - so the weight and bulk of any items they need to take always needs to be considered.

Once they leave the ambulance, the paramedics no longer have access to the information on the MDT – as it is attached to the vehicle.

- When they arrive on scene they press "At scene" on the MDT which will alert the control that they are no longer with the vehicle and away from the MDT
- As they do not have access to the MDT once they leave the ambulance, paramedics need to commit to memory or write down any critical information they will need such as a residence access code or detailed directions.

4. Attending to the patient on scene

Focus on providing the patient with the best possible treatment while keeping all paramedics safe.

Paramedics currently need to rely on their portable radio with a duress button to communicate with Dispatch when they are no longer in their vehicle. Outside of the vehicle, if they do not have their radio, then mobile phones are the fallback. However, when reception matters, primarily and waiting for them to pick up is not ideal.

If there's problems with connectivity at an incident, there is no time to troubleshoot a device or make changes to its settings. Furthermore, paramedics may have gloved hands, which could get contaminated if they touch a device – have to reach into their pockets to get a device. **Hygiene is a significant issue.**

One piece of essential equipment is this scenario that requires broadband coverage is a Heart Rhythm Monitor.

In the future they will also require the use of live-stream cameras that need images to specialists. These would also require broadband connectivity.

Paramedic safety is a priority, and uninterrupted communication is critical for ensuring this. Paramedics need a reliable fallback option for when the radio is unavailable – and this is currently mobile phones.

The primary duress alarm for paramedics is via a discrete button on each paramedic's radio. There is also a duress button within the vehicle. The fallback, if neither of these are available in a duress situation, is for paramedics to make a call on their mobile phone, using a predetermined number. In some jurisdictions, paramedics also have an App on their phone they can use. Both of these options require broadband connection for data transmission.

Upon receiving the data, the specialised cardiology unit at the hospital can prepare for the patient's arrival, and the specialist team can review the data to provide crucial treatment advice, especially in transit to at the scene.

Another example of when broadband connectivity is critical for the journey to hospital is for **stroke patients**, when data can be sent to a remote neurologist.

In some jurisdictions now ECG/defibrillation devices are being introduced along with a new Cardiac Notification Platform to streamline data communication with hospitals. These can only work with reliable broadband connectivity.

5. Transit to a hospital

Get the patient to the most appropriate definitive care facility. Ensure the hospital is informed and ready to receive the patient

During emergencies or while enroute to a hospital, paramedics might need to transmit data to hospital specialists or reports located elsewhere, like the hospital or those on-call remotely. In this instance, they attach a Heart Rhythm Monitor to the patient, transmitting diagnostic ECG data directly to a cardiologist or hospital for analysis. This relies on a broadband connection for data transmission.

The Paramedics need to determine where to take the patient, considering the time to arrive and which hospital has the capacity and best care for the patient. **In most cases for a cardiac arrest, the crew will go straight to the nearest hospital** and will already know the best route to get there. Where assistance is needed, the MDT will provide a route to the best hospital for the patient to get the treatment they need.

Finally, paramedics use an Electronic Patient Record Device (eg. laptop) to record case patient details, symptoms and any other treatment they have provided. This:

- is part of the legal documentation required for each patient; and
- also informs billing and comprehensive reporting.

SUCCESS FACTORS AND CHALLENGES

Challenges often faced in this scenario – and the specific factors that drive a successful outcome.

Locating available ambulances

Although the dispatch will typically know where the crews are during a shift and can check via radio, a lack of data connectivity could impact their ability to receive an accurate real-time location via tracking devices on the ambulance. Additionally, the Paramedics can use the MDT to set their status to let dispatch know if they are away from the vehicle, without a data connection, there is no transmission.

Notification detailed information

There is a limit to the amount of detail that the dispatcher can provide over voice in the initial call. Therefore, important information may be missed at the notification stage without a data connection to the MDT. Note: this is not critical as radio will be used to clarify content.

Receiving the notification

There is currently a big challenge with in-building coverage in hospitals. (If you can't get the notification immediately, it will significantly impact the response time.

Route planning and directions

The MDT can provide a route to the incident and give directions without relying on a data connection.

However, data connections can provide precise and timely directions, especially in unfamiliar or rapidly changing situations. Allowing crews to consider factors like current road conditions, traffic congestion, and any detours or road closures that may affect the optimal route.

Receiving information in transit

Radio is the primary channel for receiving any additional updates on the incident. The MDT will also recieve notes as they are added. Whilst it has no connectivity, the MDT cannot receive updates This means they could miss the following:

- **Updates on the patient's condition**, either worsening or improving.
- **Escalations in the incident** with further casualties and the need for more crews.
- **Risks that may impact the paramedic's safety** including potential violence at the scene or Hazmat
- **Changes in location**

Communication back to the Control Centre

If radio fails then a lack of connectivity can impact paramedics' ability to share back triage information with other crews or Dispatch via their mobile phones.

Receiving updates away from the vehicle

They may have to walk significantly far from the vehicle to the scene. During this time, without a connection, they may miss critical updates such as:

1. Changes in the patient's condition, e.g. becoming unconscious
2. Increase the risk of Duress at the scene.

"If it turns out that the person has a knife whilst you are away from the vehicle, you are relying on the voice communication to find out"

Connecting medical devices away from the vehicle

It is critical that medical devices stay connected when taken away from the vehicle to assess patients in settings, such as private residences, public areas, or remote locations. They will likely not have the time or focus to set up complex communication extensions like mesh networks.

Seamless connection of devices

Data connectivity is essential for ambulance crews to effectively utilise connected medical devices, which should seamlessly connect without requiring complex setup. Paramedics need to prioritise patient care and the situation at the scene, without the need for troubleshooting or configuring technology. The use of gloved hands further adds to the challenge of dealing with intricate device setups.

Paramedic safety at the scene

The situation can at times become dangerous for the paramedics at the scene (e.g. patient or general public violence). Radio is the primary channel when safety is a concern, however with no radio or back up data connectivity, they can not call for support from other crews, police or the control centre.

Sending patient data to specialists and receiving advice back from them

Clinical Platforms assist with transferring clinical observation data from ambulance crews to specialist teams to provide more rapid and effective treatment at the scene or upon arrival at the hospital. However, without connectivity, these services cannot deliver the lifesaving services. This may also impact the specialists sending back instructions to the paramedics in the field.

Completing Electronic Medical Records

If an area lacks connectivity, the crews cannot complete the electronic medical record for the call-out. Ideally, this happens directly after the event to ensure details are remembered and documented.

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Cardiac Arrest

This story is a hypothetical scenario illustrating a Cardiac Arrest call out for one Advanced Life Support ambulance and one Intensive Care ambulance; they are among the most senior paramedics on the road, trained to handle complex cases.

Toward the end of their shift, shortly before 3.30pm, they are in the hospital building and available, when they receive a call out over the radio from dispatch. It is a suspected cardiac arrest at a nearby RSL club (a known cellular blackspot). At this point, there are no more details on where on the premises it happened or who the patient is.

Critical aspects for Ambulance

Mission critical process are currently built around radio (voice) as the primary channel for communications and information due to the lack of PSMB.

Without the PSMB, in most cases, **data connectivity serves as a backup** to radio communication. Additionally, certain medical devices rely on connectivity to transmit and receive data. However, there is an ever increasing demand for broadband data to be able to use the latest technologies to save lives.

Time is of the essence, so we need to ensure that our people have connectivity whenever and wherever they need it.

Connected technology utilised during this incident

Radio communications
Radio communication is **the primary voice communication channel** for operational purposes. The crews have fixed radios in the vehicle as well as portable radios on their person (including a duress button).

Mobile phones
Each ambulance is equipped with at least one mobile phone. These provide fallback communication and can be used for voice calls, text messaging, and accessing various applications and resources.

The Mobile Data Terminal (MDT) is in the vehicle.
The MDT acts as a communication and information hub, enabling real-time communication, such as receiving emergency call details, providing updates on patient status, and receiving instructions from dispatch.

Connected medical devices
Devices such as the Heart Rhythm Monitor rely on data connectivity to transmit to hospitals or medical professionals in real time. Devices like the Monitor - that require a reliable data connection - will likely become more prevalent in the future as they save lives.

Electronic Patient Record Device (eg. laptop)
Outside of the emergency call, Paramedics also use an Electronic Patient Record Device to record case patient details, symptoms and any other treatment provided.

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SETTING THE SCENE

RECEIVE CALL

A call comes in on the Paramedic's portable radio. Dispatch tells them there is a suspected cardiac arrest at a nearby RSL club - **a known blackspot for cellular coverage.** This is the only information provided. Paramedics reach their vehicle and check the Mobile Data Terminal (MDT) for details.

They head off towards the RSL.

This is a category one job, which means lights and sirens and travelling as expediently and safely as possible.

They are able to get directions via the MDT as it does not rely on data and has the inbuilt standalone GPS route-finding capability.

They will be getting clarification and updates from Dispatch over the radio.

"Notification gets more and more challenging the less connection you have. We just need to start moving ASAP."

"Whilst driving we need a steady stream of info to stay up to date. You might just have the address and the patient name. But can't get the important details like they are 50 years old or 5 years old. That changes your response."

"Time is the most critical factor for us. There is no time to assess if there is connectivity, no time to set up additional solutions or time to troubleshoot issues."

What happens regarding communication

1. Notification & Turnout
Receive notifications and gather critical information to inform the response.

The emergency call is made from the scene by a member of the general public (or as a request for backup)

- The call taker receives an emergency call and documents the call details into the Computer Aided Dispatch (CAD) system.
- The Dispatch will assess each emergency and manage the Dispatch and movement of ambulance resources accordingly.
- If additional information is received from the scene, such as further patient details, the call centre will add this to the CAD.

Dispatch typically maintains contact with ambulance crews and knows their locations during a shift. To further support this process, **Ambulance GPS tracking can be used to determine the closest available ambulance to an incident accurately.**

Dispatch communicates initial case information to paramedics through radio. In cases where radio communication is not available, such as in hospitals, it is not uncommon for Dispatch to notify paramedics via mobile phones.

Details of the emergency are transmitted from the CAD to a Mobile Data Terminal (MDT) (with a SIM in it). This is a touch screen device in the cabin of the ambulance. It relays all the information that is given by the dispatcher to the paramedics, including:

- Case address
- Time of call
- Patient details
- Case nature (chest pain, stroke, sick person etc.)
- Dispatch code
- Notes provided by the caller, such as risks and safety concerns at the scene

2. Transit to the Incident
Get moving towards the location quickly and prep for arrival with the correct information.

The Paramedics get directions to the incident.

- The MDT has route-finding capabilities in-built that do not require connection to a cellular network.
- Some vehicles also have an in-vehicle navigation system on the steering wheel column.
- Paramedics may also use a map app on their Mobile Phone if needed.

Paramedics are thinking about what they will need and what they will do when they get there.

- They use apps on their phones to inform the treatment they may provide, such as dosage calculators (these are also not reliant on connectivity to work).
- They are also thinking about what equipment they may need to take from the ambulance for the incident they are responding to.

Paramedics update their status via the MDT as they progress to and arrive at the job.

Control Centre staff may continue receiving information on the incident and add further notes to the CAD whilst the paramedics are enroute. These are shared with paramedics over radio and also through the onboard MDT. More detailed information can be shared over the MDT than by radio.

Examples of updates enroute include:

- **Changes to the incident** e.g. multiple casualties or triage information from attending Paramedics already on site.
- **Changes in the condition of the patient** - for better or worse.
- **Important patient details** such as their age or other comorbidities
- **Arrival instructions,** such as where to wait for an escort, where it is safe to leave the Ambulance, or specific details on how to gain access to the premises.
- **Updates to risk at the scene** to warn them of any potential risks.

SUCCESS FACTORS AND CHALLENGES

Challenges often faced in this scenario - and the specific factors that drive a successful outcome.

Locating available ambulances
Although the dispatch will typically know where the crews are during a shift and can check via radio, a lack of data connectivity could impact their ability to receive an accurate real-time location via tracking devices on the ambulance. Additionally, the Paramedics can use the MDT to set their status to let dispatch know if they are away from the vehicle; without a data connection, there is no transmission.

Notification detailed information
There is a limit to the amount of detail that the dispatcher can provide over voice in the initial call. Therefore, important information may be missed at the notification stage without a data connection to the MDT. Note: this is not critical as radio will be used to clarify content.

Receiving the notification
There is currently a big challenge with in-building coverage in hospitals. If you can't get the notification immediately, it will significantly impact the response time.

Route planning and directions
The MDT can provide a route to the incident and give directions without relying on a data connection.

However, **data connections can provide precise** and timely directions, especially in unfamiliar or rapidly changing situations. Allowing crews to consider factors like current road conditions, traffic congestion, and any detours or road closures that may affect the optimal route.

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Radio is the primary channel for receiving any additional updates on the incident. The MDT will also recieve notes as they are added. Whilst it has no connectivity, the MDT cannot receive updates This means they could miss the following:

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- **Escalations in the incident** with further casualties and the need for more crews.
- **Risks that may impact the paramedic's safety** including potential violence at the scene or Hazmat.
- **Changes in location**

8 MINUTES ──────────────────────── **17 MINUTES** ──────── **27 MINUTES**

The crews arrive to find the incident is inside the RSL, but the ambulance is too big to drive in past the car park. There is radio coverage and limited mobile signal once they get inside the car park.

They grab all the equipment they may need at the scene and leave the vehicle. They move swiftly and safely. In some instances they are carrying up to 50kg of gear.

"If you don't have that vision of what's happening in the background you are walking in blind."

A 49-year-old man lies unconscious on the ground after collapsing onto another customer outside the back of the RSL. There is a group of intoxicated males arguing nearby.

As they administer treatment, another male from the nearby group collapses amid a scuffle. They call for backup. Police and another ambulance arrive in 4 minutes.

Now on a stretcher, the man is quickly moved into the ambulance, and the paramedics take turns administering CPR.

The Heart Rhythm Monitor detects a critical issue. He needs treatment from the Cardiologist team at a specialist Hospital. The paramedics must send his data to that team and alert them they are on their way ASAP. They drive under lights and sirens. Every second counts for the patient's outcome.

"If you don't have a data connection at the scene you can't share information with specialists, which may delay the treatment of that patient. It's phenomenal what they can do - but minutes count for those patients, delays can cause long term issues."

"Radio and data connectivity is vital to our job. From talking to the dispatcher and updating our status, to sending an ECG through to the hospital, our job is very dependent on communication and connection. Without this we can't help our patients effectively."

"At a job we need to think about so many things at once, safety, treatment, medication calculation and logistics. It's reassuring to know we can rely on our communication equipment and know we'll get a good connection. That takes the pressure off, and we know we can get backup when we need it."

"We need to make sure we have the basics systems in play that enable paramedics to do the job safely - if they don't have comms they can't get the message out, for example feeling unsafe or that they have hurt themselves."

"It's stressful when we get dispatched to a case in a known communication black spot. We have to plan ahead knowing we will be without communications, and it makes certain parts of our work impossible. Better connectivity in those situations would lead to better safety for us, and improved patient outcomes."

3. Arriving at the incident
Triage the scene to determine the response required, gather the right equipment and get to the patient safely ASAP.

The first ambulance on the scene triages the scene. They call for backup or other agency assistance if needed (and not already enroute).

They carry necessary equipment to the patient to ensure they have the right resources at the scene. In some instances they are carrying up to 50kg of gear - so the weight and bulk of any items they need to take always needs to be considered.

Once they leave the ambulance, the paramedics no longer have access to the information on the MDT - as it is attached to the vehicle.
• When they arrive on scene they press "at scene" on the MDT which will alert the control that they are no longer with the vehicle and away from the MDT
• As they do not have access to the MDT once they have left the ambulance, paramedics need to commit to memory or write down any critical information they will need such as a residence access code or detailed directions.

4. Attending to the patient on scene
Focus on providing the patient with the best possible treatment while keeping all paramedics safe.

Paramedics currently need to rely on their portable radio with a duress button to communicate with Dispatch when they are no longer in their vehicle . Outside of the vehicle, if they do not have their radio, then mobile phones are the fallback. However, when seconds matter, phoning a number and waiting for them to pick up is not ideal.

The primary duress alarm for paramedics is via a discrete button on each paramedic's radio. There is also a duress button within the vehicle. The fallback, if neither of these are available in a duress situation, is for paramedics to make a call on their mobile phone, using a predetermined number. In some jurisdictions, paramedics also have an App on their phone they can use. Both of these options require broadband connectivity.

Patient safety is also paramount. Maintaining connectivity with Dispatch is essential for support, especially if the paramedic requires assistance, such as when:
• Multiple patients on scene requiring ambulance assistance;
• A separate motor incident occurs at an existing motor vehicle incident whilst the paramedics are on scene
• Paramedics get stuck somewhere, e.g. lift
• Paramedics are put at risk by the public at the scene e.g. drug overdose at 2 am can become hostile.
• The patient becomes violent when intoxicated with alcohol or other drugs.

One piece of essential equipment in this scenario that requires broadband coverage is a Heart Rhythm Monitor.

In the future they will also require the use of live stream cameras that send images to specialists. These would also require broadband connectivity.

5. Transit to a hospital
Get the patient to the most appropriate definitive care facility. Ensure the hospital is informed and ready to receive the patient

During emergencies or while enroute to a hospital, paramedics might need to transmit data to hospital specialists or experts located elsewhere, like the hospital or those on-call remotely. In this instance, they attach a Heart Rhythm Monitor to the patient, transmitting diagnostic ECG data directly to a cardiologist or hospital for analysis. This relies on a broadband connection for data transmission.

Upon receiving the data, the specialised cardiology unit at the hospital can prepare for the patient's arrival, and the specialist team can review the data to provide crucial treatment advice, especially in transit or at the scene.

Another example of when broadband connectivity is critical for the journey to hospital is for **stroke patients,** when data can be sent to a remote neurologist.

In some jurisdictions new ECG/defibrillation devices are being introduced along with a new Cardiac Notification Platform to streamline data communication with hospitals. These can only work with reliable broadband connectivity.

The Paramedics need to determine where to take the patient, considering the time to arrive and which hospital has the capacity and best care for the patient. **In most cases for a cardiac arrest, the crew will go straight to the nearest hospital** and will already know the best route to get there. Where assistance is needed, the **MDT will provide a route to the best hospital** for the patient to get the treatment they need.

Paramedics use an Electronic Patient Record Device (eg, laptop) to record case patient details, symptoms and any other treatment they have provided. This:
• is part of the legal documentation required for each patient; and
• also informs billing and comprehensive reporting.

Communication back to the Control Centre
If radio fails then a lack of connectivity can impact paramedics' ability to share back triage information with other crews or Dispatch via their mobile phones.

Receiving updates away from the vehicle
They may have to walk significantly far from the vehicle to the scene. During this time, without a connection, they may miss critical updates such as:
1. Changes in the patient's condition, e.g. becoming unconscious
2. Increase the risk of Duress at the scene:

"If it turns out that the person has a knife whilst you are away from the vehicle, you are relying on the voice communication to find out."

Retrieving critical information
If there is no connection away from the vehicle, then information, such as the key code for an older person's door, must be committed to memory.

Seamless connection of devices
Data connectivity is essential for ambulance crews to effectively utilise connected medical devices, which should seamlessly connect without requiring complex setup. Paramedics need to prioritise patient care and the situation at the scene, without the need for troubleshooting or configuring technology. The use of gloved hands further adds to the challenge of dealing with intricate device setup.

Connecting medical devices away from the vehicle
It is critical that medical devices stay connected when taken away from the vehicle to assess patients in settings, such as private residences, public areas, or remote locations. They will likely not have the time or focus to set up complex communication extensions like mesh networks.

Paramedic safety at the scene
The situation can at times become dangerous for the paramedics at the scene (e.g. patient or general public violence). Radio is the primary channel when safety is a concern, however with no radio or back up data connectivity, they can not call for support from other crews, police or the control centre.

Sending patient data to specialists and receiving advice back from them
Clinical Platforms assist with transferring clinical observation data from ambulance crews to specialist teams to provide more rapid and effective treatment at the scene or upon arrival at the hospital. However, without connectivity, these services cannot deliver the lifesaving services. This may also impact the specialists sending back instructions to the paramedics in the field.

Completing Electronic Medical Records
If an area lacks connectivity, the crews cannot complete the electronic medical record for the call-out. Ideally, this happens directly after the event to ensure details are remembered and documented.