EMERGENCY SERVICES FOUNDATION

SCHOLARSHIP

A MODEL FOR AMBULANCE RESPONSE TO HAZARDOUS INCIDENTS

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Executive Summary

Over the past decade the ambulance services in Australia and around the world have become more aware of the requirement for paramedics to respond to a wide range of hazards. These hazards may be caused by terrorist attack, accident or natural disaster and require a response into hazardous environments where specialist equipment and training is required.

Traditionally ambulance has operated in the cold zone of an incident. However following a number of major incidents and exercises around the world, it has been acknowledged that the ambulance needs to operate in the hot zone to ensure clinical interventions necessary to save life are undertaken as soon as possible.

In Victoria, Ambulance Victoria (AV) is the responsible authority for the provision of pre hospital care and the coordination of medical treatment at the scene of an emergency; this is consistent with the State Emergency Management Arrangements and the State Health Emergency Response Plan (SHERP). Ambulance Victoria is also a signatory to the Victorian State Chemical, Biological, Radiological (CBR) arrangements.

To ensure AV can meet its obligations under the various plans, AV began a specialist equipment and training program in 2003. The AV specialist response capability now includes paramedics trained in Level A, B & C Personal Protective Equipment (PPE), Urban Search and Rescue (USAR) and aquatic response.

Since the implementation of AV's specialist response program a number of issues have emerged that restrict AV's capacity to respond to hazardous incidents. These issues include:

- Availability of trained staff
- Provision of skills maintenance training
- Depletion of available staff
- Equipment maintenance and familiarity

Also, AV's Level A, B & C PPE program was developed in the lead up to the 2006 Commonwealth Games and due to various reasons this strategy is no longer appropriate.

The UK Department of Health (DH) has developed the Hazardous Area Response Team (HART) program for the UK ambulance services over the past five years. This program gives the UK ambulance services the capability to respond to patients in hazardous situations including Chemical, Biological, Radiological (CBR) Incidents, Hazmat, USAR and other hazardous situations. The program has implemented a number of specialist trained teams around the country to respond to hazardous incidents. These teams work with existing rescue systems and agencies and complement the overall ambulance response.

The recommendations of this report are to develop and implement a Victorian HART program with the following structure:

- Develop four AV HART teams, located according to risk in the Melbourne, North East Victoria, Gippsland and Grampians Regions
- Each HART team to be trained in skills specific to the identified risks in the region concerned. Currently the most likely skill sets have been identified as:
    - Melbourne – Level A, B & C PPE, USAR & Aquatic Response
    - North East Victoria – Level C PPE, Aquatic Response & Alpine Response
    - Gippsland – Level C PPE & Aquatic response
    - Grampians – Level C PPE, Mine rescue & aquatic response.

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1. Introduction

Over the past several years Ambulance Victoria (AV) has developed and maintained its specialist response capability. This capability included the development of specialist vehicles and equipment and the training of operational personnel in the following areas:

- *Level A & B PPE*
  Level A Personal Protective Equipment (PPE) provides a capability for paramedics to operate in fully encapsulated suits and Self Contained Breathing Apparatus (SCBA) in the "Hot" zone of an incident, that has a high level of hazard risk. Level B PPE provides paramedics with splash suits and SCBA to operate in the "Hot" zone that are identified as having a lower level of risk.

- *Level C PPE*
  Level C PPE provides paramedics with an SEA 400 fan supplied positive air pressure respirator (PAPR) units and Tyvek splash suits. This provides the paramedics the capability of an immediate response into the cold and warm zones of an incident to deal with patients that have or may have a mild level of contamination. It provides paramedics with a barrier protection higher than the standard Level D protection when Level A or B is not indicated.

- *Urban Search & Rescue – Category 2*
  Urban Search and Rescue (USAR) teams locate, provide initial medical care and remove entrapped persons from damaged structures and other environments. USAR Cat 2 operators have been trained to work in hazardous environments operating specialised equipment, using techniques such as cribbing and shoring and can enter voids or carry out below surface search and rescue operations. A USAR team will always consist of two trained paramedics.

- *Aquatic Response*
  The concept of this program is to train paramedics to work safely on marine vessels; this is to enable paramedics to respond to a patient in a marine situation if the patient is not able to be brought to shore

Since the implementation of Ambulance Victoria's specialist response program a number of issues have emerged that restrict its capacity to respond to hazardous incidents and thus limiting AV's ability to fulfil its obligations under state arrangements. Specifically the main issues with AV specialist response capability are:

- *Availability of Trained Staff*

Identification of paramedics on duty that have undertaken specialist response training is a time consuming process. The AV rosters department has created a skills column as part of the published daily roster that allows filtering and sorting of the required skill set. To deploy trained staff the AV Emergency Management Unit (EMU) must identify the staff from the roster. Once identified the EMU must coordinate with the AV Communications Duty Manager (DM) to locate the staff and dispatch them to the incident.

The AV Level A, B & C PPE program was developed in the lead up to the 2006 Commonwealth Games. The strategy identified specific inner city AV teams that would most likely be responded to incidents at Commonwealth Games venues. All personnel at these teams were then provided with Level A PPE training. Since that time, due to natural staff movements these paramedics are now widespread across the metropolitan area, making it a lengthy process to coordinate and deploy to the incident. Once identified the person required may already be on a case, and as such are not available until they either clear the case or are relieved by another crew, this also may take a considerable amount of time.

- *Skills Maintenance*

To ensure staff are available for deployment, paramedics must undertake regular skills maintenance to ensure their skills remain up to date. Under Australian Standard 1715-2009, Level A & B trained personnel must undergo a yearly reaccreditation course to maintain their breathing apparatus qualifications. Currently this requires up to 100 personnel to be removed from their shift for a day or paid on over time if on a rostered day off, this is a huge cost to AV.

An online skills maintenance program for Level C PPE has been developed, however this has had minimal uptake by paramedics, with less than 10% of trained personnel completing the online course. Therefore the majority of AV's Level C trained personnel have not used the equipment since their initial training.

- *Depletion of Available staff*

For AV to provide a Level A PPE response to an incident, a minimum of six paramedics are required. This is based on two operators in the scene, two operators in readiness to respond and two operators recovering/recuperating, based on an in suit time of 20 minutes. The original AV Level A program trained 120 staff located at inner city branches. However due to natural attrition, AV currently has only 79 paramedics qualified in Level A; this is not enough staff to ensure that on average there are six trained paramedics on duty at one time.

Currently AV has 22 qualified USAR paramedics, however due to personnel being promoted into management positions or transferring to other positions such as Air Ambulance, a large number of these paramedics are no longer available for deployment.

- *Equipment*

All CBR PPE must be constantly maintained to ensure the equipment is safe and available for use when required. Level C PPE requires monthly checks on batteries and respirators. The USAR equipment cache must be maintained regularly. Due to the lack of available staff, equipment maintenance is a difficult process to manage for AV.

PPE equipment is complex equipment and staff must use the equipment regularly to ensure familiarity when required. At present trained staff are only exposed to the equipment once a year.

1.1 Purpose

The purpose of the study tour was to investigate the UK HART program to identify aspects of the program that would be suited to Victoria.

The study tour objectives were:

- Make contact and develop relationships with key UK HART program managers
- Visit HART bases, training locations & other key facilities
- Meet with HART managers and UK Department of Health representatives to obtain information regarding the development and implementation of the HART program
- From the information gathered, develop a concept for implementation within Ambulance Victoria that addresses the issues that have been identified with AV specialist response capability.

2. Study Tour Findings

2.1 UK HART Background

The UK Department of Health (DH) began the development of the Hazardous Area Response Team (HART) programme in 2005 following an initial feasibility study that looked at the potential for ambulance personnel to provide life saving clinical care at the centre of hazardous incidents, whatever the origin, whether deliberately instigated or accidental.

The objective of the study was to look at how clinical intervention can be safely and effectively provided by ambulance service personnel to triage, treat and save lives within the Hot Zone of a CBRN or other hazardous incidents as well as in Urban Search & Rescue (USAR) scenarios.

The need for such a capability within the ambulance service was initially identified during a major exercise in 2003 at a London Underground Station. One of the lessons learned was that "ambulance crews need to be able to provide earlier assessment, care and delivery of specific antidotes to contaminated casualties".

HART is now a part of the UK National Counter Terrorism Strategy (CONTEST) and the National Capabilities Program led by the UK Home Office. The HART program focussing on provision of a clinical response within the hot zone forms part of the health response within the National Capabilities program.

Traditionally, ambulance paramedics have operated within the cold zone area of an incident where it was deemed to be a safe working environment. However following a number of incidents and exercises it was determined that not being able to operate in the hot zone of a major incident meant that the ambulance service was potentially being impeded in its ability to undertake the clinical interventions necessary to preserve life at the early stages of a CBRN/HAZMAT incident. Following the 7th July 2005 bombings in London, it became apparent that the HART capability needed to be established as soon as possible. The first HART units were established in London in 2006.

HART comprises of specially recruited and trained personnel who provide the ambulance response to major incidents involving hazardous materials, or which present hazardous environments that has occurred as a result of an accident or has been caused deliberately. HART work together with police, fire and other rescue services to provide a continuum of care to patients trapped in the hot zone of an incident.

Due to HART working in the hot zone, intelligence can be passed up the command structure and to other health services. Medical intervention is delivered early due to the fact that paramedics are able to access patients in the hot zone without having to wait for other services to deem the work area safe.

Triage occurs by paramedics in the hot zone early. This means that the more severely injured patients are treated and transport first. HART members will initiate early medical intervention such as triage, oxygen therapy and haemorrhage control.

HART is both a national and local response. The HART unit is available deploy anywhere in the UK as part of the national ambulance response to major incidents. The unit also provides a special operations service locally by supporting the local ambulance trust's wider resources to deliver patient care to a range of scenarios.

2.1.1 Aims of HART

The UK Department of Health has defined the key aims of HART as:

- To have teams of trained National Health Service (NHS) ambulance personnel who can respond to an incident contain hazards.
- That these responders will be able to operate in a highly contaminated CBRNE/HAZMAT environment, or in areas requiring USAR, and provide advanced life support, triage and treatment to those affected.
- That these teams will also provide intelligence to the wider health communities, assist in the rescue operation if required and have the ability to provide medical assistance to other first responder personnel should the need arise.

2.1.2 HART Incident Types

HART has been developed to respond to a range of incidents. Including:

- Hazmat/CBRN – any incidents involving actual or suspected HAZMAT/CBRN, including gas leaks and fires involving HAZMAT
- Fires & Explosions – All fires and explosions, including fires in unsafe structures
- Transport related – Complex incidents involving transport systems, including rail, road and air (e.g. multi vehicle, multi casualty, hazardous contents, fuel spillages etc)
- Suspect packages / Vehicles and explosive devices – Incidents involving suspect packages, bags, vehicles and envelopes as well as explosive devices such as bombs or WWII ordinance.
- Unsafe structures – incidents involving unsafe structures such as building collapses, scaffolding collapses, demolition sites
- Unconscious – Incidents involving unconscious patients
- Working at height – up on scaffolding, cranes, trees, tops of buildings
- Difficult access – Trench collapse, machinery, wells
- Mountain & cave rescue – in conjunction with specialist rescue teams
- Other USAR – Incident where response is instigated by Fire USAR coordination centre.
- Inland Water – On or near drainage channels, where patients are in or within 3 metres of a water body, vehicles in water bodies, casualties are located in an area where water needs to be crossed to access the casualty; river/waterway searches, where flooded areas need to be accessed by HART operatives, unstable surfaces such as mud and ice.

2.2 HART Capability

Initially there were two main areas of capability that have been developed for HART

- Incident Response Unit (IRU) - This forms the basis of the ambulance service increased capability in the event of potential or actual contamination or presence of hazardous substances or environments, including in the Hot Zone.

- HART USAR - This extends the areas or environments in which paramedics can operate safely and provide clinical intervention to include those where access and egress is difficult and requires specialist equipment and training, this may be at height or in confined spaces and/or where there may be prolonged entrapment.

Since the initial implementation of the HART program other capabilities have been added to the HART Capability these include:

- Inland Water Operations
- Maritime Incident Response Group
- Support to tactical firearms operations

2.2.1 HART Incident Response Unit

The Incident Response Unit capability within HART has been developed to undertake the following:

- Undertake scene risk assessment making use of specialist knowledge gained in training and liaising with other experts on scene and online.
- Work alongside Fire and Rescue service personnel to deploy forward into the inner cordon or hot zone of an incident
- Facilitate rescue, in conjunction with Fire and rescue service, of mass casualties at a hazardous materials incident.
- Operate in varying levels of PPE, based on dynamic risk assessment, including Gas Tight Chemical Protection Suit and use of Extended/Single Duration Breathing Apparatus
- Identify indicators which may determine any materials involved/present at an incident
- Undertake rapid clinical reconnaissance to determine:
    - Scale of incident
    - Commencement of (Toxic) triage
    - Number & distribution of live casualties
    - Clinical resources required within the Hot Zone to save life
- Provide basic life saving treatment measures:
    - Toxic Triage (hot zone)
    - Rescue (evacuate)
    - Catastrophic haemorrhage control (tourniquets/compression dressings)
    - Antidotes (via combo pens)
    - Intra osseous access
    - Assist ventilation via bag valve mask and CBRN filter
    - Oxygen (multiple delivery system where necessary)
- Provide rapid feedback to Ambulance and other Incident Commanders regarding scene assessment, clinical resources required and potential wider health requirements
- Provide clinical details on rescued patients for effective handover in warm zone to CBRN decontamination teams
- Provide clinical back up and support for colleagues and personnel working within the hot zone

2.2.2 Urban Search and Rescue

The USAR capability within HART has been developed to undertake the following:

- Provide health input to the initial scene assessment
- Undertake scene assessment including dynamic risk assessments directly related to the needs of the ambulance and other health services
- Initial triage and immediate life saving treatment
- Hazard identification
- Casualty management
- Casualty extrication

USAR paramedics are trained and equipped to operate in:

- Any incident where a casualty requires care in a confined space environment
- Any incident to which the health and safety legislation Safe Working at Height applies and a casualty requires care
- Any incident to which the fire service requires or has deployed their USAR resources
- Any major/catastrophic/critical incident (non CBRN/Hazmat – unless the USAR paramedic is suitably trained and equipped for such incidents/environments) which requires a combined response from all three emergency services and where the assessment, incident and casualty management skills of the team are appropriate to the needs of the event.
- Any incident where an ambulance crew believe the skills, knowledge or equipment of the USAR paramedic team will benefit patient care

2.2.3 Other Capabilities

- Any incident where an ambulance crew believe the skills, knowledge or equipment of the USAR paramedic team will benefit patient care
- Inland Water Operations (IWO)
  - Provide paramedic level care for incidents required inland water operations
  - Water based search and rescue operations
- Maritime Incident Response Group
  - Paramedic level patient care for maritime operations up to 12 miles of the UK coastline
  - Incidents coordinated by HM Coastguard
- Support to tactical firearms operations
  - Supporting police tactical operations
  - UK counter-terrorism operations

2.3 The HART Unit

Each HART unit is comprised of seven teams made up of six operatives and 1 team leader, totalling 42 personnel.

A HART unit consists of the following permanent staff members:

- HART Manager
- HART Trainer
- HART Administrative Support
- 7 HART Team Leaders
- 35 HART Operatives – of which half a trained in USAR

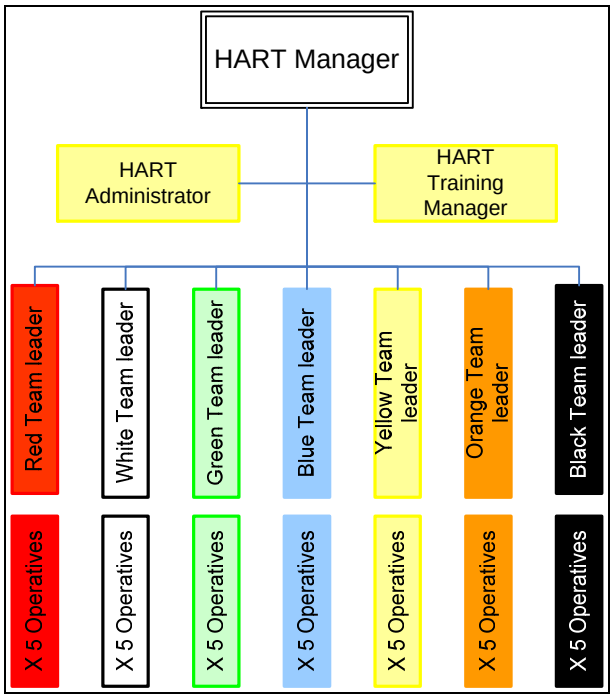

Fig 1 – HART Unit Organisational Structure

In general the teams work a seven week rotation, with one team on duty and one team on training week at any one time. All HART teams must have a week of “off road” protected training each rotation.

In line with the UK Model Response Program a HART response is expected be on scene and ready to respond as a full team within 45 minutes.

In order to maintain clinical competence, two operatives per shift are made available to respond to calls other than HART within the Ambulance Trust. These operatives respond in

non stretcher Rapid Response Vehicles (RRV). Each Ambulance Trust develops criteria for how and where HART RRV can be deployed within the trust whilst maintaining full HART capability. In general, this response is used where the HART unit is the "nearest and quickest" resource. The HART response does not have a transport capability and must be relieved as soon as practical.

2.3.1 Mobilising HART

Each of the UK's ambulance trusts has set up a special operations desk at their operations centres. This desk coordinates the special operations assets of the trust across its entire geographical service area.

The special operations desk monitors the call taking and dispatch systems and identifies incidents which may benefit from a special operations response. Special operations resources include:

- HART
- Critical Care
- Air Operations
- Special Operations Response Teams
- Decontamination teams

Complex or protracted incidents will usually warrant a response from one or more of these assets.

The special operations desk will pass all potential HART incidents to the live HART Team Leader. The HART Team Leader will then determine the most appropriate HART response based on the standard operating procedures that have been developed.

Each Ambulance Trust also has a tactical advisor on call at all times. When the special operations desk notifies the HART unit of an incident the tactical advisor is also advised. The Tactical Advisor will make contact with the HART team leader to ensure that the response is integrated into the wider trust response to the incident. The tactical advisor may also directly request the mobilisation of HART. Any on call Commander of the trust may also request HART. Operational staff may request HART.

Other agencies, particularly fire and rescue services, police, coastguard and the military may also request HART involvement in their operations. External agencies make their request by contacting the special operations desk.

HART may also be placed on an "increased notice to move" by the Department of Health or other government agency in response to a national risk or to support national operations.

A mutual aid request may also be received for HART from another ambulance service or responding agency in areas outside of the trust's geographical region.

2.3.2 HART Team Fleet & Equipment

Each HART unit has been issued with vehicles specifically designed and set up for the HART program; these vehicles are not used by any other part of the ambulance services.

Each HART unit has the following vehicles;

- Forward command unit
- Reconnaissance (light equipment) unit
- Heavy equipment carrier – CBR equipment
- Personnel carrier
- 6x6 Polaris all terrain vehicles
- Primary mover (modular hook loader)

- Urban Search & Rescue 4 x 4 vehicle
- Inland water operations 4 x 4 vehicle
- 2 Rapid Response Vehicles

In addition to normal paramedic equipment, each unit has been issue with the following equipment:

- Breathing apparatus & gas tight PPE
- Civil Responder 1 and PRPS protection suits
- Dry suits and water rescue equipment
- Confined space operating equipment
- Patient extraction devices
- Safe working at height equipment
- Remote and weatherproof lighting units
- Patient and staff welfare equipment
- Temporary structures and shelters
- Carbon monoxide detectors
- Detection identification monitors
- Hazardous area advanced clinical equipment
- Remote CCTV / camera relay systems
- Unmanned aerial drone with live camera feed
- Body worn camera systems
- Tactical medicine equipment
- Large range of secure communication platforms
- Satellite communications
- Remote command briefing suite and packages
- CBRN countermeasures and toxic triage equipment
- Ballistic protection

Fig 2 – HART Rapid Response Vehicle

Fig 3 – HART Forward Command Unit

Fig 4 – HART Polaris 6 x 6 all terrain vehicle

2.4 HART Program Structure

2.4.1 UK Ambulance Structure

All health services are administered by the UK National Health Service (NHS). The UK Department of Health controls 10 Strategic Health Authorities (SHA), these authorities overseas all NHS activities in England. In turn, each SHA supervises various NHS health trusts in its area. The devolved administrations of Scotland, Wales and Northern Ireland run their local NHS services separately.

Ambulance services are provided by the NHS ambulance services trusts. There are 12 ambulance trusts in England. Scotland, Wales & Northern Ireland each have their own ambulance service.

UK Ambulance Services are as follows:

- East Midlands
- East of England
- Great Western
- London
- North East
- North West
- South Central
- South East
- South Western
- West Midlands
- Yorkshire
- Isle of Wight

2.4.2 HART Governance Structure with Ambulance Trust

HART is required to provide both a local enhancement of ambulance service delivery as well as form part of a national capability; as such the program has both a local and national governance structure.

The National HART Coordination Group manages HART at a national level. The group is chaired by the National Strategic Ambulance Advisor, who represents UK DH. To ensure consistency nationally across HART a number of sub groups in key areas have been formed. These areas include operations, vehicles and equipment, human resources, clinical and quality assurance.

To ensure a standard approach is taken across the UK when developing a HART unit, a national service specification has been developed. This document describes the core elements each HART unit must adhere to. These elements include unit composition, levels of training and access to specialist logistics.

The NHS commissioners of each trust will ensure an annual review is conducted to confirm that HART unit conforms to the specification.

A national set of Standard Operating Procedures (SOPs) has been developed for implementation across all HART units. This ensures that all HART units are consistent in their operational setup and practice. This is particularly important when HART units provide mutual aide as part of a national response.

Locally each trust has developed policy to govern the operations of each HART unit. The HART unit has also developed a local set of SOPs to cover day to day operations. These SOPs also contain SLAs with other local agencies.

2.4.3 UK Strategic Mandate

The national strategic mandate for HART is set out in a number of UK central government policies

- National Health Service (NHS) Operating Framework: This document sets out the core business priorities for the UK NHS. The current framework references HART as a key aspect of delivering the NHS response in hazardous environments and CBRN situations.
- The UK Strategy for Countering International Terrorism (CONTEST): This strategy sets out the UK Government's planning for managing the risk of international terrorism in the UK. This document details the creation and maintenance of specialist teams within ambulance trusts to extend paramedic care into hazardous area and improve survival rates.
- Standard Ambulance Contract Guidance for Commissioners: This document supports the NHS commissioning process and ensures that essential NHS services are commissioned at the appropriate levels. Part of this document details the provision of HART, USAR and firearms/ballistic capabilities. This document also sets out the full specification for HART.
- National HART Service Specification
- Civil Contingencies Act 2004

2.5 Project Management

At a national level the HART program has been developed and implemented by a small project team. The national program team is made up of the following:

- Project lead
- Programme Manager
- Procurement lead
- Training Lead
- Communications Lead
- Evaluation
- Human Resources
- Clinical Manager
- Fire Service Liaison

Each Ambulance Trust has established internal arrangements to coordinate HART implementation locally; this includes the establishment a HART Implementation Group made up of the following:

- HART project director
- HART project lead
- Medical director
- Operations director
- Finance lead
- Operational Manager who will have responsibility for the HART unit and to whom to HART Manager will be accountable
- HART Unit Manager
- Control Room Manager
- Staff representation
- Communications

Responsibilities of the Department of Health and the local trust are set out in a Memorandum of Understanding. This document details the responsibilities of each in delivery HART, timetable for rollout within a trust and the funding arrangements.

2.5.1 Funding arrangements

The MOU between the Department of Health and the trusts for the implementation of HART provides details of funding arrangements. The HART programme is fully funded by the UK Department of Health.

Setup Costs
The Department of Health provided the funding for all setup costs including:

- Recruitment and selection processes
- Training
- Vehicles & equipment including PPE
- Learning and monitoring process
- Ongoing programme management and development

Ongoing Funding
After the first three years of the rollout, funding for the entire HART programme became part of the NHS core business and absorbed into the normal NHS budgetary processes.

2.6 Program Implementation

2.6.1 Location of bases

The objective for the HART program was to have HART units established in twelve locations throughout England. These locations were identified within the Home Office Model Response plan and are based on risk assessment and threat levels as assessed by UK security services.

The objective of the UK model response plan is to be prepared for a terrorist attack, it was acknowledged during the development of the program that HART will provide regular response to other hazardous incidents and environments. Therefore the Model Response plan sites were translated into locations to be covered by HART units (for response within 35-40 minutes) within the following Ambulance Trusts in England:

- London Ambulance Service – two units east & west
- Yorkshire Ambulance Service – One unit covering Leeds & Sheffield
- North West Ambulance Service – Two units – Manchester & Liverpool
- North West Ambulance Service – One unit – Birmingham
- North East Ambulance Service – One unit – Newcastle
- East Midlands Ambulance Service – One unit - Nottingham
- Great Western Ambulance Service – One Unit – Bristol
- East of England Ambulance Service – One unit – Covering Luton and Stansted Airports
- South Central Ambulance Service – One unit – Southhampton
- South East Coast Ambulance Service – One unit – covering Dover

2.6.2 Timeline for development

The UK HART units have been rolled out as follows:

- London (East) – January 2007
- East Midlands – April 2009
- West Midlands – April 2009
- Yorkshire – July 2009
- North West (Manchester) – July 2009
- North East – March 2010
- East of England – April 2010
- South East Coast – July 2010
- Great Western – September 2010
- London (West) – January 2011
- North West (Liverpool) – February 2011

2.6.3 Recruitment and selection

The recruitment and selection process was developed by the HART project team and was designed by used as a standard process across all UK Ambulance Trusts when selecting personnel for their HART units.

The HART project team engaged an external provider of occupational psychology to evaluate the HART program. This evaluation identified a set of competencies that defines a successful HART operative and HART team leader. The focus of these competencies is not only on paramedic skills, but also personal qualities and characteristics that would be ideal for the job.

To ensure a standard approach across all Ambulance Trusts, the project team developed and implemented the HART National Recruitment and Selection Manual. This manual outlines the recruitment and selection process and provides the trusts with templates for position descriptions, candidate evaluations, interview aids and fitness evaluations.

The application, recruitment and selection process is as follows:

1. Advertising and self assessment for the role
2. Application and short listing
3. Psychological test completion
4. Occupational Health Assessment
5. Physical Competence Assessment
6. Competency based interview
7. Training courses

All HART candidates are required to demonstrate a good level of physical fitness; this is tested at stage five – physical competence assessment. This is because of the potential to be working in extreme, sometimes protracted, conditions wearing PPE and breathing apparatus. It also tests the candidates' ability to operate at height and in confined and dark environments.

The physical competence assessment consists of the following tests:

- Circuit – Carrying a weight of 35kg, candidates must navigate a 1200m circuit which consists of 10 flights of stairs, duck under, step over, walk between two benches, dummy drag and manual dexterity test. The circuit must be completed within 24 minutes.
- Enclosed space – Negotiate an 80m tunnel with 6 obstacles including small apertures, enclosed tunnels and triangle shapes to climb through. Candidates must turn their torch off at the half way point and retrace their route back to the start. Must be completed within 12 minutes.
- Ladder climb and descent – climb 13.5m ladder to fourth floor, descend a rope from third floor and perform confidence test half way down.

2.7 Training

2.7.1 Initial Training

All HART personnel undergo Initial Core Training prior to becoming active HART operators. This core training represents the mandatory minimum amount of training activity for a HART operative to gain and maintain live operational status. The initial training operates on two tiers – national and local.

National training is developed and provided by the HART National Project Team. This training is provided to HART operatives prior to them commencing with the HART unit. This training consists of:

- 3 week residential Incident Response Unit course
  This course allows HART paramedics to operate safely in the Hot Zone using a range of personal protective equipment. The course provides training in the use of:
  - Breathing apparatus
  - Gas tight suits
- 3 week residential USAR course (50% staff)
- 1 week residential Inland Water Operations course
  This course trains personnel in the provision of paramedic care to be delivered to patients requiring water rescue.

- 2 day incident technology course

Local training is coordinated by the Local HART Training Manager and is comprised of the following:

- 2 day Powered Respirator Protective Suit course
- 2 week breathing apparatus course
- 3 day CR1 personal protection suit course
- 1 day tactical medicine
- 2 day firearms/ballistic tactics course
- Vehicle familiarisation – course per HART vehicle (x9)
- 3 day 4x4 and winching course

Fig 5 – HART USAR Training

2.7.2 Ongoing training/skills maintenance

Each of the seven teams within the HART unit has one week in every seven protected for mandatory training and requalification. Given the wide range of proficiencies which must be maintained, this protected training is only enough to cover the basic refresher and recertification elements. In addition to this training week, a number of training modules are also followed by the teams while they are live. The training programme for each HART operative is therefore spread over a seven week schedule. The unit must deliver a minimum of 150 hours of protected training per month to maintain the required safety standards.

- One week in every seven, each team is taken off road to undergo mandatory skills maintenance /re- qualification – a total of 37.5 hours of training per rotation.
- This training is managed by the HART Team Educator and may be delivered by this person or the team leader of each HART team.
- Participation in live exercises – minimum of 1 every three months

2.7.3 Training Reporting

The HART Training framework incorporates a comprehensive training record keeping, capability register and lessons identified register. This is managed with the following processes

- Confirmation Sheets – Competed each training week by the Team leader. These include a list of modules covered as part of the training week and a register of who attended each module. These are followed by a series of sheets, one for each module, which list the staff present for the module and provide confirmation of whether

or not each person achieved the objectives along with a measure of their level of confidence.

- Personal reflection sheets – Each person following the training week completes a single personal reflection sheet for the week. This provides staff with the opportunity to set out their personal objectives ahead of the training period. They then confirm the modules covered and provide a brief personal reflection on how the training went for them. Each member of staff then summarises key development areas in an action plan to roll forward to the next period of training.
- Daily Training log – The HART training manager is responsible for keeping a simple running log of all training activity taking place within the unit.
- Capability register – The capability register lists all operational HART staff and indicated which capabilities they are qualified to perform. (i.e. IRU, USAR , IWO etc)
- Lessons identified register – This register is maintained by the unit to capture all key learning points and ensure that actions are taken to learn from experience. This is for unit wide learning rather than a place to record any personal weakness. The HART manager will use this register to revise the training programme.

Fig 6 – Building Fire Exercise with Fire Brigade

2.8 Partnerships with other agencies

HART is part of national level plans such as the UK Strategy for Countering International Terrorism (CONTEST). This strategy sets out the UK Government's planning for managing the risk of international terrorism in the UK. HART teams form part of the UK's preparedness for a CBRN attack.

Each HART unit has service level agreements with the fire services in their area, these agreements set out agreed principles on for command and control with each service. Each unit also has both formal and informal arrangement with fire services for training and exercising.

2.8.1 Command and Control

The United Kingdom operates a Gold, Silver, Bronze command structure for the management of major incidents. 'Gold', 'Silver' and 'Bronze are titles of functions adopted by each of the emergency services and are role-related, not rank related.

Gold (strategic) – Gold is the commander in overall charge of each service, responsible for formulating the strategy for the incident. Each Gold command has overall command of the resources of their own organisation, but delegate's tactical decisions to their respective Silver commanders.

Silver (tactical) – Silver will attend the scene, take charge and be responsible for formulating tactics to be adopted by their service to achieve the strategy set by Gold.

Bronze (operational) – Bronze will control and deploy the resources of their respective services within a geographical sector or specific role and implement tactics defined by the Silver commander.

The Gold and Silver levels will each form a coordinating group, which is usually chaired by the police.

The HART unit operates as a specialist Bronze level function; the HART team leader will take on the Bronze Commander role during HART deployments. The HART team leader will liaise directly with command staff from other agencies.

During smaller scale incidents, the HART Team leader will maintain their normal managerial functions and will lead the HART Team response. In these situations the HART team fits in with existing ambulance command arrangements, with the HART Team leader reporting to the Ambulance Incident Commander.

During a HART deployment only the HART Team Leader will have direct operational command for the HART aspects of the operation.

Each trust has an on duty tactical liaison officer whose role is to be a link between HART, other agencies and the wider ambulance command.

Fig 7 – Building Fire Exercise with Fire Brigade

Fig 8 – Rescue exercise with London Fire Brigade

3. Recommendations

The UK HART program presents a good model to ensure ambulance is able to access patients in hazardous environments.

There are a number of features of the UK HART program which would translate into Victoria. These aspects include:

- Development of specialist trained teams
- Training personnel according to identified risks
- Provision of facilities and equipment for teams
- Working with fire and other agencies to conduct training and exercises

Implementing a similar capability in Victoria incorporating these features would address a number of the issues that have emerged since the inception of the AV specialist response program.

This capability would allow AV to access patients in a technical rescue environment and provide medical intervention as appropriate. These specialist trained teams would complement the overall ambulance service response, making it more efficient, more effective and helping to save more lives.

Incidents that a these teams would respond to include:

- HAZMAT/CBRN including gas leaks and fires
- Fires and Explosions
- Transport systems (rail, road and air crashes)
- Suspect packages
- Unsafe structures
- Unconscious patients where the cause is unknown
- Working at heights
- Difficult access
- Mountain and cave rescue (in conjunction with specialist rescue teams)
- USAR incidents instigated by Fire Services.

3.1 Proposed Model

3.1.1 Program Structure

It is recommended that AV develop and implement a minimum of four specialist trained teams across Victoria. One team to be located in the metropolitan area and three other teams set up at strategic locations across Victoria. The locations of these teams would be based on risk assessments that would need to be conducted during the program development process, however in general a team should be located in each of the Hume, Gippsland and Grampians regions.

The skill sets of the each team would be determined on the specific risks for the areas concerned. In the metropolitan area, the main risks are hazardous material incidents and structural collapse due to the large industrial areas and built environment. AV has identified that in the Hume Region the alpine areas present the main risk, therefore alpine survival and search and rescue skills would be required. In the Grampians region, the main risk surrounds the mining industry and in the Gippsland area of risk that has been identified is the large tourism industry around the marine environment.

3.1.2 Team Structure & Capability

Each regional team would have the following structure and capability:

- Metropolitan
  The metropolitan HART team would be comprised of the following:
  - Two 24 hr single responder MICA paramedics trained in USAR and Level A/B/C PPE on a 10/14 roster.
  - Two to three ambulance crews (either ALS/MICA) that are trained in Level A/B/C personal protective equipment and aquatic response.
  - It is proposed that support crews will come from a blended roster which will provide a twenty-four hour car as well as two peak period cars to support the USAR team.

- The regional teams would be comprised of the following:
  - One crew (ALS or MICA) per location on a 24 hr car on 10/14 roster
  - Each regional would be trained in Level C PPE & Aquatic response as well as skills specific to the risk in the area located.
  - Skills may include – alpine response, USAR / mine / trench rescue, working at height

To ensure their clinical skills are maintained, the team would also be available for respond to normal business cases, however processes would need to be developed to allow for the relief of these crews when they are required to respond to identified hazardous cases.

The total number of staff required to implement a the program based on this model is:

Metropolitan Team
- 10 USAR trained paramedics to cover the two single responder units on a 10/14 roster.
- 32 Level A/B & C PPE and aquatic trained paramedics on a blended sixteen line roster to support the USAR trained paramedics.
- One off road team Manager

Regional Teams
- 33 regional paramedics trained in Level C PPE, Aquatic & areas specific to the risk in each region
- One team manager for each team.

3.1.3 Training & Skills Maintenance

All paramedics would need to undergo appropriate and accredited training in each of the skills before the team would be operational. All initial training would need to be delivered by a registered training organisation. The preference would be that training is conducted by the agency that the team would most likely work with during a response for each of the skills. This would ensure that the personnel are aware of the agencies procedures. For example the MFB would be preferable to provide Level A & B PPE training and USAR training.

Under Australian Standards, users of Self Contained Breathing Apparatus must undergo a yearly reaccreditation. Other skills may have the same standards, however even if there is no set guidelines that AV must adhere to for reaccreditation, all crews must maintain their skills.

It would also be beneficial for the teams to regularly exercise their skills, preferably with the appropriate control agency for the particular incidents that they would be responded to. This would include the fire services for Level A/B and USAR and Police for Aquatic response.

Therefore the program structure should include regular skills maintenance and exercising. The options for that may be setting up a training program that requires the paramedics to practise their skills over a period of time i.e. 4-5 week cycle. A modified roster arrangement

could be developed that allowed the crew to be taken off operational duty for that period of time for training. Another option could be making the crew "unavailable to recommend" for normal business incidents whilst training is being conducted, the training would only be interrupted for identified hazardous incidents.

The coordination of training would be the responsibility of the team manager, who should be a qualified trainer. The team manager would ensure that each paramedic in their team is current and maintain the teams training records. The Australian Standard yearly reaccreditation may have to be delivered by a registered training organisation.

3.1.4 Facilities & Equipment

In metropolitan region an appropriate site would need to be identified to house the team. The facility would need enough space to house the following:

- 3 – 4 vehicles
- Level A/B PPE & Level C PPE equipment
- USAR medical cache equipment.

The site would also need enough space to maintain equipment and to carry out skills maintenance training. The building itself would have facilities as other Ambulance branches; however it would also need indoor space to conduct training.

It is unlikely that there is a current branch available in the metropolitan area that would be in an appropriate location and also would have the appropriate facilities to house the vehicles and equipment required for the HART team, therefore the best situation would to build a new fit for purpose site. This ensures that the branch is in the correct location and has the appropriate facilities.

It is envisioned that regional teams would have significantly less vehicles and equipment; therefore the best option would be to take over existing branches and either transfer existing staff to new branches or train staff to form part of new team.

3.1.5 Deployment

Currently when an incident has been identified as requiring the escalation of the AV Emergency Response Plan (ERP), the duty manager in the communications centre notifies the AV Regional Critical Incident Manager (RCIM) for the region where the incident has occurred. The RCIM will asses the incident and decide on what resources other than normal ambulance resources are to be deployed. If the incident requires the deployment of specialist trained personnel and equipment, the Ambulance Emergency Operations Centre (AEOC) will coordinate this process. The AEOC identifies the trained personnel that are on duty and requests the duty manager to deploy those crews to the incident. If there are not enough trained personnel on duty, the rosters department may be requested to recall to duty trained staff. The equipment deployment will also be coordinated by the AEOC.

Under this model the team would automatically be dispatched to a number of identified types incidents, within a set geographical area, i.e. Stand by at incident; Hazmat etc. Outside of the set area, the RCIM would be consulted for deployment. Any incident that is not one of the identified types of incidents the duty manager will asses the incident as per the ERP and notify the RCIM, who may then request the team to be deployed if required. The Health Commander may also request these teams be deployed if they believe their skills are necessary.

For normal business incidents, the team would be dispatched via normal processes. I.e. via ESTA.

3.2 Benefits

- Availability & depletion of trained staff

Under the current National USAR arrangements “The medical component of a team or task force is critical. Due to the types of injuries that can be encountered at an USAR incident, paramedics involved in USAR operations should be qualified to the highest clinical level available within their state”

According to the State CBR arrangements the Ambulance Service is responsible for the “provision of appropriate skills and equipment for CBR emergencies, including multi casualty incidents, triage of casualties and provision of first aid and invasive treatment, assistance with coordination of medical teams, provision of support to other agencies and assistance with the decontamination of casualties in the warm zone”.

Currently due to the widespread distribution of trained staff and the depletion of staff over the past few years, AV has had increasing difficulty in guaranteeing a Level A PPE or USAR response. By implementing a this program, AV would have constant access to the right numbers of trained staff, therefore ensuring that AV meets its obligations under the National and State USAR and CBR arrangements.

This model would also ensure that paramedics are trained in areas that present specific risks to the regions in which they are located.

- Skills Maintenance

Under Australian Standards Level A trained personnel must undergo a yearly reaccreditation course to maintain their qualifications. Currently this requires up to 100 personnel to be removed from their shift for a day or paid on over time if on a rostered day off

An online skills maintenance program for Level C PPE has been developed, however this has had minimal uptake by paramedics, with less than 10% of trained personnel completing the online course.

The implementation of a program similar to the UK HART model would mean that a smaller number of personnel would need to maintain their skills. The program would also have built in regular training, which would ensure all personnel keep their skills up to date.

A HART program would also ensure that personnel have regular familiarisation with specialist equipment and would also ensure that this equipment is maintained.

4. References

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Victorian State CBR Arrangements

Ambulance Victorian Emergency Response Plan

National USAR Arrangements

Emergency Management Manual Victoria

State Health Emergency Response Plan