Review of Ambulance Service provision within Dublin City and County

Dublin City Council
Comhairle Cathrach Bhaile Átha Cliath

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

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Foreword

The detailed review of Ambulance Service provision within Dublin City and Council has provided senior management in both the Health Service Executive and Dublin City Council with the opportunity to carry out a detailed review of service. As with all services, particularly inter agency services difficulties do arise from time to time and there are areas in the Ambulance Service which need to be improved upon. There is however no doubt as to the commitment of everyone involved, Management, Trade Unions and most importantly the staff whose combined areas of skill, expertise and dedicated to patient care bring about a service second to none. We are satisfied that if the recommendations in this report are implemented without delay any difficulties will be minimised and the required improvements will be made to benefit all.

We wish to express our appreciation to all those who have participated in the review and who have contributed to the final report.

Frank McClintock
Assistant National Director
Joint Chair

Matt Twomey
Assistant City Manager
Joint Chair

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Contents

Chapter 1.

Introduction

Significant changes have occurred in the organisation of health services in Ireland. The largest of these have been the implementation of the Health Service Reform programme which is a programme of Government. Out of this initiative, the Health Service Executive was established in January, 2004. Following this was the publication of the Health Act 2004 which vested the authority for the organisation and management of Health Services in the Health Service Executive. The main thrust of the reform programme was to address the following issues:

- A national focus on service delivery and executive management of the system
- Reduced fragmentation of the current system to make it more manageable
- Clear accountability throughout the system
- Better budgeting and service planning arrangements
- Continuous quality improvement and external appraisal
- Robust information gathering and analysis capability
- Preserve and build on the strengths of the existing system

Central to the achievement of these goals in the context of the Dublin Area, is the newly published goals of the National Ambulance Strategy, (2006) dealing with Communications and Information Technology. It is included as a guide to enable the review group to consider these in their final recommendations as all future funding in this area must subscribe to the requirements of this strategy. The summary of this strategy is listed in appendix A

In order to examine and review the position in the Dublin area in relation to the changes in the provision of health services overall and in the delivery of ambulance services specifically, the Dublin City Manager and the Director of the National Hospitals Office of the Health Service Executive agreed to carry out a review of the ambulance services in Dublin City and County. The basis

of this proposal were outlined in a letter from the manager for Dublin City Council to the Director of the National Hospital Office which is outlined in Appendix B

Both managers represent the main organisations involved in the delivery of ambulance services in the area of Dublin City and County. These services are delivered on behalf of the Health Service Executive who are the statutory health authority in Ireland. The services are:

- The National Ambulance Service, Health Service Executive
- The Dublin Fire Brigade Ambulance Service, Dublin City Council.

The organisations felt there was a need to review the capacity and capability of ambulance provision within the Dublin City and County Area. This would include all aspects of ambulance operations excluding routine patient transport services which are exclusively managed and delivered by the National Ambulance Service**.**

Another important reason for carrying out this review is that the response times for the delivery of emergency ambulance services in Dublin City and County are considered very low in relation to similar cities around the UK and Europe. **The 8 minute response time for emergency responses in Dublin City and County is between 23% and 27% and this compares poorly in relation to the 8 minute response time in general in England of 75% for dealing with life threatening calls**.

The Review Group on the Ambulance Service provision within Dublin City and County was established in October, 2005 by the National Director of the National Hospitals Office, Health Service Executive and the Manager of Dublin City Council.

The Senior Managers set out the terms of reference for the Review Group.

The Membership of the Review Group

The members of the review group are:

Health Service Executive

Mr Frank McClintock, Assistant National Director,
National Hospitals Office (Joint Chairman)
Mr Pat McCreanor, Chief Ambulance Officer,
Eastern Region, National Ambulance Service
Mr Ray Bonar, Chief Ambulance Officer, (Secretary)
Western Area, National Ambulance Service

Dublin City Council

Mr Matt Twomey, Assistant Manager, (Joint Chairman)
Mr Gerry Geraghty, Executive Manager, Dublin Fire Brigade
Mr Hugh O'Neill, Chief Fire Officer, Dublin Fire Brigade

Independent Member

Mr. Philip Selwood,
Joint Chief Executive
Gloucestershire & Wiltshire Ambulance Service

Terms of Reference

The terms of reference established for the group were:

- Review the linkages between Dublin City Council and the National Ambulance Service.
- Explore the role of Dublin Fire Brigade and the National Ambulance Service in the provision of ambulance services within the Dublin City and County Area encompassing Brigade future plans.
- Define and discuss the current issues impacting the delivery of patient care within Dublin City Council and County Area.

- Engage agencies and companies to assist in the determination of solution options.
- Review and consider all relevant strategic, operational and technical reports.
- Develop and agree standards for delivering ambulance services within the Dublin City Council and County Area.
- Engage associated Staff side representative organisations.
- Develop and agree recommendations for service delivery.
- Develop and agree an implementation plan with associated timescales.

Chapter 2.

Methodology

Introduction

The approach of the review group was to establish a process that was inclusive and analytical. It was important that every stakeholder in the process had the opportunity to participate in the review. All items of existing information and data was examined by external consultants and presented to the stakeholders following analysis. The details of this analysis are contained in the report.

Repeat meetings were held with stakeholders to clarify and amplify the issues raised in the data and analysis as well as providing an opportunity to review submissions from each group.

Meetings of the Review Group

The Group met on 14 occasions between the 26 October, 2005 and the 18th April, 2006.
They also met with staff representative bodies on 6 occasions. Some of these meetings were with single union groups and other meetings were with the joint unions. These meetings were held between 11th January, 2006 and 18th April, 2006.

Meetings with Representative Organisations

The staff representative organisations that met with the committee were:

- SIPTU- Local Authority Branch. Met the Review Group on 4 occasions
- SIPTU - Health Services Branch. Met the Review Group on 4 occasions
- IMPACT-. Met the Review Group on 4 occasions

Most of these meetings were with the group of unions, but at least one meeting was held individually between the Review Group and each representative body. The main focus of these individual meetings was to discuss the detailed submission that the representative body made to the Review Group.

Collection and Analysis of the data

Active Solutions Ltd (ASL who are a leading UK organisation involved in the analysis of data for the Emergency Services) was engaged to support the work of the review group. The company worked closely with the operations and technical staff of the DFB and NAS control centres to identify the data that existed and to develop formats and reports on the basis of this data. Further details on this research will be described later in the report. . The detailed report is listed in Appendix E.

Presentations to the Review Group

The Pre-Hospital Emergency Care Council (PHECC) made a presentation to the review group on the level and depth of Pre-hospital care standards that currently exist in Ireland and what is expected of service providers in the future.

Active Solutions Ltd (ASL) made 3 presentations to the group after each stage of their research into the operations data drawn from the DFB and NAS databases.

Chapter 3

Evolution of Policy in the Area of Ambulance Service Provision in Ireland

Historical Background

Prior to 1970 when the Health Boards were established, the Local Authorities were the statutory Health Authorities in Ireland. As such, they provided all the health services including the ambulance services. With the establishment of the Health Boards through the Health Act, 1970, this function passed from the local authorities to the eight regional Health Boards.

Over a period of thirteen years, the ambulance service function of the local authorities was transferred to the Health Boards. The only exception to this situation was in Dublin where Dublin Corporation continued to provide an ambulance service in the Dublin area through the Dublin Fire Brigade on an agency basis for the National Ambulance Service, HSE.

The Statutory basis for the provision of Ambulance Services is contained in section 57 of the Health Act 1970, which provides that:

- A Health Board may make arrangements for providing Ambulances or other means of transport for the conveyance of patients from places in the Boards functional area to places in or outside that area or from places outside that area to places in that area.

- In making arrangements under this section, a Health Board shall act in accordance with the directions of the Minister.

For many years there had been a diversity of opinion between the Eastern Health Board and Dublin Corporation on command and control arrangements for ambulance calls made via the “999” emergency service in the Dublin area.

During a strike by the Dublin Fire Brigade in 1988, the Eastern Health Board Command and Control Centre Centre took charge of the 999 ambulance calls for the Dublin Area. Following a resumption of work after the strike, there was disagreement between Dublin Corporation and the Eastern Health Board regarding Command and Control arrangements.

A review group under the chairmanship of Professor Eamonn Quade, University of Limerick sat to find a solution to the disagreements between Dublin Corporation and the Eastern Health Board. This group failed to find a solution. As a result of a Government decision, the control of 999 calls in the Dublin area reverted to Dublin Corporation and this is the position to date. (Ref P.100 RRGAS, 1993)

Role and Purpose of the National Ambulance Service

The role and purpose of the National Ambulance Service is to provide a clinically appropriate and timely pre-hospital care and transportation service. Pre-hospital Emergency care and transportation services are provided as an integral part of a continuum of care for patients/clients. The provision of high quality ambulance services requires the National Ambulance Service to operate in partnership with a wide range of statutory and private organisations. It also involves working closely with other health care providers at primary and community level, and in both acute and community care settings.

The roles of the National Ambulance Service can be defined in terms of its strategic and operational commitments.

The Strategic Roles of the National Ambulance Service are:

- To prepare plans, policies and budgets for the implementation of national policy in support of DOHC and HSE policies
- To develop national policy for the provision of pre-hospital emergency care in Ireland

- To develop national policy for the provision of critical care and general patient transport for the HSE
- To supervise the implementation of delivery mechanism for pre-hospital emergency care in Ireland
- To establish service level agreements with service providers who are required to support the HSE national ambulance service.
- To work with other public services and government agencies in support of national health and social care policies
- To evaluate the level, quality and clinical standard of pre-hospital emergency care being provided by internal and external service providers
- To ensure that all services being provided are meeting public service financial and value for money policies and standards

The key Operational Roles of the National Ambulance Service are:

- To provide Pre Hospital Emergency Medical Services.
- To participate in and make arrangements for the operation of multidisciplinary emergency practitioner care teams and networks
- To provide critical care transport services such as neonatal, paediatric and other intensive care mobile services.
- To provide routine non-ambulant patient transport within the health care sector.
- To establish and operate the Health Service Communications and Command & Control services.
- To participate with internal and external organisations in the planning of and mitigation of the effects of major emergencies.
- To provide pre-hospital specialist professional training and related services.

The Role of the Dublin Fire Brigade as an Ambulance Service Provider.

All ambulance related services provided by the Dublin City Council on behalf of the HSE will be provided in the context of current and future service level agreements between both parties. In the main this will include for the present the following functions and roles:

- To provide an accident and emergency ambulance service in the catchment area of Dublin city and county
- To provide ambulances for the transfer of non-ambulant patients between hospital and other health service facilities
- To participate in the provision of an integrated ambulance control and dispatch centre which will dispatch all ambulance resources in the area of Dublin city and county
- To subscribe to the provision of services in accordance with those standards set down by the Pre-hospital Emergency Care Council
- To provide the commissioner of services (The HSE) with all statistics and reports to ensure clinical, operational and financial accountability in accordance with the service level agreement
- To fully participate in the operation and management of the communications and dispatch centre which will provide these services in the Dublin city and county area

Current Policies for the Delivery of Ambulance Services in Ireland

Several national reports and strategies have been published which have a direct implication on the future direction of the ambulance service in Ireland. These are:

- The Review Group on the Ambulance Services (1993)
- Strategic Review of the Ambulance Service (2001)
- Quality & Fairness - A Health System for You (2001)

- The Health Service Reform Programme (2003)
- Mason Report on Communications in the Ambulance Service (2005)
- Communications and IT Strategy , National Ambulance Service(2006)

The Review Group on the Ambulance Services (1993)

The Review Group on the Ambulance Service in 1993 also looked at the issues around the delivery of Ambulance Services in the Dublin area. This review was the first strategic examination of the ambulance services in Ireland and laid the foundation for the ongoing development of the services since then. The review was chaired by Mr Frank Ahern from the Department of Health and Children. This review has been the driver of national policy in relation to the provision of ambulance services in Ireland for over 13 years.

The outcome of the review recommended that:

- Dublin Corporation should have a long term involvement in the delivery of ambulance services on an agency basis on behalf of the Eastern Health Board
- A common protocol for service provision should be agreed jointly between Dublin Corporation and the Eastern Health Board
- The Dublin Fire Brigade and Eastern Health Board should provide the full range of Accident and Emergency services in the Dublin area
- Defined areas were identified for the unique provision of A&E service by each of the above services
- Operational protocols were to be put in place to accommodate these new arrangements for service delivery
- Have a jointly agreed policy on training and industrial relations
- That the services of both organisations would function as a single entity for the delivery of ambulance services in the Dublin area using a single command and control facility in Townsend St

- That the EHB command and control facility in St James's hospital would move to Townsend St to facilitate the development of a single entity service.
- That a steering group of representatives from Dublin Corporation, Other Local Authorities , Dept of Environment, Eastern Health Board and the Dept of Health be established with the Chairmanship rotating between the Local Authority and the Eastern Health Board
- That the Head of Operations is appointed by the Eastern Health Board and the Deputy Head of Operations is appointed by Dublin Corporation.

It was the aim of the Review Group that the proposals would:

- Provide for a fully integrated Ambulance Service in Dublin
- Avoid wasteful duplication of services
- Allow for the long term involvement of Dublin Corporation in the provision of the full range of Ambulance Services in the Dublin Area
- Allow Dublin Corporation and the Eastern Health Board to operate within clearly defined roles with full co-operation and mutual assistance

The above outcomes remain current policy for the implementation for the service delivery of ambulance services in Ireland and in specific to the Dublin area. **Despite 13 years passing, many of the goals of this review and subsequent DOHC policy have not been implemented fully in the Dublin City and County area**.

The current review aims to ensure that these policy goals are fulfilled and where appropriate enhanced in order to ensure that there is implementation of high quality integrated ambulance services being delivered to the population of Dublin City and County. This must ensure that any fragmentation in the current system of delivery is removed and that all patients seeking ambulance services receive a seamless accountable and equitable level of services.

The Strategic Review of the Ambulance Services (2001)

The Strategic Review of the Ambulance Service 2001 provides a blueprint for the development of the Irish Ambulance Service. It stated that there was a need for improvements in national coordination to ensure that there is a consistent and unified approach to all aspects of the ambulance service and to ensure that service operates as one entity to the maximum extent

The 2001 Review identified eight key objectives:

- To improve national co-ordination and direction
- Separate patient transport from the emergency medical service
- Eliminate on-call from emergency rosters and implement other measures to improve response times
- Reduce the number of control centres and standardise dispatch systems on a national basis
- Develop an integrated ambulance service for the ERHA region
- Strengthen clinical direction and audit
- Continue emphasis on staff training and development
- Complete work currently in progress

The following were the national key recommendations from this review, of which very little progress has been made within the Dublin City and County area:

- **Command & Control Arrangements** –
  The entire ambulance resource for the Dublin area should operate as a single service with no duplication of services and with clearly defined areas of operations. All ambulances serving the Dublin area should be brought under a single Command and Control Centre. It is also important that there is close liaison and co-operation between the services in relation to any systems or technology developments to ensure compatibility in use and operation of control systems and procedures.

- **Medical Priority Dispatch Systems**

  Considering the high volume of emergency calls in Dublin, it is recommended that medically approved dispatch protocols be introduced to ensure an appropriate response and high quality patient care.

- **Clinical Direction**

  Pre-hospital clinical protocols must be monitored and reviewed in accordance with current evidence-based clinical practice to ensure that patient care in the pre-hospital setting is of the highest quality. Consideration should be given to developing joint clinical audit programme (ERHA & DFB) to allow protocols and practices to be judged against outcomes of care on a consistent basis.

- **Joint Management Team**

  It is the view of this review group that a joint management team from ERHA, DFB and appropriate clinicians be set up to address these issues.

The situation in Dublin needs to address several of these objectives and the recommendations arising. There is a need to have a unified control centre for the receipt, dispatch, monitoring and evaluation of all ambulance calls and the development of an integrated ambulance service for the Dublin area initially.

The need for a co-ordinated delivery strategy in line with other health service initiatives is also identified. The ambulance service delivery strategies have to be developed by one body and delivered as a holistic unit in terms of the overall delivery of health services nationally and in this context in the Dublin region.

The Health Service Reform Programme (2003)

The most recent high level policy that impacts on this review is contained within the Health Service Reform Programme. It is significant that the outcome of this reform programme reinforces many the issues of previous reports and strategies on the ambulance services. The Health Service Reform programme initiative was launched in 2003. This is the most significant health initiative in the state since its foundation. The programme resulted in the abolition of the eight regional health boards which were replaced by the Health Service Executive (HSE) in January, 2005. The 2004 Health Act established the HSE. From an ambulance service perspective, it resulted in the merging of the eight regional ambulance service into one National Ambulance Service under the management of an Assistant National Director in the National Hospitals Office.

The Health Service Reform programme was driven by the following principles:

- A national focus on service delivery and executive management of the system
- Reduced fragmentation of the current system to make it more manageable
- Clear accountability throughout the system
- Better budgeting and service planning arrangements
- Continuous quality improvement and external appraisal
- Robust information gathering and analysis capability
- Preserve and build on the strengths of the existing system

In relation to this report, the review must subscribe to these reform objectives. There has to be a strategic focus on the delivery of ambulance services nationally and in the context of this report within the Dublin region and any fragmentation that exists in service delivery needs to be addressed as part of the solutions proposed in the review. Accountability for HSE funding must also be clearly addressed as does clear criteria for budgeting and service planning

arrangements. All of these service delivery issues must be linked to quality of care in service delivery which is supported by good quality and timely management information. There are many strengths in the existing system, but these can be improved and built upon. A lot of these improvements can be addressed through a Service Level Agreement between the Dublin City Council and the Health Service Executive.

The Mason Report on Communications in the Ambulance Services (2005)

The Mason Report, 2005 was a significant proposal in relation to the future arrangements for the provision of a communications infrastructure in the Ambulance Services. However, there is a much wider range of health service communications needs existing and these will have to be factored into any health service communications developments. These recommendations in this report can be summarised as:

- To establish four (4) health service call centres – one to support each HSE administrative area.
- The aim of these centres is to provide an integrated communications service support for multidisciplinary providers in support of holistic patient services
- These call centres will deal with all health service communications needs
- These centres will contain the following services
    - Ambulance Emergency dispatching
    - Inter-hospital critical care transfers
    - Patient transport services-stretcher based at an intermediate care level
    - Bed monitoring services
    - Patient transport services through contractors
    - All out-of-hours medical on-call services

- Specialist health support services such as Public Health Nursing, Social Workers etc that are needed out of hours
- Primary care centres
- Patient advice and referral service

The primary focus of the Health Service reform programme was to remove the fractured nature of service provision. The central theme of any of the communications developments in the future within the ambulance service is to focus all activity on the care of patients and their needs. This provides for further impetus for resolving the historical issues associated with the provision of ambulance services in Dublin City and County.

Chapter 4:

The Vision for Future Structures and Systems of Service Delivery.

Strategic Overview.

The Health Service Executive believes that patient and client care is at the core of the Health Service Reform Programme. With this value being paramount, the review group seek to guide the development of the changes required for improving services to its client base. This should be done in partnership with all stakeholders and interested parties, creating an inclusive, responsive, accountable service, dedicated to achieving the best outcomes for the public we serve.

The risks of the current ambulance service provision stems from the future requirements of the Health Service Reform Programme itself. A more patient centred and clinically effective Health Service, coupled with the rising demand for emergency response creates an expectation from both patients and health professionals alike. The dramatisation of the service through media and profile further compounds public expectation of the service. The Ambulance Service will only be able to play its full part in a modern Health Service with considerable changes to technology, culture and working practices. if this cannot be done, major anomalies will compromise the initiatives underpinning the Health Service Reform Programme and in particular that of the National Ambulance Service.

Clinical development within the Ambulances Services has seen some major changes in the manner patients receive care. Effective, potentially life saving interventions are carried out routinely at the scene, allowing stabilisation of patients prior to transfer to hospital. This can only lead to an increase in the survival rates of patients who might otherwise have died.

With the introduction of advanced training for EMT-Advanced Paramedics, the levels of pre-hospital emergency care will increase and consequently enhance patient outcomes even further. This initiative will be further supported by the

development of more advanced emergency care skills in the existing EMT population to bring them up to paramedic standard.

These clinical developments will need to be managed appropriately and uniformly in order to ensure a consistent approach is adopted and equity of care is provided throughout the State.

An integrated Emergency Medical Dispatch system will need to be developed to ensure that patient's needs are identified at a very early stage in the call handling process and that the appropriate level of care provider is dispatched on the basis of clinical qualification and location to the patient.

Planning the improvement of the Ambulance Service on a national basis over the short, medium and long term is required, if it is to contribute as a partner in the modernisation of the Health Service. These considerations require an inclusive approach with key health, social service professionals and other stakeholders to ensure that benefits are maximised and to mitigate potential risks. It is in the context that this review has focused on the development of an integrated ambulance service delivery mechanism to serve the needs of the population of Dublin City and County.

The following principles have driven the outcome of this review:

- Equity
- People-centeredness
- Equality
- Quality
- Accountability
- Uniformity of access
- Timeliness of service

This review always viewed the outcome of its deliberations as being compatible with the principles outlined in the Report - Quality & Fairness - A Health System for You (2001). This report laid down the foundations for the

establishment and maintenance of any health service organisation for now and in the future. It is in this context that the review group builds its recommendations and plans for the future

Future Development of the Ambulance Services in Dublin City and County in the Context of this Review

Many changes have occurred in the emergency ambulance service sphere of responsibility in the context of increasing demands and expectations and continuing technological and medical advances. The demand for ambulance service provision within the Dublin and its environs has grown significantly over the last decade, particularly in the demand for emergency responses

The emergency ambulance service in Dublin needs to be in a position to meet these demands and challenges. There is a need to ensure that appropriate staff and resources are provided to ensure that a quality and efficient pre-hospital emergency care system is achieved in a timely manner.

To this end, the Ambulance Service must strive to provide its services in an integrated manner, co-operating with other health care personnel and other emergency services. It must

- Deliver the best quality care to patients in need in the timeliest method.
- Treat people at all times with dignity and respect.
- Achieve high clinical standards and excellence in pre-hospital emergency care.
- Work for continuous improvement, in terms of effectiveness and efficiency in each aspect of the service.
- Recognise the principles of partnership in staff/ management inter-actions.

To ensure that the ambulance services in Dublin will operate at a standard that will be on a par with best practice in other developed countries, the

following components of a quality Pre Hospital Emergency Care Services System need to be in place. It must have:

- Easy access to a single EMS system by the public by dialing - 999 or 112 to ensure appropriate response and level of care in a timely manner.

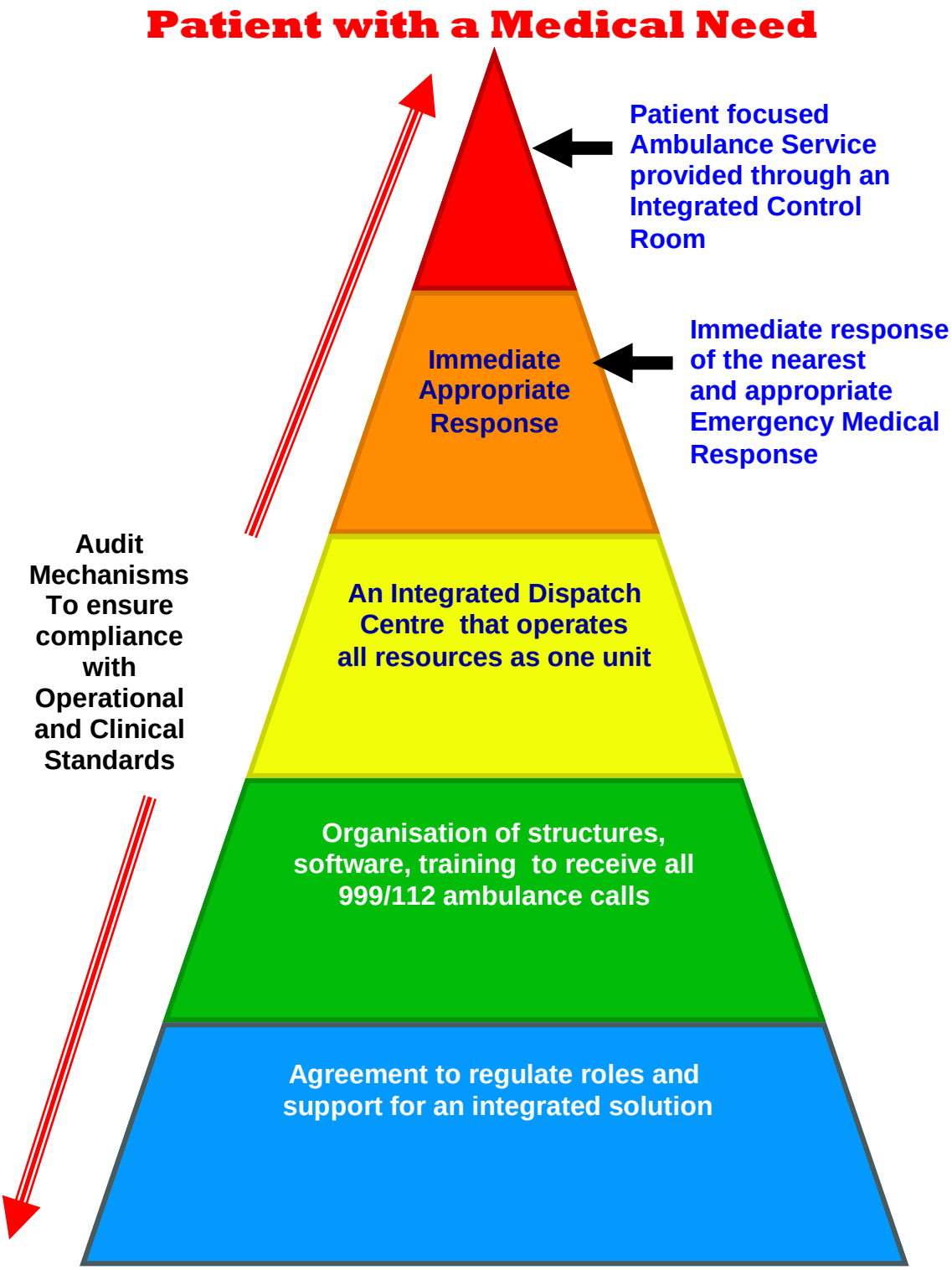
- A single integrated communications systems staffed by trained personnel using medically approved dispatch protocols to ensure an appropriate response irrespective of boundaries.

- Initial responders i.e. public, 1st responders, other health professionals and emergency services, to stabilise the patient until trained emergency medical personnel arrive.

- Appropriate equipped vehicles staffed by trained EMS personnel. These must have a high exposure to on-going pre-hospital emergency care practice in line with PHECC guidelines. This is to ensure safe and appropriate medical care is practiced and appropriate to the needs of each patient in their care in line within a clinical governance model.

- Systems of accurately measuring and auditing all the above components must be in place. This is to ensure optimal levels of care consistent with accepted standards of clinical practice and appropriate pre-hospital clinical guidelines are delivered to the highest quality of care.

Fig 1: Essential Components of a Quality Pre-hospital Emergency Care Service



Chapter 5:

Present Organisation of Ambulance Services in Dublin City and County

Service Delivery Systems

The current system of providing pre-hospital emergency care in Dublin City and County is based on the Dublin Fire Brigade (DFB) providing emergency ambulance services from 10 stations mainly focused in Dublin City. The DFB have 13 A&E vehicles based in their stations. The DFB services are mainly focused on accident and emergency provision. (See Appendix C for DFB Station locations and resources)

The National Ambulance Service (NAS) provide both emergency ambulance services and patient transport services in the Eastern Region which comprises counties Dublin, Kildare and Wicklow. Their presence in Dublin City and County is in 4 stations with 32 A&E ambulance vehicles and 6 motorcycles. There is additional support from a further 3 stations on the boundary of Co Wicklow and Co Kildare who have an additional 14 A&E vehicles. While the NAS carry out an extensive amount of accident and emergency service provision, they are also involved in inter-hospital critical care transfer services as well as dealing with the majority of GP urgent calls. It also operates and manages the Neo-natal transfer service nationally from the Dublin base as well as providing a Mobile Intensive Care Ambulance Service (MICAS) nationally from the Dublin base. (See Appendix D for NAS Station locations and resources).

The NAS have a total of 55 A&E vehicles and 6 motorcycles in the Eastern Region as a whole. It also has a fleet 20 PTS vehicles in the region.

The existing ambulance service provision whereby these services are delivered by two different organisations using two differing communications systems and software does not support many of the goals and aims of the requirements of all of the strategic reports on the ambulance services and the health service reform programme.

Command and Control Arrangements

Within the Dublin area, there are two control centres located in the Townsend Street building. Both the DFB and NAS control resources are located here. All the DFB fleet are dispatched from this centre. The NAS fleet based in 4 stations in the Dublin area are dispatched from this centre.

These control centres, while being located in the same room, operate and dispatch the ambulances resources in Dublin City and County as two separate entities in which there seems to be very limited integration on the deployment of these services

In the Eastern region, the NAS have 3 call centres. These are in Wicklow town, Naas and Townsend St, Dublin,1.

While some co-ordination of 999 calls takes place in the Townsend St centre, it is the view of the HSE that this system is not sufficiently integrated to provide seamless ambulance services to the population of Dublin City and County. It is perceived that this service is fragmented and the existence of this situation undermines one of the main objectives of the Health Service Reform programme.

Significant Issues Arising from Current Arrangements

Lack of a Single Point of Contact

The lack of a single point of contact for the receipt of all ambulance calls for Dublin City and County is not a satisfactory arrangement for supporting the needs of patients or clinicians seeking the services of the ambulance services.

Lack of Integration

There is a lack of integration of control services and service delivery. This was a central focus of the recommendations of all the reports and policies that have been written over the last 13 years. DOHC policy has not been implemented in this regard.

The Nearest Ambulance Response is not always Dispatched

The nearest ambulance resource is not always dispatched to meet the needs of the patients requesting services. Again this element of the service delivery of policy has not been implemented.

Value For Money Issues

The issue of value for money also arises in that there are two separate stand alone systems for service delivery of ambulance services. Each system has its own infrastructure and supporting systems. There is no cross accountability in terms of clinical or financial items. There are two different training systems even though they conform to training staff to the same standard. Even the accreditation systems that support the training programmes are different with each organisation being supported by different third level organisations.

Clinical and Financial Risks

The current approach to service delivery leaves the HSE exposed to clinical and financial risks. The absence of a Service Level Agreement for the provision of existing services is an issue that needs to be urgently addressed to mitigate these risks and provide a system of financial and clinical accountability

Chapter 6:

Independent Analysis of Current Service Delivery

Introduction

The review group agreed to engage an independent organisation to examine and analyse the work of both the NAS -East and the DFB with the aim of validating the data of both organisations in term of activity and distribution of work in the area of ambulance service delivery in Dublin City and County.

ACTIVE Solutions Europe Ltd (ASL) were engaged to undertake a review of the provision of Ambulance Services across the Dublin City and County area. The details of the research and results are outlined in the final report submitted by Active Solutions Ltd to the Review Group - Appendix E.

Scope of the Review by Active Solutions Ltd

The analytical review by ASL was to examine and report upon the current joint provision of independent services as delivered by both the NAS- and Dublin Fire Brigade (DFB). The scope of the review was clearly defined, requiring:

- A comprehensive quantitative assessment of the demand for service
- Calculation of the current relative levels of service provision and response standards across both organisations
- Assessment of the best use of the combined resources of both organisations to optimise the provision of service aligned to patterns of demand
- Quantification of the potential performance improvement gains achievable through a combined approach to Ambulance Service strategic planning and operational tactical deployment planning
- A performance improvement impact assessment of additions to the current Ambulance Service vehicle fleet

Aim

The aim of the ASL review was to provide a robust, evidenced based assessment of the combined provision and performance potential of the NAS and DFB Ambulance Service for Dublin and County.

Objectives

In order to achieve the aim of the ASL review, the following objectives were set:

- Conduct and report upon a data audit across both NAS and DFB to assess the capacity of the individual organisations data sets to be utilised within a standard analytical and reporting methodology to deliver robust demand analysis.
- To identify and address any limitations in the incident data collected and held by each organisation and comment on its robustness and reliability for strategic and operational planning and service delivery.
- To investigate, report upon and assess the impact of patterns and trends in incident data.
- To utilise the incident data to profile spatial and temporal demand for Ambulance Services and then advise upon the best use of the combined vehicles to respond to overall demand, demonstrating potential performance improvement across NAS and DFB.
- To develop a tactical deployment performance forecast and impact assessment of additional vehicles on Service Delivery Performance Standards

Findings from the ASL Analytical Review

- It is clear that there is a complex and co-dependant relationship between the two Ambulance Service providers across Dublin City and County, yet the evidence shows that a closer more integrated approach

to the utilisation of the combined resources available to the public would enable significant service improvement to be achieved.

- Production and implementation of an updated Tactical Deployment Plan (TDP) -as current calculations are based upon data from 2004/2005- within the individual services or combined services would improve deployment through aligning service provision deployment in line with localised demand profiling.

- Adoption of a common TDP would deliver significant improvements in performance. Initial use of existing posts and the introduction of agreed standby points over time, in negotiation with staff, would deliver increased performance in relation to response time and associated patient outcomes.

- The removal of PTS workload from the emergency vehicle resource base provides for additional improvement in performance, and this is a step, which can be quantified in terms of potential improvement independently of implementation of combined or individual service TDP.

- Aligning resource availability with demand through optimised shift and rota development offers further efficiency, service improvement and performance gains within existing resources. Clearly such a path requires careful consideration in terms implementation, but this forms a key component of any such work and the case for undertaking such a change programme is clear, strong and has many existing and successful precedents.

Chapter 7:

Organisation, Governance and Structures

Introduction

The emergency medical service of the future needs to be part of a seamless system, fully integrated into the health service to achieve a high degree of continuity of care and treatment for the population it serves. The service needs to work in partnership with other health care providers in order to enhance the quality of life of the communities it serves.

The emergency medical service should:

- Deliver the best quality care to patients in need in the most timely manner.
- Treat people at all times with dignity and respect.
- Achieve high clinical standards and excellence in pre hospital care.
- Work for continuous improvement in terms of effectiveness and efficiency in each aspect of the service.
- Recognise the principles of partnership in staff/ management interactions.

A national strategy for the ambulance service has been identified and highlighted in a number of key strategic documents dating back to 1993. The central theme running through these reports is that there is a need for a nationally driven and cohesive approach to delivering pre-hospital emergency care in Ireland. This principle needs to be focused and applied in the Dublin area. This objective must be carried through to any new arrangements for the organisation and the delivery of ambulance services in the Dublin region

In order to achieve these goals, the group concluded that a greater focus would need to be put on the establishment and development of appropriate governance and structures in line with best practice as outlined in previous policies and reports on the provision of ambulance services in Ireland and in the Health Services in general.

Proposed Governance and Structure

After a detailed discussion on various approaches to structuring and systems development, the Review Group agreed with the following roles and structure:

- The identity of the communications unit should be unique and the members of this unit should work as a single unit even though they are from two different services
- The members of each service should carry out the role of receiving all ambulance calls for the geographical area covered as a single entity. They should dispatch all mobile ambulance and first responder resources within this area as a single centre.
- They should be able to clearly identify all incoming calls and see the location of all mobile ambulance resources.
- Each service will have its own management stream.
- Both management streams will work together to achieve the goals established by the management board of the communications unit.
- These goals will be operational in nature and will be the method of delivering the strategies and policies set by the management board.
- The management Team will consist of the following personnel:
    - Chief Ambulance Officer NAS (Joint Chair)
    - Chief Fire Officer DFB (Joint Chair)
    - Senior NAS Communications Manager
    - Senior DFB Communications Manager
    - Staff Representative from DFB Communications team
    - Staff Representative from NAS Communications team
- A management Board for the communications unit will be established to set policy and to agree strategy for the operation of the communications unit. The members of this board will consist of members of the current Review Group

The management group for the Control Centre need to ensure that the following issues are central to their future actions:

- The need to put patients a central theme in all discussions. The focus of all activity is to support the needs of the patient in all decisions and actions.
- Physical and ergonomic layout of the control centre
- Physical and social integration of the staff working in the centre
- Seamless integration of all communications tasks and deployment of services
- Risk management issues in the control centre
- Software issues
- Maintaining and building the delivery of Pre-hospital care standards
- Types of calls and ranges of fleet
- Appropriate responses to all calls
- High levels of consultation and partnership building.

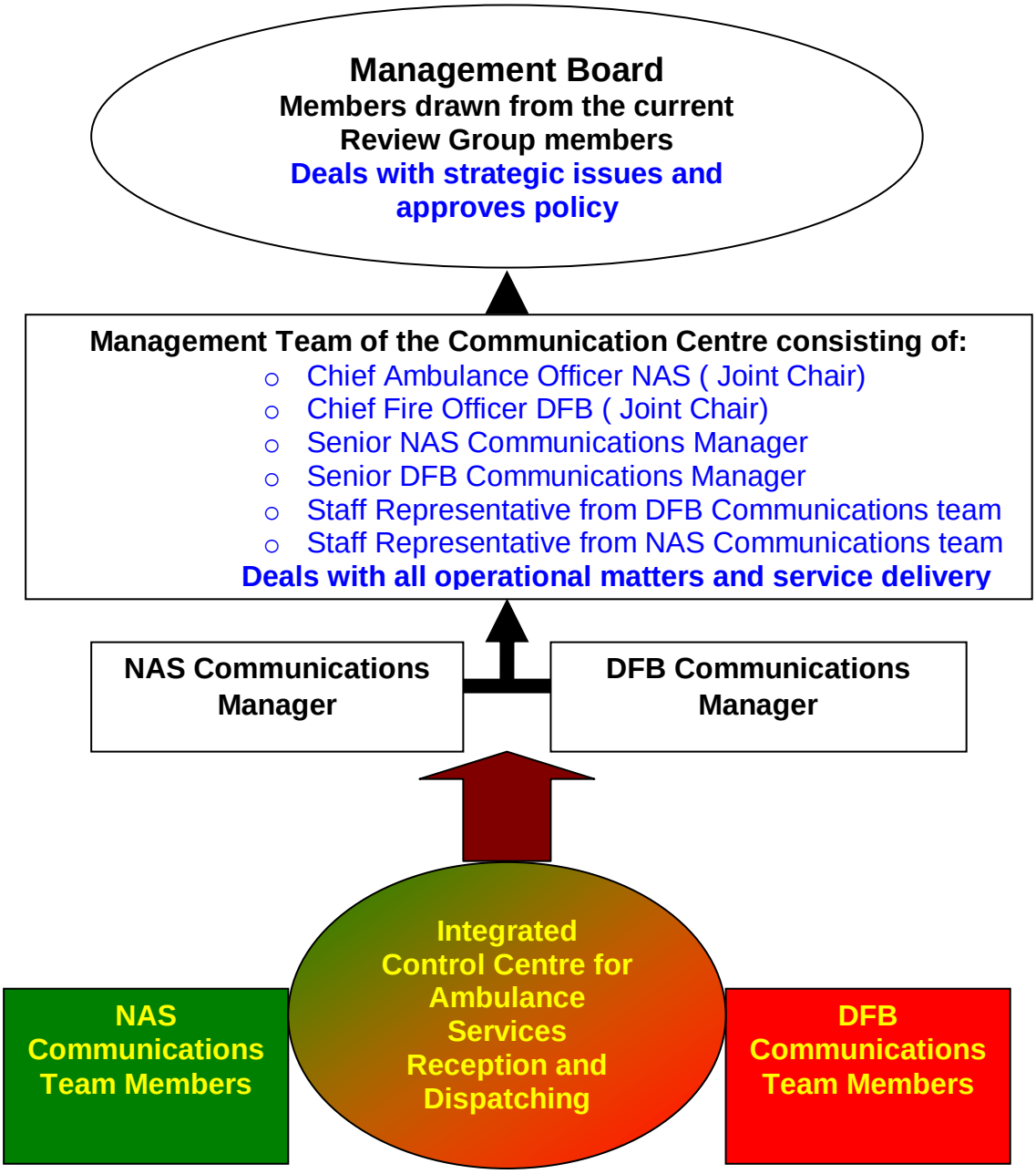


Fig 2: Schematic of proposed Governance and Operations Structure

The Review Group are of a view that there is a long term role for the DFB in ambulance services in the Dublin area. Currently there are two dimensions to this involvement; reception and dispatching of ambulances and the provision of an ambulance service from 10 centres in Dublin.

All strategies and actions must be focused on the need to ensure that all operational and strategic decisions and actions are based on patient need. All systems and processes need to be organised and developed in the context of effectively ensuring that patient demands are targeted and prioritised to ensure that the ambulance service response is timely and appropriate.

The group also felt that the issues were complex and needed to address a range of issues. These being; social, technological and physical infrastructure.

In order to build an environment of trust and good team working, it would be important that all the staff involved in the communications centre have a sense of being on the same team and are focused on achieving the same goals and aims.

One of the first steps to be taken in this regard was to suggest that the current dining and facility arrangements be shared to encourage the workforce in the communications centre to mix more easily and as a result to remove any perceived suspicions and barriers to communications and relationship building.

It was also suggested that the physical layout of the communications room be reorganised to ensure that those staff dealing with ambulance calls be arranged to work in a common unit which is arranged in the middle of the room. All controllers involved in this activity would take ambulance calls on the basis of immediate availability and will dispatch the ambulance fleet of both organisations as one resource depending on availability.

The technological development to be put in place will ensure that all ambulance requests regardless of source will be directed to common screens in the joint ambulance unit which would show patient needs and ambulance resources. It is the understanding of the group members that this infrastructure is already there and only needs to be implemented through same software application that will make the link between NAS and DFB

systems. Both service managers agreed to implement this activity now with the aim of progressing this element of the work in hand.

Any new system will have to be ergonomically friendly and need to take account of the psychological needs of all staff working in the centre. The occupational health of staff working in the control centre will be a primary consideration for management when putting in place any working arrangements in the future

Integration and Operations

A question arose on what did the Review Group understand the term integration to mean? This is important as the Review Group have to convey this vision to all the parties involved. As a result of a discussion it was the view of the Review Group that integration should be defined as:

"the reception, prioritisation, dispatch and monitoring of all ambulance calls(excluding PTS) in the Dublin City and County area by DFB and NAS personnel acting as a single unit."

This definition implies that the unit will be located in one physical area, share common communications infrastructure and share software systems which will identify all incoming and outstanding ambulance calls and monitor all ambulance fleet resources on an ongoing basis.

The issue of the range of work to be carried out by the combined ambulance service was discussed by the Review Group. The DFB will continue to do A&E work in the first instance, but that this should be extended to deal with Urgent and inter-hospital critical care transfers as well.

The overall ambulance fleet will be expected to address these needs as one unit of activity. Appropriate resources will match the requirements of the Service Level Agreement (SLA)in this regard. This may require some

differentiation in the range of vehicles being currently used. This requirement will be based on policy, patient and operational need.

A range of response models will need to be developed. It was clear from the discussions that the current single type of response model will be unsustainable in the future. It is estimated that 35% of calls do not need an A&E ambulance response. Priority Dispatch systems will help to identify these cases. Responses will range from A&E ambulances; stay at home policies, non-transport policies, on-site treatments, single responders, Co-responders and Community Emergency First Responders. The development of response teams and systems will determine the amount and extent of these schemes.

The benefit of using the Dublin based ambulance resource as a single unit is that we can capitalise on the deployment of these resources on the basis of best meeting patient needs. It is estimated that the ambulance resource in the Dublin area is in the region of 26 crews and vehicles. When these are mixed in with DFB co-responders and other schemes being developed, it should provide an ambulance controller with a good range of options for dealing with patient needs in an appropriate time frame.

Chapter 8:

Recommendations

The overriding principle guiding these recommendations are that any member of the public or health professional have a single point of contact with the emergency ambulance services serving Dublin City and County and get a response from the nearest appropriate emergency care resource in the shortest possible time period.

To achieve this, there are 15 central recommendations.

The recommendations are grouped under the following headings:

- Organisation Governance
- Operations
- Clinical Issues

Organisation Governance

- That a Strategic Management Board for the Communications Unit will be established to set policy and to agree strategy for the operation of the communications unit serving the population of the area of Dublin City and County.

- The members of this board will in the first instance consist of members of the current Review Group.

- That Operational Management Group be appointed to oversee the daily operations of the centre will consist of the following personnel:
    - Chief Ambulance Officer NAS (Joint Chair)
    - Chief Fire Officer DFB (Joint Chair)
    - Senior NAS Communications Manager
    - Senior DFB Communications Manager

- Staff Representative from DFB Communications team
- Staff Representative from NAS Communications team
- A Medical Advisor for each service

- That a Partnership Working group be established to deal with the normal partnership issues around the operations of the Communications unit. The members of the group will consist of:
    - Chief Ambulance Officer NAS (Joint Chair)
    - Chief Fire Officer DFB (Joint Chair)
    - Senior NAS Communications Manager
    - Senior DFB Communications Manager
    - Staff Representative from DFB Communications team
    - Staff Representative from NAS Communications team
    - A Medical Advisor from each service

Operations, Communications and Training

- That an integrated Command and Control unit comprising of staff from the DFB and the NAS be set up to receive , prioritise and dispatch all emergency, urgent and critical care patient transfers in the Dublin City and County Area. This recommendation is supported by the research by ASL where they state that;

    "the evidence shows that a closer more integrated approach to the utilisation of the combined resources available to the public would enable significant service improvement to be achieved. This could result in a 22% improvement in response times for the 8 minute band. This would increase the current response time for this band by between 23 to 27%. This will still leave our response times in Dublin City and County well below the UK standard for similar areas of 75% responses to emergency calls being completed in 8 minutes. Nevertheless, it will see a significant improvement form the current position".

- This Control unit will be located in one physical area, share common communications infrastructure and share software systems which will identify all incoming and outstanding ambulance calls and monitor all ambulance fleet resources on an ongoing basis.

- That the DFB will continue to do A&E work, but that this should be extended to deal with Urgent and inter-hospital critical care transfers as well.

- The overall ambulance fleet in Dublin City and County will be required to respond to all emergency, Urgent and Critical Care transfer work as one unit of service provision.

- That all staff engaged in the delivery of ambulance service both in the control area or on road operations to participate in joint training programmes/exercises to ensure consistency in actions and operational responses.

- It is a key requirement that both services take a combined strategic and tactical approach to planning and resourcing their services to introduce effective Tactical Deployment Plans (TDP) for ambulance response in the Dublin City and County area. This approach is essential to ensure that response time are improved form the current level.

- There should be a realignment of ambulance resources to ensure that all resources are directly mapped against service demand. This will require further research to identify TDP footprints for resource deployment. Such a recommendation will require the input from staff representatives at an early stage.

- That the PTS workload be removed from the emergency vehicle resource base. Research has shown that for each vehicle removed

from this activity, it will result in an increase in response times of 1.4% to 1.8% per vehicle.

- That further resources be allocated to the development of Community First Responder schemes. This will improve the response time for those communities with a low population density which are not near the normal ambulance resource centres.

- That further research is carried out while these recommendations are being implemented to determine if additional ambulance units are required. This should be done in the context of the effectiveness of implementing the above recommendations and the resulting response times being achieved as a result. It must be remembered that we will be still far short of the UK average of achieving an 8 minute response time for 75% of all calls. This recommendation must be focused on achieving this aim.

Clinical

That a clinical governance group be established to oversee the quality and effectiveness of patient care from the point of call receipt to the stage where the patient is handed over to the care of another health professional. This group should be chaired by the NAS Medical Director (to be appointed) This group will include a management and medical representative from DFB and NAS.

That NAS and DFB services subscribe to full clinical accountability and that any identified risks are mitigated immediately and that all actions in the context of the Health, Safety and Welfare at Work Act, 2005 are complied with.

Chapter 9:

Implementation Plan

There are 15 main recommendations to be implemented as a result of the review. These are outlined in table 1.

The implementation of the key recommendations in the report will be complex and there will need to be a clear mechanism to be put in place to drive their implementation. This will involve the establishment of a steering group to lead the implementation process. The steering group will establish structures to implement these recommendations. This should involve all the stakeholders involved in the process.

The project leader for this programme must adopt a strong project management approach setting specific objectives, target dates and projected outcomes which are timely and deliverable.

This programme will require specific resources committed to the implementation process. It will require full commitment by the senior management teams of both the NAS and the DCC to ensure that the project objectives are achieved within time and on budget.

The process should commence within one month of the publication of the review document. The implementation process should be completed within 9 months of the commencement of the process.

The following table provides a list of the recommendations under each of the key strategic targets.

Organisation Governance
Operations, communications and training
Clinical

The table also identifies the agency responsible for taking action in respect of each recommendation, and the agency that should provide guidance where relevant, the target dates and projected costs and outcomes.

Table 1: Implementation Plan

Recommendation	Guidance By	Action By	Target dates	Projected Costs	Outcomes
1. Organisation Governance					
1.1 That a Strategic Management Board for the Communications Unit will be established to set policy and to agree strategy for the operation of the communications unit.					
1.2. That an Operational Management Group be appointed to oversee the daily operations of the centre.					
1.3. That a Partnership Working group be established to deal with the normal partnership issues around the operations of the Communications unit.					
2. Operations, Communications and Training					
2.1. That an integrated Command and Control cell comprising of staff from the DFB and the NAS be set up to receive , prioritise and dispatch all emergency, urgent and critical care patient transfers in the Dublin City and County Area.					

Recommendation	**Guidance By**	**Action By**	**Target dates**	**Projected Costs**	**Outcomes**
2.2. This Control unit will be located in one physical area, share common communications infrastructure and share software systems which will identify all incoming and outstanding ambulance calls and monitor all ambulance fleet resources on an ongoing basis.					
2.3. That the DFB will continue to do A&E work, but that this should be extended to deal with Urgent and inter-hospital critical care transfers.					
2.4. The overall ambulance fleet in Dublin City and County will be required to respond to all emergency, Urgent and Critical Care transfer work as one unit of service provision.					
2.5. That all staff engaged in the delivery of ambulance service both in the control area or on road operations to participate in joint training programmes/exercises to ensure consistency in actions and operational responses.					
2.6. It is a key requirement that both services take a combined strategic and tactical approach to planning and resourcing their services to introduce effective Tactical Deployment Plans (TDP) for ambulance response in the Dublin City and County area. This approach is					

essential to ensure that response time is improved form the current level.					
Recommendation	**Guidance By**	**Action By**	**Target dates**	**Projected Costs**	**Outcomes**
2.7. There should be a realignment of ambulance resources to ensure that all resources are directly mapped against service demand. This will require further research to identify TDP footprints for resource deployment. Such a recommendation will require the input from staff representatives at an early stage.					
2.8. That the PTS workload be removed from the emergency vehicle resource base. Research has shown that for each vehicle removed from this activity, it will result in an increase in response times of or 1.4% to 1.8% per vehicle.					
2.9. That further resources be allocated to the development of Community First Responder schemes. This will improve the response time for those communities with low population densities which are not near the normal ambulance resource centres.					
2.10.That further research is carried out while these recommendations are being implemented to determine if additional ambulance units are required . This should be done in the context of the effectiveness of implementing the above recommendations and the resulting response times being achieved as a result.					

Recommendation	**Guidance By**	**Action By**	**Target dates**	**Projected Costs**	**Outcomes**
3. Clinical					
3.1. That a clinical governance group be established to oversee the quality and effectiveness of patient care from the point of call receipt to stage where the patient is handed over to the care of another health professional. This group should be chaired by the NAS Medical Director (to be appointed) This group will include a management and medical representative from DFB and NAS.					

Appendix A

National Ambulance Service Strategy (2006) Communications and Information Technology

With the establishment of the National Ambulance Service in January 2006, a new strategy for the organisation of the ICT and Communications functions have been developed. In principle, one of the main objectives of the strategy is to develop 4 national HSE call centres to support all the communications needs of all health service providers. This will include the provision of communications supports for the ambulance services. This strategy will impact on the direction the HSE will follow in regard to the future investment in existing call centre facilities. None of the existing communications facilities will have the capacity to meet the physical, and communications infrastructure needs of these call centres.

In summary, the primary goals of the HSE ambulance service Communications and ICT strategy are:

- To ensure quality and equitable provision of ambulance services, the developments in IT, the need to review deployment models in accordance with VFM initiatives, the fourteen ambulance control centres in Ireland need to undergo rationalisation

- Effective communications between the patients and the caller; the ambulance service vehicle and crew; and the receiving hospital department or receiving treatment centre; must underpin a modern ambulance service

- The development of modern control centres will provide the platform for improved healthcare command and control policies and procedures, with potential linkages to GP out of hours services, implementation of priority based dispatch models, efficient use of land and air resources but to mention a few.

Critical to assisting pre-hospital care providers is the impact that a control centre can have on patient care. The future development of control centres must:

- Provide faster telephone answering
- Ensure that the nearest appropriate resource is deployed
- Provide rapid and accurate advice to callers(including emergency medical telephone instructions where necessary) whilst the pre-hospital provider is en-route
- By working with operational managers ensure that ambulance resources are deployed to locations where demand is likely to be high
- Provide accurate information about the location of incidents and conditions of patients

- Provide fast accurate planning of non-emergency patient journeys so that non-emergency resources convey patients when scheduled so that patients spend the minimum length of time travelling it and from appointments
- Effectively control non-emergency resources “on the day” in order that patient journeys suffer the minimum of disruption

The vision for the control centres is to provide quality driven control centre procedures, following internationally renowned best practice, introducing modern equipment and technological systems with appropriate staffing levels to deploy ambulance resources more effectively and efficiently. The control centres need to have clear functions separating emergency and non-emergency functions and investing in each

The reduction of the number of these control centres as recommended in the Mason Report (2004) should provide the platform for the development of a small number of supra regional command and control centres. These centres should be developed integrally providing the amalgamation of ambulance services and out of hours GP services, telephone advice and a number of other options to be explored. This would assist in the provision of efficient and effective primary and pre-hospital care services.

Central to ensuring efficiencies within the pre-hospital setting will be the introduction of ambulance liaison staff at each of the acute hospitals which will provide direct access for patients and hospital staff to ambulance personnel, who in turn can ensure that both groups’ needs can be met better than at present. In short, this will result in shorter more reliable journeys with less waiting times at hospitals. The introduction of this initiative coupled with the appropriate technology will help to reduce the number of cancelled appointments and unnecessary utilisation of ambulance resources.

Certain national technology currently is at, or near, the end of its useful life as supported by the Mason’s technical review (2004):

- In order to improve radio telecommunications a new infrastructure is required to support both voice and data communications Mason (2005)
- Over the years, ambulance services nationally have purchased command and control systems albeit not the same systems. (Mason 2004)

In order to implement the above, further evaluation of the Mason findings would need to be carried out and clearly defined recommendations required with the associated costs.

An IT/IS strategy needs to be developed in conjunction with ICT directorate and the appropriate funding identified and secured

It is the view of the HSE that any proposals by the review group must address these strategic objectives in order to receive support for any solutions being proposed in the report.

Appendix B

Location of Ambulance stations and resources of Dublin Fire Brigade

Station	Number of Ambulances	Patient Transport Vehicles	Other Vehicles
Blanchardstown	1	0	1 Fire Appliance
Dolphins Barn	1	0	3 Fire Appliance
Donnybrook	1	0	2 Fire Appliance
Finglas	1	0	1 Fire Appliance
Kilbarrack	1	0	1 Fire Appliance
North Strand	1	0	2 Fire Appliance
Phibsboro	1	0	1 Fire Appliance
Rathfarnham	1	0	3 Fire Appliance
Tallaght	1	0	1 Fire Appliance
Townsend Street	2	0	2 Fire Appliance 2 Paramedic Response Vehicles 2 Response Vehicles (Response and Training)
Spare Stock	2		
Total	**13**		23

Appendix C

Location of Ambulance Stations and Resources of the National Ambulance Service – Eastern Region

Ambulance Station name	A&E Vehicles	PTS Vehicles	Other Vehicles
Swords	2	2	Response car
James' Street	18	10	Two 4x4 Community vehicles
Tallaght	2	0	0
Loughlinstown	10	2	One 4x4 & response car
Maynooth	2	0	0
Naas	6	0	One 4x4 & 2 vans
Athy	5	1	0
Baltinglass	2	0	0
Wicklow	6	5	One 4x4
Arklow	2	0	0
Leopardstown	0	0	Six Motorcycles
Townsend Street	0	0	One Control Response Vehicle
Total	**55**	**20**	

Appendix D

Report from the Analytical Review of the activity of the Ambulance Services of NAS-East and DFB by ASL

Introduction

ACTIVE Solutions Europe Ltd were engaged to undertake a review of the provision of Ambulance Services Across the Dublin City and County area. The review was to examine and report upon the current joint provision of independent services as delivered by both the Eastern Region Ambulance Service (NATIONAL AMBULANCE SERVICE) and Dublin Fire Brigade (DFB). Both organisations maintain a fleet of A&E ambulances and fully trained staff operating within Dublin City and its surrounds. The scope of the review was clearly defined, requiring:

- A comprehensive quantitative assessment of the demand for service
- Calculation of the current relative levels of service provision and response standards across both organisations
- Assessment of the best use of the combined resources of both organisations to optimise the provision of service aligned to patterns of demand
- Quantification of the potential performance improvement gains achievable through a combined approach to Ambulance Service strategic planning and operational tactical deployment planning
- A performance improvement impact assessment of additions to the current Ambulance
  Service vehicle fleet

The review process was fully and ably supported by the joint chairs a Review Board comprising of senior management representatives from both the HSE and Dublin City Council and an external advisor. Throughout the life of the review process meetings were held involving key stakeholders from across both organisations, drawn from operational and control room personnel as well as union representatives.

Aim and Objectives

NATIONAL AMBULANCE SERVICE and DFB both currently deliver ambulance services to Dublin City and county, both maintaining a fleet of A&E ambulances. The NATIONAL AMBULANCE SERVICE covers emergency, urgent and PTS work, while DFB covers demand classed as emergency work only.

AIM

The aim of the review was to provide a robust, evidenced based assessment of the combined provision and performance potential of the NATIONAL AMBULANCE SERVICE and DFB Ambulance Service for Dublin and County.

OBJECTIVES

In order to achieve the aim of the review the following objectives were set:

- Conduct and report upon a data audit across both NATIONAL AMBULANCE SERVICE and DFB to assess the capacity of the individual organisations data sets to be utilised within a standard analytical and reporting methodology to deliver robust demand analysis.

- To identify and address any limitations in the incident data collected and held by each organisation and comment on its robustness and reliability for strategic and operational planning and service delivery.

- To investigate, report upon and assess the impact of patterns and trends in incident data.

- To utilise the incident data to profile spatial and temporal demand for Ambulance Services and then advise upon the best use of the combined vehicles to respond to overall demand, demonstrating potential performance improvement across NATIONAL AMBULANCE SERVICE and DFB.

- To develop a tactical deployment performance forecast and impact assessment of additional vehicles on Service Delivery Performance Standards

This report details the processes and methodology used to achieve the project aim through delivery of the objectives and delivers the findings and recommendations of the review process.

The following section of the report provides details of the methodology used to deliver the aim and objectives of the review.

Initial Instruction

Following initial engagement and agreement on the specification of the review, the starting point was to secure access to key data sets and practitioner knowledge about the specification, collection, collation, manipulation, storage and access to the incident and organisation specific information required from both NATIONAL AMBULANCE SERVICE and DFB. Primary contacts were identified within each organisation and agreement on access to both data sets and support from key staff members to undertake the review was secured.

Data Discovery

ACTIVE were supplied with a 12-month sample of emergency and urgent incident data from the NATIONAL AMBULANCE SERVICE and DFB. This data was then processed and subjected to a series of assessments and data cleaning processes within Microsoft Access to ensure maximum utility. The cleaned and standardised data sets were then imported into ACTIVE Total Solution Mapping for preliminary analysis and reporting to be undertaken.

The initial findings were presented to the Review Board on 2nd December 2005 to look at the relative distribution of demand across the services and the geographic and temporal variation in demand by type of incident.

This exercise raised questions from the Review Board about some aspects of the validity of the data; in particular the spatial reference used to position each incident, the consistency of time fields between the two data sets, and the relationship between calls and incidents records.

As a result, it was agreed that ACTIVE should conduct a data validation exercise. ACTIVE sent a team comprising of an experienced Lead Consultant and a Senior Systems Developer to visit both organisations to verify the datasets received and understand fully how data was collected and stored in the database.

Initial data verification of incident data from both services took place in Dublin in December 2005 and a detailed report was compiled which outlined the findings. (Appendix 1)

The results obtained from the Data Audit and subsequent report (Appendix 1) indicated that there was a requirement for additional data to be identified and requested from both the NATIONAL AMBULANCE SERVICE and DFB. In addition to the new data sets containing the core variables required for the demand analysis, an extract of Patient Transport Service (PTS) data was also obtained from the NATIONAL AMBULANCE SERVICE.

Upon receipt of the agreed data sets from both the NATIONAL AMBULANCE SERVICE and DBF a single, common variable, data set was defined and each data set was processed to ensure maximum utility and compliance was achieved. The single verified and validated data set was then produced with each organisations data tagged and unique incident numbers attributed to

each incident record for quality assurance and cross referencing purposes. This data set then formed the basis for the demand analysis and deployment planning.

The following section describes the data processing and reports upon both the NATIONAL AMBULANCE SERVICE and DFB's data sets submission to the review process respectively.

Data Report

It was agreed that a single complete years data would be supplied by each organisation for the purposes of the review. The data obtained and used within the analysis covered the period from the 1st October 2004 to the 30th September 2005. This represented the most up to date, common, complete and validated data period available for the review from both organisations.

National Ambulance Service Data

The data set received from the NATIONAL AMBULANCE SERVICE contained 31,703 emergency and urgent incidents for the study period, of which, 30,238 were successfully imported into ACTIVE systems. The remaining incidents fell into two classes, 1,066 incidents were classed as 'duplicate' or 'abort' calls and 398 were outside of the operational area. It was agreed that these incident records were not to be included in the analysis.

The NATIONAL AMBULANCE SERVICE provides Emergency, Urgent and also PTS cover. In discussion with the Review Board it was agreed that all workload that could occupy an emergency vehicle be included in the analysis, therefore all emergency and urgent incidents are included along with PTS journeys.

NATIONAL AMBULANCE SERVICE provided all PTS journeys for the study period, and a list of emergency vehicle call signs. ACTIVE processed the PTS data and extracted only those records that used an emergency vehicle. This equated to 9,866 journeys, 818 of these incidents had missing 'estimated pickup' time fields, which meant they could not be included in the base analysis. None of the 818 records were classed as "unplanned". However, it may be that some of these planned PTS journeys required an acute care vehicle due to the patient's medical needs.

In addition to the core incident data set required for the review, all existing locations of Ambulance Stations were supplied to ACTIVE for use within the demand analysis and deployment-planning component of the review.

Dublin Fire Brigade Ambulance Service Data

The data set received from DFB contained 70,757 ambulance incidents that were carried out by Dublin Fire Brigade during the study period. The DFB

data audit had highlighted a significant number of Pump deployments to Ambulance Service calls. In order to explore this further, quantify and report upon the level of this occurrence DFB provided ACTIVE with a list of vehicle call signs for its ambulances. This meant that just call signs that used an ambulance could be subset from the database and Pump deployments identified as a subset of the data. This resulted in a total of 10,967 completed pump responses to an Ambulance Service call. FIG 1 shows how these incidents breakdown in terms of attendance in relation to ambulance vehicle dispatch.

Number of incidents where a pump arrived after a DFB ambulance	4,138
Number of incidents where a pump arrived before a DFB ambulance	5,012
Number of incidents attended by a pump and no DFB ambulance	1,817

FIG 1. Calls that had a fire pump dispatched

Enquiries made with DFB operational staff confirmed that the majority of the 1,817 incidents reported as attended by a pump only, would have been be in support of a NATIONAL AMBULANCE SERVICE vehicle.

Attempts were made to verify and quantify the operational staff's statements, through establishing a link between the NATIONAL AMBULANCE SERVICE and DFB incident data sets, however due to variations in the geo-coding methodologies across the services and both services using their own independent incident numbering system, no robust method was available to link the two incident data sets.

This issue also means that there is the potential for duplication of incidents across the two services data sets.

ACTIVE were able to secure the successful import of 70,604 out of 70,757 incidents into ACTIVE systems. 153 incidents that could not be imported had no geographic reference or the location was outside of the operational area.

In addition to the core incident data set required for the review, all existing locations of DFB Stations were supplied to ACTIVE for use within the demand analysis and deployment-planning component of the review.

Combined Incident Master Data Set

The outputs from the data cleansing and processing, in the form of two discrete but now compatible and verified data sets, one from each of the two services were then used to derive a common master data set for use within the Review analysis.

A total of 109,890 incidents were successfully linked and included in a single database, and provided a robust master data set for demand analysis and deployment planning. This provided a comprehensive, consistent and unified data set reporting upon overall demand for the Ambulance Service across Dublin and Districts that could occupy an emergency vehicle.

Although much valuable incident data is captured across both organisations the core requirements for a standardised, unified incident data set for the review was specified from common fields available across all of the various data sources. The minimum key variables required for Tactical Deployment Planning (TDP) are:

Incident No
Date of Call
Time of Call (Estimated time of pickup for PTS)
Grid Reference
Type of Call (E, U, PTS)

These core variables enable analysis of demand for service both geographically and temporally, which can then be used to calculate prioritised lists of ambulance dispatch locations for each hour of the week (TDP).

NOTE: In consultation with the Review Board the assumption was made that DFB incidents are classified and to be treated as 'E' calls within the analysis.

'Clear to Clear' Time Analysis

The Tactical Deployment Planning (TDP) component of the review process requires the use of an averaged 'clear to clear time', clear to clear time is defined as the period between the time the vehicle is mobilised and the time the vehicle is clear and available again. The accepted clear to clear standard for Ambulance services around the world is an average of 60 minutes. An analysis was undertaken to calculate the average time it takes both NATIONAL AMBULANCE SERVICE and DFB to complete a job (clear to clear time).

The data analysis reported the following average times for NATIONAL AMBULANCE SERVICE and DFB:

NATIONAL AMBULANCE SERVICE

all incidents average = 63mins
(E incidents average = 55mins)
(U incidents average = 78mins)

DFB all incidents average = 34mins

From the results of the clear to clear time analysis it can be seen that that there is a significant variation between the NATIONAL AMBULANCE

SERVICE and DFB average times. Although not verified this is likely to be a function of the density of population and relatively smaller travel distances both to and incident and between an incident and hospital.

For the purposes of the combined service provision and performance analysis an average clear to clear time of 60 minutes has been assumed. For the service provided by DFB the performance calculations made will be conservative, because in reality vehicles have the capacity to complete more than the average 1 call per hour assumed.

Summary

Access to, manipulation and successful collation of the two services data sets to form a single robust master data set that was fit for the purpose of this study was achieved. This was the first important step enabling a meaningful assessment of the overall demand for Ambulance services to be produced and the relative provision of service across both organisations to be quantified and examined both spatially and temporally.

It is important to state that there are significant data related issues that complicate the analysis of the combined service data:

- The lack of a common unique identifier for each incident across both services means that there is an un-quantified potential for duplication of records across the combined services data sets.
- Life threatening calls cannot be subset because CBD or MPDS is not used. Within the NATIONAL AMBULANCE SERVICE data set all 'E' classification calls have been assumed to be life threatening calls, and all DFB calls have been assumed to be life threatening. This will artificially inflate the number of potentially life threatening calls, and have a detrimental effect upon the performance forecasts produced using this data.
- Access to data on the actual number of vehicles that were available in each hour would improve the accuracy of the abstraction factor used within the TDP to be undertaken, and therefore improve the TDP model accuracy. The abstraction rate of 34% has been assumed within this review, as this is the standard across UK ambulance services.

The following section reports upon the methodology and results of the Demand Analysis undertaken

Demand Analysis

Following the completion of the data verification in December 2005, a meeting was setup including senior management, operational staff and unions at which the individual and combined services incident data was made available for examination and querying within the ACTIVE Total Solution Mapping (TSM) software package. The purpose of this demonstration session was to subject the data sets to the scrutiny of practitioners ensuring that the data and methods used were robust enough for further use within the review process.

Introduction to ACTIVE Total Solution Mapping

TSM is predicated on connecting data sets using geographic reference, especially where data are otherwise impossible to inter-relate. It provides a fast, accurate and flexible spatial and temporal analysis environment in which to explore the patterns of demand, design the optimum locations from which to respond and determine the work load for each response origin at different times of the day and days of the week. For the purposes of this review TSM has been configured using Ordnance Survey Ireland data provided by Spatial Planning Solutions. For the purposes of generating travel time boundaries the road network available was considered fit for purpose, accepting the limitations of the current OSI product offer. There can be no doubt that a map data set that is more up to date and complete would provide a more accurate and consistent basis for the analysis to be undertaken. Since this project has been competed a new nationally comprehensive and up to date road network and classification has been released by Navteq and will form the basis of all future Ireland based mapping and analysis projects.

Incidents are plotted using the Irish Grid, which means incidents can be plotted up to a precision of 1 metre accuracy, although this will depend on the accuracy and precision of the gazetteer being used in both organisations.

TSM contains a module called JourneyMan, a sophisticated travel time boundary generator. This allows the creation of a boundary to describe the potential travel time from any given point, using road speeds and congestion rules. Congestion rules have been created which work inside the M50 motorway and decrease road speeds further as we move towards the City Centre. These boundaries are used to further analyse incident data, and will report on coverage of demand within, for example, an eight minute travel time of a proposed or existing response origin (station or standby point). ACTIVE TSM can easily export data, and prioritised lists of stations and response origins based on demand can be created.

Significantly, alternative deployment options can be safely modelled and remodelled in TSM, and potential improvements in performance can be forecast (subject to the constraints inherent in the data being analysed) before any risks are taken in the implementation of change.

Findings of Demand Analysis

The combined data from NATIONAL AMBULANCE SERVICE and DFB was examined with the Review Board in January 2006.

Demand analysis was undertaken identifying the spatial and temporal distribution of incidents and also the relative spatial distribution of service provision by both organisations was measured and is reported upon here. As expected the majority of incidents responded to by DFB are located within Dublin City (65%). NATIONAL AMBULANCE SERVICE workload is distributed 77% outside of Dublin City and 23% within Dublin City.

By plotting the incidents on a map, represented by proportional circles sizes by number of incidents recorded at the same location, 1210 NATIONAL AMBULANCE SERVICE incidents were identified as being located in exactly the same location in Bray. Cross referencing the incident codes with the individual incident attribute data it was clear that the incidents were being coded with a default location by the CAD system if no geographic code was supplied. FIG 2 shows the clustering of the incidents, and the larger red dot shows incidents with the same geographic reference.

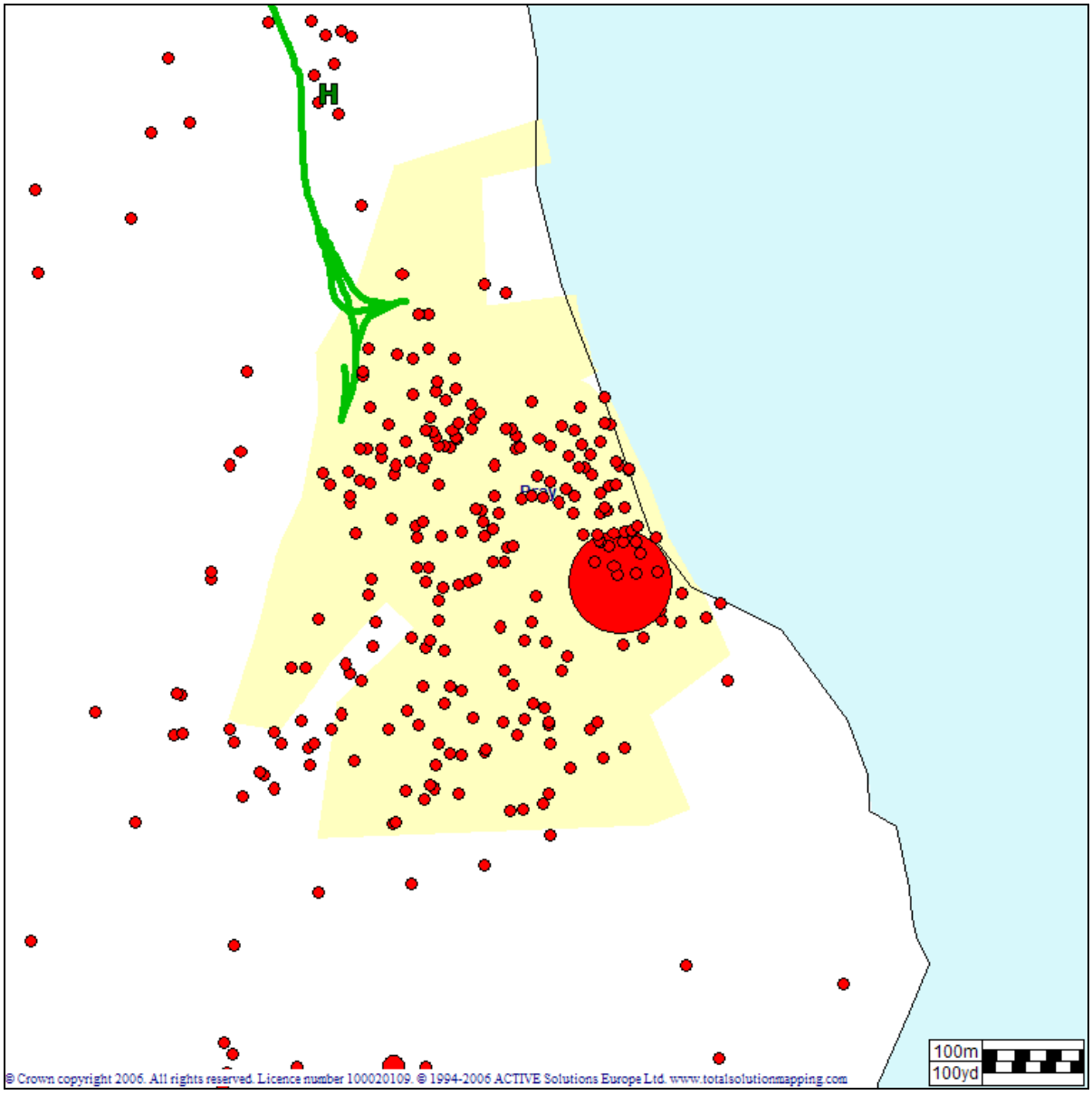


FIG 2. Large cluster of incidents at same location in Bray

The large cluster of incidents, in Bray, was excluded from the analysis, as they could not be accurately located for the purposes of the review. This represented a relatively small proportion of total demand for services and examination of the data showed that there was no significant spatial clustering of the incidents and therefore was unlikely to have a significant impact upon the further analysis to be conducted.

The scrutiny process undertaken by the review board identified errors in the locations of several stations provided to ACTIVE. The board undertook to obtain a verified set of station location data for use within the review, which was subsequently provided in February 2006 and imported into the ACTIVE TSM system.

Spatial clustering of incidents was also identified when examining the distribution of the NATIONAL AMBULANCE SERVICE data. The data set

showed this to be the result of variations in the location precision supplied within the gazetteer used to generate the geo-codes from the address data. The gazetteer snaps to a 1km centroid in certain areas. FIG 3 shows this effect. Larger dots show clusters of incidents in exactly the same location.

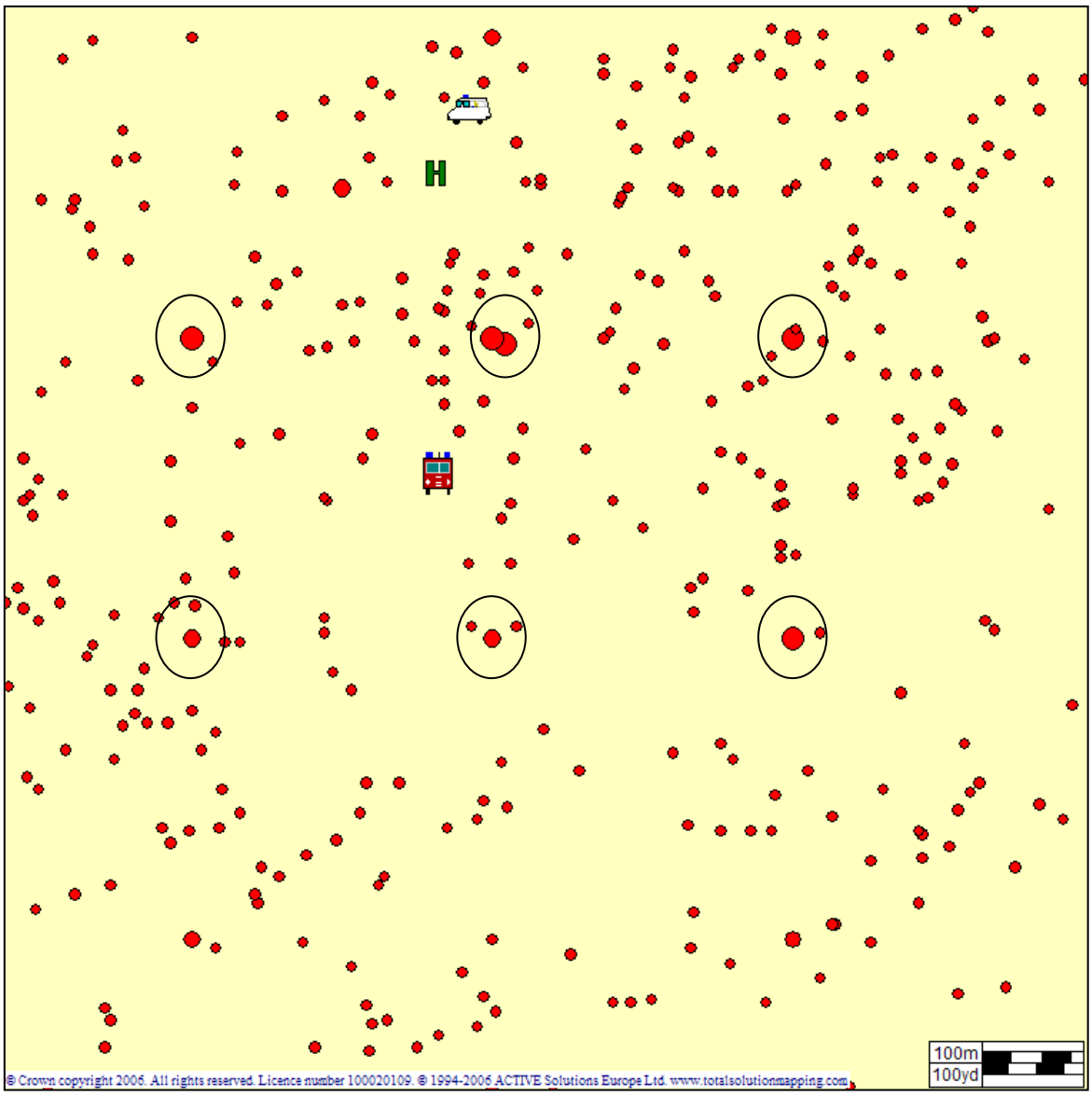


FIG 3. 1km grid effect of incidents in Dublin

The observed clustering of incidents to 1KM grid points in some areas is not crucial for the purposes of the analysis to be undertaken for this review, however consideration should be given to the updating and improving the gazetteer and geo-coding tools to enable increased accuracy and precision to be achieved, enabling more sophisticated further analysis to be undertaken.

Comprehensive analysis of demand by hour of day and day of week show peaks in morning and afternoon rush hours, and significant troughs at night. The highest level of demand is observed in the week is the early hours of Sunday morning in Dublin City centre.

The results of the spatial and temporal analysis presented to the review board and subjected to the scrutiny of the board, were proven to be robust and valid. The findings confirmed the generally accepted perception of the relative distribution of demand for service across both organisations, providing additional detail through an agreed methodology. The results of the initial data audit, validation exercise, collation and analysis were signed off by the Review Board as fit for the next stage of the review, the Tactical Deployment Planning (TDP).

TDP - Steps in Creation

It is accepted that performance in terms of responsiveness, utilisation and patient outcomes can all be improved by a more dynamic approach to the deployment of available resources relevant to the spatial and temporal patterns of demand. Tactical Deployment Planning (TDP) is a widely used technique in high performance ambulance services and attempts to ensure that sufficient resources are placed in the busiest locations at the right time as demand dictates. A TDP will be created for a combined service to show where and when resources should be deployed and also to forecast what potential performance improvement might be achieved for response to emergency incidents.

Plans are displayed in the ACTIVE TDP Viewer, and run in time with the clock on the computer. As the user moves through the day, the plan changes to reflect the priorities in the particular hour. Dispatchers also have the ability to scroll through the hours to plan for meal breaks, vehicle movements and shift changes.

TDP Viewer allows the dispatcher to allocate vehicles to each response origin and visualise the current coverage on a map. The map works with a simple traffic light system to show whether a post is staffed, a vehicle is on route to post, or an area is not covered at all.

The dispatcher uses the prioritised lists and visualisation of geographic cover as a guide, along with their professional judgement, to place vehicles in the places most likely to have a call at any particular time of the day. This means that vehicles are more likely to be closer to the location of the next call, so that a vehicle can get to the incident quicker and be clear of that incident ready for another in a shorter overall time period.

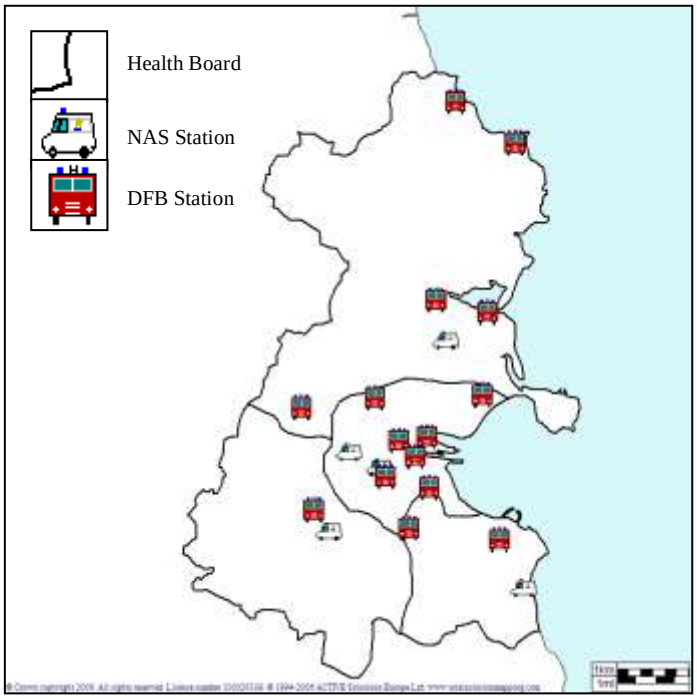
A TDP for the combined services will advise upon the best use of the combined vehicles to respond to overall demand, and also forecast the performance potential of the combined resources NATIONAL AMBULANCE SERVICE and DFB.

Identification of optimised vehicle positions in comparison with existing stations

Using ACTIVE TSM loaded with the combined incident data, hotspot maps of demand for service were generated. E, U and PTS calls between 01/10/2004 and 30/09/2005 are separately analysed, and counted firstly into 3km grid squares, from where the 500m concentration of demand within each “hot” 3km grid square can be found. Once the 500m hotspots are identified, a suitable point on the road network, on which to stand by, can be selected within the immediate vicinity, usually a primary route or crossroads to maximise response potential. This methodology identifies Response Origins across the operational area.

When identifying potential Response Origins it is important to compare with existing station locations, to minimise potential change where possible. FIG 4 shows DFB stations (fire engine symbols) and NATIONAL AMBULANCE SERVICE stations (ambulance symbols). FIG 5 shows the locations of existing stations and recommended demand based Response Origins. 3km grid squares are coloured from blue to red to show the density of incidents.

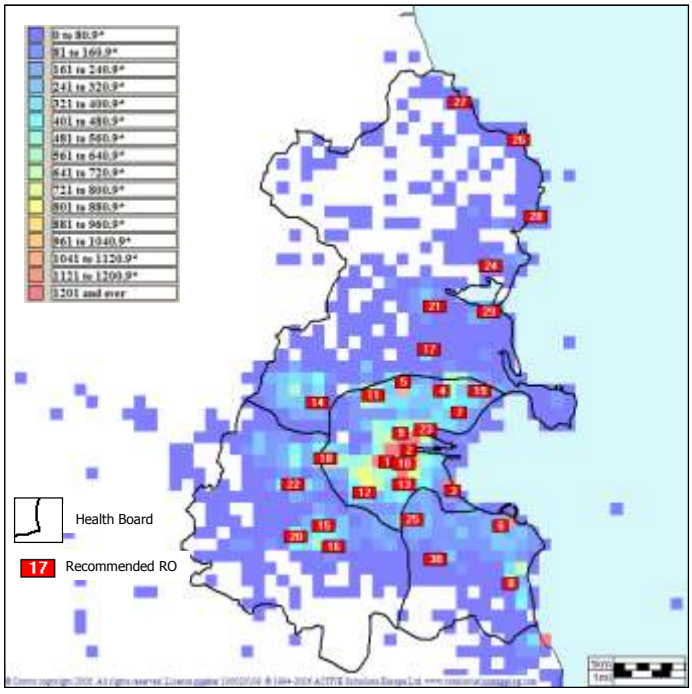
Existing DFB and NATIONAL AMBULANCE SERVICE Stations



DFB currently has 15 fixed locations from which its ambulances could be deployed. Currently there are 11 Ambulance vehicles deployed from ten fire stations.

NATIONAL AMBULANCE SERVICE currently has 5 fixed locations from which its ambulances could be deployed.

FIG 4. Existing AMBULANCE SERVICE and DFB stations



Recommended Response Origins and Incidents Counted in 1km Grid SquaresDemand analysis revealed 30 possible locations, which are hotspots of demand that could warrant an emergency vehicle at certain times of the week. 14 of these 30 are less than 1 km away from an existing NATIONAL AMBULANCE SERVICE or DFB site and should be covered from the existing locations.

FIG 5. Recommended response origins and 1km grids coloured by number of incidents

Response Footprint Formation

Response Footprints are geographic areas that describe a part of the operational area that a Response Origin is likely to respond to. These are edge-matched boundaries to ensure complete coverage of the operational area and are drawn based on travel time boundaries but also take into account geographic features such as major roads, railroads, rivers and lakes. It is usual for these footprints to be verified by operational staff as to their operational reality. This verification process is especially desirable where the road network being used is not complete. The Response Footprints should be subjected to such a verification process before they are finally relied upon as a logical deployment division of the operational area.

Once verified, the Response Footprints ensure that every call gets counted once only in the prioritisation calculation. These boundaries allow each Response Origin to be prioritised by demand, counting incidents into its Response Footprint. FIG 6 shows the Response Origins and Footprints generated.

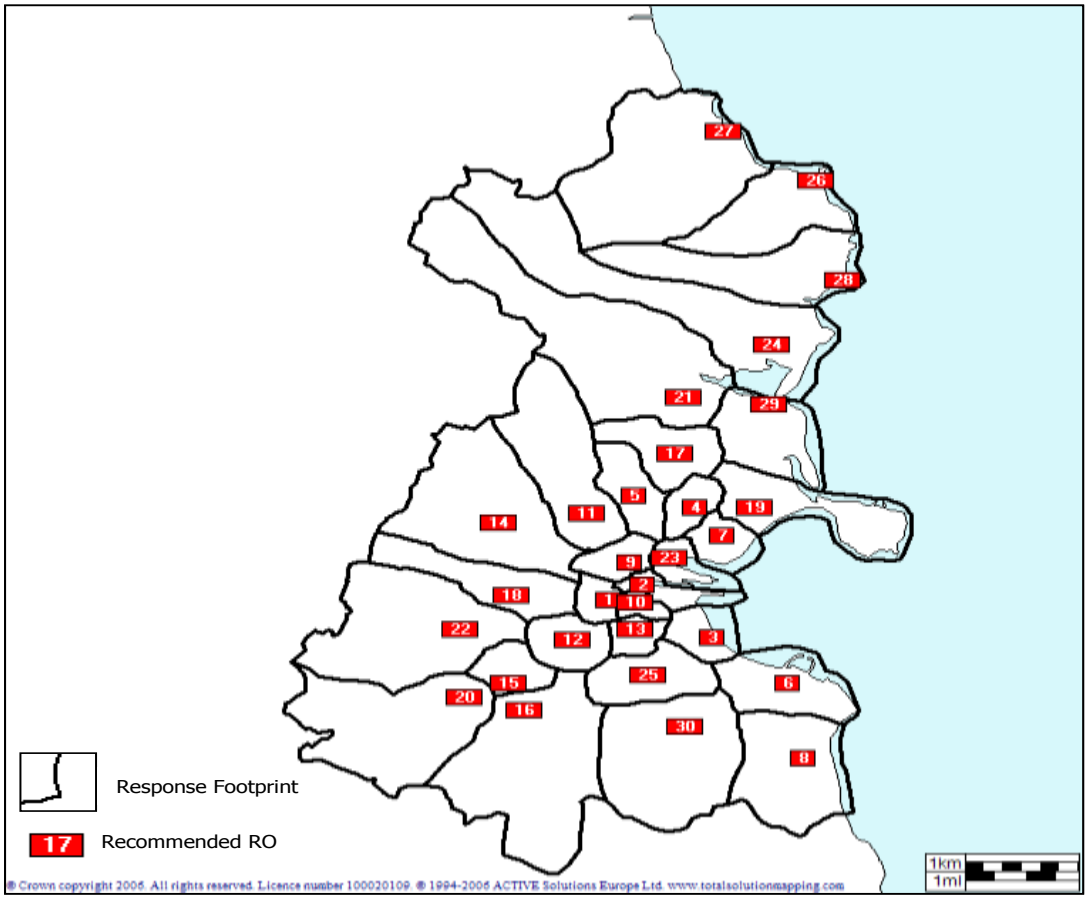


FIG 6. Recommended Response Origins and Response Footprints

Tactical Deployment Plan

The deployment plan contains prioritised lists of Response Origins based on the amount of demand for each hour of the week. Each vehicle is allocated to a Response Origin based upon the demand in its Response Footprint. This means some Response Origins may have two or three resources, if warranted, in some hours, and many Origins will not be allocated vehicles hour after hour until the predicted pattern of demand warrants it. This provides a prioritised list of Response Origins for dispatchers to use as a guide, to position ambulances where the next call is likely to originate, which means that response times can be reduced.

100% compliance with the plan is not to be expected. This would mean that all resources are in the right place at the right time, all waiting for the next incident. In practice, as the resources are better allocated to the areas of greatest demand, their utilisation rises and they rarely are waiting for a call. The plan needs to be used by dispatchers with some working knowledge of the geography of the operational area to ensure that post to post movements are prudently instructed.

FIG 7, below, shows a sample plan for Friday 11:00am – 11:59am. Each location is listed in priority order based on the demand in this hour. Each Response Origin is numbered and the letter prefix after the number indicates first (A), second (B) or third (C) vehicles. If the dispatcher can cover the highest priority posts, responsiveness is likely to improve because the vehicles will be close to where the next incident will take place. Yellow cells show how many vehicles should be available in this hour and groups of blue or red Response Origins signify posts of equal priority. The map in the bottom left corner shows the current coverage of vehicles and the table above shows the location and status of each vehicle.

The TDP is a methodology employed in high performance ambulance services across the world, which aims to put vehicles in the right place at the

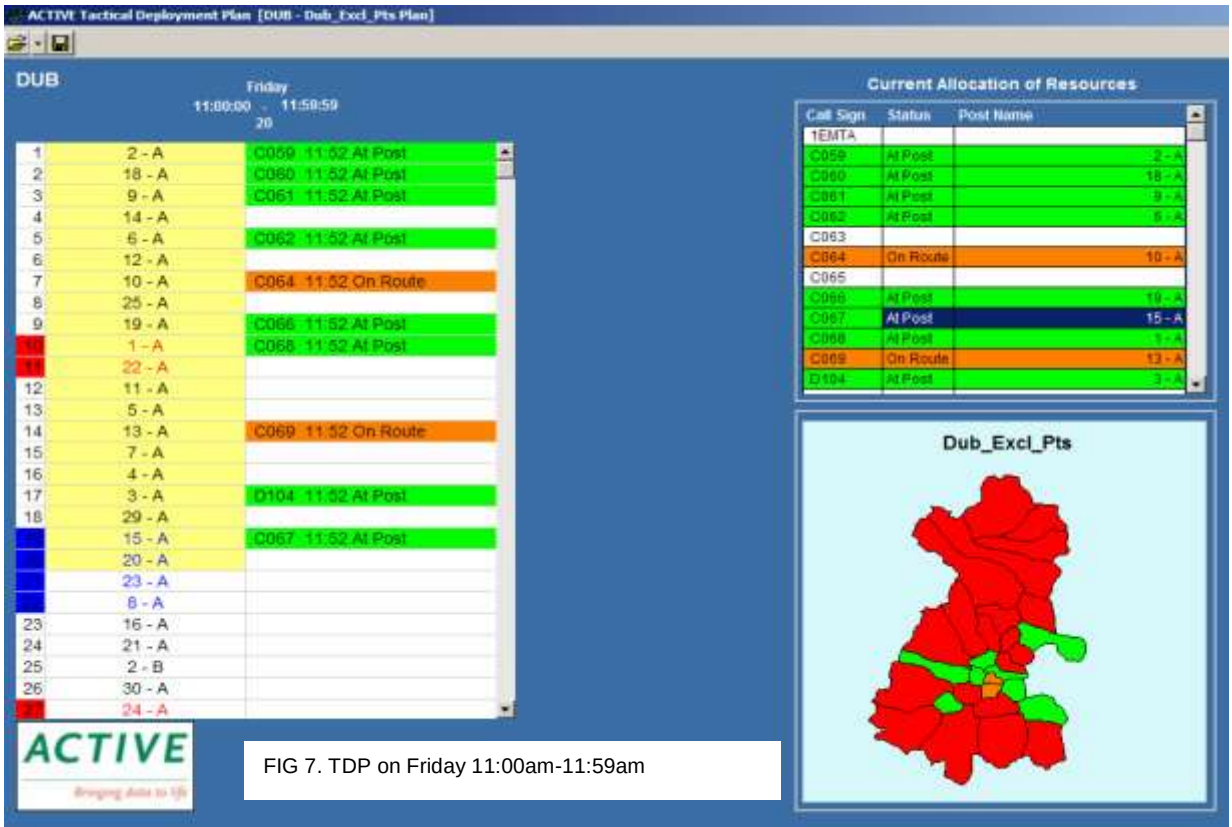


FIG 7. TDP on Friday 11:00am-11:59am

right time based on historic demand analysis. This means that response times will be shorter, and as a result patient outcomes should improve.

The TDP produced, identifies prioritised deployment locations based upon the demand analysis conducted, approximately half are existing stations and the rest are new locations based upon concentrations of demand. 30 locations have been identified, as this is the maximum number of vehicles ever available from the combined NATIONAL AMBULANCE SERVICE and DFB fleet. At times when less than 30 vehicles are available, dispatchers should aim to direct vehicles to the top priority posts. Additional resource availability may be accommodated within the existing plan or may be more effective deployed from a new standby point.

The following section of the report deals with the PTS workload and its impact upon emergency response resource availability.

Impact of PTS Workload

This section aims to give an insight into the impact of using emergency resources for patient transport work. Using the PTS dataset, queries were defined to analyse all PTS journeys that used an A&E vehicle.

FIG 8, below, shows for each operational response footprint, how many PTS calls on average occur in each day and hour of the week. Amber cells indicate on average there is one PTS call in particular hour of the week in the response footprint. Orange cells indicate two PTS calls and red cells indicate between three and four PTS calls.

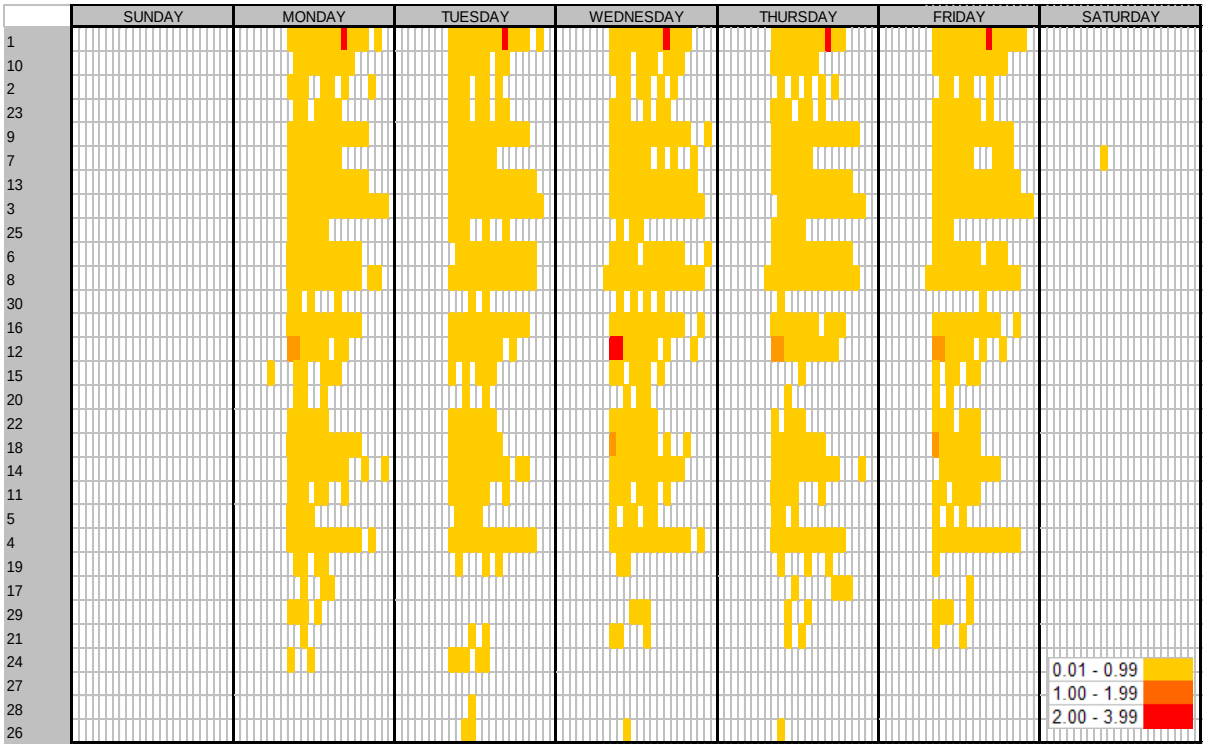


FIG 8. Geographical and temporal spread of PTS workload

The analysis shows that Response Origin 1 and 12 have relatively higher PTS demand throughout the week. In some hours up to four PTS calls are been carried out in Response Origin 1, which reduces the availability of emergency response vehicles and crews impacting upon service provision and performance.

Approximately 50% of all PTS journeys start from hospital as is expected, and FIG 9 shows the distribution of PTS pickups in 1km grid squares, and the location of hospitals. This clearly shows the hospital locations as the hotspots of PTS demand.

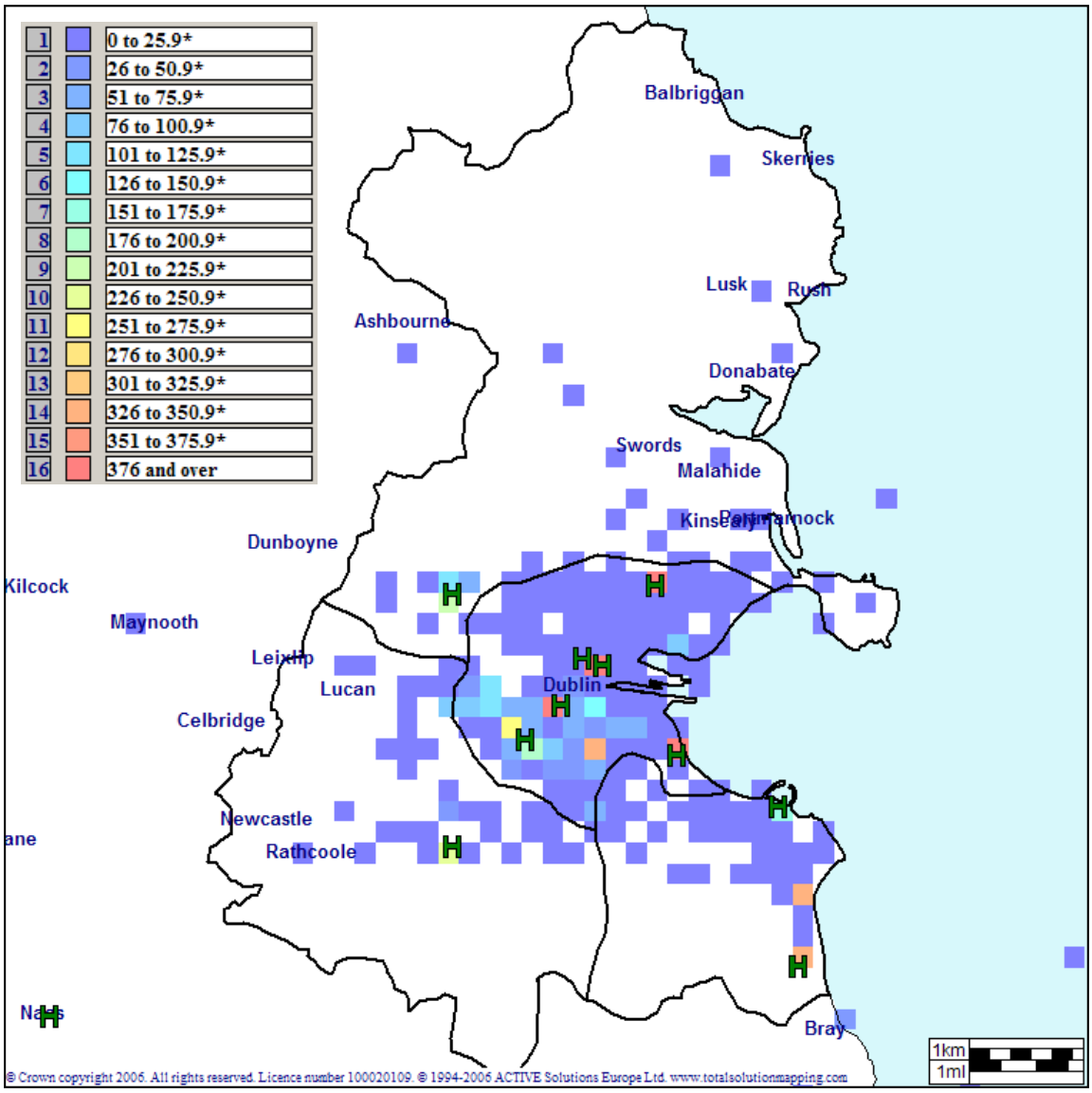


FIG 9. Hospital locations and PTS demand counted into 1km grids

FIG 10 shows the location of these response origins, Response Origin 1 (City Centre) and response origin 2 (City SW).

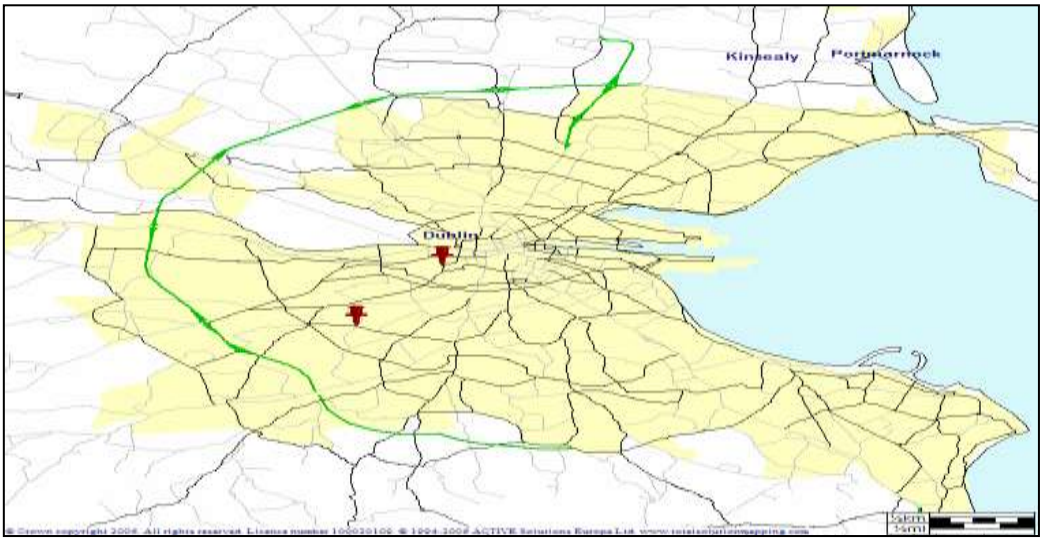


FIG.10 Locations with high PTS demand

The use of emergency response vehicles for PTS journeys can have a significant impact upon performance of an ambulance service. The combined master data set enables this impact to be analysed and quantified across the whole area and this can be modelled within the TDP. For the purposes of the review two scenarios were modelled, the details and result are provided in the following sections of the report

Tactical Deployment Plan Impact Analysis

The demand based analysis can be modelled to represent changes in the resource availability and / or utilisation across the services. This enables the testing of the potential impact upon service provision and performance to be assessed prior to decisions being made and implemented, informing the decision making process and helping to avoid risk. For the purposes of the review TDPs have been created for two different scenarios and a performance forecast has been calculated for each.

Scenario 1 – Using the TDP and an abstraction factor to allow for vehicles off road,
sickness etc.

In this scenario the data model assumes that the ambulance service continues to work as it is now but is managed using the TDP. Numbers of resources available to cope with emergency incidents is reduced because at certain times of the day they are tasked with doing PTS journeys. An abstraction factor of 34% is modelled into the plan, to allow for vehicles off road, sickness etc. in line with standard practice.

Scenario 2 – Using the TDP and an abstraction factor to allow for vehicles off road, sickness etc. Vehicles available have been reduced where they will be needed for PTS work.

In this scenario the data model assumes that no PTS is delivered by emergency vehicles, unless the clinical needs of the patient dictate an acute care transportation. An abstraction factor of 34% is modelled into the plan, to allow for vehicles off road, sickness etc. in line with standard practice.

TDP Performance Assessments

In the absence of any guidance as to current or future performance standards for DFB or NATIONAL AMBULANCE SERVICE, we have used the current UK standards as a parallel against which we can report within this review process. Currently the UK is tasked with getting to 75% or more of all Category A (life threatening) emergency calls within 8 minutes. To achieve this standard, ambulance services need a clear and consistently applied classification system that identifies what is and what is not a life threatening call and they need to be consistent in the calculation of start time for an incident as even minor variation can have significant impacts upon the performance standards achieved. For the purposes of the review process the

master data sets has been used and every effort has been made to ensure that the data set conforms to the standards required for a robust analysis to be undertaken.

For each scenario the predicted potential performance improvement has been calculated. This is based on the number of resource available for each hour throughout the week, the Response Origins that would be covered in the TDP based upon a ranked demand prioritisation, and the number of calls covered within eight minutes of each of those Response Origins.

It should be noted that in the absence of MPDS codes or CBD codes, AS1 or "E" incidents are assumed to be life threatening. This assumption is likely to overstate the total life threatening demand for service and the reported performance forecasts are likely to be higher if life threatening incidents could be identified and extracted from the data for use in subsequent TDP models.

The current performance of the combined fleet has been calculated as a baseline for assessment of the TDP improvement potential. The calculated performance over the years data used within the review reports a combined service figure of between 23 –27% reached within the Category A response standard of 8 minutes.

Implementation of the scenario 1TDP shows that there is a significant potential improvement gain of between 12 and 18%, whilst the removal of the PTS workload in conjunction with the implementation of the TDP delivers a further 2 –4% performance improvement potential.

% Performance 8 min 'E' Calls		
Current	Scenario 1	Scenario 2
23-27%	+12-18% pt	+2-4% pt

Summary

- Implementing the TDP provides a potential performance improvement to emergency demand cover of 12-18% points.
- If an intermediate care fleet was introduced to take care of all PTS workload, a further 2-4% point increase in the number of emergency calls responded to in 8 minutes or less can be expected.
- Improving fleet management and human resources management, which would reduce the abstraction factor could further improve performance.

Impact of Additional Vehicles

For each scenario we have calculated the predicted impact upon performance of the addition of resources. This is based on which posts would be covered in the TDP and the number of calls covered within 8 minutes from each. We have then assumed the next highest priority post is covered, as measured by demand, by the new vehicle. A single additional vehicle is used for the example, achieving the greatest potential improvement in performance; additional vehicles would then be being allocated to the next highest level of demand post within the area.

Adding one vehicle to scenario 1 or 2 would give 1.4-1.8% increase in performance. In scenario 2 the vehicle could be either an ambulance or an intermediate care vehicle which would free up an A&E ambulance for emergency work.

The impact of further additional vehicles would be relative to the level of demand as you move down the priorities lists of posts each having less calls to cover.

Additional Impact of 1 Vehicle (A&E or ICV)		
Current	Scenario 1	Scenario 2
0.00%	1.4-1.8%	1.4-1.8%

Resource Assessment

Resource Numbers

FIG 11 and 12 show the numbers of emergency vehicles made available by each service by day and hour. We know that DFB has a consistent number at all times, whilst the NATIONAL AMBULANCE SERVICE has an increase in resources during the day.

Ambulance Service Vehicles

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sunday	6	6	6	6	6	6	6	6	7	7	8	8	8	8	8	8	7	7	7	7	7	7	7	7
Monday	5	5	5	5	5	5	5	5	16	16	19	19	19	19	19	19	14	14	7	7	7	7	7	7
Tuesday	5	5	5	5	5	5	5	5	15	15	18	18	18	18	18	18	15	15	8	8	8	8	8	8
Wednesday	5	5	5	5	5	5	5	5	16	16	19	19	19	19	19	19	14	14	7	7	7	7	7	7
Thursday	5	5	5	5	5	5	5	5	16	16	19	19	19	19	19	19	15	15	8	8	8	8	8	8
Friday	5	5	5	5	5	5	5	5	16	16	19	19	19	19	19	19	15	15	8	8	8	8	8	8
Saturday	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

Fire Service Vehicles

FIG 11. NATIONAL AMBULANCE SERVICE scheduled A&E vehicles

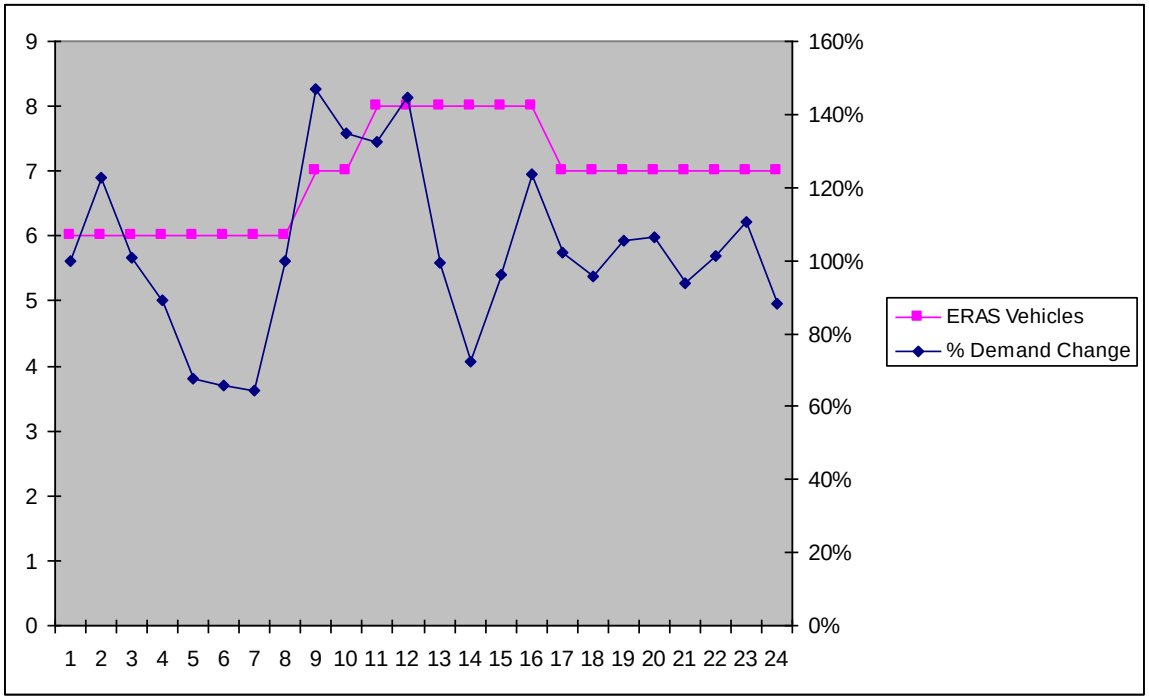
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sunday	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Monday	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Tuesday	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Wednesday	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Thursday	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Friday	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Saturday	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11

FIG 12. DFB scheduled A&E vehicles

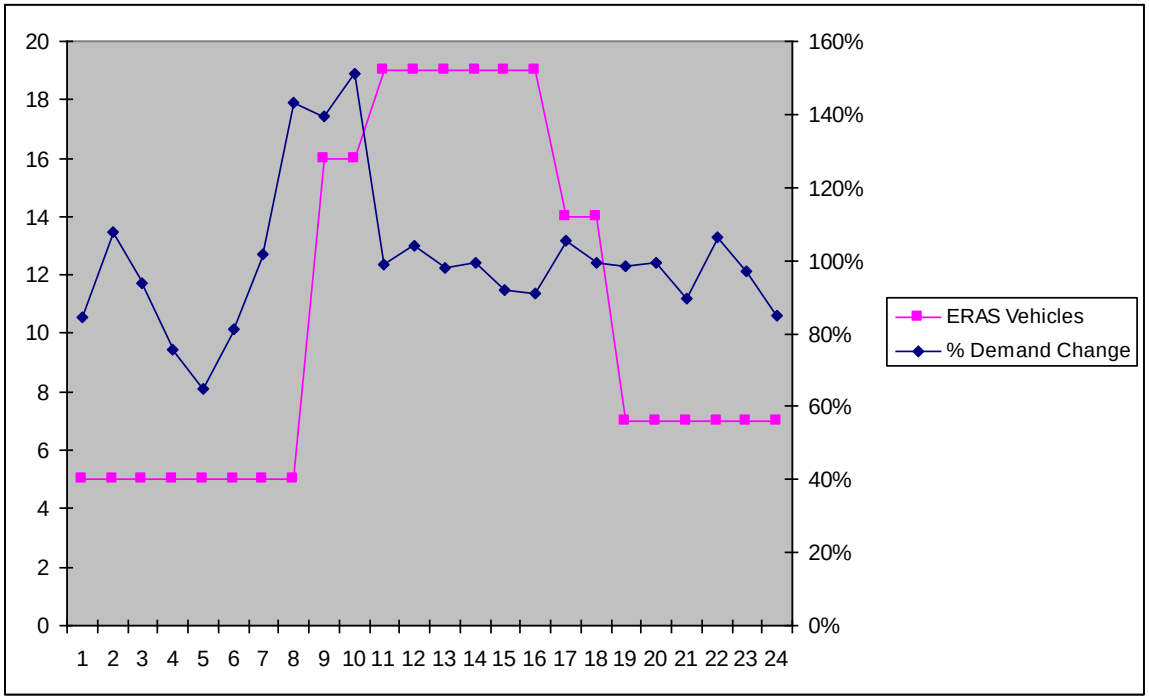
These figures were verified by the Review Board. The minimum number of resources in any one hour is 16 and the maximum is 30. It is this maximum number of available resource that dictates the number of response origins that have been planned within the Tactical Deployment Plan process reported above.

The following series of graphs show how workload changes throughout the day, and compares this with the percentage of resource change within the NATIONAL AMBULANCE SERVICE.

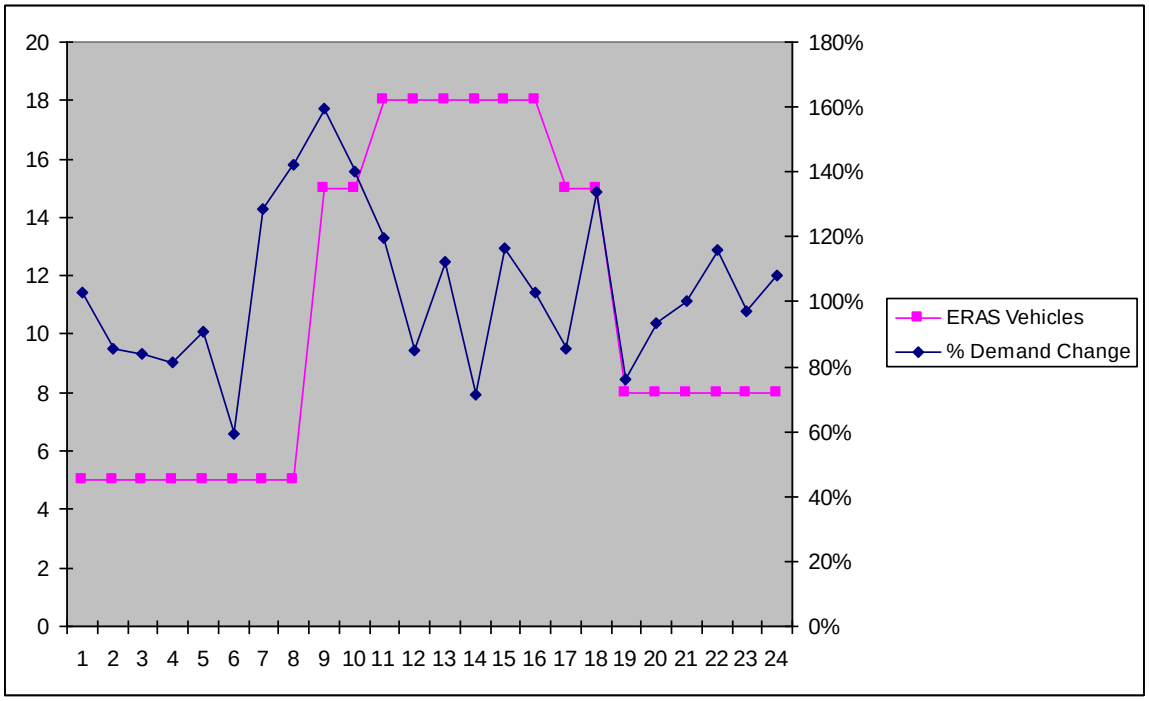
Sunday



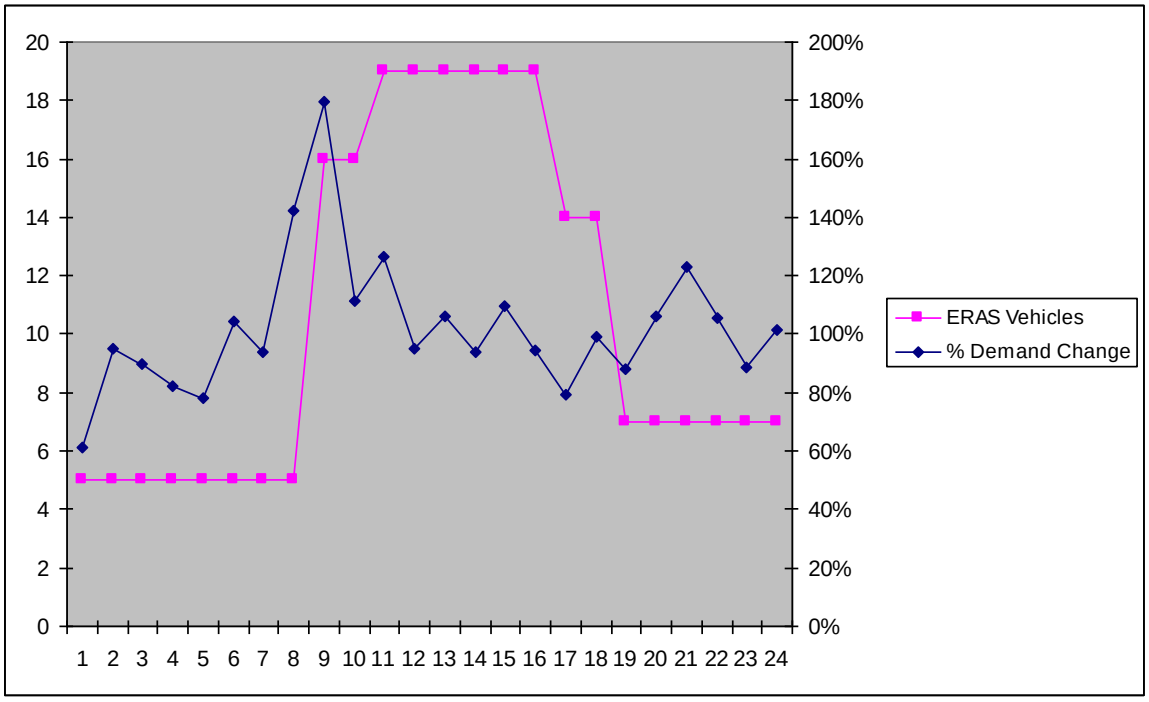
Monday



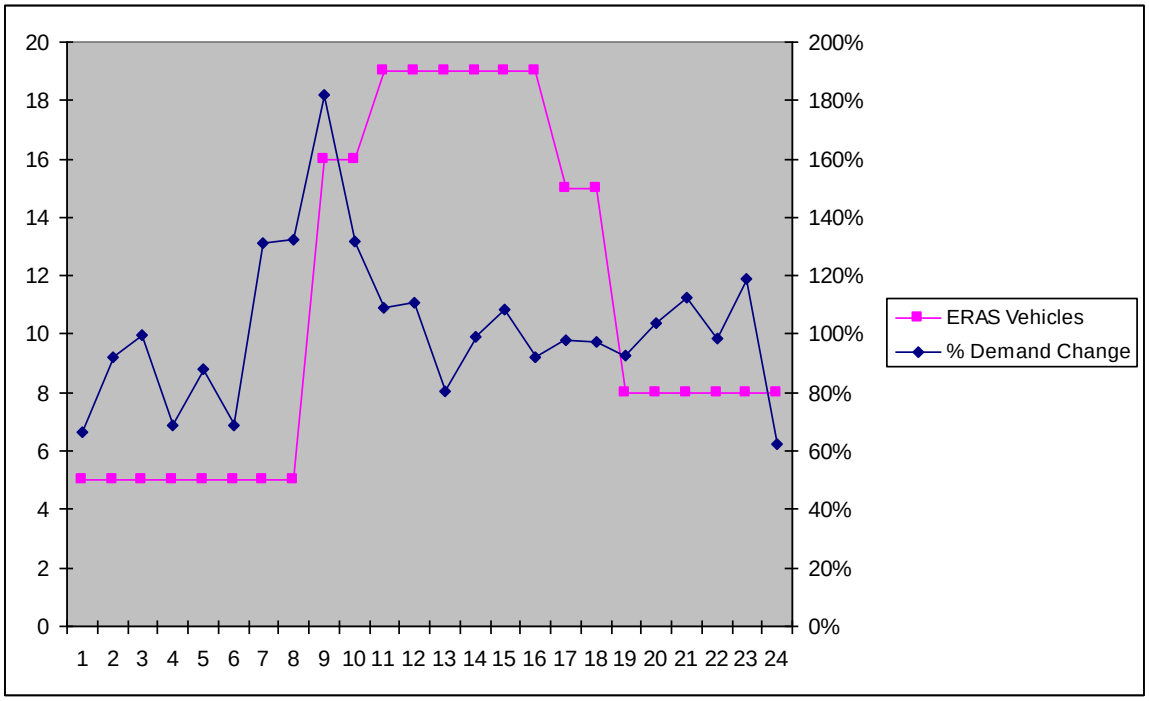
Tuesday



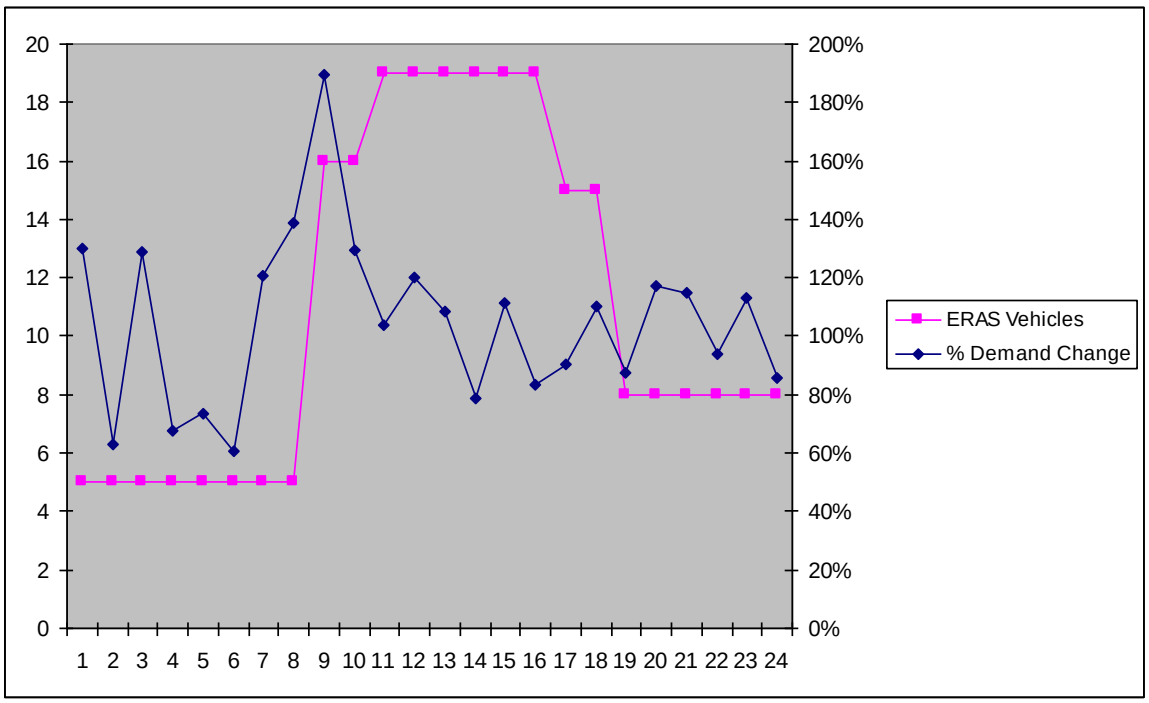
Wednesday



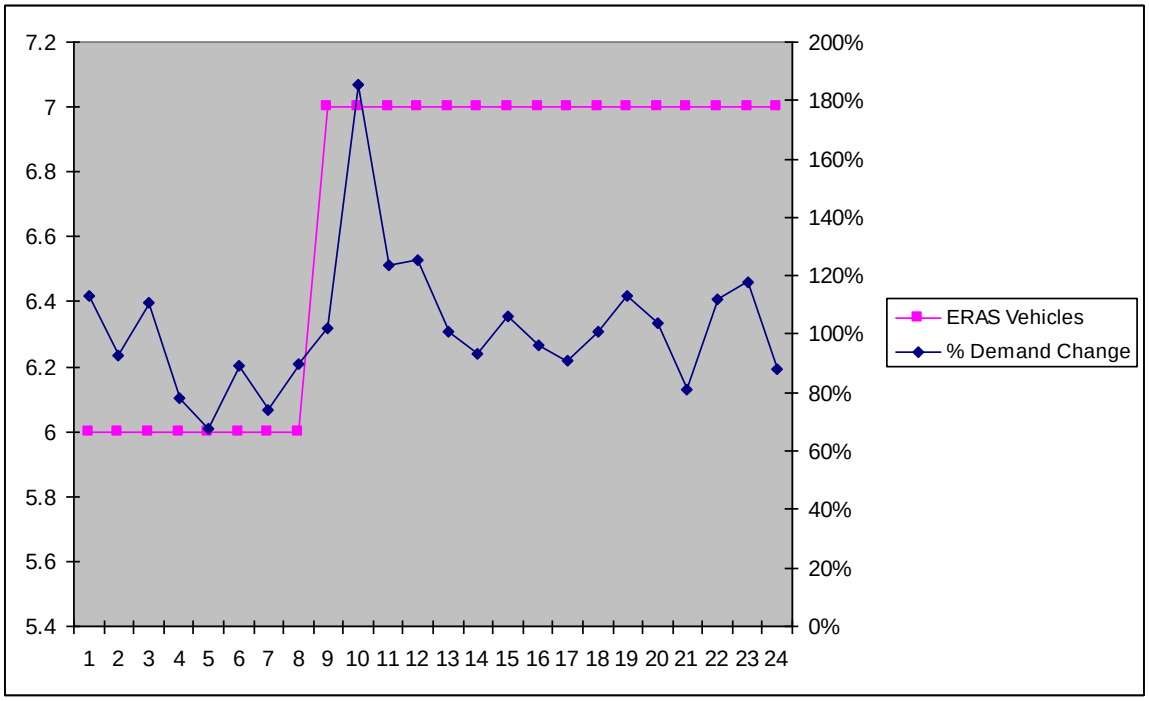
Thursday



Friday



Saturday



The graphs show the relative time periods in which resource builds up in relation to variation in demand. This reports on whether shift patterns follow demand peaks, or not.

On Sundays, it would seem that resources are not building up quickly enough, lagging by 1-2 hours but thereafter the level appears to be reasonably well aligned with the profile of change in demand. This is consistent each day. Resources coming off shift at the end of the day do so at the right time, there is a peak in demand between 20:00 and 22:00 each day but no increase in resource. On Saturday from 7am there are 7 vehicles available through until midnight. There is potentially a window for resources to be decreased early evening prior to the very busy hours of Saturday night/Sunday morning.

Shift and rota optimisation can be undertaken to better align resource utilization with observed variation in demand. To formulate recommendations on the optimum rostering based upon demand, further analysis would be required.

Emergency Incidents By Hour of the Week

FIG 12 looks across the hours of completed work, and we see that the peaks and troughs of emergency calls responded to by the NATIONAL AMBULANCE SERVICE (NAS) are fairly consistent.

Likewise, during the week days there is a reasonable consistency of minimum and maximum values for the DFB emergency calls but there is an interesting spike towards the end of Friday and the exaggerated build up of demand through the late hours of Saturday and a significant peak in the early hours of Sunday morning, all at variance with the underlying trend. This reflects the town centre's social and leisure based demand that we know to be a considerable contributor to workload.

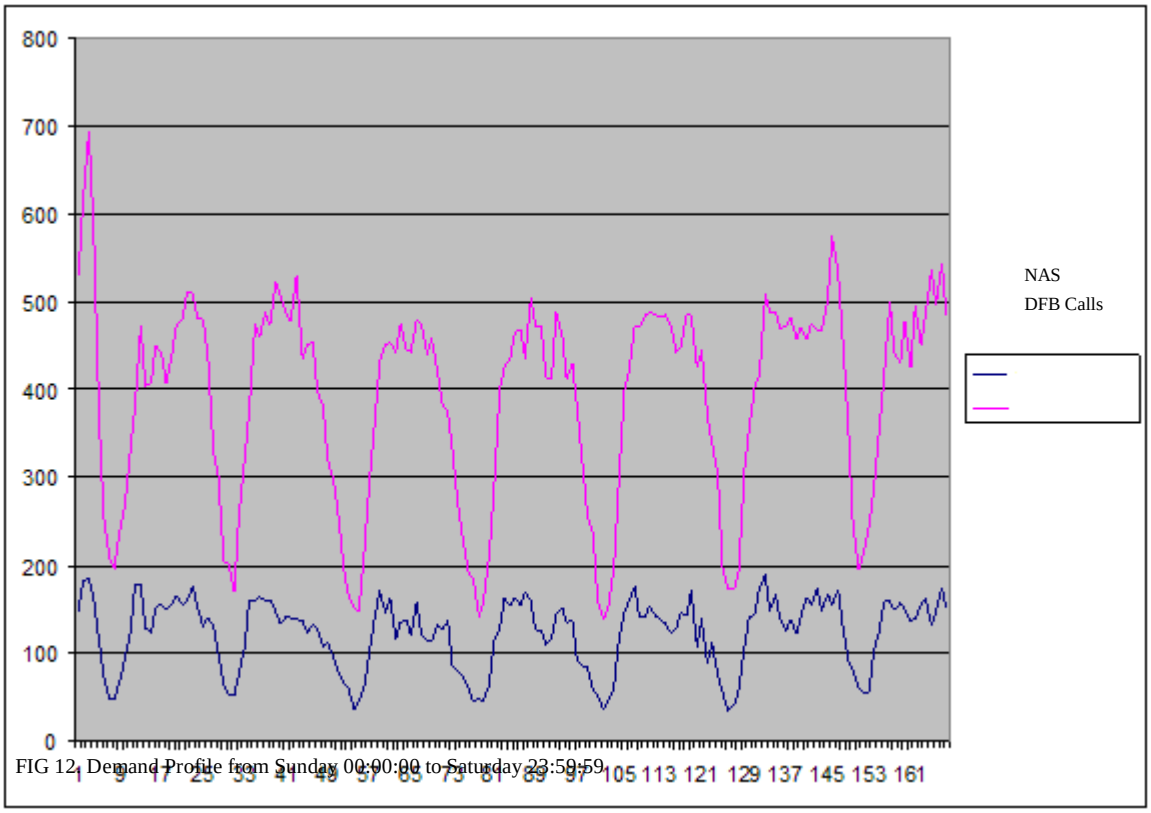


FIG 12, Demand Profile from Sunday 00:00:00 to Saturday 23:59:59

Summary

The number of DFB ambulances available is consistently eleven throughout the week. Further analysis could provide an optimised resource requirement profile for DBF aligned with the demand analysis completed within this report.

NATIONAL AMBULANCE SERVICE resources vary from night to day, and the shift patterns tend to follow the peak of demand in most cases. Some slight changes could be made to shift patterns at weekends to better 'fit' the pattern of demand.

As is common to most cities Dublin experiences its highest peaks in demand over the weekend due primarily to city centre concentrations of population participating in a range of leisure activities.

Conclusions

This review process has involved developing a close working relationship with key staff members within both the NATIONAL AMBULANCE SERVICE and DFB, both of which organisations have provided valuable support throughout the review.

The review process itself has involved the completion of a data collection, validation and collation exercise, which identified key variation in the way in which data is captured and recorded across the two organisations. Central to this is the issue of the ability to uniquely identify individual incidents across both organisations data sets, as currently this is problematic and may result in inaccurate assessment of the total demand for services.

It was however possible to bring together the key data required to undertake the review into a single master data set, which enabled total demand for service to be quantified and analysed. A comprehensive quantitative assessment of the demand for service was completed identifying the range of provision and supplied by both organisations across the operational area. A significant level of overlap of service was observed within the results indicating the existence of co-dependence in the ability to provide Ambulance Service cover.

The current relative levels of service provision and response standards across both organisations were calculated and mapping outputs produced to illustrate the spatial and temporal extent of cover provided within the resource availability. Using a measure of performance common to UK service of response to Life Threatening incidents within 8 minutes, the calculated performance was reported at 23 –27%.

The impact of PTS workload was identified as having a negative effect upon the availability of emergency response vehicle and subsequent performance. This was quantified in terms of the volume of calls and the distribution of that workload across the operational area and the week, hour by hour.

A Tactical Deployment Plan TDP was produced for two Scenarios one calculating the of the best use of the combined resources of both organisations to optimise the provision of service aligned to patterns of demand, the second repeating this but removing the PTS workload impact from the model to report upon potential additional improvement in service provision.

Both models optimise the deployment of resources based upon demand in relation to the total number of resources available to the combined organisations. A quantification of the potential performance improvement

gains achievable through a combined approach to Ambulance Service strategic planning and operational tactical deployment planning is reported with up to a combined scenario improvement of 22%.

The impact of additional vehicles was also modelled in relation to potential performance improvement impact. The management of resources targeted using the TDP ensures that each resource is deployed to the area of greatest demand for service from a prioritised list of locations, this means that any additional resource will either pick up the next greatest demand area not currently served with existing resources or may require reconfiguration of the TDP to maximise the effectiveness of the plan utilising alternative deployment points. In the case of the review the additional resource was modelled to take up the next greatest demand within the existing TDP resulting in a potential performance improvement of 1.4 –1.8%. Any additional resources would return a performance improvement potential relative to the level of residual demand post by post.

The analysis of current resource availability in relation to demand highlighted the fact that DFB had a consistent resource base across all hours of the week, while the NATIONAL AMBULANCE SERVICE has varied availability aligned with current shift and rota structures. There would appear to be a clear case for further examination of resource availability in relation to variation in demand for services across both organisations, optimising resource utilisation to achieve performance improvements through efficiency in operation.

The analysis highlights the fact that although significant performance improvements are achievable through improved collaboration between the two services and that there are further gains to be made through a comprehensive review of shift and rota configuration in relation to observed and forecast demand.

It is apparent from the analysis that there is likely to remain a significant proportion of the population across the combined services operational area, which due to the sparse and sometimes remote location will require consideration to be given to alternative approaches to service provision. Initiatives such as Community Responders may be considered to be appropriate and mapping the drive time response potential from the TDP will enable identification of areas that are less well served by the current or recommended operational response services. These areas can then be classified, prioritised and targeted on a risk based classification derived from both historic demand and also demographic and lifestyle profiling, informing a targeted and tailored approach to service provision.

The overall findings of the review are positive. It is evident that although there are still significant issues in relation to a range of fundamental issues facing the separate Ambulance Services, the review has identified solutions to many of the issues and clear service provision and performance improvements can be achieved through application of the methodologies employed and demonstrated within this review process.

Recommendations on a staged implementation of TDP and associated service improvements work

It is clear that there is a complex and co-dependant relationship between the two Ambulance Service providers across Dublin City and County, yet the evidence shows that a closer more integrated approach to the utilisation of the combined resources available to the public would enable significant service improvement to be achieved.

Production and implementation of an updated TDP (as current calculations are based upon data from 2004/2005) within the individual services or combined services would improve deployment through aligning service provision deployment in line with localised demand profiling.

Adoption of a common TDP would deliver significant improvements in performance. Initial use of existing posts and the introduction of agreed standby points over time, in negotiation with staff, would deliver increased performance in relation to response time and associated patient outcomes.

The removal of PTS workload from the emergency vehicle resource base provides for additional improvement in performance, and this is a step, which can be quantified in terms of potential improvement independently of implementation of combined or individual service TDP.

Aligning resource availability with demand through optimised shift and rota development offers further efficiency, service improvement and performance gains within existing resources. Clearly such a path requires careful consideration in terms implementation, but this forms a key component of any such work and the case for undertaking such a change programme is clear, strong and has many existing and successful precedents.

Equity of service provision needs to be clearly demonstrated, and one of the obligations of improved information and intelligence is to act upon the new knowledge and evidence available to ensure that there is equity in the decision making process in relation to the use of resources and the associated level of service provided to all citizens. In relation to this the identification of relative risk in areas remote from existing service provision provides an imperative for the development of alternative response and mitigation approaches e.g. Community Responder schemes.

Improved operational, demand and risk intelligence informs both the strategic planning and operational delivery of an Ambulance Service, enabling economic efficient and effective service delivery to be pursued based upon the best available evidence base. It is clear that there is significant potential for improved information production and use across the Ambulance Services and that there is an associated and quantifiable performance improvement to be achieved.

Appendix E

Written Submissions to the Review Group

Written submissions were received from the following individual and groups:

- SIPTU, Local Authorities Branch
- SIPTU, Health Services Branch
- IMPACT, Dublin Fire Brigade Members
- Cllr Dathi Doolan, Dublin City Council

The Review Group met each of the representative bodies to discuss their submissions

The Review Group met with each of the representative bodies to discuss their submissions. Cllr Doolan did not attend to make a presentation of his submission.