Public Safety Network

Appendix 3.4

Wellington Free Ambulance Use Cases

Contents

NOTE: The contents of this appendix have been sourced from the Wellington Free Ambulance communications capability Use Cases v1.3 document.

1. Wellington Free Ambulance Operations

1.1 Operational Functions

Core operations are triggered by the occurrence of incidents within the scope of Wellington Free Ambulance's (WFA's) work, (i.e. medical events, patient transfers, trauma incidents, and clinical support).

1.1.2 Emergency Ambulance Service

When requests for help are received by WFA's Communications Centre, the patient is triaged by Call Takers using an internationally recognised medical priority dispatch system (MPDS), which prioritises the response based on the presenting symptoms and circumstances. The priority assigned to each call is established by a group of New Zealand Health Professionals, with consideration to associated clinical risks and historic responses to patients presenting with the same symptoms.

If the patient's condition is not immediately life-threatening then the incident is referred to an Emergency Medical Triage Nurse to phone back and further assess the patient's condition using the internationally utilised triage system called Odyssey. This triage tool is designed to apply the Medical Professional's Knowledge and experience to further assess the patient's condition over the phone. Secondary Clinical Telephone Assessment is used in ambulance services worldwide and has been introduced in New Zealand to help connect patients to the right care at the right time, where a patient's symptoms have been identified as non-life-threatening. The additional assessment may result in a more urgent ambulance response, or the incident may be closed after the caller has been given further advice or support to ensure the right care for patients.

This process is the same in both St John and WFA regions as Call Takers answer calls from all areas.

When incidents are triaged as requiring an ambulance response, ambulance resources are dispatched by the Dispatcher. There are three dispatch areas based in WFA's Communications Centre; Wellington Emergency Ambulance, Wellington Patient Transfer, and St John Central South Region. The St John Central South Region channel is mainly dispatched by a St John-employed Dispatcher but can be dispatched by a WFA Dispatcher during breaks or absences.

Resources then make their way to the incident scene and resolve the incident. This could mean that the patient is treated at scene or that they are transported to a medical facility. If the Ambulance Officers on scene require further assistance, then they could:

- Request the Dispatcher sends another crew to attend to help them with lifting a heavy patient or provide specialist procedures or drugs,
- Call the Clinical Paramedic Advisor to discuss treatment or transport options,
- Request a helicopter to transport the patient or bring an Ambulance Officers with specialist skills,
- Request Police or FENZ attendance be notified or attend to assist with scene safety, helicopter landing zones, lifting or CPR.

During the response and resolve stages, the Dispatcher and attending resources remain in contact, with the Ambulance Officers advising when they are responding, have arrived at scene, have assessed the patient's status, have decided whether to transport or treat at scene, and when they have cleared from the incident and are available for the next patient. The Dispatcher enters all the information updates into the Computer Automated Dispatch (CAD) system Incident, and liaises with the Clinical Paramedic Advisor, operational managers, and external agencies.

Whether attending an incident or not, on duty resources keep their status current with the Dispatcher by sending updates on their location. The Dispatcher retains overall oversight and control over the resources in their area, following a Deployment Plan to ensure optimum coverage.

Regular reports, clinical audits and incident reviews take place using information gathered from CAD and ePRF.

1.1.2 Patient Transfer Service

WFA's Patient Transfer Service (PTS) transfers patients between hospitals, medical appointments, air ambulances, and homes. Requests for patient transfers are received from medical facilities, District Health Boards, Primary Health Organisations, rest homes and members of the public. Requests are currently received via phone call or fax to the Communications Centre. In the near future a web portal booking system will be implemented to replace the fax machine. Transfers for patients attending Dialysis Unit appointments are received by the Communications Centre via email from the WFA PTS Coordinator, who is based in the Wellington Hospital Transit Lounge.

The bookings are entered into CAD by Call Takers and dispatched by a dedicated PTS Dispatcher. Most transfers are prioritised as low acuity, however some patients, such as those travelling to and from intensive care units or air ambulances, are treated as urgent and may travel under lights and sirens. Urgency is determined by the health professional requesting the transfer.

The PTS Dispatcher dispatches the bookings based on the key performance indicators set by the contracts held with Ministry of Health and the various District Health Boards. For example, only ambulances may be used to transfer patients between hospitals, dialysis patients must be picked up within 45 minutes of their treatment finishing, and air ambulances must be met by an ambulance within five minutes of landing.

Like Ambulance Officers, Patient Transfer Officers remain in contact with their Dispatcher through the transfer lifecycle. The model of dispatch and communication is also the same.

If a transfer is required outside of the PTS hours of 0600-2300, it will be dispatched by the EAS Dispatcher using an EAS ambulance.

1.1.3 Events

WFA's Events team provide medical coverage at events around the WFA region. Requests for event cover are received via phone, email or the WFA website, processed by the Events Manager, and a summary is sent to the Communications Centre to be entered into CAD.

Which vehicle and staff will be assigned to the event is determined prior by the Events Manager, so the Dispatcher simply assigns the CAD incident to the right vehicle at the specified time. Event Medics

will advise the Dispatcher when they start and finish but otherwise the general management of the event occurs within the Events team, with the support of the Events Manager or Shift Manager.

Event Medics frequently utilise the Clinical Paramedic Advisor to assist them in the treatment of their patients. If a patient is in a serious condition and/or requires transport to hospital, the Event Medics will call the Communications Centre to request an EAS ambulance. The request is prioritised in the same way as other 111 calls.

1.2 Roles

The table below summarises the roles involved. At any time, the type of communication a role engages in depends on where they are — in a communications centre, in a vehicle, at a station, at a scene (away from a vehicle), at a medical facility, or 'at large' (i.e. not at any of these locations). See Appendix Two: Operational Roles for more details.

Role	Description
Call Taker	Answer incoming calls to the Communications Centre. Accurately triage and input ambulance request details into the Communications Centre computer system. Provide support and accurate advice to callers. Based in a Communications Centre.
Dispatcher	Dispatch and control ambulance resources within defined procedures to ensure the best patient outcome. Based in a Communications Centre.
External Health Professional	Doctors, registered nurses or midwives. Could be based in hospitals or other medical facilities. May be receiving patients transported to their facility or providing clinical advice by phone.
Emergency Medical Triage Nurse	Based in the Communications Centre. If the patient's condition was triaged as not immediately life-threatening during the initial 111 call, then the incident is referred to an Emergency Medical Triage Nurse to phone back and complete a more in-depth assessment of the patient's condition.
Clinical Paramedic Advisor	Provide clinical support and enable effective and efficient communication between Ambulance Officers, health professionals, hospital staff, patients, and other on-duty Communications Centre staff. Hold Paramedic or higher qualification.
Ambulance Officer	Responders specialising in pre-hospital emergency care. Different qualification levels can provide different treatments and are authorised to administer different medications. Qualifications are: - First Responder - Emergency Medical Technician - Paramedic - Intensive Care Paramedic - Extended Care Paramedic - Flight Paramedic.
Patient Transfer Officer	Specialised in manual handling, Patient Transfer Officers transport patients between hospitals, air ambulances, and to and from home to medical appointments. The patients vary

Role	Description
	from mobile to requiring intensive care level treatment. Qualifications are: - First Responder - Emergency Medical Technician.
Event Medic	Event Medics provide medical coverage at events and are trained in providing lifesaving interventions. Qualifications are: - First Responder - Emergency Medical Technician. Event Medics are often supported by Ambulance Officers with higher qualifications, usually at larger or more hazardous events.
Shift Manager	Provide operational support and management to the Ambulance Officers. Also provide support for the Patient Transfer Service and Event Medics outside of business hours. Will co-respond with Ambulance Officers to events of significance, such as cardiac arrests or mass casualty incidents.
Team Manager Communications	Supports the Dispatchers and Call Takers and liaises with external agencies and other operational managers.
Manager on Call	Select WFA managers provide on call resilience, support and advice for the on-duty Team Manager Communications and Shift Manager when they are dealing with situations of a significant nature. The group operate on a rotating roster where they are available 24 hours a day, for a seven day period.
Support Staff	The main support staff are the IT team who assist users of communications devices with any issues.
External Agencies	The main external agencies that WFA interact with are Police and FENZ. Other agencies can include, but are not limited to, WREMO, Civil Defence, medical facilities, city councils and Coast Guard.

2. Current State

2.1 Communication Services

Communications goals in WFA are currently achieved via 20 communications capabilities.

Capability	Also known as	Communication Type	Connectivity Method	Met by Aggregated Service Requirements Capability
Make wide-area group call	Make LMR call	Voice (Push-to-Talk)	Wide-area LMR network	CC01
Make local-area group call	Make direct-mode LMR call	Voice (Push-to-Talk)	Wide-area LMR (simplex mode)	CC18
Make point-to-point call	Make a phone call	Voice (Point-to-Point)	Phone	CC03
Request wide-area group call	Bidding or Routine request	Messaging (machine to machine)	Wide-area LMR (P25 messaging)	CC10
Send Priority Duress Alert	Automated Duress Alert – via portable or terminal radio	Messaging (machine to machine)	Wide-area LMR (P25 messaging)	CC07
	Automated Duress Alert – via MDT	Messaging (machine to machine)	Cellular Data	CC16
Send predefined status message	Automated Status Messaging – via portable or terminal radio	Messaging (machine to machine)	Wide-area LMR (P25 messaging)	CC09
	Automated Status Messaging – via MDT	Messaging (machine to machine)	Cellular Data	
Send vehicle location/data message	AVL	Messaging (machine to machine)	Cellular Data	CC13
Send Priority Dispatch Alert	Tone Portable	Messaging (machine to machine)	Wide-area LMR (P25 messaging)	CC07
Send Dispatch Alert	Send Dispatch Details to MDT, Cell Phone & Pager	Messaging (machine to machine)	Paging, Cellular SMS, Cellular Data	CC08
Send personal message		Messaging (person to person)	Paging, Cellular SMS, Cellular Data	CC12

Capability	Also known as	Communication Type	Connectivity Method	Met by Aggregated Service Requirements Capability
Send incident information	MDT	Messaging (machine to machine)	Cellular Data	CC16
Navigate route to incident	MDT	Messaging (machine to machine)	Cellular Data	CC16
Send vehicle to vehicle message	MDT	Messaging (machine to machine)	Cellular Data	CC16
Send patient assessment details	Telestroke	Messaging (machine to machine)	Cellular Data	CC16
	Lifepak Transmission	Messaging (machine to machine)	Cellular Data	CC16
	ePRF	Messaging (machine to machine)	Cellular Data/Wi-Fi	CC16
	Ongoing care referrals to third party	Messaging (machine to machine)	Cellular Data/Wi-Fi	CC16
	Photos	Messaging (machine to machine)	Cellular Data	CC06 & CC16
View details of active incidents	Visinet App	Messaging (machine to machine)	Cellular Data	CC16
Send and Receive Incidents to/from Police and/or Fire	InterCAD	Agency to Agency Interface	Fibre Data Connection	N/A
Get Information	Access to health data bases such as Concerto via ePRF. Access for Shift Managers to WFA back office information	Messaging (machine to machine)	Cellular Data/Wi-Fi	CC16
Report Information		Messaging (machine to machine)	Cellular Data/Wi-Fi	CC16

WFA currently uses the Police P25 digital radio network. This network is comprised of VHF and UHF frequencies. WFA primarily utilises the VHF spectrum to support its mobile vehicle and portable

operations throughout their operational area. Direct access to UHF operation is only within the Central Wellington region for the purposes of MCI events.

The ambulance Mobile Data Terminal (MDT) is the primary method to relay incident information to Ambulance Officers, followed by pager and cellular text message. The MDT is used by crews to receive incidents and send predefined status updates to the CAD system. MDT is preferred over the use of voice communications for routine status updates. When voice communication is required, the radio remains the preferred method over cell phone use. WFA also use paging to activate community first Responders and send incident information to their Responders. Paging is generally viewed as a resilience and only useful in areas with no cellular coverage.

If a case is urgent, voice over radio is used to alert ambulance crews, as well as pagers being activated and the MDT and cell phones receiving the details. The verbal announcement allows other units to hear the dispatch and can offer to respond if within the vicinity. If it's a non-urgent case, there may be no verbal interaction at all. The Dispatcher assigns the case which triggers the pagers and cell phones for the alerting, then the MDT receives all the case details and notes.

WFA relies significantly on cellular platforms to deliver AVL tracking of vehicles, data to the frontline and to enable the CAD to make recommendations on units to assign to an incident.

2.2 Use Cases

The following use cases are current state however, where possible, appropriate Public Safety Network technologies have been referenced.

WFA 01 - Dispatch Incident

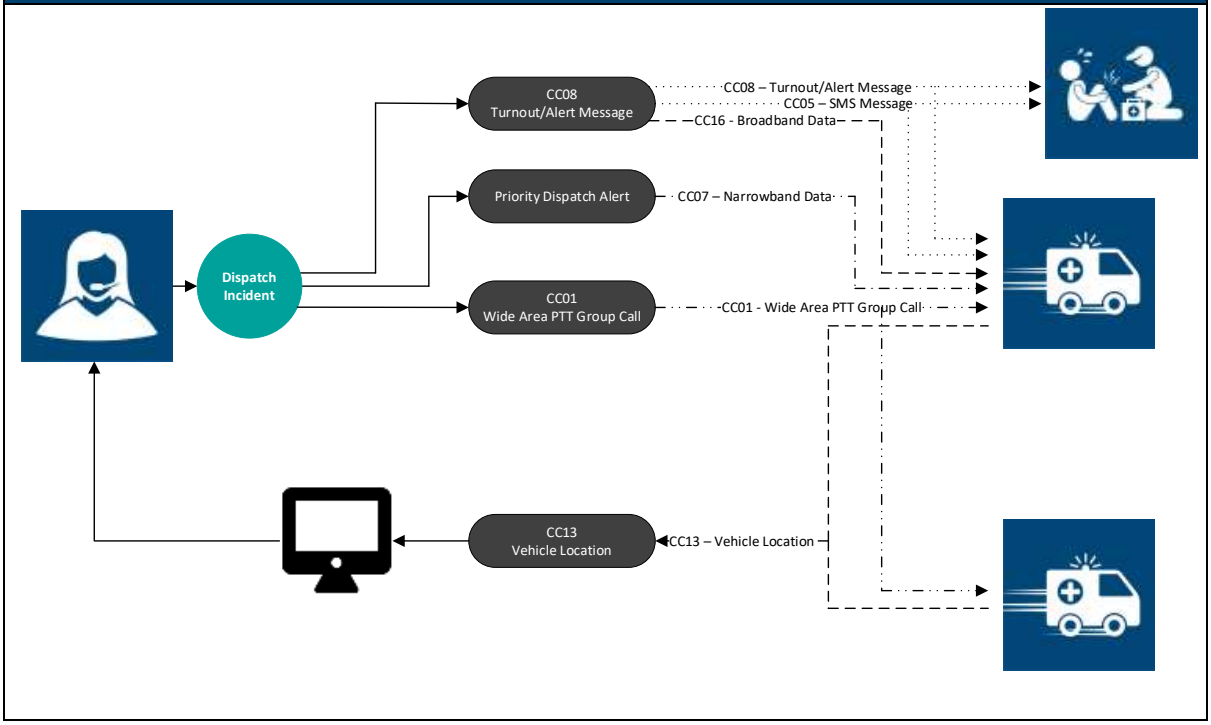
Communication Goal

Send the most appropriate resource to the incident in a timely manner, and ensure the Responders have the information they require.

Context

1) A request for help has been received by the Communications Centre and the patient has been triaged and assessed as requiring ambulance attendance.
2) An ambulance crew on scene has requested another vehicle attend to assist them with lifting a heavy patient or provide specialist procedures or drugs.
3) The incident involves multiple patients or is of a significant nature, therefore requiring additional vehicles and/or management support.

Model



Description

1) Initial Assign recommends to the Dispatcher which resource to send.
2) Dispatcher accepts the Initial Assign recommendation or overrides it and chooses a more appropriate resource.
3) Resources receive notification of the incident and a short summary of the details on the vehicle MDT, Cell Phone and Pager.

Exception Scenarios

1) Incidents prioritised as RED1 or RED2

Resources assigned to incidents prioritised as RED1 or RED2 will also be notified via an audible tone on their Portable Radio and a wide-area group call.

2) Incident prioritised as PURPLE

Resources assigned to incidents prioritised as PURPLE will also be notified via an audible tone on their Portable Radio and a wide-area group call. A second wide-area group call, known as an All Informed Broadcast, is made to see if any other vehicles are closer and available to attend as well.

3) Initial Assign unavailable

If Initial Assign is not working, the Dispatcher will manually select an appropriate resource to send.

Note

1) Occasionally WFA vehicles are required to respond outside the jurisdictional boundary with St John, and vice versa.
2) The GoodSAM app is a free cellular phone application that alerts people that a patient suspected to be in cardiac arrest is nearby. This allows them to possibly save a life by providing CPR and using an Automated External Defibrillator (if available) prior to emergency services arriving. The app was developed in the United Kingdom and has been implemented by a number of ambulance services around the world. GoodSam is supported in New Zealand by WFA, St John, and the National Cardiac Network. People who are trained to perform CPR and use an AED can register on the website and download the app to their phone. When a call comes into the Communications Centre and is coded as a suspected cardiac arrest, CAD will automatically notify GoodSAM. Some cardiac arrest codes do not result in a GoodSAM notification, such as those resulting from trauma and other potentially dangerous situations. If a GoodSAM Responder is within 1000m of a suspected cardiac arrest they will receive an alert via their phone, giving them the opportunity to respond. The app also shows Responders the location of the incident and the nearest known AEDs. The Dispatcher does not need to do anything in addition to dispatching Emergency Services

and does not know if GoodSAM Responders are responding or not. See the Integration section of this document for more details.

3) Incidents that have been triaged as appropriate for Clinical Triage Assessment appear in a CAD Queue visible to the Emergency Medical Triage Nurses. The Nurses then assign themselves to the incidents and, based on their subsequent assessment, will either close the incident or change the incident coding so that it is sent back to the EAS Dispatcher Queue for an Ambulance resource to be assigned to it.

Future State

Improvements that WFA would like to see in the future state
1) All-informed broadcasts and dispatch to higher priority incidents be audible regardless of the volume the device has been set at.
2) Dispatchers can alert devices that have their volumes turned down.
3) Alert to device is reliable so we don't have to resort to multiple devices for resiliency.
4) Dispatchers can see which communication services are available to specific users.
5) One device for notification, communication, and documentation.
6) Devices and communication services work outside of the WFA jurisdiction.

WFA 02 – Respond to Incident

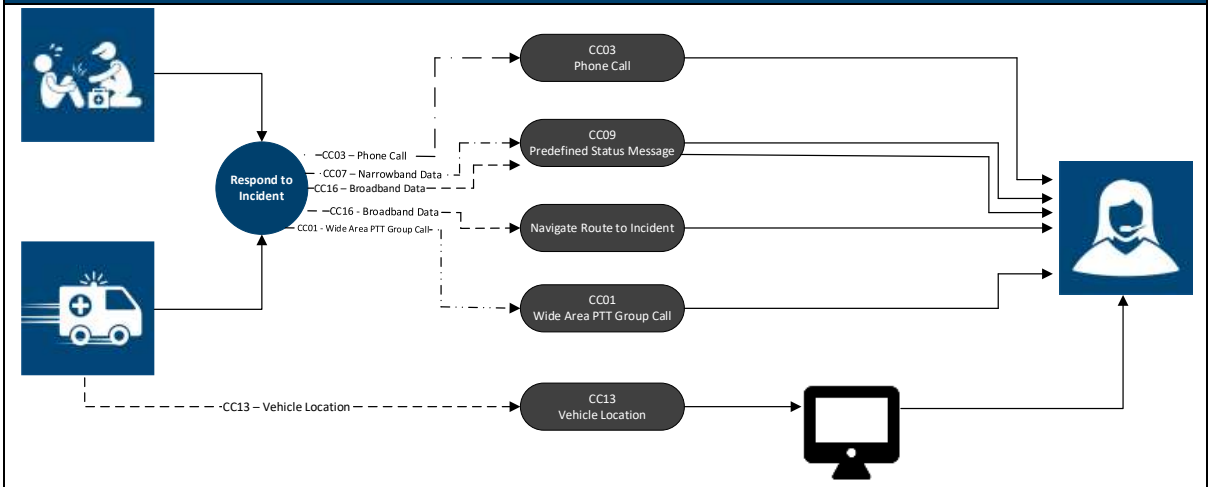
Communication Goal

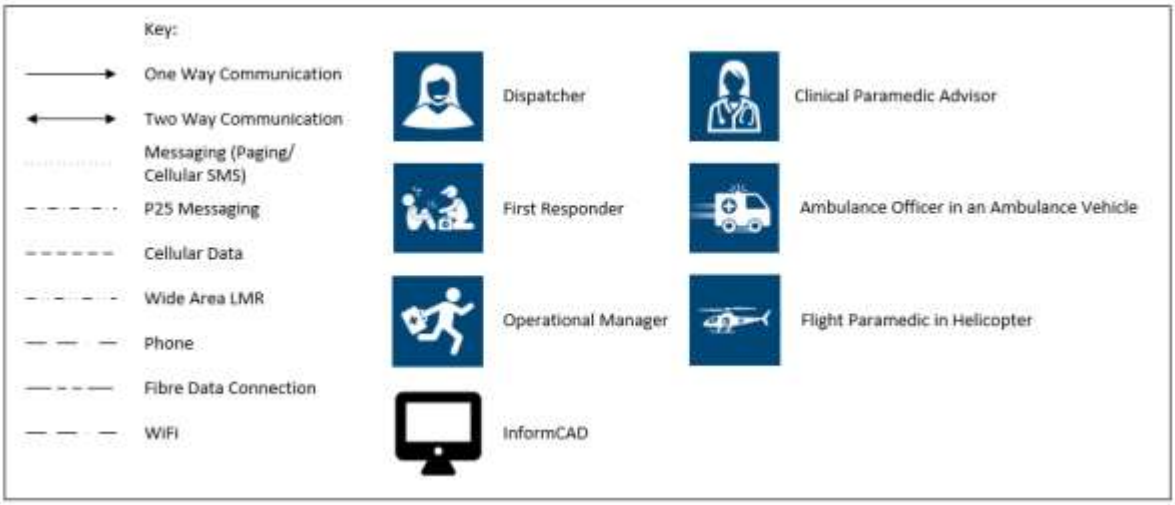
Use the quickest and most efficient route to the incident, provide updates to the Dispatcher regarding location and vehicle status.

Context

1) Resource has received notification of an incident they need to attend, via their vehicle MDT, Pager and Cell Phone (and possibly had their Portable Radio toned).
2) The resource needs to acknowledge the notification and advise the Dispatcher whether they can attend or not.
3) If they can attend, the resource needs to know the quickest and most efficient route to take to get to the incident scene.
4) The resource needs to advise the Dispatcher when they are at the incident scene.

Model





Description

1) Resources acknowledge the incident notification with an automated status message via the vehicle MDT or Fixed Terminal Radio, or they verbally acknowledge the notification via wide-area group call (this could also be done via phone call but is not common practice).

2) Resources can view the route to the incident on the vehicle MDT.
3) Once the resource is in the vicinity of the incident an automatic message will be sent from the vehicle's AVL to the CAD incident notes.
4) When the resource has arrived at scene, they advise the Dispatcher with an automated status message via the vehicle MDT, portable radio or fixed terminal radio, or via wide-area group call.

Exception Scenario

1) No response from an assigned resource

Where there is no response from an assigned resource, the Dispatcher will call the crew member via phone. If the assigned resource is a First Response Unit (FRU) then the Dispatcher will assume they are not available and will not attempt to make further contact. It is rare for a FRU to call to advise they are not available, normally the notification will go unanswered.

Note

Map books, Tom-Toms, and personal phones are used regularly as an alternative to the MDT mapping. This is personal preference. There is some distrust of the MDT mapping due to historical faults.

WFA 03 – Incident Management

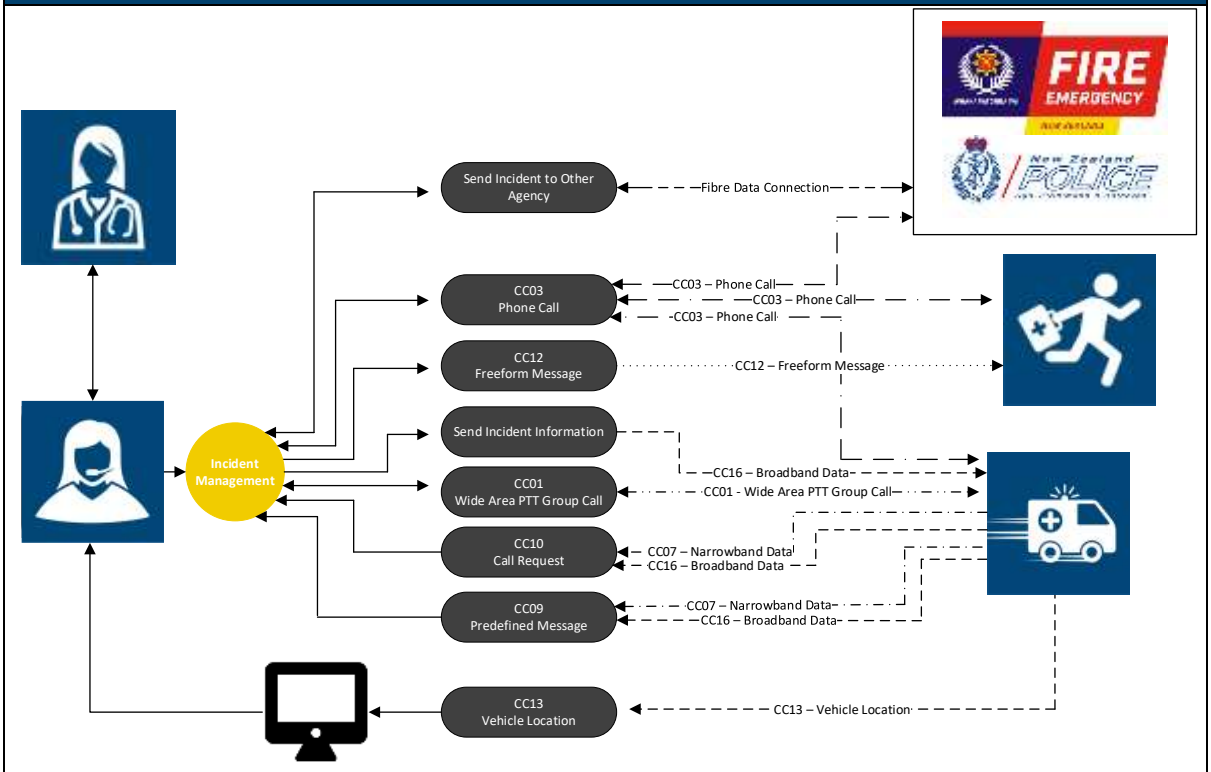
Communication Goal

Co-ordinate the incident response to ensure safety and efficiency.

Context

1) During the response and resolve stages, the Dispatcher and attending resources remain in contact, with the Ambulance Officers advising when they are responding, have arrived at scene, have assessed the patient's status, have decided whether to transport or treat at scene, and when they have cleared from the incident and are available for the next patient.
2) The Dispatcher enters all the information updates into the CAD Incident.
3) The Dispatcher liaises, as required, with the Clinical Paramedic Advisor, operational managers, and external agencies.

Model



Description

1) Resources will advise the Dispatcher of the patient's medical status and their intention to transport or not as soon as possible after arriving at scene via phone call or wide-area group call.
2) Resources advise the Dispatcher when they depart scene, arrive at hospital or have resolved the incident with an automated status message via the vehicle MDT, phone call, portable radio or fixed terminal radio, or via wide-area group call.
3) The Dispatcher updates operational managers as required via Pager or Cell Phone.
4) The Dispatcher sends incidents to Police or FENZ as required via InterCAD. Communication between the agencies about the incident is then made via comments in the CAD incident.

Exception Scenarios

1) Verbal updates

Updates that do not come via automated status messages are manually inputted by the Dispatcher.

2) InterCAD not working

If InterCAD is not available a Communications Centre employee will phone the Police and /or FENZ Communications Centres to verbally advise them of the incident details.

3) Resolved without ambulance attendance

Clinical Paramedic Advisors in the Communications Centre may also resolve the incident without ambulance attendance. Currently this is by phone call. In the future WFA would like to see greater opportunity for video consultation, data sharing (from personal medical devices or photos), and Mission Critical Telephony for the Communications Centre to third parties.

Note

1) Interaction between the CPA and dispatcher is generally via desktop message, face-to-face, or via comments in the CAD incident.
2) At any stage, a Responder may send a priority duress alert to advise the dispatcher that they are in danger. This could be done via the portable radio, terminal radio or MDT. Everybody logged into CAD is immediately notified of the emergency status by an audible alert and visual display of the emergency caller's ID on the CAD screen. This occurs regardless of which Communications Centre and/or jurisdictions the Call Takers and Dispatchers are currently viewing. In the P25 network, the Responder is given pre-emption and signalling will tell all radios in that talkgroup that are not in emergency mode to stop transmitting to make the channel available for the emergency call. When the duress button is depressed on the portable and terminal radios, it will open the talkgroup and continually transmit for 30 seconds or until the Push-To-Talk button is depressed to stop it. This does not occur when the priority duress alert is activated via the MDT. During the 30 second

	open microphone period, if another priority duress alert is received from another Responder, the second open microphone period will not begin until the first has finished. If four vehicles are activated concurrently, the talkgroup could be blocked for up to two minutes.

WFA 04 – Resolve Incident

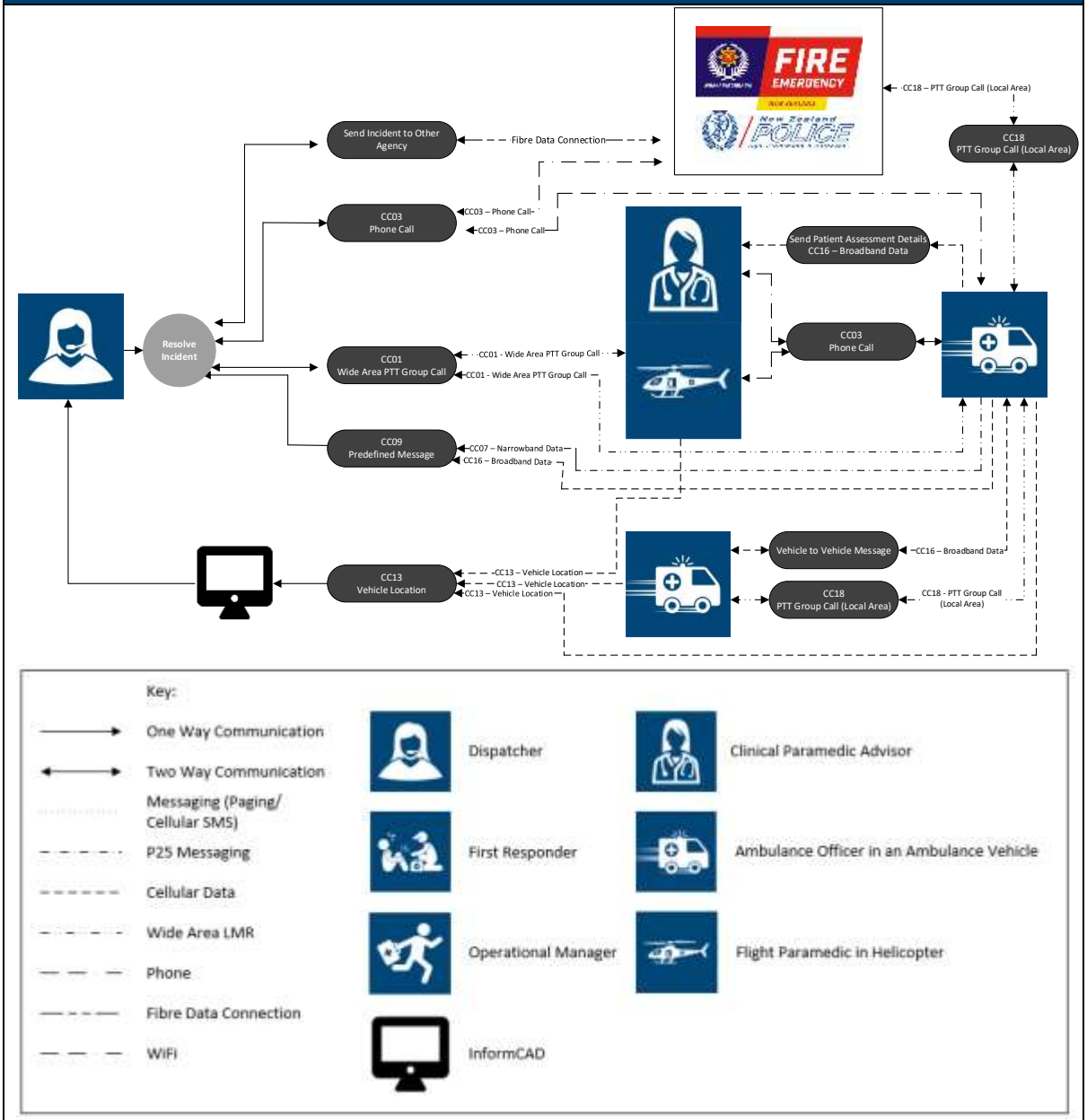
Communication Goal

Provide the most appropriate care for the patient.

Context

1) If the Ambulance Officers on scene require further assistance, then they could:
   - Request the Dispatcher sends another crew to help them with lifting a heavy patient or provide specialist procedures or drugs,
   - Call to the Clinical Paramedic Advisor to discuss treatment or transport options,
   - Request a helicopter to transport the patient or bring an Ambulance Officer with specialist skills,
   - Request Police or FENZ attendance be notified or attend to assist with scene safety, helicopter landing zones, lifting or CPR,
   - Liaise with hospital specialists to discuss treatment options.

Model



Description
1) Requests from Ambulance Officers on scene for another crew, other agency, or helicopter are made verbally via Radio or Cell Phone. 2) The Dispatcher sends incidents to Police or FENZ as required via InterCAD. Communication between the agencies about the incident is then made via comments in the CAD incident. 3) When dispatching additional ambulance or helicopter resources, the Dispatcher either uses Initial Assign or manually chooses an appropriate resource. Dispatch notification, response and incident management then occurs as per WFA 01, WFA 02 and WFA 03 above. 4) Ambulance Officers on scene can use their mobile phone to liaise with the Clinical Paramedic Advisor, using voice or data to send photos.
Exception Scenario
4) InterCAD not working If InterCAD is not available a Communications Centre employee will phone the Police and/or FENZ Communications Centres to verbally advise them of the incident details. **5) Resolved without ambulance attendance** Clinical Paramedic Advisors in the Communications Centre may also resolve the incident without ambulance attendance. Currently this is by phone call. In the future WFA would like to see greater opportunity for video consultation, data sharing (from personal medical devices or photos), and Mission Critical Telephony for the Communications Centre to third parties.
Notes
1) Whilst most on scene inter-agency liaising takes place face-to-face between senior roles, Responders on scene at an incident will sometimes communicate with other agencies on scene via LMR liaison channels. These liaison channels operate in simplex mode on the analogue radio network. The liaison channels are most commonly used by the Rescue squad, who have indicated that they frequently experience coverage issues because most of the incidents they attend are in remote locations. 2) Ambulance Officers on scene can also send patient assessment details to health professionals at medical facilities using the Lifepak, Telestroke tablet, ePRF or their cell phone. Clinical Paramedic Advisors may also phone health professionals to seek advice or discuss health pathways for the patient. 3) Ambulance Officers on scene and Clinical Paramedic Advisors can access external health databases such as Concerto via the WFA Toolkit on the ePRF tablet or online portal. The CPA can view all historical Patient Report Forms in eTriage via CAD but the Ambulance Officers can only view ones that are more than 24 hours old via the ePRF tablet. 4) All helicopter requests are referred to the Clinical Air Desk based in the St John Communications Centre in either Auckland or Christchurch. The Ambulance Officer working on the Air Desk assesses the incident against the ANTS criteria using information provided in the incident notes or by calling the scene. They then recommend which helicopter be dispatched or decline the request.

Future State

Improvements that WFA would like to see in the Future State
1) Cameras on Responders' devices can be used for remote consultation with Clinical Paramedic Advisors and external Health Care Professionals 2) Information from Responders devices can be viewed remotely by the Clinical Paramedic Advisor and Air Desk

WFA 05 – Resource Management

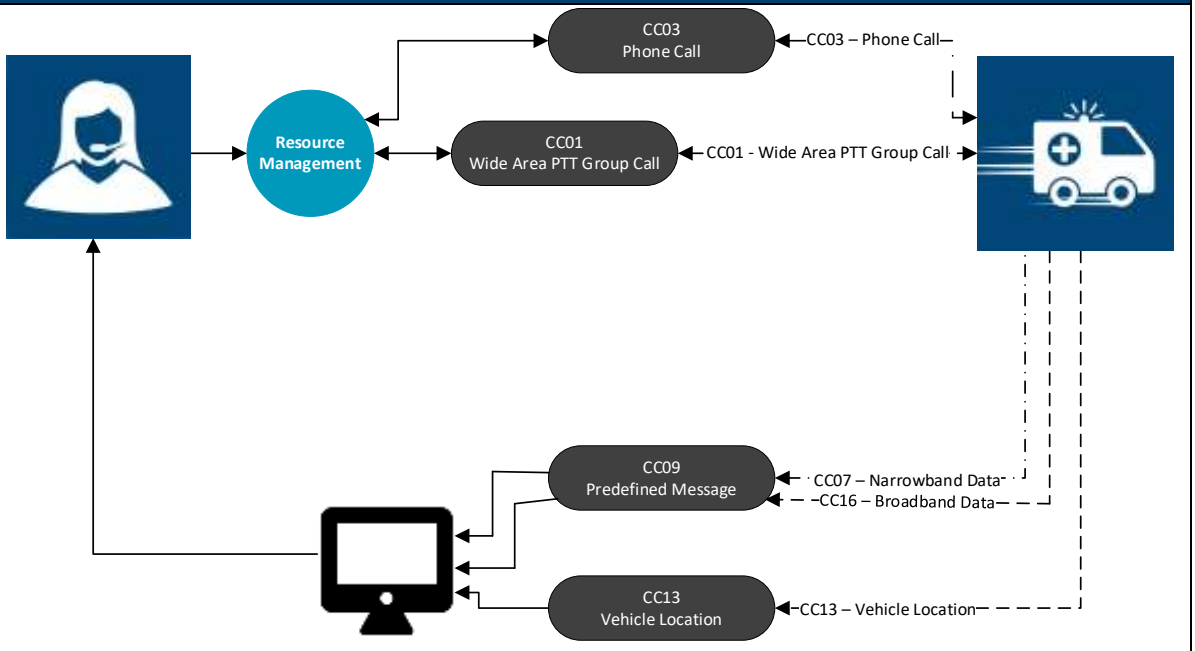
Communication Goal

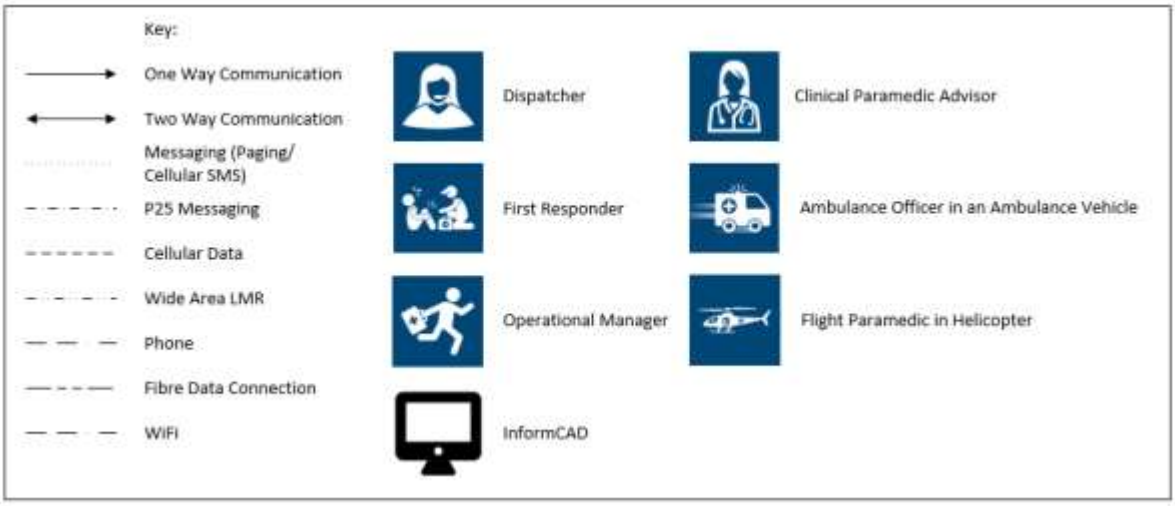
Co-ordinate resources to ensure optimum crew and community safety.

Context

1) Whether attending an incident or not, on-duty resources keep their status current with the Dispatcher by sending updates on their location.
2) The Dispatcher retains overall oversight and control over the resources in their area, following a Deployment Plan to ensure optimum coverage.

Model





Description

1) Data is automatically sent every 10 seconds from the vehicle's AVL to CAD so the Dispatcher can always view the vehicle's current location.

2) Resources advise the Dispatcher when they depart scene, arrive at hospital or have resolved the Incident with an automated status message via the vehicle MDT, phone call, portable radio or fixed terminal radio, or via wide-area group call.
3) Resources can also advise the Dispatcher if they are unavailable for reasons such as refuelling, restocking equipment or going 'local area' to buy meals with an automated status message via the vehicle MDT, phone call, or wide-area group call.

Exception Scenarios

1) Verbal updates

Updates that do not come via automated status messages are manually inputted by the Dispatcher.

2) AVL Not Working

If the AVL is not working, Dispatchers will routinely request a verbal update of a vehicle's location via phone call, or wide-area group call.

3) Data Connection for AVL

Data from the vehicle AVL is sent every 10 seconds but this is subject to coverage availability. For example, if the vehicle is going through a tunnel or an area of poor coverage, then the AVL information sent to CAD will be delayed.

Note

1) Whilst the AVL data is sent to CAD every 10 seconds, the CAD map refresh rate is greater to improve the stability of the mapping system.
2) Operational Managers can also remotely view the details of incidents via the Visinet application on their Cell Phones.
3) At any stage, a Responder may send a priority duress alert to advise the dispatcher that they are in danger. See WFA03, Note 2 for more information.

WFA 06 – Review and Report

Communication Goal

Capture and distribute incident information as needed to support operations, bill users, audit, investigation, and improve future incident response and management.

Context

1) A Patient Report Form is completed for all patients who have been assessed face-to-face. This is recorded on the ePRF tablet by Ambulance Officers and Event Medics, and on a paper form by Patient Transport Officers.
2) The information recorded in ePRF is shared with patients and the medical facilities they are transported to.
3) Regular reports, clinical audits and incident reviews take place using information gathered from CAD and ePRF.
4) All audio transmissions that go through the Communications Centre are recorded on RedBox.

Description

1) Reports can be generated that show all details recorded in the CAD Incident. This includes, but is not limited to:
    - Times that the call started and ended,
    - When each resource was assigned, responding, at scene, with the patient, departing scene, at destination, and available again,
    - The reason each vehicle cleared from the job, (e.g. accidental alarm activation, ambulance not required, medical incident, ACC related incident, or treated at scene),
    - Incident comments manually entered by Call Takers and dispatchers.
2) Reports that are regularly generated using data from CAD and/or ePRF include, but are not limited to:
    - At Scene Times
    - Codestat
    - Clinical Paramedic Assessment Incidents
    - Clinical Quality Indicators
    - Daily Patient Transfer Service Volumes
    - Calls referred to Early Mental Health Line
    - Exception Report – information entered into CAD incorrectly
    - Helicopter Incidents
    - Hospital Turnaround Times
    - Life Flight Incidents
    - Median Incident Times and Meal Breaks
    - Ministry of Health Patient Transfer Service Data
    - National Ambulance Sector Office Reports
    - National Telehealth Service Reporting
    - Clinical Telephone Assessment Reporting
    - Out of Hospital Cardiac Arrest Registry
    - Patient Transfer Service contractual requirements
    - Urgent Community Care Incidents
    - Volumes of Calls by Time Taken
    - Clinical Audit Results
    - Cardiac Arrest patients that survive to discharge
    - Information to then send Patient Satisfaction Surveys.
3) Data from CAD is used for the Response Performance Monitor, where managers can view a dashboard of resource performance against contracted key performance indicators.

4) The information recorded in ePRF is printed at the Emergency Department and given to the receiving health professional at patient handover.
5) If the patient is transported to a non-emergency department medical facility the receiving health professional is given a reference number to access the information online.
6) Reports generated from CAD enable WFA to bill Ministry of Health, Rest Homes, and other facilities for Patient Transfers.
7) RedBox is accessed via a web portal and must be accessed via generic Call Handler and Dispatcher logon credentials. This will provide access to the last 50 recordings on all recorded lines.

Exception Scenarios

1) MDT Not Working

If an MDT is faulty then Dispatchers will manually record updates from the crew in the CAD incident.

2) ePRF Not Working

If the ePRF system or tablet is not working, Ambulance Officers will record patient assessment and treatment details on a paper form. The paper forms are then manually entered into the eTriage system when the crew are back on station and/or the system outage is resolved.

3) CAD Outage

If there is a CAD outage, Call Takers and Dispatchers will record incident details on paper forms. Incidents that have been documented on paper will be manually entered into CAD once the outage has been resolved.

4) RedBox Access

To access more than the last 50 recordings you must be granted permission and have your own unique logon to RedBox. This is reserved for Call Handling Team Leaders (CHTL), Duty Centre Managers (DCMs), Team Managers (TMCs), Clinical Paramedic Advisors and the Training and Quality Team.

Note

Data from eTriage is stored in a St John server in Auckland. WFA data analysts are unable to access this data. Every night the Wellington data is automatically copied into a WFA reporting server that they can access.

2.3 Additional Use Cases

WFA 07 – Manager Notification

Communication Goal

Ensure chains of command are functional and effective during major incidents and situations of a significant nature.

Context

1) Shift Manager provides operational support and management to Ambulance Officers during events of significance, such as cardiac arrests or mass casualty incidents. This may be as a co-response.
2) Shift Manager liaises with the Dispatcher and/or Team Manager Communications regarding operational demand and resourcing options.
3) Escalation process is initiated and the Manager on-call provides on-call resilience, support and advice for the on-duty Team Manager Communications and Shift Manager.

Description

1) Dispatcher notifies managers as tabled below:

	Shift Manager/ Wairarapa Manager	Wairarapa Manager After Hours (1800-0700)	Executive Director Healthcare Services (or Manager on-call if EDHS not available)
Confirmed or Potential MCI	Dispatch	Call	Call
Serious Motor Vehicle Accident	Dispatch	Call	Call
10:10	Dispatch	Call	Call
SM/WM uncontactable or 10:10			Call
Urgent Police request	Call	Call	
3+ ambulances at 1 scene	Call	Call	
Hospital overloaded or bypass	Call	Call	
Significant communications outage	Call		
Outstanding Red or Purple with no resource available in 8 minutes	Call	Call	
Potential peer support/distressing incident	Call	Call	
Back-up not available	Call		

Crew requesting stand-down	Call	Call	
Potential chemicals at scene (potential HAZMAT Team)	Call	Call	
Potential inaccessible patient (potential Rescue Squad)	Call	Call	
Potential firearms at scene (potential TEMS team)	Call	Call	
Injury to staff	Call		
Significant injury to staff	Call	Call	
Significant rail, airport or marine incident	Call	Call	
Crew reporting fatigue (or dispatcher has concerns)	Call	Call	
Paediatric cardiac arrest	Call	Call	
Single crew at scene with no back-up	Page		
Status 0 patient (deceased)	Page		
Police or FENZ standby	Page		
ED delay >30min	Page		
Vehicle breakdown	Page		
Crew out of service	Page		
Crew delaying meal break	Page		

2) Managers may choose to respond to the incident scene, join the Dispatcher in the Communications Centre or liaise remotely.
3) Major incidents often involve a multi-agency response; therefore the managers may be required to participate in audio conferences.

Future State

Improvements that WFA would like to see in the Future State
1) Video footage from Responders' devices and the vehicle can be viewed remotely by Operational Managers, Dispatchers, Clinical Paramedic Advisors and Officers in Charge of events. Those supporting the Responders can gain situational awareness and not be reliant on the Responders feeding information back to the Communications Centre whilst trying to help patients.

WFA 08 – Coverage Optimisation

Communication Goal

Ensure that Responders retain optimum coverage regardless of their location or proximity to their vehicle.

Context

1) When presented with multiple networks the device automatically selects the most appropriate option.
2) When in or around their vehicle, Responders' devices can leverage the vehicle's Wi-Fi to ensure continued access to communications networks.
3) When moving away from their vehicle and/or entering buildings then Responders' devices can utilise the vehicle's LMR or Cellular repeater if their portables do not already have adequate coverage.

Description

1) Responders arrive at an incident and whilst still in the vehicle they notify the Dispatcher in the Communications Centre that they are on scene (this could be done by voice or status messaging via their MDT or radio).
2) Responders then gather their equipment and head towards the building to find the patient.
3) Between leaving the vehicle and entering building the Responders engage in a PTT conversation with the Dispatcher in order to obtain updated patient location information.
4) Once they are with the patient the Responders will advise the Dispatcher that they have located the patient, what the patient's status is and give an indication of their intentions to transport the patient or not.
5) Whilst with the patient in the building the Responders may need to make voice or video calls, or transmit information, from medical devices such as a cardiac monitor. This communication could be with health professionals at a medical facility, or the Clinical Paramedic Advisor in the Communications Centre.
6) If the patient is going to be transported the Responders will escort them to the vehicle.
7) Whilst in and around the vehicle may still need to make voice or video calls or transmit information from medical devices.
8) When ready to leave the scene, the responder will advise the Dispatcher that they are departing scene and which hospital they are heading towards (this could be done by voice or status messaging via their MDT or radio).

Note

1) WFA don't currently have this capability so this use case is future state.
2) There must be a seamless user experience across the hybrid network so that Responders do not notice when their devices move from one network to another:
   - Responders' devices must automatically connect to the vehicle bubble without any manual input,
   - Responders' devices must select the most appropriate network automatically without any manual input.
3) A short-isolated period of buffering, no longer than two seconds, is acceptable during video calls.
4) All talkgroup options must be presented to and available for the user to select, regardless of the bearer.

WFA 09 – Transparent Network Management

Communication Goal

Dispatchers and Responders know where Responders will have communications coverage so that extra steps can be made in order to ensure Responders are safe and have the information they require.

Context

1) Dispatchers can see network coverage in relation to incident locations and the response route.
2) Responders' devices show which networks have coverage and at what strength.

Description

1) When dispatching an incident to a remote location Dispatchers can check the coverage availability at the scene and on the route likely to be taken by Responders.
2) Dispatchers can then advise Responders of any blackspots they may encounter and both parties can ensure that any relevant response information is received before Responders go out of the coverage area.
3) Dispatchers are aware that there are Responders unable to communicate with them and will escalate to management if they have not heard back from the Responders within appropriate timeframes.
4) When returning from the blackspot Responders can check their devices to see when they have enough coverage to successfully transmit to the Dispatcher and update them.

Note

1) Whilst Responders should be able to view the coverage they have on their devices, optimum network selection should occur automatically as per use case WFA08 – Coverage Optimisation.

WFA 10 – Device and Service Management

Communication Goal

Provide day-to-day support for the use of devices, including on-boarding and off-boarding of users, and IT support for minor issues.

Context

1) A new staff member is employed and requires a device for their role.
2) A user resigns or no longer requires a device for their new role.
3) A user has lost a device, or the device has been stolen.
4) A user requires a replacement device or accessory.
5) A user has difficulty using their device.
6) Access to talkgroups and applications is restricted to authorised users.

Description

Example 1: Lost or Stolen Device

1) Responders report a lost or stolen device to their operational manager.
2) Operational manager provides the Responder with a spare device and notifies the Communications Centre so they can update the device allocated to the vehicle in CAD.
3) If the missing device is a radio, Comms or IT will contact the Police Service Desk to have the device disabled from the network.
4) The TMC or Dispatcher tests the device with the Responder to ensure the device is working and CAD has been updated correctly.
5) The operational manager submits an IT request form and after 48 hours IT replenish the operational manager's spare stock with a device from the IT spare stock.

If the missing device is a radio:

6) Operational manager completes a CommLease insurance claim form and IT submit it.
7) IT allocates new SUID and update Enable Fleet.

Example 2: On-Boarding/Off-Boarding

On-Boarding:

1) HR send a notification that there is a new staff member.
2) IT creates a new user account in WFA Active Directory.
3) User's manager logs an IT request to have a device issued to the user.
4) User collects device from IT.
5) Whilst with IT, user logs into the device to complete Mobile Device Management enrolment.

Off-Boarding:

6) HR send a notification that there is an exiting staff member.
7) User returns device to IT.
8) IT disables Active Directory account and wipes the device in preparation for it to be reissued to another user.

Exception Scenarios

1) Hardware Faults

Issues with devices such as devices not retaining their charge or cracked screens will be referred to the provider by the IT team.

2) Network Faults

Network issues will be referred to the provider by the IT team, or by the Team Manager Communications outside of business hours.

3) Software Faults

Some software, such as ePRF, is currently managed by St John.

Future State
1) It is expected that service providers will operate a Service Desk to perform incident management and carry out agreed service requests. The Service Desk must be available 24 hours per day, seven days per week to match WFA's operational hours. 2) Service providers need to provide real-time notifications of outages and service issues (planned and unplanned). 3) Devices must be able to be remotely configured.

WFA 11 – User Identification

Communication Goal

Ensure only authorised users have access to Emergency Services networks and device functions.

Context

1) Only authorised devices may access Emergency Services networks.
2) Users must sign into their devices in order to use them.
3) Certain applications and functions will require further user identification to access them, such as databases that hold patient information.

Description

1) The Responder unlocks their device using a fingerprint, proximity token, facial recognition, pin code or pattern.
2) When the Responder begins their shift they log into the WFA portal on their device.
3) Active Directory checks the submitted username and password and determines that the Responder is an authorised user.
4) The user is now able to use their device to complete their operational duties.
5) The Responder attends a patient who has a complex medical history. The Responder needs to check the details of the care plan the patient has with WFA. The Responder must re-enter their username and password.
6) The restricted access application will automatically log out when the device is locked or after 5 minutes of inactivity.
7) The Responder's shift ends, and they log out of the WFA portal.

Note

1) Whilst security must ensure that devices and networks are protected from accidental or nefarious misuse, user identification must be quick and easy due to nature of emergency incidents.
2) Lost or stolen devices must be able to be remotely locked or deactivated.
3) The device will automatically log out 14 hours after log on (normal EAS shifts are 12-13 hours and NZTA driving regulations restrict driving hours to 14 hours).
4) Auditing will occur to ensure that staff are only accessing the WFA portal whilst on duty and access to patient information databases is related to the current incident they are attending.
5) The release of any personal or health information held by WFA is an area of particular risk given the sensitivity of health information. There are several times during the lifecycle of an incident where it is required that personal and/or health information is gathered and disseminated. This includes during assessment of a patient by a Call Taker, Nurse, Clinical Paramedical Advisor or Ambulance Officer, dispatch of an incident, responding to an incident, resolving an incident, and during reviewing and reporting post-incident. Occasionally information may also be requested by external parties such as patients, insurance companies, medical facilities, probation officers, Oranga Tamariki, coroners, media, and Police. This information could include audio recordings, CAD reports or patient report forms. All practical steps must be taken to ensure that communication pathways are secure, or if they are not, to ensure that personal or health information is not relayed.

2.4 Specialist Roles

Whilst all roles follow the same six operational functions outlined above, WFA has five specialist groups with requirements over and above those of a standard Responder:

- Flight Team
- Rescue Squad
- HAZMAT Team
- Mental Health Community Response Team
- Tactical Emergency Medical Support Team.

These specialist teams are usually responding alongside other WFA resources and/or resources from other Emergency Services agencies. Responders on scene at an incident often communicate with other agencies on scene via LMR liaison channels. These liaison channels operate in simplex mode on the analogue radio network. For example, the liaison channels are used to coordinate helicopter landing zones with FENZ Responders.

2.4.1 Rescue Squad

The Rescue Squad is dispatched on an as required basis either individually or as a unit. They have equipment that can be used to access patients in difficult and/or remote locations. They are also trained in high angle rescue.

Their communication challenges include:

- Coverage in remote locations
- Coverage within buildings/tunnels
- Operating devices while in precarious positions
- Operating devices while wearing personal protective equipment (this ranges from simple helmets to full respirator body suits).

Vehicles and communication devices are shared with the HAZMAT Team.

2.4.2 HAZMAT Team

The HAZMAT team are a group of WFA Ambulance Officers who are a part of a national response team. They are specially trained to access, treat, and retrieve patients in incidents involving biological, chemical or radiological hazards. They have equipment that can be used to treat exposed/contagious patients.

The HAZMAT team could be operating over a distance of 50m to several hundred metres depending on what the agent is, what other hazards are involved, what the spread of casualties is, and what their mandate is.

Communication is from the point of patient to the collection point. This is not likely to be line of sight, nor is it likely to be within speaking distance.

Both the Splash Suit and the Saratoga Suit can be worn with or without FENZ Breathing Apparatus masks.

Decontamination occurs via a wet decontamination process.

Their communication challenges include:

- Operating devices while wearing personal protective equipment (this ranges from simple helmets to full respirator body suits),
- Operating devices in volatile situations (such as in vicinity of explosive materials).

Vehicles and communication devices are shared with the Rescue Squad.

2.4.3 Tactical Emergency Medical Support

Tactical Emergency Medical Support (TEMS) is a six-month pilot involving WFA Ambulance Officers being imbedded with the Police Special Tactics Group and Armed Offenders Squad. TEMS will primarily be deployed by Police. This will be directly from the Police Communications Centre, and from STG and AOS command. If they are not otherwise tasked by Police then they will also respond to purple incidents for WFA, if they are within the vicinity and can be released within 15 minutes. They will also respond to WFA incidents that have been identified as not being safe for Ambulance crews to enter.

The three Ambulance Officers taking part in the trial have received increased Tactical Emergency Casualty Care Training. Two will be full time, the third is a reserve. One full-time member will be primary on-call, with vehicle 481 (a fully equipped WFA Mitsubishi Outlander). The second full-time member will be the secondary on-call. This is changed week about. The current hours are 0700-1500 Monday to Friday.

The teams' current communications equipment is:

- 1x VHF terminal radio (fixed in vehicle),
- 2x portable VHF radios (WFA owned and used to monitor WFA EAS Talkgroup),
- 2x portable VHF/UHF radio (Police owned and used to monitor the STG and AOS Talkgroups),
- They will also often carry a spare Police VHF/UF portable radio depending on the operation. (Police owned and used to monitor the General Hutt or Wellington Police Talkgroups),
- 2x iPhones (Police owned and used to assist communications with Police).

When tasked with a Police operation, the Ambulance Office will wear two earpieces connected to two portable radios, one monitoring the AOS/STG Talkgroup and the other monitoring the WFA EAS Talkgroup. They will also monitor the general Police area Talkgroup on a separate portable radio. The WFA radio is usually turned to silent unless the Ambulance Officer requires it.

Communications challenges that have been identified during the first few weeks of the trial include:

- There is a physical and mental burden monitoring three radio channels,
- There is a future requirement for earmuff communications. This would provide hearing protection from loud noises such as explosive breaching, whilst retaining the ability to communicate.

2.4.4 Mental Health Co-Response Team

The Co-Response Team (CRT) is a team that incorporates a Police Officer, paramedic and a mental health professional working together to provide a co-ordinated and responsive service to people experiencing mental health distress. The team will engage with services to better meet the person

needs in the community whilst working in a way that puts the person at the centre of decision-making. The CRT is a resource that can respond to complete a mental health face-to-face assessment.

The aim for the CRT is to provide appropriate and timely care, utilising pathways and connections in the community. The assessment can take up to 90 minutes. Ideally this group of patients will no longer be transported to the Emergency Department for their mental health assessments, however there will be instances when community-based care is not appropriate and the patient will require transport.

The CRT was launched on 17 March 2020 and is currently in trial phase as these communications requirements are still being developed.

2.4.5 Flight Paramedics

Flight Paramedics respond single crewed in a rapid response car or as part of the helicopter team with the pilot and crew members. They can be dispatched because of their specialist skills, if there are access difficulties, where the patient is considered to have a time critical problem, or where the estimated number and condition of patients is such that sufficient resources would not reach the scene in a reasonable time by road.

All helicopter requests are referred to the Clinical Air Desk based in the St John Communications Centre in either Auckland or Christchurch. The Ambulance Officer working on the Air Desk assesses the incident against the ANTS criteria using information provided in the incident notes or by calling the scene. They then recommend which helicopter be dispatched or decline the request.

Their unique communications challenges include:

- Noisy environment within helicopter or on the airport tarmac,
- Operating hands-free while being winched,
- Operating while wearing protective gear like helmet and gloves,
- Operating with multiple communications networks (i.e. helicopter, ambulance, fire),
- Limited space,
- Coverage.

2.5 Business Continuity Procedures

There is a business requirement for WFA to use communications for their day-to-day operations, and to continue to do so in the event of failure of one or more components.

WFA relies on one or more network operators to supply on demand to supplement capacity or to deploy their own resources in situations of unexpected network outage. Without network capability WFA would struggle to retain its command and control dispatch model. Whilst call taking functionality can be diverted to the other Communications Centres or local Emergency Operation Centres (EOC), Responders would be reduced to using portable radios in simplex mode.

WFA do not currently own any mobile cell site products and do not have any intentions of purchasing any. However, this is reliant on the current network coverage remaining as it is or better, and the coverage being reliable, even in times of Major Incidents. WFA are open to discussion in this area.

In a major incident such as an earthquake, it is foreseen that the WFA response area would be divided into approximately seven isolated areas. These would be operated independently with resources that were in the area already or that are flown in afterwards.

The table below outlines the Essential Services relating to Ambulance communications. The services have been prioritised as follows:

Category	Description
Critical	Reserved for services that must be provided immediately or will result in the loss of life, infrastructure destruction, loss of confidence in WFA, and significant loss of revenue. These services normally require continuity within 12 hours of interruption.
Vital	Applies to services that must be provided within 48 hours or will likely result in loss of life, infrastructure destruction, loss of confidence in WFA, and significant loss of revenue or disproportionate recovery costs.
Necessary	Those services that must be resumed within one week or could result in considerable financial, reputational or personnel loss, further destruction or disproportionate recovery costs.
Desired	Those services that could be delayed for two weeks or longer but are required in order to return to normal operation conditions and alleviate further disruption or disturbance to normal conditions.

Essential Service	Service Description	Recovery Time Objective	Maximum Acceptable Outage	Category
Solidus Platform	Telephony platform that routes inbound calls to specific centres and agents to manage call flow	30 seconds	1 hour	Critical
Asset Tracking (AVL)	Supports allocation and response to scene	30 seconds	4 hours	Critical
InformCAD	Having access to the standard call taking system and support systems to process calls and apply the appropriate category to each call	30 seconds	1 hour	Critical
Mobile Data Terminals (MDT)	The ability to dispatch and allocate response assets, and to navigate response assets to incident scenes	30 seconds	4 hours	Critical

Citrix	Web-based virtualisation platform to access remote servers (e.g. CAD)	120 seconds	4 hours	Critical
Digital Status Messaging Interface (DSMI)	Tone calling stations, hospitals and vehicles, and vehicle status updates	30 seconds	4 hours	Critical
BCP Mobiles	Back-up for notification of incidents in the event paging and/or CAD is unavailable	15 minutes	1 hour	Critical
Radio Network	Having the ability to communicate with response assets and other stakeholders via analogue and digital radio networks	30 minutes	1 hour	Critical
Instant Connect	Radio dispatch software that enables Dispatchers to monitor radio channels through their computer	30 minutes	4 hours	Critical
Paging	The communication platform used for response assets and external interested parties	1 hour	12 hours	Critical
Premises	Having access to a habitable building that contains all the critical systems for service delivery, supported by electricity	6 hours	24 hours	Critical
	WFA Communications Centre: Mains: Single supply UPS: At maximum capacity will maintain functionality for 20mins whilst generator starts up. Generator x2: back-up to entire site with no loss to functionality	1 hour	36 hours	Critical
Non-111 telephony (outbound calling)	The communication platform between the Communications Centre and response assets and external interested parties	30 seconds	1 hour	Vital
InterCAD	Electronic transfer of incidents between Police, FENZ, and Ambulance	1 hour	24 hours	Vital
Reporting Services	Real-time performance information system	1 hour	72 hours	Vital
Retrospective Performance Reporting	Performance reporting on previous days/weeks/months	24 hours	1 week	Necessary

Failures tend to fall under the following categories:

- Device failure,
- Application failure,
- Access failure,
- IT Network failure,
- Building (Site) failure,
- Police P25 Digital Radio Network failure.

Outlined below are the various Business Continuity Procedures (BCPs) that are in place to deal with such failures.

Note:
This document does not address the BCPs relating to other core business functions, such as call taking. Events affecting isolated parts of the operation or supporting services may potentially be managed within the Communications Centre using local resources or support services. Only failure scenarios that prevent the Communications Centre from performing normal operations will result in the Ambulance Communications Centres Disaster Recovery and Business Continuity Plan being invoked and fail-over to another Communications Centre.

2.5.1 Application Failure

Software applications that support day-to-day dispatch and communications include:

- Instant Connect (formally IPICS) – Ambulance's radio resource command and control system
- InformCAD – Ambulance's computer-aided incident dispatch system
- RedBox – Ambulance's voice recording system for radio and telephony communications. All voice transmissions that go via the Communications Centre are recorded and used for adverse incident investigation, auditing, and general quality improvement purposes.
- Citrix – provides the link between the Communications Centre in Wellington and where the CAD servers are in Auckland. The Christchurch Communications Centre also relies on a Citrix connection.

Scenario	Significance	Action (i.e. Fail over to…)
Instant Connect primary server failure	Non-Critical	Instant Connect back-up server
Instant Connect primary and backup server failure (i.e. total failure)	Critical	Station Radio Console (SRC)
Complete Instant Connect failure or PC Workstation failure (i.e. total failure)	Critical	SRC on desktop *Note: SRC is only applicable for the digital network.*
Primary InformCAD Status Messaging application interface failure	Non-Critical	Secondary Interface resumes operation
Failure of both the Primary and Secondary Messaging Interface	Critical	Decision required to invoke BCP for InformCAD operation. Or none. Resume digital status messaging when interface available
If in DR mode and loss of connection to the CHC based Messaging application	Critical	Resume digital status messaging when interface available or Invoke next layer of DR regarding Stand-Alone instance of InformCAD
Loss of the Messaging Interface running in Stand Alone operation	Critical	None. Resume digital status messaging when interface available
InformCAD failure	Critical	None. Resume digital status messaging when interface available. Communications Centre DR and BCP to be invoked
RedBox primary server failure	Non-Critical	RedBox back-up server

RedBox primary and back-up server failure	Non-Critical	Fail-over Centre RedBox primary server. *Note: If this occurs, the Fail-over Centre's RedBox system will record radio communications but not telephony*
The Citrix connection fails for the entire Communications Centre	Critical	If it is just the Wellington Communications Centre affected then it would fail over to the other two Communications Centres. If both Wellington and Christchurch Citrix connection failed then Auckland would be expected to process all 111 calls and dispatch all areas in NZ.
The Citrix connection fails for a single or small amount of users	Non-Critical	The user or Team Manager Communications contacts St John ICT to reset the user's Citrix session.

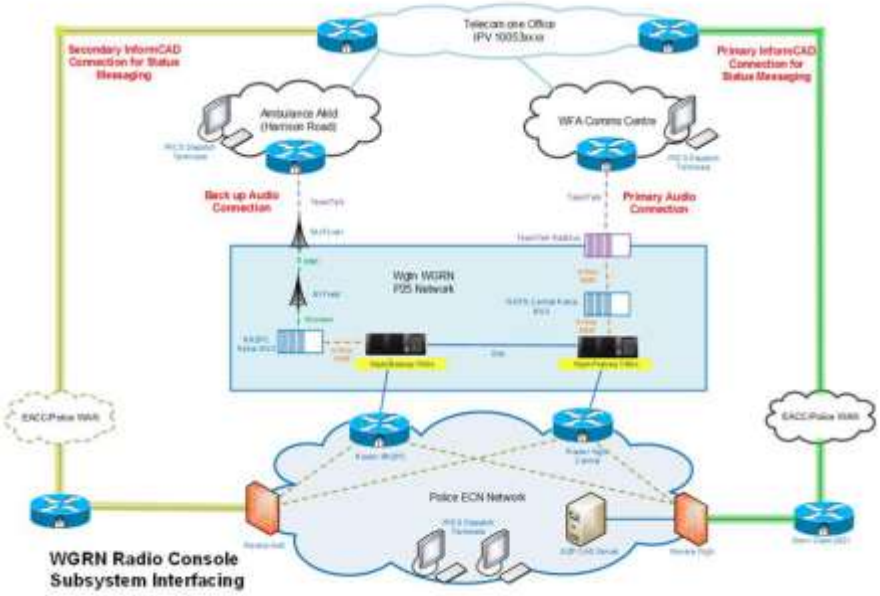
2.5.2 Access Failure

An access failure is a failure to the network connections and/or the interface devices that provide connectivity or access between the Emergency Ambulance Communications Centre IT Network infrastructure and the Police P25 Digital Radio Network.

Scenario	Significance	Action (i.e. Fail over to…)
Primary TAG failure	Non-Critical	Back-up TAG
Primary and Secondary TAG failure	Critical	SRC on desktop *Note: SRC is voice only – LMR status messaging not available. MDT status messaging will still work*
Loss of primary audio connection	Non-Critical	Back-up audio connection
Failure of primary and back-up audio connection	Critical	SRC on desktop
Loss of primary data connection	Non-Critical	Fail-over to secondary
Failure of primary and secondary data connection	Critical	Loss of status messaging

Trunked Analogue Gateway (TAG's)

The EAS, PTS and MI talk groups have 2x geographically redundant TAG's. This is the connection between the Communication Centers and the digital network. In the event of a TAG failure the Comms Dispatcher will switch to the backup TAG in IPICS and the status messaging system will automatically fail over. The figure below shows the high level conceptual block diagram for the communications network interfacing to WFA.



2.5.3 IT Network Failure

An IT Network failure is a failure to any part of the Ambulance IT Network, either in whole or in part, that prevents operation of the key Ambulance dispatch and crew communications applications and connectivity. This includes, but is not limited to, server failures and data circuit failures affecting access.

Scenario	Significance	Action (i.e. Fail over to…)
Ambulance IT Network failure	Critical	Initially: • SRC on desktop, portable radios, cell phones and paper-based incident recording (until Fail-over Communications Centre function can be mobilised) Then: • Fail-over Centre

2.5.4 Building (Site) Failure

Building (Site) failure arises where the Communications Centre has been declared unsafe or a hazard to staff, thereby requiring its evacuation.

Scenario	Significance	Action (i.e. Fail over to…)
Building (Site) failure	Critical	Initially: • Portable radios, cell phones and paper-based incident recording (until Fail-over Communications Centre function can be mobilised)

		Then: • Fail-over Centre

2.5.5 Police P25 Digital Radio Network Failure

A failure that results in the serious loss of, or damage to, the core network itself that prevents the P25 Trunked (digital) radio communications from operating.

Scenario	Significance	Action (i.e. Fail over to…)
Primary Core failure	Non-Critical	• Move to DR Core Network
Primary and DR Core failure	Critical	• MDT, Radio (voice only) or cell phone as there will be a loss of status messaging including Emergency Duress
P25 Radio Network Failure	Critical	• Cell phones, MDT, Pager, Simplex, Analogue network

Device Failure

Device	Action
Radio	Most vehicles are equipped with both a terminal radio and at least one portable radio. In the event a radio device fails, users have the option of selecting another radio device or using their cell phones. IT have programmed two portable radios to be used as operational spares. Labelled 'Spare 1' and 'Spare 2', these have a bright yellow case and are kept with the Shift Manager. There is the ability to remotely deactivate a portable radio from the network if it is lost or stolen.
Cell Phone	If a cell phone fails users can usually use the radio network to contact the Communications Centre. Personal cell phones can temporarily be loaded against the vehicle for the shift, although this is avoided where possible. Dispatch alerts are also sent to MDTs and pagers.
Pager	If a pager is not working then the user can still receive incident dispatch alerts via their cell phone, and MDT if they are working in an equipped vehicle.
ePRF	If the ePRF tablet is not working, then users will record patient assessment and treatment details on a paper form. The paper forms are then manually entered into the eTriage system when the crew are back on station and/or the device has been fixed/replaced, whichever occurs first.
Lifepak	If the Lifepak is unable to transmit then users can take a photo of the ECG printout and send it to the hospital cardiology team using their cell phone, or they can fax it if a fax machine is available. If the Lifepak fails completely, rather than just the connectivity, then another vehicle with a working Lifepak will be requested to assist. The offshore Lifenet server continually tests each receiver in the hospitals to ensure they are online and able to receive the transmission. An alert is sent to WFA via email or SMS message if the hospital goes offline for more then 9 minutes.
MDT	If an MDT tablet is not working users receive incident details via their cell phones and/or pagers. Status updates can be given verbally with radio or phone, or via digital messaging through radios. Map books, Tom-Toms and personal cell phones may be used for mapping the route to incidents.

Appendix One: Current Device Volumes by Vehicle Type

Currently cellular phones are personally issued to operational managers and some corporate employees. The Event Medic Team share a pool of 25 portable VHF radios and there is a pool of 25 UHF portable radios for Major Incidents. Otherwise devices are allocated as per Appendix Two.

Initial NGCC Detailed Business Case financials were costed to give WFA the option of issuing devices to Responders rather than vehicles.

Many of the enhancements WFA hope to implement as a result of PSN would be greatly aided by staff having their own devices. Many of the current device issues staff face would also be alleviated.

Personally issuing devices to EAS Responders is being explored by WFA as a change that may be implemented before WFA transition to PSN capability.

Device	Frontline Ambulance	PTS Vehicle	Events Vehicle	Rescue Vehicle	UCC/Helicopter Paramedic	Corporate Vehicle	Support Vehicle
Vehicle Radio Terminal VHF	1	1	1	1	1	0	1
Portable Radio VHF	2	1	1	2	2	0	Varies (0-2)
Portable Radio UHF	0	0	0	0	0	0	Varies (0-5)
Cell phones	1	1	1	1	1	0	Varies (0-1)
Satellite Phones	0	0	0	1	0	0	Varies (0-1)
Pagers	1	1	1	0	1	0	Varies (0-1)
Sierra Vehicle Communication Hub/Wireless Router (MP-70 or GX 400)	1	1	1	1	1	0	Varies (0-1)
Samsung tablet (MDT - Wi-Fi)	1	1	1	1	1	0	Varies (0-1)
Samsung tablet (e-PRF - Wi-Fi and SIM)	1	0	1	0	1	0	Varies (0-1)
12 Lead Monitor	1	0	1	0	1	0	Varies (0-1)

Note:
Bring Your Own Device (BYOD) is seen as a solution for providing Event Medics, Volunteer Ambulance Officers, and Paramedic Students with access to communications and the tools required to complete their duties. Authorised users could be given access to a WFA platform that would hold applications such as ePRF. Whilst logged into the WFA platform, all communications would be recorded for auditing purposes. BYOD would also provide Responders eligible for a personally issued device with an alternative option if they have a preferred device model. If BYOD devices were introduced as described above, it would be required that the applications in the WFA platform have priority.

Appendix Two: Operational Roles

Patient Transfer Officers

Patient Transfer Officers work single crewed in either a PTS ambulance, van or car.

Their communication challenges include:

- Coverage inside hospitals
- Noise when on the airport tarmac for air transfers
- Working single crewed means their devices must be easy to use while driving (i.e. hands-free).

Emergency Ambulance Officers

Ambulance Officers work double crewed in an ambulance.

Extended Care Paramedics

The Urgent Community Care (UCC) service is staffed by Extended Care Paramedics (ECPs). These Ambulance Officers have an extended range of clinical skills, medications and connections with other health services. Their role is to assess and treat patients at home or refer them on to the most appropriate care. Their focus is patients with low acuity needs. WFA have two UCC services – Kapiti and Porirua. Operating hours are 7.30am to 7.30pm, seven days a week.

Their unique communications challenges include:

- They spend a lot of time liaising with third parties regarding ongoing care pathways for their patients. This means they require a separate device in order to continue to be contactable by the Dispatcher.
- Working single crewed means their devices must be easy to use while driving (i.e. hands-free).

Flight Paramedics

See 2.4 Specialist Roles section for further details.

Rescue Squad/HAZMAT Team

See 2.4 Specialist Roles section for further details.

First Responders

First Responders respond when they are available, in their private vehicles. They are usually single crewed. They are equipped with a pager and radio but also have the dispatch alerts sent to their personal phones.

Their communication challenges include:

- Their response areas often have poor coverage,
- Responding single crewed so needing communications equipment that is easy to use while driving and treating patients.

Shift Managers

Shift Managers respond single crewed in the operational support car. They could be first on scene to an incident if workload is high but their normal day-to-day function is to support their staff either on scene at incidents or afterwards. They liaise with the Communications Centre to smooth any operational issues, carry UHF radios, satellite phone for major incidents and aid Ambulance Officers as required with any faulty devices. Shift Managers also carry a corporate laptop and will use it, along with their cell phone, to access WFA back office information to assist them in maintaining crewing of vehicles, staff welfare, and fleet management.

Their communications challenges include:

- Responding single crewed so needing communications equipment that is easy to use while driving and treating patients.

Clinical Paramedic Advisors

Clinical Paramedic Advisors work in the Communications Centre. There is only one CPA rostered on at a time unless there is training or an assessment taking place. There are St John Clinical Support Officers in Auckland and Christchurch also.

Their unique communication challenges include:

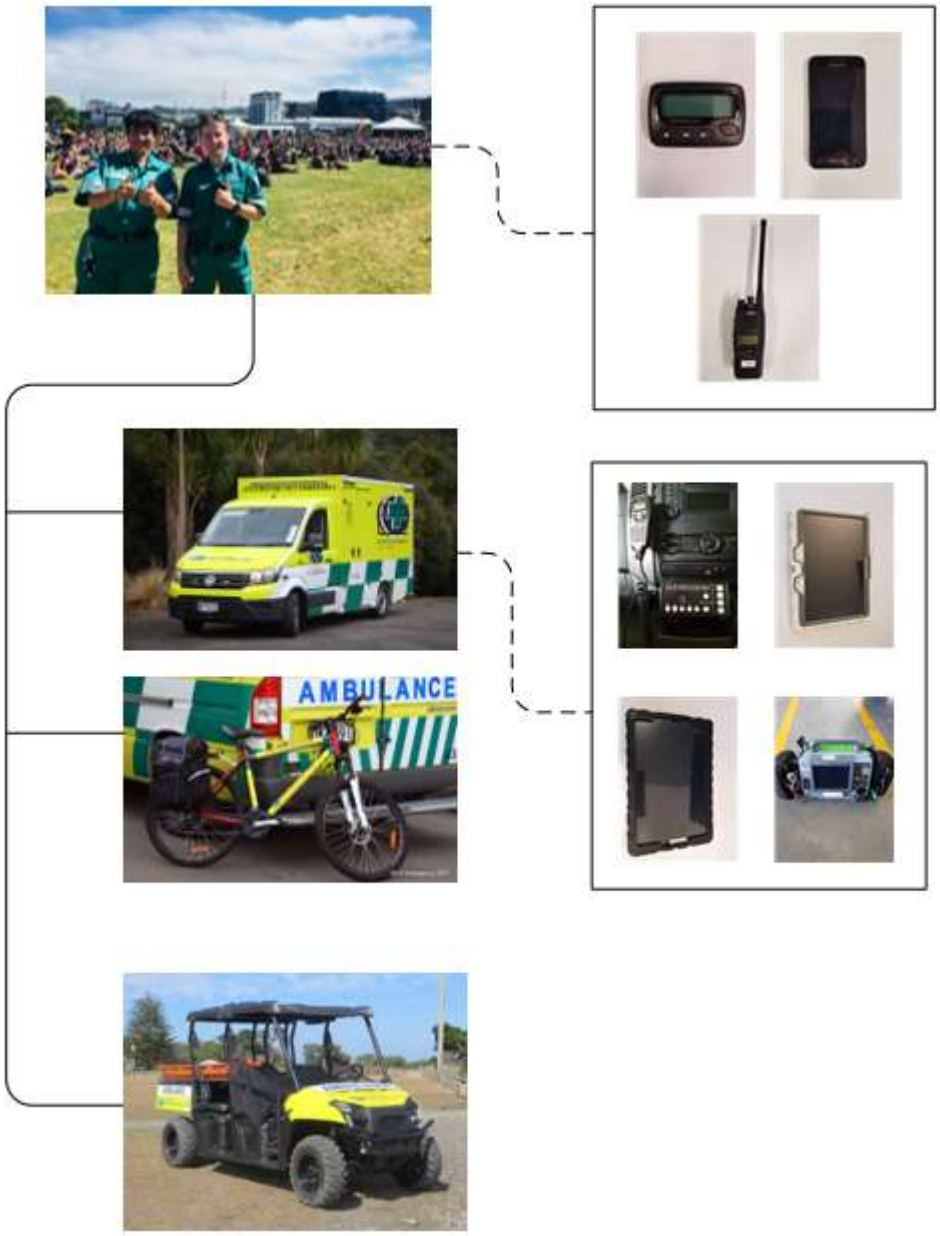
- They cannot see the patients they are assessing/treating,
- They rely on secondhand information to make decisions.

Event Medics

Event Medics could be working single crewed or, for larger events, in teams of 10-30. They are supported by Ambulance Officers at events that have the potential for requiring more advanced clinical skills. If the patient requires transporting to hospital the Events Team will request EAS ambulance assistance via a phone call to the Communications Centre.

Their unique communications challenges include:

- Noisy environments such as concerts,
- Coverage issues within venues or at remote locations,
- Many team members but limited number of devices.



Appendix Three: Glossary of Terms

Term	Definition
ANTS Criteria	The criteria for dispatching an Emergency Air Ambulance resource. The criteria has four categories: **A**ccess, **N**umber, **T**ime Dependent and **S**kill Dependent.
ATP	Authority to Practice. The internal qualification level assigned to Ambulance Officers that dictates which treatments and medications they are authorised to treat patients with. Whilst qualifications are universal, ATPs are specific to the agency that issues them. For example, a graduate with a Bachelor of Health Sciences in Paramedicine is not automatically permitted to practise until they have been granted an ATP by an ambulance agency. An Ambulance Officer with the ATP of Intensive Care Paramedic with WFA is not automatically permitted to practise as an ICP with St John.
AVL	Automatic Vehicle Location. A means for automatically determining and transmitting the geographic location of a vehicle. This vehicle location data, from one or more vehicles, is transmitted to the Communications Centre and fed into the CAD application to inform incident response recommendations and track vehicles on the CAD maps.
CAD	Computer Aided Dispatch system. WFA, Police, St John and FENZ each use a CAD system to record calls and dispatch resources. The agencies' CAD systems vary and have different names, but they all complete the same function.
Codestat	Data gathered from the Lifepak. Used for Quality Improvement and reporting. Currently no link between Codestat and CAD so has to be manually established.
CTA	Clinical Triage Assessment. If the initial assessment undertaken by a Call Taker determines that the patient's condition is not immediately life threatening, then they might be referred to a nurse for a further assessment instead of having an ambulance dispatched. This is known as CTA. After a more in-depth assessment, the nurse will either determine that the patient requires ambulance attendance, recommend that the patient is transported by private car to an appropriate medical facility, or will provide advice on how the patient can be cared for at home.
DHBs	District Health Boards. Organisations responsible for providing or funding the provision of health services in their district.
EAS	Emergency Ambulance Service. The WFA team that respond to patients requiring medical assistance.
ED	Emergency Department. The area of the hospital that specialises in emergency medicine, the acute care of patients who present without prior appointment, either by their own means or by ambulance.
EOC	Emergency Operations Centre. Part of the Co-ordinated Incident Management System (CIMS) structure. An EOC is a local level co-ordination centre that co-ordinates the local response and provides support to incident level response activities.
ePRF	Electronic Patient Report form (e-PRF), used to electronically capture patient assessment and interaction information. The ePRF connects to the Wi-Fi hotspot in the vehicle when it is in range and connects directly to cellular if it is not in range. The e-PRF connects directly to cellular to ensure that it can be remotely accessed for security purposes (e.g. wiped if lost).

Term	Definition
eTriage	The system that holds all the patient information gathered during the assessment and treatment of a patient. Also used for clinical auditing and reporting. Information from ePRF is automatically uploaded into the database but when paper Patient Report Forms are used these need to be manually inputted.
FENZ	Fire and Emergency New Zealand.
FRU	First Response Unit. WFA has First Responders in Ohariu Valley, Whitemans Valley, Waikanae and Riversdale. They are people within the community who hold a WFA ATP but are not based on an ambulance. Instead when assigned to incidents they respond in their private vehicles, provided initial assessment and treatment until the ambulance arrives.
FTE	Full-Time Equivalent. The unit that indicates the workload of an employee in a way that makes workloads comparable over various contexts, allowing part-time workers' working hours to be standardised against those working full-time. The standardised figure is 1.0, which refers to a full-time worker. 0.5 refers to an employee who works half full-time hours.
Incident	An event that requires the services of one or more of the Emergency Services agencies (WFA, St John, Police and/or FENZ). For example, a motor vehicle accident or a cardiac arrest.
InformCAD	New Zealand Ambulance's chosen Computer-Aided Dispatch system.
Initial Assign	A function within InformCAD that recommends to the Dispatcher which resource to assign to an incident. Initial Assign uses AVL data as well as information loaded against each resource such as qualification and vehicle type.
InterCAD	A system used primarily by agency Dispatchers to request resources from other agencies. For example, a WFA Dispatcher could send an incident recorded in the Ambulance CAD system to the Police CAD system.
Instant Connect	Ambulance's radio resource command and control system.
Lifepak15	A heart monitor and defibrillator device. The Lifepak 15 connects directly to the Wi-Fi hotspot in the ambulance.
MDT	Mobile Data Terminal. A Samsung tablet fixed on the dash of ambulance. Connects to ambulance Wi-Fi. Uses integrated apps to stream a range of data about the incident and allows two-way communication. Used to receive dispatch information and GPS navigation. Also allows Responders to send status messages so the Dispatcher gets real-time reporting of patient and crew status.
MCI	Mass Casualty Incident. See MI definition. MCI is an older term that has been updated to MI.
MI	Major Incident. An event which has significant impact, and which demands a response beyond the routine incident management process.
MPDS	Medical Priority Dispatch System. The logic behind the software designed to triage patients (proQA).
MTS	Manchester Triage System. One of the most commonly used triage systems. It enables nurses to assign a clinical priority to patients, based on presenting signs and symptoms, without making any assumption about the underlying diagnosis.
NASO	National Ambulance Sector Office. NASO is a joint office between ACC and the Ministry of Health, responsible for the planning and funding of ambulance services on behalf of both agencies.

Term	Definition
Operational Communications	Communications involved in operations designed to achieve WFA's organisational objectives. Corporate communications are excluded.
ProQA	The software used to triage a patient's condition and then provide medical advice.
PTO	Patient Transfer Officer. See PTS.
PTS	Patient Transfer Service. The branch of WFA responsible for the transfer of patients between hospitals, to planned treatments, and to their place of care.
Queue	List of critical information relevant to the Dispatcher that gives an overview of the incident. Queues are split into Pending and Assigned, depending on whether a resource has been assigned to the incident. Queues are also filtered depending on the jurisdiction chosen, (i.e. a WFA EAS Dispatcher can choose to only see their incidents or to add in PTS incidents as well).
RedBox	Ambulance's voice recording system - used for both telephone and radio communication recording
Resource	An Ambulance, PTS Car or Van, Helicopter, First Responder, Specialist Team, or Operational Support Vehicle that is available to be assigned to an incident by a Dispatcher.
Runcall	When a vehicle comes across a patient, the information they provide is entered into CAD with the Runcall coding to ensure the incident has been recorded but indicates the patient hasn't been triaged using ProQA. For example, when an ambulance on the way to another patient comes across a motor vehicle accident.
SRC	The Station Radio Console System (SRC) enables all communications, including radio transmissions from any of the 8 radios, to be monitored from any of the 6 separate remote monitoring points. The SRC also enables receive and transmit functions, for most communication equipment, from these 6 remote monitoring points. The SRCs are used by WFA if both TAGs fail and there is no connection between the Communications Centre and the Police P25 Digital Radio Network. There are two main pieces of equipment to this system, a SRC Control Head and a SRC Control Rack.
TaaS	Telecoms as a Service. TaaS delivers a range of cross-government telecommunications and managed security services that work seamlessly regardless of the supplier or agency. TaaS services cover most of the government needs for telecommunications and managed security services, including WAN, LAN, Wi-Fi, voice (mobile, PABX and public network access), unified communications, and contact centre services. As Lead Agency, the Department of Internal Affairs (DIA) negotiates services and contracts with suppliers on the TaaS panel.
TAG	Trunked Analogue Gateway.
TMC	Team Manager Communications. Responsible for the day-to-day operations of the communications centre and line manages the Call Takers and Dispatchers on their shift. There are four TMCs, one for each shift colour.
Tones Messages	Tones are used to send messages over the radio. Audible tones are created by the system and sent over radio that are decoded by the radio receivers. At WFA, Portable Radios are toned to alert Responders about a critical incident.

Term	Definition
TracPlus	TracPlus is a tracking and communication software that is used by the Dispatcher based on the Air Desk in the St John Auckland Clinical Control Centre. It is used to track and manage all air resources available to St John and WFA, including the Life Flight Westpac Rescue Helicopter that the WFA Flight Paramedic is based on.
WFA	Wellington Free Ambulance.
WREMO	Wellington Regional Emergency Management Office.