Comptroller and Auditor General

Report on Value for Money Examination

Department of Health and Children

The Emergency Ambulance Services

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The report was prepared on the basis of information, documentation and explanations obtained from the bodies referred to in the report.

The draft report was sent to the Accounting Officer of the Department of Health and Children and to the Chief Executive Officers of the Health Boards and their comments requested. Where appropriate, these comments were incorporated in the final version of the report.

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Report of the Comptroller and Auditor General

The Emergency Ambulance Services

I have, in accordance with the provisions of Section 9 of the Comptroller and Auditor General (Amendment) Act, 1993, carried out a value for money examination of the emergency ambulance services.

I hereby submit my report of the above examination for presentation to Dáil Éireann pursuant to Section 11 of the said Act.

John Purcell
Comptroller and Auditor General

28 November 1997

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Summary of Findings

Emergency ambulance services are provided by the eight regional health boards in their respective regions. In the Dublin city area, an emergency ambulance service is provided by the Dublin Fire Brigade on behalf of the Eastern Health Board.

The estimated cost of providing the emergency ambulance services was just over £28 million in 1996, when almost 300,000 patient journeys were undertaken. At the end of the year, the nine emergency ambulance fleets consisted of 272 emergency vehicles located at 89 ambulance stations.

As well as providing pre-hospital emergency medical care and transportation of the seriously ill and injured to hospital, the health boards' ambulance fleets are also used to transport patients between hospitals for urgent or planned treatment and for more routine transport of patients to clinics and day care centres.

This examination was undertaken to establish the extent to which the emergency ambulance services are provided efficiently and economically.

Efficiency of the Emergency Ambulance Service

The systems in place in the health boards for measuring efficiency are underdeveloped. In some health boards, emergency call response times (a key indicator of efficiency) are not routinely recorded. In other areas, the times recorded may not be reliable because of the methods used to capture the data.

The examination found that, nationally in early 1997, 87% of emergency calls were responded to within 20 minutes. However, in the Midland, North Western and Western Health Board areas, less than 60% of the calls received were responded to within 20 minutes. Irish ambulances do not meet the standard of response time achieved by the ambulance services in England mainly because population and geographical circumstances are different and the resources provided for the services are considerably less.

No performance targets in relation to response time have been set at a national level or by individual service providers. Appropriate targets, which take account of the different circumstances faced by service providers, should be set as a matter of urgency.

A Review Group appointed by the Minister for Health recommended in 1993 that there should be a single command and control centre for emergency ambulances in each health board area to improve the efficiency of dispatch of ambulances. By October 1997, some health boards had not yet centralised their ambulance command and control.

Studies in the early 1970s concluded that in some health board regions, response times could be significantly reduced if extra ambulance stations were established. A recent initiative to improve the response time in more remote locations involves schemes where specifically trained general practitioners are dispatched as a first response while an ambulance is en-route. All initiatives to improve response times should be subjected to rigorous cost-benefit analysis before implementation.

Economy of the Emergency Ambulance Service

In order to overcome existing shortcomings, all the health boards should develop comprehensive costing and activity monitoring systems which allow them to identify clearly the full costs of patient transport services and to relate costs to identified activities.

The examination found that the cost of the emergency ambulance service in 1996 was in the range £6.09 to £7.32 per head of population served in most of the health board areas. The cost was significantly above the national average in the North Western Health Board, which spent £11.29 per head. Even allowing for the fact that the population served is widely dispersed over difficult terrain and poor roads, it is surprising that the average speed of response to emergency calls in the region was the lowest achieved by any of the service providers.

One way of comparing economy in the use of resources is in terms of the average cost per hour that ambulance crews are planned to be on duty i.e. cost per rostered hour. The examination found that the range of cost per rostered hour was from £16 in the Midland Health Board, to £39 and £44 respectively for the Eastern Health Board and Dublin Fire Brigade, where the fastest response times are achieved. The cost per rostered hour was between £19 and £24 in the other health boards.

The lowest unit cost was achieved in the Midland Health Board area largely due to nurses working in hospital wards being called on, when required, to act as ambulance crew members. As a result, it takes longer to get a fully crewed ambulance on the road, so the apparent economy is achieved at the expense of fast response times.

The number of emergency journeys in 1996 was in the range 16 to 29 per thousand of population in the health board areas, except in the Eastern Health Board area where there were 68 emergency journeys per thousand which reflects the higher density of population, higher traffic volumes and greater concentrations of industry.

Non-emergency journeys averaged 40 per thousand of population. However, in the Mid-Western and Western Health Board areas, the rates were much higher than the average — 73 and 63 per thousand, respectively. While undertaking a higher level of non-emergency journeys improves the utilisation of resources, it may also reduce the

ability of a service to respond to emergency calls. In considering options to improve response times, the feasibility and cost of undertaking non-emergency journeys using other, less expensive, forms of transport should be taken into account.

Strategic Issues

The 1993 Review Group report provided a good basis for the development of effective, efficient and economical emergency ambulance services. However, progress in implementing the report's recommendations has been slow. In part, this was due to industrial relations difficulties which were resolved only in April 1997. One of the recommendations involved the use of a standardised patient report form by all emergency ambulance services. The delay in its introduction resulted in the loss of information which could have greatly assisted the measurement of the effectiveness of the ambulance services and indicated areas where the delivery of medical care could be improved.

A National Ambulance Advisory Council, recommended in the Review Group report, was established in 1994 to ensure that uniform standards of service would operate throughout the country. Because it is an advisory body with no statutory powers over the health boards, the Council's ability to achieve its objectives was limited. The Department intends to review the structure of the Council to improve its effectiveness.

The planned introduction of clinical audit of the emergency ambulance services should strengthen the ability of the service providers to monitor the effectiveness of their activities. Clinical audit will also facilitate the setting of national standards for the quality of pre-hospital medical treatment.

The cost effectiveness of introducing priority based dispatch systems, which aim to maximise the ability of the service to respond quickly to the most serious cases should be examined.

The Emergency Ambulance Services

1 Introduction

1.1 Emergency ambulance services are operated by the eight regional health boards and by the Dublin Fire Brigade, which provides a service in the Dublin city area on an agency basis for the Eastern Health Board. The services provide pre-hospital emergency medical care and transportation of the seriously ill and injured to hospital. Emergency ambulance fleets are also used to transport seriously ill patients who need to be moved between hospitals for urgent or planned treatment and for more routine transport of patients to clinics and day care centres.

1.2 At the end of 1996, the nine emergency ambulance fleets consisted of 272 emergency vehicles located at 89 ambulance stations throughout the State. An estimated 298,000 patient journeys were made during 1996 and the cost of providing the services was just over £28 million.

1.3 In major accident situations, the emergency ambulance services can be augmented by ambulances and crews provided by the Civil Defence, the Permanent Defence Forces and by a number of voluntary agencies, including the Order of Malta, the St John's Ambulance Brigade and the Irish Red Cross.

1.4 An air ambulance service for emergency cases is operated by the Air Corps. The service is generally provided in emergencies requiring the very rapid transport of critically injured or ill patients over long distances.

1.5 The private ambulance industry in Ireland is relatively small. Such ambulance services are mainly engaged in the transport of private patients. Occasionally, health boards hire private operators to transport non-emergency patients.

Value for Money in the Emergency Ambulance Services

1.6 Providing an emergency ambulance service which delivers good value for money depends on it achieving a required level of effectiveness in an efficient and economic manner. Table 1.1 (over) sets out the main measures which are relevant in evaluating the performance of the emergency ambulance services.

An Effective Ambulance Service

1.7 Traditionally, the main aim of an emergency ambulance service was the swift transportation of patients to hospital. Accordingly, the operational objective in responding to emergency calls was to minimise the elapsed time from the receipt of an emergency call to the arrival of the patient at the nearest suitable hospital, where appropriate medical care could be provided. In most cases, only a minimal level of pre-hospital medical treatment was administered by the ambulance crew.

Table 1.1 Performance measures for emergency ambulance services

Effectiveness measures	Reduced mortality of emergency patients
	Reduced long-term disability or illness of emergency patients
	Shorter hospital stays for emergency patients
Efficiency measures	Time taken to get ambulances/crews to scenes of emergency incidents
	Frequency of active use of ambulances/crews
	Quality of pre-hospital medical care delivered by ambulance crews
Economy measures	Cost of ambulance service per head of population
	Cost per rostered hour of ambulance service

1.8 More recently, emergency ambulance services have moved from the traditional role to a situation where more emphasis is given to delivering medical treatment at the incident scene and during the journey to hospital. Ambulance equipment and crew training have been developed to facilitate the delivery of this increased pre-hospital treatment. The objective has been to improve the effectiveness of the service, resulting in reduced mortality and long-term disability, and shorter hospital stays for emergency patients.

An Efficient Ambulance Service

1.9 The ability of an ambulance service to ensure that emergency patients receive effective medical treatment depends critically on how efficient it is in responding to emergency calls. The emphasis for operational efficiency is on minimising the elapsed response time between the receipt of an emergency call and the arrival at the scene of a fully-equipped emergency ambulance and crew. In turn, this requires the provision of a level of rostered ambulance hours which takes account of the particular characteristics of the population and of the area served.

1.10 Increasing the number of ambulances and crews on duty at any point in time should improve the ability of an ambulance service to respond to emergency calls but could also result in long periods of inactivity for crews between calls. Having crews on stand-by does not necessarily indicate an inefficient use of resources. However, operational efficiency is enhanced where the required speed of response to emergency calls is maintained and, in addition, ambulances and crews are engaged in carrying out urgent and pre-planned journeys while rostered.

1.11 An efficient emergency ambulance service must be capable of delivering effective medical care to patients, both at the scene of the incident and during the journey to

hospital. The medical expertise of the crew and the standard of the medical equipment available on board the vehicle all impact upon the efficiency of an emergency ambulance service.

An Economic Ambulance Service

1.12 Economy in the provision of the emergency ambulance services requires that resources of the right quality (vehicles, equipment, crew, back-up staff) are provided at least possible cost. The level of service required, taking into account the population served, needs to be considered in evaluating the economy achieved by an ambulance service.

1.13 Savings resulting from improvements in the economy of the provision of the emergency ambulances services could be used to reduce the cost of the existing service, or alternatively, to improve the level of service, for example by decreasing the average response time.

Previous Study

1.14 A wide-ranging study of the emergency ambulance services was conducted by an Ambulance Review Group appointed by the Minister for Health in 1991. The Review Group considered many aspects of the services including arrangements for service delivery, command and control systems, training requirements and organisation and management of the services. The *Report of the Review Group on the Ambulance Service* was published in 1993.

Scope of the Examination

1.15 This value for money examination was undertaken to establish the extent to which the emergency ambulance services are provided efficiently and economically. The following specific questions were addressed.

- Are the emergency ambulance services efficient in responding to emergency calls?
- Are the emergency ambulance services provided economically?
- Are resources used efficiently by the emergency ambulance services, consistent with maintaining rapid response times?
- Has a national strategy for the provision of effective, efficient and economic emergency ambulance services been developed and implemented?

1.16 The examination focused on the roles of the following bodies in relation to the provision of emergency ambulance services

- the ***Department of Health and Children***, which provides the funding for the services and is responsible for developing and implementing national policy in relation to ambulance services

- the ***health boards***, which are responsible for delivery of the emergency ambulance service in their respective regions.[1]

1.17 A number of health boards are developing innovative strategies for responding to emergency calls, such as schemes where the first response is provided by specially trained general practitioners. These schemes were not examined during the study.

1.18 The quality of the medical treatment administered to emergency patients (by ambulance crews or by first response general practitioners) is a critical determinant of the efficiency and effectiveness of the service provided by the health boards. However, examination of these aspects would require extensive clinical audit, drawing on specialist medical knowledge. The quality of medical care was therefore excluded from the scope of this examination. However, certain non-clinical issues which impact on the nature of treatment provided were considered e.g. the provision of ambulance equipment to specified standards and the qualifications and training of ambulance personnel.

1.19 The ability of the emergency ambulance services to respond, in co-operation with the other emergency and security services, to major emergencies has not been examined. The air ambulance service provided by the Air Corps was also excluded from the examination.

1.20 The methodology for the examination is set out in the appendix.

[1] *Internal management arrangements in health boards for the provision of the emergency ambulance services were not examined.*

2 Response Time for Emergency Calls

2.1 The speed of response to emergency calls is a key indicator of operational efficiency for the emergency ambulance services. Speed of response is measured by the 'response time' which is the elapsed time between the receipt of an emergency call and the arrival of a fully-equipped emergency ambulance at the scene of the incident (see Figure 2.1).

2.2 Each of the emergency ambulance service providers supplied information about the emergency call response times they achieved in early 1997, for the purposes of this examination. However, the systems used by individual ambulance services for measuring speed of response are underdeveloped, with the result that the quality of the data provided is variable.

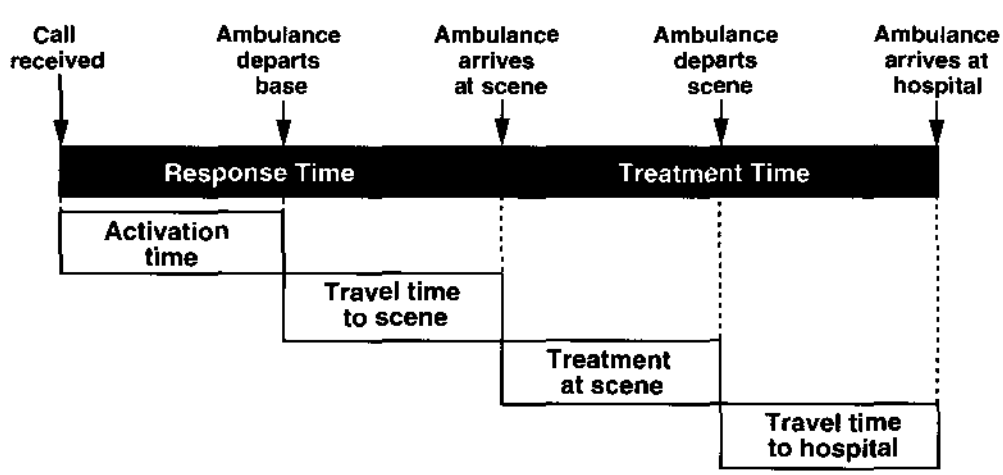
Figure 2.1 Emergency call response time

The total time spent by an emergency ambulance service in dealing with an emergency call extends from the moment the emergency call is answered, to the moment when the patient arrives at the hospital.

The **response time** is the elapsed time between the receipt of an emergency call and the arrival of a fully equipped emergency ambulance and two-person crew at the scene of the incident. Response time is made up of two components: activation time and travel time to scene.

Activation time is the time which elapses between receipt of an emergency call and the dispatch (usually from the ambulance base) of a fully-equipped emergency ambulance and two-person crew.

Travel time to scene is the time which elapses from dispatch of an ambulance and two-person crew, to the time it arrives at the scene of the incident.



2.3 The examination found that

- Response times are not routinely recorded for all ambulance stations.
- Several different methods are used to collect response time data. A few service providers have automatic data recording systems while others use manual systems or a combination of manual and automatic systems.

2.4 Response time data for the Midland and South Eastern Health Boards and for part of the Eastern Health Board area was not available from the health boards' own records, so they supplied information gathered by a research team from the Faculty of General Practice in University College, Dublin which was commissioned by the Department in November 1996 to carry out a nationwide survey of emergency call response times.

2.5 In presenting response times in this report, consistent definitions have been used for all service providers. They relate to the arrival of emergency ambulances, and do not take account of situations where another kind of assistance (such as a general practitioner trained in emergency care) arrived at the scene before an ambulance.

Current Response Times

2.6 No performance targets in relation to response time have been set at a national level or by individual service providers.

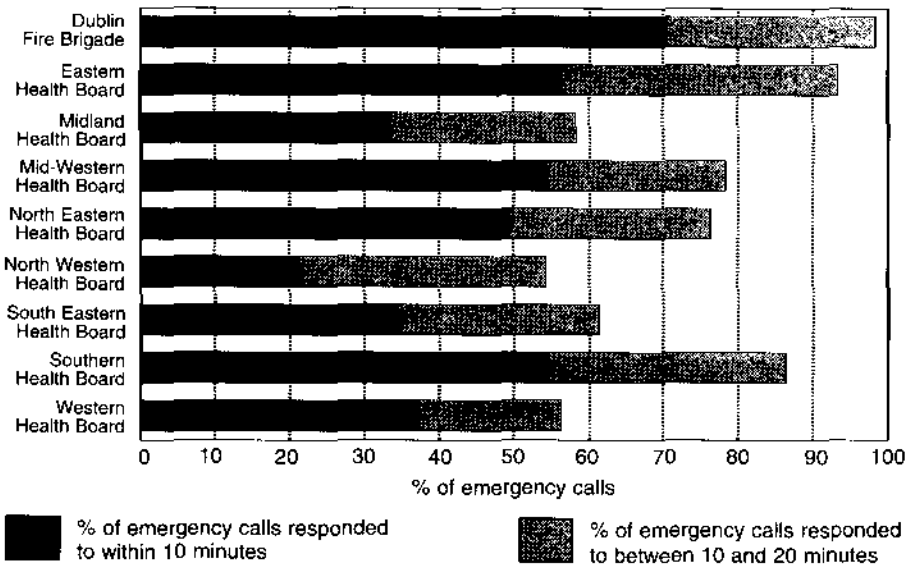
2.7 Estimated response times achieved by the emergency ambulance services during the first quarter of 1997 are summarised in Figure 2.2. Although the systems for measuring response times are not fully reliable, the estimates are considered to be indicative of the general efficiency of the emergency ambulance services.

2.8 Four emergency ambulance services responded to more than 50% of emergency calls within ten minutes. In the North Western Health Board area, only 21% of calls were responded to within 10 minutes.

2.9 More than 90% of emergency calls received by the Dublin Fire Brigade and the Eastern Health Board were responded to within 20 minutes. In the Midland, North Western and Western Health Board areas, less than 60% of the emergency calls received were responded to within 20 minutes.

2.10 The response rates shown in Figure 2.2 reflect the average response rates throughout the area served by each of the service providers. Within each region, the response times achieved in answering calls in the more urban areas (where most ambulance stations are located) tend to be better than those achieved in responding to calls from rural areas.

Figure 2.2 Emergency call response times, within 10 minutes and between 10 and 20 minutes, by service provider,1997 (first quarter)



Source: Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997

Target Response Rates for Ambulance Services in England

2.11 Emergency call response times for ambulance services in England are measured against recommended national performance standards which were first introduced in 1974. The targets, based on response times which were considered to be broadly achievable by the ambulance services generally, are

- emergency ambulance services should respond to 50% of emergency calls within eight minutes
- ambulance services which serve urban areas[2] should respond to 95% of calls within 14 minutes
- ambulance services which serve rural areas should respond to 95% of calls within 19 minutes.

2.12 UK Department of Health reports show that 27 of the 37 ambulance services in England succeeded in meeting their 95% target response time in 1996-97. Only six of the 37 services failed to meet either of the relevant performance targets.

[2] *Services in regions where the average population density is greater than 618/km². In Ireland, only the Eastern Health Board area would be regarded as an urban area service under that definition.*

2.13 Consideration is being given in the United Kingdom to the introduction of ambulance despatch systems which try to establish the seriousness of the illness or injury involved in individual emergency call cases, and to give higher priority to those which are more serious. Where such priority-base despatch systems are adopted, new target response times are likely to be introduced for the different categories of cases.

2.14 Performance targets set for the emergency ambulance services in England are not necessarily appropriate or achievable by the emergency ambulance services in Ireland. The relative level of resources invested in the provision of the emergency ambulance services in Ireland is considerably less than in the UK and population characteristics also differ. Appropriate targets for Ireland would have to take into account the level of resources available and the circumstances in which the services operate.

Trends in Response Times

2.15 In the early 1970s, the Operations Research (OR) Unit in the Department of the Public Service carried out detailed studies of the ambulance services in operation in a number of areas, to identify ways in which the performance of the service could be improved. Most of the studies reported response time in terms of the percentage of emergency calls responded to within 15 and within 30 minutes. Table 2.1 compares the response times found in the studies with those achieved in the corresponding health board areas in early 1997.

Table 2.1 Emergency call response times in selected health board areas, early 1970s and 1997 (first quarter)

Ambulance service area	Percentage of calls responded to:			
	within 15 minutes		within 30 minutes	
	Early 1970s %	1997 1st quarter %	Early 1970s %	1997 1st quarter %
Midland Health Board area	35	48	61	80
South Eastern Health Board area	31	50	64	79
Southern Health Board area	34	76	64	94
Western Health Board area	41	48	60	72

Source: Operations Research Unit Reports, Department of the Public Service, 1970-75; Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997.

2.16 The response times improved in all the areas examined in the period between the early 1970s and 1997. Most progress appears to have been achieved by the Southern Health Board. The response times improved least in the Western Health Board area.

Factors Impacting on Response Time

2.17 Figure 2.3 indicates the main factors which impact on the response times achieved by the emergency ambulance services. The service providers have a degree of control over three factors within their allocated budgets: crewing arrangements, ambulance command and control systems (both of which determine how quickly an ambulance and crew can be activated) and the geographical deployment of ambulances and crews. The remaining factors are environmental and act as constraints in the making of deployment decisions.

Activation Time

2.18 Figure 2.4 (over) summarises the percentage of cases where a fully-equipped ambulance and two-person crew were activated within the three minutes of receipt of an emergency call in early 1997.

Figure 2.3 Factors impacting on the speed of response to emergency calls

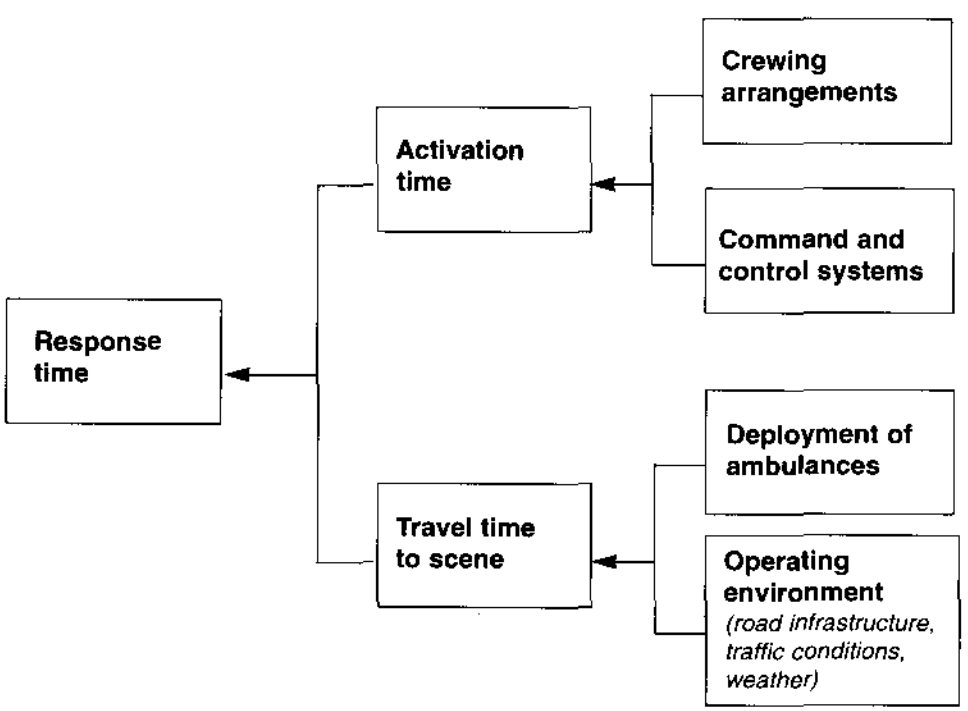
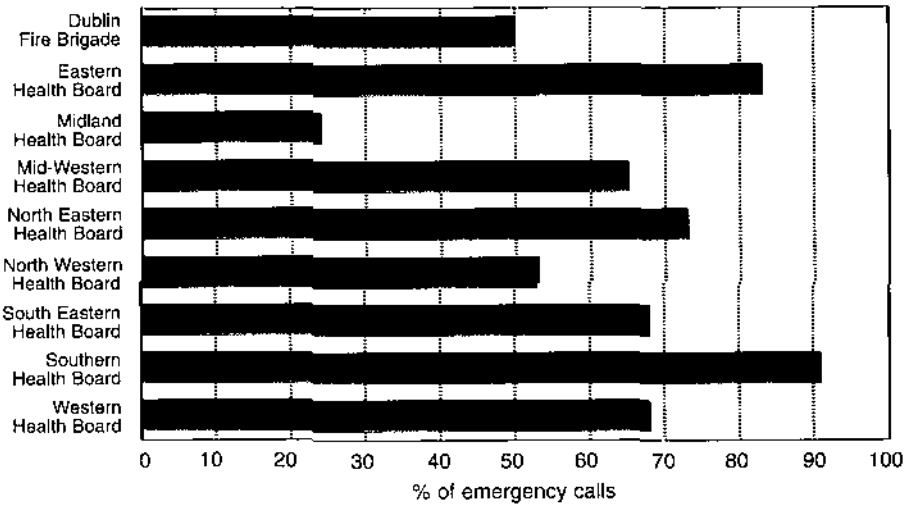


Figure 2.4 Percentage of emergency calls where an ambulance was activated within three minutes, by service provider, 1997 (first quarter)



Source: Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997

2.19 The Southern Health Board reported the highest rate of activation within three minutes (91%). In the Midland Health Board area, ambulances were dispatched within three minutes in less than a quarter of emergency call cases.

Crewing Arrangements

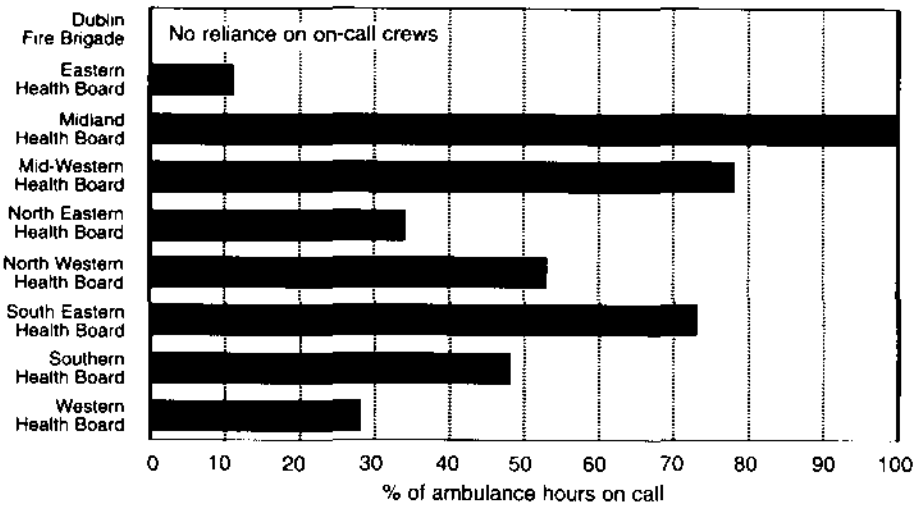
2.20 In some ambulance services, emergency calls are answered by two-person crews who are rostered to be on stand-by in the ambulance station while not engaged on a patient journey. This facilitates fast activation in response to a call. Other ambulance services rely part of the time (for example, at night) on ambulance crews who are 'on call' i.e. they are not actually on stand-by in the ambulance station, but are available, if required, to go to the station or to be collected by the ambulance driver en-route to an incident.

2.21 Where resources are limited, on-duty crewing is not always possible. On-call service is provided during times when demand for the service is lowest. Figure 2.5 illustrates the level of reliance of each of the service providers on 'on-call' crewing.

2.22 The practice in relation to use of on-call crew varies considerably.

- Dublin Fire Brigade rosters two-person crews on stand-by at all times for all ambulances and so has no on-call ambulance crews.

Figure 2.5 Degree of reliance on 'on-call' ambulance crew, by service provider, 1997 (first quarter)



Source: Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997

- In four health boards (Mid-Western, North Western, Southern and South Eastern), ambulances in many of the smaller and less busy stations are crewed by a driver, who is usually on stand-by, and by a nurse, who is on-call from ward duties in the hospital where the ambulance is stationed. The Midland Health Board relies on this kind of arrangement in all its ambulance stations and so 100% of its ambulance hours are on-call.

- The Eastern, North Eastern and Western Health Boards (which, after the Dublin Fire Brigade have the lowest rates of 'on-call' cover), do not use hospital nurses to accompany drivers on emergency calls.[3]

Command and Control

2.23 Dedicated command and control centres, with appropriate communications technology, can reduce the time taken to activate ambulances. They also provide control over mobile ambulances, which can, if necessary, be re-directed to respond to calls of greater urgency.

2.24 The Ambulance Review Group found that there were a total of 22 separate command and control centres in use by the eight health boards, including a number

[3] *The Western Health Board employs nurses, who are not rostered on ward duties, as full-time ambulance crew.*

of base stations at individual hospitals for mobilising and controlling the ambulances located there. The Review Group recommended that the base stations at hospitals be phased out as soon as practicable and operations transferred to a single central command and control centre for each health board area. Table 2.2 outlines the current command and control situation for each service provider.

2.25 The Department of the Environment and Local Government is currently funding a project (called the Computer Aided Mobilisation Project or CAMP) to develop three regional command and control centres for the fire service (in Dublin, Castlebar and Limerick). The Ambulance Review Group considered the option of integrating ambulance command and control structures with the CAMP centres but, for a variety of reasons, did not recommend that course of action. However, the group did recommend that where either the fire or ambulance services propose to upgrade their communications systems, the possibility of joint ventures should be explored.

Table 2.2 Command and control arrangements for the ambulance services, by service provider, October 1997

Service provider	Current command and control arrangements
Dublin Fire Brigade	Single command and control centre in Townsend Street.
Eastern Health Board	One centre for Dublin area in operation at James' Street. Wicklow and Kildare depend mainly on individual ambulance bases in Wicklow town and Naas.
Midland Health Board	Depends on hospital bases. Command and control centre constructed but not operational.
Mid-Western Health Board	Single command and control centre operational.
North Eastern Health Board	Single command and control centre operational.
North Western Health Board	Single command and control centre operational.
South Eastern Health Board	Depends on hospital bases. Command and control centre constructed but not operational.
Southern Health Board	Two separate command and control centres operational (Cork and Tralee).
Western Health Board	Depends on hospital bases. Centralised command and control planned.
Recommendation of 1993 Ambulance Review Group	***A single command and control centre in each health board area***

Source: Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997.

2.26 Two health boards (Eastern and Western) plan to integrate their command and control systems with the CAMP centres. In both cases, a CAMP centre is located within the health board region.

Travel Time

2.27 A variety of factors determines the time required for an ambulance to travel from the point of dispatch to the scene of an incident. The number and location of ambulance stations in a region is a critical factor which reduces the potential distance to be travelled. Many of the other determinants of travel time (such as traffic congestion, road and weather conditions) are outside the control of the ambulance service providers, though in the longer term, decisions on ambulance station locations can compensate for some of these factors.

2.28 The number of stations varies from region to region (see Figure 2.6). In most health board regions, ambulance stations tend to be situated in the grounds of hospitals located in the largest centres of population. As a result, stations tend to be closest to the areas of highest demand.

2.29 The size of the geographic area served by each station varies considerably among the service providers (see Table 2.3, page 15). Apart from the Eastern Health Board region, the average area served by each ambulance station varies from just over 600 km^2 to over 1,500 km^2.

2.30 Response times generally are shorter where stations, on average, have smaller areas to serve. However, this is not always the case which suggests that other factors also have a strong influence. Thus, while the North Western Health Board has one of the lowest average areas to serve per station, it takes the longest to respond to calls. The Health Board points out that the population it serves is widely dispersed and that, in Donegal in particular, journey times are very long because of the terrain (much of which is mountainous and/or indented coastline) and the poor condition of the roads. In response to these circumstances, the Board is running a pilot project under which selected general practitioners have been trained and equipped to deliver pre-hospital emergency care, both as a first response to emergency calls, and in support of ambulance crews.

2.31 The Department of the Public Service OR Unit studies carried out in the early 1970s considered the deployment of ambulances in four health board regions. They concluded that emergency response times in the Western, Midland and South Eastern regions could be significantly reduced if new ambulance stations were established in a number of locations in each of the regions. The studies recommended that the cost effectiveness of establishing the new stations should be investigated.

Figure 2.6 Location of emergency ambulance stations, 1997

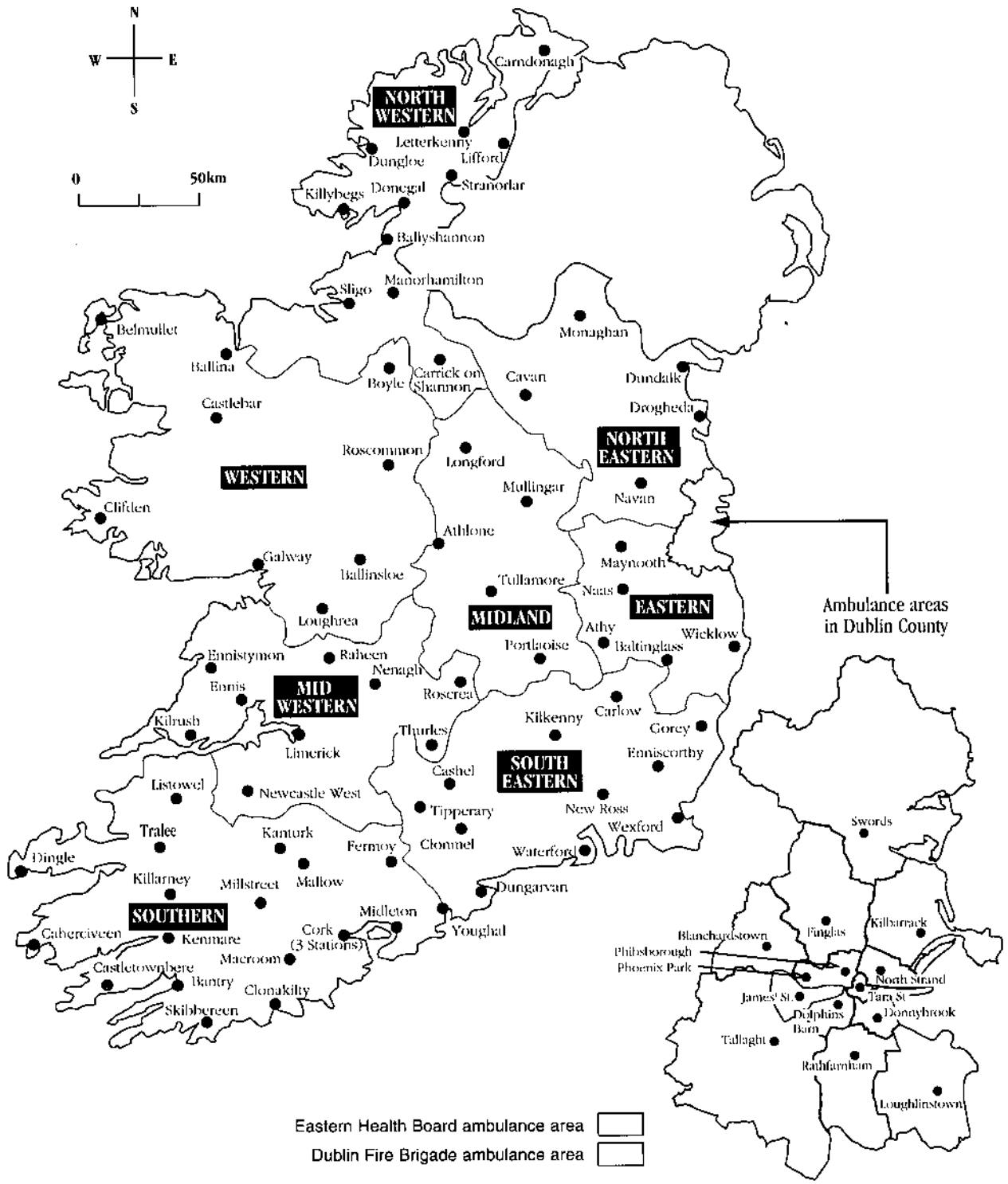


Table 2.3 Average area served per ambulance station, by service provider

Ambulance service area	% of calls responded to within 20 minutes	Average area per station (km^2)
Eastern Health Board[a]	97%	240
Midland Health Board	58%	1,300
Mid-Western Health Board	78%	870
North Eastern Health Board	76%	1,270
North Western Health Board	53%	740
South Eastern Health Board	61%	851
Southern Health Board	86%	609
Western Health Board	56%	1,530
All ambulance services	87%	789

Note: *[a] Includes the service provided by the Dublin Fire Brigade.*
Source: *National Ambulance Fleet Survey, National Ambulance Advisory Council, 1996.*

2.32 The number of stations in each of the three health board regions remains the same as it was when the studies were carried out. A new ambulance station was established by the Western Health Board at Ballinlough, Co. Roscommon in the late 1970s. However, it was closed after four years as a cost-saving measure. The cost effectiveness of setting up new stations in the other regions does not appear to have been investigated.

Conclusions

2.33 The current level of information recording does not facilitate evaluation of the relative efficiency of the ambulance services in responding to emergency calls. All emergency ambulance services need to improve the level of management information gathered, particularly information on the operational performance of the services.

2.34 Response time targets need to be set for all emergency ambulance service providers as a matter of urgency. These targets will need to take into account the different circumstances (population size and distribution, geography and resources) faced by different service providers.

2.35 Service providers should regularly review the manner in which crew and ambulances are rostered and deployed, to establish if there are ways of improving response rates within available budgets. The contribution to achieving high response rates which alternative first responses, such as the general practitioner response schemes currently being piloted, can make should be identified.

3 Use of Resources

3.1 Economy in the emergency ambulance services requires that resources of the right quality are utilised at the least possible cost. Thus, examination of the economy of the emergency ambulance services first requires an estimation of the cost of the resources employed.

3.2 Rostered ambulance hours represent the combination of resources used in the provision of the service. This chapter examines how economically rostered ambulance hours are provided, taking into account variations in the size of population served. It then considers how efficiently the various ambulance services use the available resources.

Cost of the Emergency Ambulance Service

3.3 The cost identification systems in most health boards do not allow ready or precise identification of the full cost of their emergency ambulance services, which makes it difficult to evaluate the level of economy and efficiency achieved. The estimates of cost presented below are based on the following common approach.

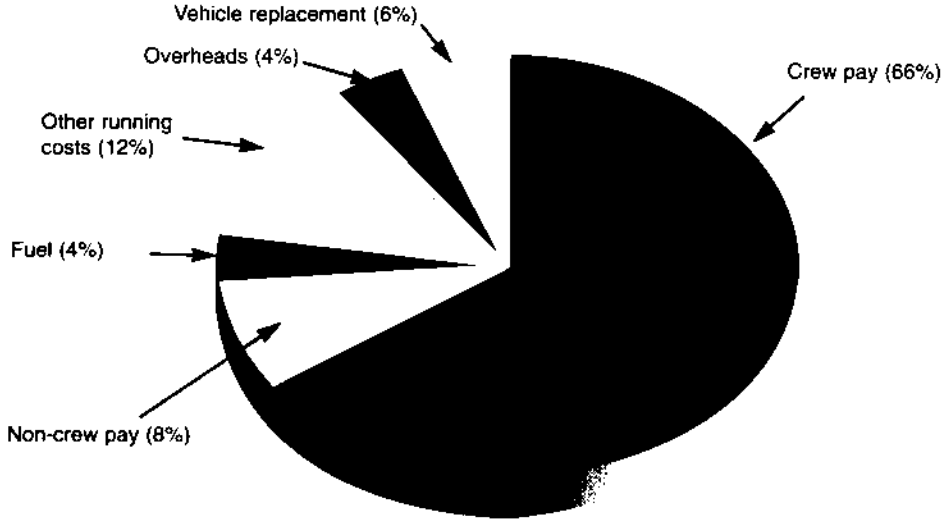
- The costs of transporting patients using other forms of transport (for example, minibuses or taxis) are excluded.

- The pay costs for ambulance crew and support staff engaged mainly in ambulance service activity were extracted from salary and pay records in each health board. For Dublin Fire Brigade and hospital nurses, estimated expenditure was based on the estimated number of full time staff used in providing the service.

- Pension entitlements of the staff providing the emergency ambulance services are not a current expenditure item and are not included in the cost estimates. Inclusion of pension entitlements would inflate the pay cost but would not distort the overall cost model. Current pension payments to retired ambulance crews are excluded since they are not an expense arising from the provision of the current services.

- Estimates of spending on overheads (for example, apportioned accommodation and administration expenses) were examined in detail for the Midland and Eastern Health Boards. The other service providers were asked, in a questionnaire, to estimate the cost of overheads involved in running the emergency ambulance services and the estimates supplied are presented below. In some cases, the expenditure reported appears to be an underestimate. For example, no expenditure was reported in respect of administrative personnel support from health board headquarters in some responses.

Figure 3.1 Breakdown of expenditure on the emergency ambulance services, 1996



Source: Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997

- Construction and fitting out of ambulance stations and command and control centres is an occasional capital expense. Expenditure of this kind is excluded from the figures presented so that meaningful comparisons of expenditure between regions may be made.

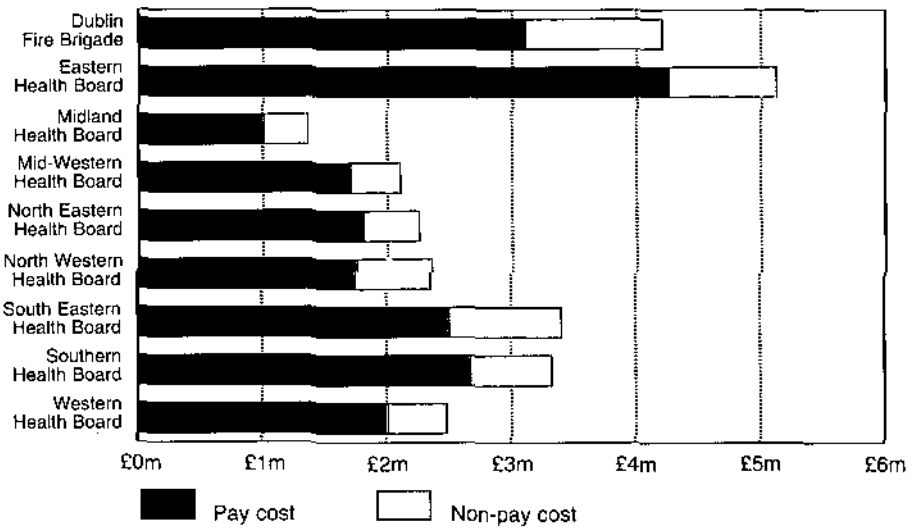
3.4 Total expenditure on emergency ambulance services in 1996 was estimated to be just over £28 million. Figure 3.1 shows the breakdown of expenditure. Almost three-quarters of the estimated cost of providing the service is accounted for by payroll costs (crew and support staff, including command and control personnel), which amounted to £20.8 million.

Comparisons of Cost in Each Health Board

3.5 Figure 3.2 sets out the total estimated recurring expenditure on the emergency ambulance services in 1996 by each of the service providers.

3.6 The absolute cost of the emergency ambulance services cannot be used to compare the levels of economy in each health board area. Comparisons on the basis of absolute cost alone would be misleading due to the varying demography and geography of each

Figure 3.2 Cost of the emergency ambulance services, by service provider, 1996



Source: Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997

area, and the different management policies pursued by each health board. The analysis of economy can be pursued by examining two measures of relative economy

- the cost per head of population
- the cost per rostered ambulance hour.

3.7 Several of the health boards argued that other measures, such as the cost per kilometre travelled, cost per patient journey and cost per vehicle, indicate aspects of the relative economy achieved by the service providers and requested that some or all of them be included in this report. The proposed measures were examined carefully but they were considered not to be helpful when making comparisons between so varied a group of service providers. They have more relevance within the individual services, when monitoring trends over time or when evaluating ways to meet particular demands.

Cost Per Head of Population

3.8 Comparison of the cost per head of population shows the relative economy of the emergency ambulance services in each area while taking account of the size of the population served (see Table 3.1).

Table 3.1 Estimated current cost of the ambulance service per head of population, by area, 1996

Ambulance service area	Population	Current cost per head of population	% of calls responded to within 20 minutes
Eastern Health Board*	1,294,000	£7.21	97%
Midland Health Board	205,000	£6.43	58%
Mid-Western Health Board	317,000	£6.63	78%
North Eastern Health Board	306,000	£7.32	76%
North Western Health Board	210,000	£11.29	53%
South Eastern Health Board	391,000	£8.66	61%
Southern Health Board	546,000	£6.09	86%
Western Health Board	352,000	£7.13	56%
All health boards	3,621,000	£7.34	87%

Note: * *Includes both Dublin Fire Brigade and Eastern Health Board services.*
Sources: Census of Population 1996; Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997.

3.9 For most of the service providers, the cost of the emergency ambulance service was in the range £6.09 to £7.32 per head of population. In the Eastern Health Board region, including the area served by the Dublin Fire Brigade, the average cost of the service was £7.21 per head of population. The cost per head of population is lowest in the Southern Health Board (£6.09 per head), which nevertheless achieved one of the highest levels for response time to emergency calls.

3.10 In two cases, the cost per head is significantly above the national average: in the South Eastern Health Board, the cost was £8.66 (18% higher than the average), and in the North Western Health Board, the cost was £11.29 (54% higher than the average). In both cases, the speed of response to emergency calls was among the lowest achieved by any of the service providers.

3.11 The Midland Health Board had a comparable low response rate, but in that case, the cost of the service (£6.43 per head) is among the lowest. In both the Midland and Southern Health Board areas, there is heavy reliance on 'on call' hospital nurses to crew ambulances and the cost of the nurses was attributed to the emergency ambulance services only for the duration of the ambulance calls. Where full time two-person crews operate, the cost of the crew is attributed to the services even when the crew is on stand-by awaiting a call.

Cost Per Rostered Ambulance Hour

3.12 The resources available to the ambulance services are combined to produce ambulances and crews which are available for deployment to transport patients. One way of measuring the resources used is the number of rostered ambulance hours purchased with the available funding. In estimating rostered ambulance hours, an ambulance was considered rostered whenever a crew has been assigned to the vehicle i.e. it is available to be activated. The crew may be on stand-by in the ambulance station or on call.

3.13 The rostered ambulance hour is a suitable indicator which captures the combination of inputs which make up the emergency ambulance services. A good indication of the relative economy of the emergency ambulance services provided in each area is obtained by comparing the cost of rostered ambulance hours. Table 3.2 indicates the cost of rostered ambulance hours across all ambulance services during 1996.

3.14 The number of rostered hours provided in the North Western Health Board area is equivalent to 470 hours per thousand of the population, which partly explains why the cost per head is so high. The Midland Health Board has the next highest number (400 per thousand). The lowest level of rostered hours provided per thousand of population is in the Eastern Health Board area. The hours provided in the other regions are all in the range 320 to 360 per thousand.

3.15 The pattern in the quantity of rostered hours provided suggests that there may be an element of economy of scale involved, with relatively fewer hours being required in areas where the population is larger and more densely grouped. (The Midland and North Western Health Boards have the smallest populations — just over 200,000 in each case.) However, even allowing for this factor, the scale of provision of hours in the North Western Health Board does appear to be significantly out of line.

3.16 The cost per rostered hour is highest in the Dublin Fire Brigade (£44) and Eastern Health Board (£39), where the fastest response times are achieved. The cost is influenced by a number of factors.

- There is greater use of two-person crews by these agencies, which also have more sophisticated and expensive communications infrastructure.

- There is a higher rate of pay for Dublin Fire Brigade personnel and Eastern Health Board personnel operating in the Dublin area.

Table 3.2 Rostered ambulance hours, by service provider, 1996

Ambulance service	Rostered hours supplied		Cost per rostered hour	
	total hours ('000)	hours per 1,000 of population	total cost per hour	*of which: overtime*
Dublin Fire Brigade	96	180	£44	—*
Eastern Health Board	133		£39	*£6.90*
Midland Health Board	83	400	£16	*£1.70*
Mid-Western Health Board	104	330	£20	*£1.90*
North Eastern Health Board	98	320	£23	*£4.50*
North Western Health Board	99	470	£24	*£2.20*
South Eastern Health Board	140	360	£24	*£4.60*
Southern Health Board	180	330	£19	*£1.90*
Western Health Board	128	360	£20	*£2.80*
All service providers	1,061	290	£25	*£3.10*

Note: * *Expenditure on the Dublin Fire Brigade ambulance service is estimated on the basis of the number of full time staff required to provide the target rostered hours.*
Source: Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997.

3.17 The lowest unit cost is in the Midland Health Board area (£16 per rostered hour) and is achieved largely due to the total reliance on hospital nurses and the absence of a centralised command and control network. As already stated, this apparent economy is achieved at the expense of fast response times. In other areas, the range of cost per rostered hour is fairly consistent, ranging from £19 to £24 per rostered hour.

3.18 The Eastern Health Board pointed out that the number of hours worked can be substantially in excess of the number of rostered hours, as a result of overtime. They suggested that actual hours should be used when considering unit costs, instead of rostered hours. However, doing so would reduce the unit cost for those who undertook most overtime. Focusing on 'cost per rostered hour' as a primary measure of economy favours those who try to minimise overtime.

3.19 Overtime payments made by the emergency ambulance service providers vary from 9% to 20% of total expenditure on the services. The final column of Table 3.2 shows how much of the cost per rostered hour in 1996 arose due to such payments. Proportionately, expenditure on overtime is highest in the Eastern, North Eastern and South Eastern Health Boards.

Use of the Ambulance Service

3.20 The ambulance service undertook an estimated 289,000 journeys during 1996. These can be divided into three categories of journey, each requiring different response in terms of speed and medical care.

- Emergency journeys (about 41% of all journeys) are made in response to either '999' calls from the general public, or to calls from other emergency services or medical personnel already at the scene of an incident.

- Urgent journeys (about 16% of the total) are undertaken at the request of medical personnel who, at short notice, require a patient to be transported to hospital within a specified time.

- Pre-planned journeys (about 43% of the total) involve the routine transport of patients between hospitals or from home to hospital, clinic or day centre.

Comparisons of Efficiency

Journeys per Head of Population

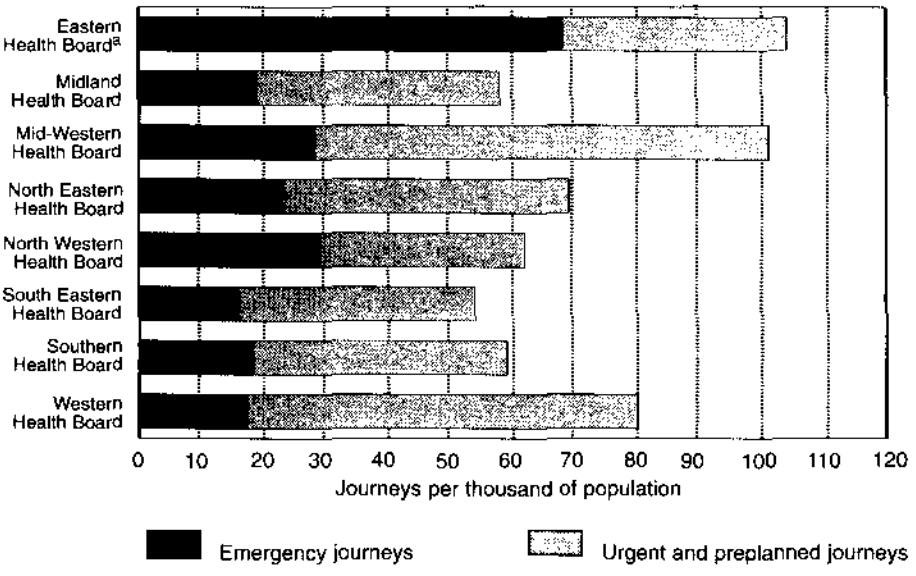
3.21 Figure 3.3 shows the number of emergency and other journeys per thousand of population for each of the health board regions. Journey rates are broadly similar. The exceptions are

- the number of emergency journeys in the Eastern Health Board area and

- the number of non-emergency (mainly pre-planned) journeys undertaken by the Mid-Western and Western Health Board ambulance services.

3.22 The level of demand for ambulance services, in terms of number of emergency journeys per thousand of population, should not vary very widely where the population structure is similar. Apart from the Eastern Health Board area (which includes the area served by the Dublin Fire Brigade), the rate of emergency journeys is within the range 16 to 29 per thousand. The significantly higher rate in the Eastern Health Board area (68 per thousand) arises mainly from factors such as the much higher density of population, higher traffic volumes and greater concentrations of industry. However, there is probably also an element of 'induced' demand for the service because of the quick response times. In other (particularly outlying) areas, there may be a tendency to use other available forms of transport to bring some sick or injured people to hospital.

Figure 3.3 Estimated journeys per thousand of population, by region, 1996



Note: [a] Includes Dublin Fire Brigade emergency journeys
Source: Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997

3.23 The highest level of non-emergency ambulance journeys is undertaken by the Mid-Western and Western Health Boards' ambulance services (73 and 63 per thousand of population respectively), compared to a national average of 40 per thousand. The clinical condition of patients is unlikely to explain all of this difference, which suggests that there may be a greater tendency in these areas than elsewhere to use ambulances to transport non-emergency patients. This results in ambulance resources, which are in place anyway, being used more intensively.

3.24 Cutting back on the number of pre-planned journeys undertaken may be one option which would allow the speed of response to be increased. The marginal cost of improved speed of response for the ambulance service would be the extra expenditure involved in transporting ambulant patients by other modes of transport. The trade off between quick response times and the use of ambulance service resources for non-emergency journeys is a major management issue for the service providers.

Activity per Rostered Ambulance Hour

3.25 The activity of crews while rostered also provides an indication of the overall level of output occurring in each area. No reliable data is available about the amount of time

that ambulance crews spend on active duty. One proxy measure of the activity level of crews is indicated by the number of kilometres travelled per hour rostered.

3.26 The location where required treatment is available for patients may impact significantly on the average journey length. In some areas, certain treatments are available only in a few hospitals within the region. In other cases, patients may have to be transported outside the region, perhaps to national treatment centres, most of which are located in Dublin. Both these situations result in more long-distance journeys, with ambulance crews being engaged for extended periods. The North Western Health Board pointed out that it undertook an estimated 1,200 journeys outside the region in 1996, accounting for a significant proportion of the aggregate distance travelled and resulting in the highest average journey length of any of the service providers (see Table 3.3).

3.27 Ambulance crews in the Western Health Board area travel the greatest distance during each rostered hour (17 km per hour). Rates are lowest in the Southern Health Board area (7 km per hour). This reflects the longer and more frequent journeys undertaken, on average, in the Western Health Board area, and underscores the trade-off which can occur between speed of response to emergency calls and the intensity of use of ambulance service resources.

Table 3.3 Kilometres travelled per rostered ambulance hour, 1996

Ambulance service	Average length of journey (km)	Kilometres per rostered hour	% of calls responded to within 20 minutes
Dublin Fire Brigade	18	13	98%
Eastern Health Board	23	11	93%
Midland Health Board	71	10	58%
Mid-Western Health Board	44	13	78%
North Eastern Health Board	43	9	76%
North Western Health Board	112	14	53%
South Eastern Health Board	70	15	61%
Southern Health Board	53	7	86%
Western Health Board	79	17	56%
All service providers	43	12	87%

Source: Survey of Ambulance Services, Office of the Comptroller and Auditor General, 1997.

Conclusions

3.28 Service providers should develop comprehensive costing and activity monitoring systems which allow them to clearly identify the full costs of patient transport services, and to relate costs to identified activities. In particular, information is required about the type of journey, distance travelled and time engaged per journey.

3.29 The cost of providing the emergency ambulance service varies considerably between service providers, ranging from £16 to £44 per rostered hour. The relative costs broadly reflect variations in the response times achieved by the services concerned.

3.30 Health boards serving a rural or dispersed population may need to put in place relatively more rostered hours per thousand of population to guarantee a defined level of operational performance. However, the employment of such extra resources should be reflected in the quality of service provided. The North Western Health Board operates in a particularly difficult environment. While it provides significantly more rostered hours per thousand of population than any other service provider, it still has the lowest response rate. This suggests that the provision of extra rostered hours may not always be the best way to improve response times, and underlines the need to carry out cost effectiveness analysis both of current spending and of any new spending proposals.

3.31 The emergency ambulance services operated by the health boards are currently organised to undertake both emergency and non-emergency patient transport. The latter improves the utilisation of the emergency ambulance services' resources but potentially may reduce the ability of the services to respond to emergency calls. In considering options to improve response times, the feasibility and cost of undertaking some non-emergency journeys using other, less expensive, forms of transport should be taken into account.

4 Improving the Efficiency and Effectiveness of the Emergency Ambulance Services

4.1 The efficiency and effectiveness of the emergency ambulance services can only be assessed if objectives and targets exist for the services to achieve. These objectives and targets should form part of an overall national strategy for the emergency ambulance services.

Developing a National Strategy

4.2 In 1994, the Department of Health published a national strategy for health care entitled *Shaping a Healthier Future.* This document outlines the roles of the Department and the regional health boards in the delivery of health services. The key objectives of the Department were defined to include

- advising and supporting the Minister in determining national policy
- strategic planning and management at national level
- monitoring and evaluating the service and financial performance against national objectives and performance standards
- identifying and supporting the introduction of more effective management practices.

4.3 Under the strategy outlined in *Shaping a Healthier Future*, the Department devolves the detailed management of the health services to the regional health boards. Accordingly, the emergency ambulance services are not managed nationally but are a group of services each managed within its own health board region. While the detailed management of the services is the responsibility of the health boards, the Department acknowledges that its role should include development of a national strategy for the emergency ambulance services.

4.4 The Ambulance Review Group considered many aspects of the ambulance services including arrangements for service delivery, command and control systems, training requirements and organisation and management of the services. The Group's report, published in 1993, contained over seventy separate recommendations.

4.5 The Department's policy was to implement all the recommendations of the Ambulance Review Group. The Department prioritised the recommendations but did not set a definite timescale for their implementation, nor did it estimate the associated cost. Some progress has been made in the development of systems for carrying out clinical audit of the emergency ambulance services and in establishing

response times but efficiency or effectiveness targets for the ambulance services have not yet been set at national level.

4.6 The Department pointed out that its attempts to implement the recommendations have been severely hampered by industrial relations difficulties. These difficulties were resolved during April 1997 and a revised strategy for implementation is being developed.

4.7 Since the publication of the Review Group report, the Department has provided almost £10 million in special development funding to the health boards. Development funding is allocated to emergency ambulance service projects specifically related to the implementation of the recommendations in the report.

4.8 The Department tracks development funding to ensure actual expenditure is related to the specified projects. However, it does not actively monitor the effect of the development expenditure on the performance of the ambulance service and has not indicated measured value for money achievements directly resulting from development spending.

National Ambulance Advisory Council

4.9 The Ambulance Review Group recommended the establishment of a National Ambulance Advisory Council (NAAC) to ensure that uniform standards of service operate throughout the country. The NAAC was established by Ministerial Order in 1994 for a three-year term, replacing the existing Ambulance Services Council. The council is a part time body whose members are drawn from the Department, the medical profession and the health boards.

4.10 The NAAC has gone part of the way towards achieving its mandate but, to date, has failed to fulfil a number of its functions, as outlined in the Ministerial Order. Table 4.1 summarises the council's achievements relative to the terms of reference.

4.11 A number of factors affect the ability of the NAAC to fulfil its mandate

- The NAAC is an advisory body with no statutory powers over the health boards or the ambulance services. The NAAC depends on co-operation from other bodies to carry out its functions. The lack of statutory authority curtails the ability of the NAAC to achieve its objectives in a number of areas.

- The council cannot enforce compliance with the National Ambulance Standards as it has no power of sanction over the health boards or private ambulance operators.

Table 4.1 Current position in relation to the National Ambulance Advisory Council functions

Functions	Current position
Recommend standards for pre-hospital care	None published
Recommend standard operating procedures and protocols for the ambulance service	Standards in relation to some aspects of the ambulance services were published in 1995
Advise on assessment and approval of training courses and award of diplomas, certificates, etc.	Achieved
Evaluate public and private ambulance services in the context of the standards recommended by the council	A study by the UCD Faculty of General Practice of the operational performance of the emergency ambulance services was commissioned in November 1996
Undertake research on developments in the ambulance service, especially in regard to emerging technology	Appears to be conducted in an ad hoc manner
To report annually on the ambulance service	Annual reports have been produced for the years 1994-1996 on the ambulance fleet; no report has yet been published on the ambulance service

- It is unclear how the council can evaluate public or private ambulance services over which it has no authority.

- The NAAC is a part time body and most council members hold full time positions elsewhere in the health service. A full time council and staff would enable the terms of reference to be completely fulfilled.

- The council does not have an annual budget allocation. The funding of council activities, provided by the Department, appears to be on an ad hoc basis.

4.12 The NAAC has recommended to the Minister for Health that it should become a statutory body. A reconstituted council, with a strong regulatory role in relation to the health boards, and with its own budget and staffing, may prove more effective.

4.13 The first term of the council ended in July 1997. The Department has stated that the council members will be re-appointed before the end of 1997 for a one-year term, pending a review by the Department of alternative approaches to the re-structuring of the council to maximise its effectiveness.

Setting and Monitoring National Performance Standards

4.14 The Department requires that the policies pursued by the health boards agree with the national strategy as outlined in *Shaping a Healthier Future*. Generally, health boards have developed mission statements, objectives and strategies for the delivery of health care. However, the objectives do not include measurable targets for the emergency ambulance service in terms of the efficiency or effectiveness of the service provided.

Standard Patient Report

4.15 The report of the Ambulance Review Group recommended that a standardised patient report form be introduced, and that its use should be mandatory for all emergency ambulance services. A standard form would have several uses including

- transmitting information on the patient's history and medical condition quickly to accident and emergency department staff
- assisting in determining whether prescribed medical protocols have been followed
- facilitating the clinical audit process
- use in the medico-legal process.

4.16 A suggested format for the patient report was included in the Ambulance Review Group report. Agreement on the introduction of the form was only achieved in May 1997. In the years since the recommendation was made, information has been lost which could have greatly assisted the measurement of the effectiveness of the ambulance service and indicated areas where the delivery of medical care could be improved.

4.17 The introduction of patient reports must be accompanied by systems to analyse the data provided and to promote action to rectify departures from best practice in relation to the provision of medical care. The Department has agreed to the appointment of medical advisers for each of the emergency ambulance services to supervise these functions.

Target Response Times

4.18 The nationwide study of the current emergency ambulance response times by the Faculty of General Practice in University College, Dublin commenced in January 1997. The objectives of the study include

- construction of an accurate baseline of response times to emergency calls
- identification of factors contributing to response times
- identification and prioritisation of options for optimising response times.

4.19 The results of the study have been submitted to the service providers and to the Department, and a report on the study findings is now being prepared.

4.20 In setting performance standards, the establishment of achievable response time targets should be the first priority. Monitoring and evaluating the ability of the ambulance services to meet the required performance standards will require the development of systems which accurately record operational performance.

Priority Based Response

4.21 The traditional approach in responding to emergency calls is to dispatch the next available emergency ambulance to the scene of the incident, regardless of the nature of the illness or injuries involved. By contrast, priority dispatch systems are designed first to identify the urgency of the case being reported and then to prioritise cases requiring different levels of response. Ambulance controllers decide on the appropriate response to each situation, primarily through asking the caller a structured set of questions. Cases which are considered on medical grounds to be low priority may not be responded to immediately if to do so would be likely to preclude the immediate dispatch of an ambulance to a later, life-threatening incident.

4.22 Priority dispatch systems are widely used in the US and in Europe. This kind of system is currently in use on a trial basis in a number of UK ambulance service areas. The Ambulance Review Group recommended that health boards should give consideration to the introduction of a priority dispatch system.

4.23 Where priority based systems are adopted, response time targets usually reflect the different service objectives for the different kinds of emergency calls. Accordingly, the introduction of a priority based system should be accompanied by appropriate target response times and monitoring systems.

Training of Ambulance Crews

4.24 National standards for the training of ambulance crews were published jointly by the Department and the NAAC in October 1995 but the introduction of new training and technology was banned by the ambulance service unions from November 1995 to April 1997. The dispute was resolved in April 1997 as part of the negotiations on pay. As a result, the standards were not introduced anywhere in the country between October 1995 and the summer of 1997. In the interim, ambulance crews operated without the minimum training deemed necessary by the NAAC.

4.25 The report of the Ambulance Review Group recommended that the practice of employing nurses on call from hospital wards on emergency ambulances should be ended. Generally, hospital nurses do not have specialist training in pre-hospital care. Consequently, ambulances using nurses as crew members are operating without a two-person crew trained to the specified standard.

4.26 In line with the recommendations of the Ambulance Review Group, all new recruits to the emergency ambulance services are employed as emergency medical technicians. Arrangements for the training to NAAC standards of nurses currently serving with the emergency ambulance services are under discussion.

Ambulance Equipment

4.27 In recent years, almost all rostered ambulances have been equipped with automated external defibrillators at an approximate cost of £1.4 million in 1997 prices. Defibrillators are used to assist cardiac arrest victims by applying electric shocks but can also be used to monitor heartbeat. The Ambulance Review Group report states that "... defibrillation should ideally be performed within four minutes of the cardiac arrest. Every minute's delay after this dramatically reduces the chance of a successful outcome".

4.28 The percentage of calls responded to within four minutes varies between health boards but is in the range of 5% to 19%. Defibrillators undoubtedly add to the effectiveness of the emergency service. Achievement of better response times, coupled with priority based response, would allow their more efficient use in cardiac arrest cases.

4.29 The Department of Health provided development funding for defibrillators but did not conduct a formal cost/benefit analysis. Prior investigation may have highlighted the need to improve operational performance to obtain optimal value for money from the defibrillators.

Conclusions

4.30 The Ambulance Review Group report provided a good basis for the development of effective, efficient and economical emergency ambulance services. However, progress in implementing the report recommendations has been slow.

4.31 The Department, in conjunction with the health boards, should develop and cost an integrated implementation plan for the recommendations included in the report of the Ambulance Review Group. The expected benefits, in terms of effectiveness, efficiency and economy, to be achieved from each element of the implementation plan should also be identified.

4.32 There is a need to set national standards for the emergency ambulance services to ensure that the service is as effective, efficient and economical as possible. This does not necessarily mean that the same type of service, or the same service standard, can be supplied everywhere.

4.33 The planned introduction of clinical audit to the emergency ambulance services is a welcome development, which should strengthen the ability of the service providers to monitor effectiveness. Clinical audit will facilitate the setting of national standards for the quality of pre-hospital medical treatment.

4.34 The cost effectiveness of introducing priority based despatch systems should be explored in the context of setting target emergency call response times and the establishment of systems to monitor the performance of the emergency ambulance services.

Appendix

Examination Methodology

The examination was carried out by staff of the Office of the Comptroller and Auditor General.

Data Collection

The following bodies were consulted

- Department of Health and Children
- National Ambulance Advisory Council (NAAC)
- each of the regional health boards
- Dublin Corporation/Dublin Fire Brigade.

The Department of Health and Children is the body through which public resources are made available for the provision of the ambulance service. Investigation at the Department of Health and Children and the NAAC included examination of their respective roles in developing strategy and policy, setting operational standards and monitoring performance. Information was obtained from documentation, interviews with relevant officials and written replies to queries.

On-site investigations of emergency ambulance services were conducted at the Midland Health Board and Eastern Health Board. These investigations included

- interviews/meetings with relevant personnel in the ambulance and finance units of each organisation
- examination of records
- written requests to relevant health board officials for information
- production of reports from management accounts
- analysis of data.

Based on the work carried out in the Midland and Eastern Health Boards, a questionnaire was developed to obtain data from the remaining six health boards and the Dublin Fire Brigade. Each of the service providers completed and returned the questionnaire. Following analysis of the answers provided, clarifications, supplementary information and confirmation of information supplied were obtained from the service providers, where necessary.

Clearance of Report

A draft report on the value for money examination was circulated to each of the health boards and to the Department of Health and Children. They were invited to comment on the contents of the report and to correct any errors in relation to matters for which they are responsible. The report was revised in the light of the comments received.

Reference Material

This examination referred to previous reports on the ambulance service and to relevant published documents. The main documents used include

Department of Health
Report of the Review Group on the Ambulance Service
Dublin: The Stationery Office, Pn. 0110, December 1993

Department of Health/National Ambulance Advisory Council
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Dublin: Department of Health, October 1995

National Health Service Executive
Review of Ambulance Performance Standards: Final Report of Steering Group
London: Department of Health, CC 0023, July 1996

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Dublin: Department of Health, 1997

National Ambulance Advisory Council
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Dublin: Department of Health, 1997

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— **The Local Authority Ambulance Service**
Report No 1/71, May 1971

— **The Ambulance Service: Southern Health Board**
Report No 1/73, April 1973

— **The Ambulance Service: Midland Health Board**
Report No 5/73, December 1973

— **Ambulance Services in South-East County Dublin and East County Wicklow**
Report No 4/74, July 1974

— **The Ambulance Service in Dublin City**
Report No 7/75, July 1975

— **The Ambulance Service: South-Eastern Health Board**
Report No 10/75, September 1975