V I C T O R I A

Auditor-General
of Victoria

SPECIAL REPORT No. 50

METROPOLITAN AMBULANCE SERVICE

Fulfilling a vital community need

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The President

The Speaker

Parliament House

Melbourne Vic. 3002

Sir

Under the provisions of section 16 of the *Audit Act* 1994, I transmit the Auditor-General's Special Report No. 50, *"Metropolitan Ambulance Service: Fulfilling a vital community need"*.

Yours faithfully

C.A. BARAGWANATH
Auditor-General

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Foreword

Earlier this year, I found it necessary to report to Parliament on some very serious matters concerning the probity of contractual and outsourcing arrangements at the Metropolitan Ambulance Service. The circumstances relating to these matters were identified at an early stage of a performance audit of the Service and demanded that the Parliament be informed as soon as possible.

This Report presents the results of the detailed performance audit of the Service.

As the title to the Report indicates, the Service fulfils a vital community need. It is therefore critical that, at all times, the community can have confidence in the efficiency and effectiveness of its metropolitan ambulance service in responding to emergency calls and providing high quality clinical care to patients.

The various matters discussed in this Report illustrate the intensity of strategic effort taken by the current management of the Service to address those issues which prompted past public criticism of the organisation and specific problems inherited from the previous administration. These problems centred particularly around very clear deficiencies in major outsourcing arrangements with the private sector.

I reiterate the message I conveyed in my earlier Report on the serious probity matters that the strategic management of the Service under its current chief executive officer is positive.

Many important issues have now been earmarked for attention in the Service's forward planning documents. It is my view that, with clear determination by the Government of future funding arrangements and a continued responsible management approach within the Service, the community can confidently expect the Service to progressively move towards achieving a level of performance comparable with best international practice.

C.A. BARAGWANATH
Auditor-General

Part 1

Executive summary

Part 1.1

Overall audit conclusion

1.1.1 The Metropolitan Ambulance Service has undergone a turbulent period since the early 1990s, with sustained criticism over poor ambulance response times, highlighted by a number of events receiving extensive press coverage. The Service's financial performance has been poor with deficits recorded every year up to 1996-97. In addition, the awarding of the communications contract to Intergraph BEST (Victoria) Pty Ltd, along with the outsourcing of a number of other Service operations to the private sector, has created considerable public controversy. Most of the projected savings from outsourcing arrangements have not eventuated, further contributing to the Service's poor financial position and necessitating an increase in annual government contributions of almost 300 per cent to $47 million since 1993-94.

1.1.2 Given the above background which had arisen under the previous administration, audit found the current management of the Service to be very competent, progressively addressing the risks and deficiencies inherited from the earlier administration, bringing about improved operational performance and with a clear vision for the future after recognition of resource requirements and increasing workloads. In addition, the Service is seeking to benchmark its performance against other ambulance services throughout the world.

1.1.3 The financial position of the Service remains a concern for government. The relatively precarious liquidity position, due to low cash flows, has contributed to difficulties in meeting creditor commitments. In this regard, audit considered that the Service was at a disadvantage in maximising its revenue opportunities primarily due to:

- the failure of the Department of Human Services to allow the Service to recoup the full cost of ambulance transport provided to non-subscribers to its Ambulance Membership Scheme and to persons insured by private health insurance schemes;
- declining revenue from the Ambulance Membership Scheme due to the inability of the Service to compete on equal terms with private sector health insurers providing ambulance cover; and
- the provision of free ambulance transport to pensioners and health care card holders without full recoup from government of the cost to the Service of providing such services.

1.1.4 Considerable attention has been given by the Service to the management of outsourcing contracts with the private sector. However, the extent to which the current management of the Service can influence contractors is limited to the terms contained within the contracts which were entered into by the previous administration. With hindsight, the contracts were invariably deficient in terms of measurement of contractor performance in qualitative terms and in relation to the provision of suitable management information to the Service. Any improvements requested by the Service in the quality of contractors' performance have often been accompanied by protracted conflict between the parties, centring on the ambit of contractual provisions and contractors' demands for additional payments. Also, a number of the shortcomings in the Service's outsourcing arrangements cannot be addressed until the contracts expire over the next few years when re-tendering or in-house operations can be considered.

1.1.5 The public's expectation of its ambulance service is that it will respond quickly to emergency calls and provide high quality clinical care to patients. In this regard, audit found that:

- The performance of ambulance teams in responding to emergencies has continued to progressively improve from levels of the past, notwithstanding the impact of a depleted emergency vehicle fleet and the loss of experienced operational staff which have resulted from the policies of the previous administration. The progressive reduction in ambulance response times, despite an increasing workload, can in part be attributed to improved performance by Intergraph in dispatching vehicles in under 150 seconds and by strategic monitoring of the performance of ambulance teams by Service management. By the year 2000, subject to provision of resources, the Service expects to be meeting more stringent response time targets consistent with international best practice;
- Intergraph's Communications Centre is one of the most technologically advanced Centres of its type in the world. With the exception of some issues involving products used by Intergraph from other suppliers, including the level of reliability that can be placed on the mapbase, audit found no reason to doubt the reliability of the hardware and software used by Intergraph. However, certain problems have been experienced by the Service with Intergraph's performance which the Service mainly attributed to the management of resources by Intergraph in relation to its calltaking and dispatching responsibilities. Other factors established by audit related to the increasing levels of emergency calls and the processes associated with the implementation of the Advanced Medical Priority Dispatch System. The majority of these issues have been progressively addressed by the Service, the Bureau of Emergency Services Telecommunications and Intergraph. Since March 1997, the performance of Intergraph in its calltaking and dispatching functions has gradually improved to reach its best performance yet, although still below the performance measures required of it by the Service. The ability of the Service to apply the performance measures under the contract is currently the subject of a dispute between Intergraph and the Service. Due to the inability of Intergraph to reach the targeted levels of performance, significant sums of money have been withheld by the Service from the monthly service charges payable to Intergraph under the terms of the contract;

- Until relatively recent times, inadequate attention has been given to the clinical expertise and ongoing competencies of ambulance officers. Although the Service has a Medical Standards Committee, this Committee has not been in a position to effectively monitor the provision of clinical services in the field. The Service has now strongly focused on this important core function, with a range of initiatives including the conduct of clinical audits, development of a clinical quality assurance plan, increased training and an emphasis on paramedic skills. Further progression in monitoring and researching clinical skills will be largely dependent on the Service's efforts in developing a clinical database;
- Situations occurred when the Intergraph dispatcher could not immediately locate an ambulance for dispatch to attend an emergency within a 12 by 16 kilometre rectangle centred on the location of the emergency. This position was experienced in almost 7 per cent of the most time-critical emergencies during the period December 1996 to April 1997. While there are a range of legitimate reasons for this occurrence and in most instances response vehicles were subsequently found within 2 minutes, it still remains an important issue requiring attention by the Service. Reasons contributing to this situation relate to inadequate resources including shortage of emergency vehicles, high workloads, a failure of ambulance crews to notify Intergraph of their status and technological limitations;
- Despite an anticipation by the Service and Intergraph that mobile data technology would be introduced by May 1994, this has not occurred. The adoption of this technology would assist in reducing time taken to dispatch ambulances, provide increased knowledge to dispatchers of available emergency vehicles and provide better management information in order to monitor performance of ambulance crews; and
- The scheduling by Intergraph of workloads for the Service's non-emergency contractors warranted improvement. In addition, due to workload demands, transportation of patients that could have been provided by the non-emergency contractors was periodically undertaken by the Service's emergency fleet. On other occasions the reverse situation occurred. Although the Service's policy allows for a degree of operational flexibility by permitting an interchange of patient transport between emergency and non-emergency operations, audit considered the use of the Service's emergency fleet for non-core operations, such as non-emergency transport, to be inappropriate, given the impact on the availability of vehicles for emergency operations.

1.1.6 In summary, audit found that within existing financial and resource constraints, the Service was providing a high quality service to the community. The capacity to achieve further efficiency gains leading to internal savings was found to be very limited, particularly in view of the contractual arrangements for outsourced services which have been entered into in previous years in conjunction with the existing enterprise agreement with ambulance staff.

1.1.7 Opportunities for future improvements such as additional emergency vehicles and staff to meet increasing workloads, greater use of technology including the introduction of the substantially delayed mobile data terminals and the establishment of a clinical database, will be dependent on the Service's ability to maximise its revenues and reach agreement with the Department of Human Services on a funding formula which can provide certainty for future planning. Further reductions in ambulance response times can be achieved if resources are provided, which have been identified by the Service in its draft *Emergency Operations Operational Plan 1997-2000*. However, the balancing of the community's expectations for reduced response times against the cost of providing the necessary resources to achieve such a reduction is a matter for decision by government. In this regard, the Department of Human Services, as the responsible agency for ambulance services in the State, has not provided a strategic direction to the Service on these issues.

1.1.8 Finally, audit considers that the most critical issue requiring attention is determination of a future funding formula for the Service which is consistent with the Government's expectation of the Service. Unless this issue is addressed urgently, ultimately the performance improvements in recent times achieved by the Service will begin to decline.

❑ ***RESPONSE*** *provided by Secretary, Department of Human Services*

The Department notes the positive comments about current management of the services and agrees with audit and MAS there is a need to review funding arrangements for MAS. The Department has indicated this to MAS and is in the process of undertaking such review.

The Department notes and agrees with MAS's management response on a number of matters raised in the Report including those relating to the emergency vehicle fleet.

The Department also notes audit's positive conclusion that Intergraph's Communications Centre is one of the most technologically advanced centres of its type in the world.

In several areas such as clinical care, non-emergency transport services and emergency response, suggestions for further research are well focused and helpful.

The Department does not agree with the statement concerning the lack of full recoup from government of the cost of providing ambulance transport to pensioners and health care cardholders, since this does not have regard to prior year adjustments and funding by the Department for budget shortfalls.

❑ ***RESPONSE*** *provided by Chief Executive Officer, Department of Metropolitan Ambulance Service*

The Auditor-General's Report on the Metropolitan Ambulance Service is the product of a detailed review of our operations, and will be a valuable resource in the future development of the organisation. The Report identifies a number of opportunities for improving MAS performance, many of which the Service is already actively pursuing. The general endorsement of current management directions is particularly gratifying given the comprehensive nature of the Report.

The Report identifies future funding arrangements as the most critical issue facing the Government and the Service. MAS strongly supports the Report's recommendation for a detailed review of the current basis for funding.

As recognised in the Report, MAS is operating in a difficult environment, with unprecedented growth in workload and intense public scrutiny of our performance. Nevertheless, significant improvements in performance have been delivered. Key areas of improvement include emergency operations response, clinical services, contractor performance and strategic planning.

There has been an exceptionally high level of growth in the number of emergency cases which MAS has attended over the last 3 years. In 1996-97, emergency caseload increased by approximately 10 per cent, with further growth of almost 17 per cent in the September quarter of 1997-98.

These growth rates make maintenance of response performance a major challenge. However, despite the workload increase, response to 90 per cent of all Code 1 cases has been within 15 minutes since March 1997, and within 14 minutes during August and September 1997. This performance is the best achieved since June 1994 (the earliest available comparable data), and is a credit to our staff.

The performance of our contractors has contributed in part to these results. There have been continuing improvements in Intergraph's performance as measured by the total time to dispatch Code 1 cases (from less than 75 per cent of Code 1 cases dispatched within 150 seconds prior to September 1996, to over 80 per cent in recent months). Intergraph has also achieved a high level of compliance with new internationally proven protocols for call taking (introduced in December 1996), improving the consistency and accuracy of information gathered from callers.

Performance by MAS's non-emergency stretcher contractors has also improved, resulting in a significant reduction in non-emergency response times. All contractors are now accredited to ISO 9002.

The introduction of the Advanced Medical Priority Dispatch System in December 1996 was an extremely important initiative to enhance our clinical performance. AMPDS ensures that medically relevant information is rapidly gathered by calltakers and that the clinically appropriate level of ambulance response is dispatched. The system is based on experience with over 200 million cases worldwide, and has been specifically tailored for Australian conditions by the supplier in consultation with MAS's Medical Standards Committee.

❑ ***RESPONSE*** *provided by Chief Executive Officer, Department of Metropolitan Ambulance Service - continued*

Another major clinical initiative was the implementation of a comprehensive Clinical Quality Assurance Plan, which includes regular evaluation of the effectiveness of patient care.

As indicated in the Report, MAS has also prepared strategic plans covering all major aspects of its activities for the next 3 years. These plans provide the basis for ensuring continuing improvements in performance into the future.

The Auditor-General has highlighted a number of areas for further action, and MAS is already pursuing most of these suggestions. MAS has a clear vision of the future and a strong commitment to further improving its performance. With the continuing support of the community and the Government, we are well placed to move forward.

❑ ***RESPONSE*** *provided by Secretary, Department of Justice*

The conclusion by audit that "Intergraph's Communication Centre is one of the most technologically advanced Centres of its type in the world" is welcomed. While audit's Report relates to Ambulance Services Victoria and in particular the Metropolitan Ambulance Service (MAS), it is important to recognise that the Communications Centre referred to by audit is one of 2 Communications Centres that form the most advanced multi-agency emergency service telecommunication service in the world.

This project is bringing a new era in telecommunications to Victoria's emergency service organisations. The MAS is now experiencing the benefits envisaged when the Government made the decision to establish a shared emergency services computer assisted calltaking and dispatch function and to outsource the delivery of the service to the private sector.

The data collection and management capability of this new system will deliver major benefits to agencies in their future planning, response management and performance measurement. This is illustrated to audit by the way that the audit team could access and analyse data in a way that was not previously possible.

Audit has identified a number of issues associated with the implementation of the CAD service delivered by Intergraph, as well as by other telecommunications service providers such as Telstra. This should not be unexpected in a project of this size and complexity which is a pioneering one. The project's success cannot be judged by the number of problems encountered along the way or by the extent of short-term gains that are made. It's success will be best measured in the medium-term when the agencies, their staff and the community generally have had time to adjust to the change inherent in the project.

It is pleasing to note that while audit has identified a number of issues, these had already been identified by the agencies and are already being acted upon. Of particular importance is the recognition and better understanding than the CAD project has bought to the calltaking and dispatch function that is enabling performance to be accurately measured for the first time. In this respect Victoria has, during the course of this project, led the way is establishing national standards for emergency service telecommunications.

❑ ***RESPONSE*** *provided by Secretary, Department of Justice - continued*

The finalisation of this benchmarking work will address the issues raised by audit regarding the level of service being delivered against appropriate measurements, which, to date, have relied on limited historical information and operational experience. These National benchmark standards will clarify the outputs being sought in both quantitative and qualitative terms.

The importance of these benchmark standards needs to be recognised, as this project has clearly demonstrated that over-emphasis on the speed of calltaking and dispatch can result in the loss of quality in information so vital to the ESOs in providing an appropriate response.

It is disappointing that audit has not attempted to contrast the performance being delivered by the CAD system against the service available to MAS from its former East Doncaster Communication Centre. This would have enabled a more meaningful evaluation to be made as to the benefits being delivery to MAS.

The introduction of technological change brings with it new challenges, particularly when the technology and experience resides outside of Australia. The introduction of a medical triage system for MAS has required the application of these skills and knowledge for the first time in Australia. The initial problems encountered over a relatively short period in late 1996 and early 1997 are outweighed by the substantially enhanced use by MAS of its ambulance resources. These benefits will now be carried through to the other emergency service agencies.

The most efficient use of ambulance resources as a result of the enhanced calltaking and dispatch, automatic vehicle location and AMPDS has enabled MAS to manage a record workload in the past 12 months with increasing levels of performance in service delivery.

The benefits from the Government's decision to partner with the private sector in the shared emergency services telecommunications project are now becoming apparent. There is much more improvement that will become apparent in the near future.

There is an increasing need for attendance to events by a combination of the emergency service resources. The more efficient management and co-ordination of these multi-agency responses will be possible because of the CAD system and its multi-skilled operators. The ability to capture information from a caller only once and to send this information electronically to a number of Emergency Service Organisations will see critical response times reduced and service delivery to the community improved.

The CAD system incorporates one of the largest and most accurate digital mapping facilities in the world. This mapping facility, produced by the Department of Natural Resources and the Environment, is continuing to be developed to meet the demanding levels of accuracy required for time critical responses by the ESOs. The rapid advances made in the implementation of digital mapping for the State as a result of this project and the initiatives being taken to continue to improve its level of accuracy, has established a strategically significant asset for use by the public and private sectors in the future. The role of local government in providing accurate and timely information is vital and the Government has initiated action to ensure that the benefits of this are achieved.

❑ ***RESPONSE*** *provided by Secretary, Department of Justice - continued*

It is pleasing to see that audit recognises the significance of the CADMap in recommending that it be adopted by Telstra as the database for its calling line identification service in Victoria. The improvement in the level of accuracy and availability of calling line identification is of vital importance to the emergency services, and in particular to MAS.

The CAD system also brings to MAS a level of "fail-safe" back-up in its communications that it has not previously had available. This back-up not only applies to the technology capability but also to the operators, with operators at the 2 State Emergency Communication Centres trained to deliver calltaking and dispatch services to MAS.

The performance audit is disappointing in that it has largely focused on problems experienced in implementation, without recognising the substantial gains that have been made already or the foundation that has been established for furthering its development to enhance the capability of ESOs to serve the Victorian community.

It would be naive to expect that the development and operationalising of such a complex and technologically advanced system to service all of the State's emergency service organisations would be achieved without there being some implementation problems. Nevertheless, it is apparent that the Victorian community is now being, and will continue to be, well served by the Government's initiative to establish the shared emergency services telecommunications system.

Part 1.2

Summary of major audit findings

EMERGENCY CALLTAKING AND DISPATCH SYSTEM **Page 31**

- For several months during 1997, Intergraph was in major default under its contract with the Metropolitan Ambulance Service for failing to answer at least 70 per cent of calls within 5 seconds.

  Paras 4.12 to 4.25

- The Service has progressively withheld moneys from its monthly service charges payable to Intergraph due to the failure of Intergraph to meet the specified performance measures.

  Para. 4.20

- Audit analysis identified a very strong interrelationship between the percentage of daily calls directed to Intergraph that are abandoned and the average daily call answer time.

  Paras 4.28 to 4.32

- Research to determine the reasons for the incidence of abandoned calls which are around 17 000 per annum is warranted.

  Paras 4.33 to 4.35

- A major disagreement between the Service and Intergraph concerning the appropriateness and legality of performance measures needs to be resolved as quickly as possible.

  Paras 4.52 to 4.57

- Despite gradual improved performance by Intergraph, it has not been able to comply with performance measures specified by the Service requiring it to dispatch 90 per cent of emergency vehicles within 150 seconds.

  Paras 4.64 to 4.75

- Notwithstanding that Intergraph's system handles life-threatening situations, virtually on a daily basis, the efficiency and effectiveness of the dispatching function at Intergraph is not subject to detailed quality control mechanisms.

  Paras 4.76 to 4.79

EMERGENCY CALLTAKING AND DISPATCH SYSTEM *- continued* **Page 31**

- Only 2 dispatcher stations, resourced by sole operators, are currently utilised to dispatch emergency vehicles across an area of almost 10 000 square kilometres.

Para. 4.80

- Because, during peak workload periods, additional time is absorbed in dispatching ambulance crews to emergencies, which can have far reaching consequences for patient health, and even survival, the Service and Intergraph need to quickly reach agreement on action necessary to increase dispatching capacity during these periods.

Paras 4.81 to 4.89

- There was a high incidence, on average almost 6 per cent, of all emergency cases during the period December 1996 to April 1997, of Intergraph dispatchers unable to locate nearby available ambulances to attend emergencies.

Paras 4.90 to 4.94

- System-generated maps produced by Intergraph show that the inability of dispatchers to locate a nearest available ambulance for an emergency was more prevalent in particular areas.

Paras 4.95 to 4.101

- The mapping facility underpinning Intergraph's system is not subject to continuous updating, thereby limiting its overall effectiveness in rapidly identifying the location of emergencies.

Paras 4.111 to 4.165

- While the operation of the BEST Quality Review Team constitutes an important quality control activity, the Team's effectiveness would be considerably enhanced if both the Service and Intergraph formally reported back to it on actions taken in respect of matters investigated by the Team.

Paras 4.167 to 4.187

EFFECTIVENESS OF THE SERVICE'S EMERGENCY RESPONSE Page 77

- For 1996-97, the Service's response times performance was mainly within its target of 16 minutes for 90 per cent of Code 1 emergencies, despite a significant increase in workloads.

  Paras 5.12 to 5.15

- To complement certain initiatives, such as the establishment of a volunteer emergency response team in the Craigieburn area, the Service should formulate a performance benchmark specific to the highest priority emergencies.

  Paras 5.16 to 5.22

- The Service expects within 4 years to be utilising a performance measure for response times which is broadly in line with existing international benchmarks.

  Paras 5.23 to 5.27

- Over half of the 27 400 multiple responses, where more than one ambulance vehicle was dispatched to the scene of an emergency, which occurred during the 6 month period to 30 June 1997, were regarded by the Service as not justified on clinical grounds after completion of a patient assessment.

  Paras 5.34 to 5.40

- Although the Service has achieved a reduction in multiple responses, it has the challenge of further lowering the incidence of such responses without compromising the quality of patient care.

  Paras 5.41 to 5.42

- The Service should develop performance measures governing the time taken by an ambulance from the departure of scene to arrival at hospital, taking into account ambulance station locations and the proximity of hospitals.

  Paras 5.80 to 5.92

- Time spent at hospital by some ambulance crews was considered to be excessive.

  Paras 5.93 to 5.105

- The implementation of mobile data terminals, which was planned for 1994 as part of the Service's communications network, remains a critical overdue component of the Statewide emergency communications system still to be facilitated by BEST.

  Paras 5.106 to 5.125

EFFECTIVENESS OF THE SERVICE'S EMERGENCY RESPONSE - *continued* Page 77

- The inability of the Service to utilise mobile data terminals is resulting in productivity savings forgone calculated by the Service at $720 000 per annum, in addition to the outlay of $302 000 per annum for additional staff at Intergraph due to the failure to implement this technology.

  Paras 5.122 to 5.123

- Due largely to the actions of the past administration, the existing low level of the Service's emergency vehicle fleet (103 vehicles as at 30 September 1997) is considered by the Service to represent a high risk in terms of its emergency response capability.

  Paras 5.130 to 5.138

- The Service's emergency vehicle fleet is not likely to significantly increase under the current procurement program until at least mid-1998 as approximately 70 vehicles will need to be retired over the period to June 2000.

  Paras 5.140 to 5.141

- No cost savings have been generated from the outsourcing of vehicle fleet management and maintenance to a private sector company and specific weaknesses in the service provider's performance have been identified by the Service.

  Paras 5.145 to 5.148

THE STANDARD OF CLINICAL CARE Page 117

- The role of the Service's Medical Standards Committee would be enhanced if, in addition to standard setting and clinical advice, it was given the responsibility for high level monitoring of the implementation of clinical standards.

  Paras 6.9 to 6.19

- The Advanced Medical Priority Dispatch System, which dispatches emergency vehicles based on a pre-determined clinical assessment of each case, is one of the most technically advanced and efficient dispatch systems in the world.

  Paras 6.48 to 6.57

- There would be merit in the Medical Standards Committee evaluating the need for a protocol in respect of the Service's duty of care for patients who refuse transportation despite warranting medical attention and for those patients deemed by ambulance officers as not requiring further care.

  Paras 6.58 to 6.65

- Scope exists for strengthening the interaction between Service personnel and hospital network staff, particularly those employed in emergency departments in hospitals.

  Paras 6.66 to 6.69

NON-EMERGENCY PATIENT TRANSPORT SERVICES Page 135

- The external surveys and other feedback obtained by the Service indicate a creditable level of client and patient satisfaction with the Service's non-emergency transport operations.

  Paras 7.12 to 7.14

- Under current contractual arrangements, the Service bears all of the risks associated with the provision of non-emergency patient transport.

  Paras 7.15 to 7.18

- Continuing attention needs to be directed by the Service towards new initiatives to lift the level of pre-bookings of non-emergency transport, which currently represents only 25 per cent of non-emergency transport requests.

  Paras7.25 to 7.37

- The use of emergency resources for transport that could be undertaken by non-emergency transport operators is viewed by many ambulance crews as the most critical factor that reduces the availability of ambulances for emergency cases.

  Paras 7.45 to 7.50

- The ongoing need for the Service to be involved in the transport of patients other than by ambulances, in competition with private sector operators, is questionable.

  Paras 7.54 to 7.56

- Private sector firms undertaking non-emergency patient transport are not subject to the same stringent standards applying to the Service.

  Paras 7.57 to 7.64

FINANCIAL AND STRATEGIC MANAGEMENT Page 153

- Throughout most of the 1990s, concerns have existed over the ongoing financial viability of the Service with adverse financial results incurred in all years until 1996-97.

  Paras 8.7 to 8.11

- The Service is experiencing difficulty in making payments to suppliers as they fall due.

  Para. 8.12

- On a strategic basis, the Department will need to define its expectations for the Service and ensure funding is in line with those expectations.

  Paras 8.13 to 8.15

- Expenditure of the Service has continued to increase in line with the workload and revenue from sources other than government grants has continued to decrease from approximately $47 million in 1993-94 to $32 million in 1996-97. During the same period, annual government funding to the Service has had to be increased from $16 million to $47 million.

  Paras 8.16 to 8.29

- The ability of the Service to increase revenue is severely limited, in that it has been constrained in recouping the full cost of providing transport to pensioners, health care card holders, non-subscribers to the membership scheme and transport costs incurred by ambulance subscribers to private health funds.

  Paras 8.30 to 8.33

- Subscriber numbers fell from 922 000 in 1991-92 to 750 000 in 1996-97, primarily because of the inability of the Service to compete on equal terms with private health funds offering similar schemes at cheaper rates.

  Paras 8.44 to 8.48

- Average fees currently charged by the Service for emergency patient transport are $272 per trip, only 47 per cent of the average cost of $576 incurred in providing the transport.

  Para. 8.51

- The Service is currently exploring a range of options for the future administration of the subscriptions scheme, given that envisaged cost savings and quality improvements have not eventuated from the outsourcing arrangement with the private sector.

  Paras 8.55 to 8.67

- The Service has a vision for the future which, although dependent upon funding and the achievement of internal efficiency gains, clearly articulates the strategies required to bring it closer operationally to international best practice.

  Paras 8.73 to 8.79

Part 2

Background

ROLE OF THE METROPOLITAN AMBULANCE SERVICE

2.1 The Metropolitan Ambulance Service is responsible for providing emergency medical transport, pre-hospital care and non-emergency stretcher and clinic car transport services for around 3.2 million people throughout the Melbourne metropolitan and Mornington Peninsula regions, an area of almost 10 000 square kilometres. It is also responsible for providing air ambulance services throughout the State. The Service is an integral component of the health care system and, consequently, a significant infrastructure is in place to enable a rapid emergency response and delivery of a high standard of pre-hospital care to the community.

2.2 The objectives of the Service as outlined in the *Ambulance Services Act* 1986 are as follows:

- *"to respond rapidly to requests for help in a medical emergency;*
- *to provide specialised medical skills to maintain life and to reduce injuries in emergency situations and while moving people requiring those skills;*
- *to provide specialised transport facilities to move people requiring emergency medical treatment;*
- *to provide services for which specialised medical or transport skills are necessary;* and
- *to foster public education in first aid."*

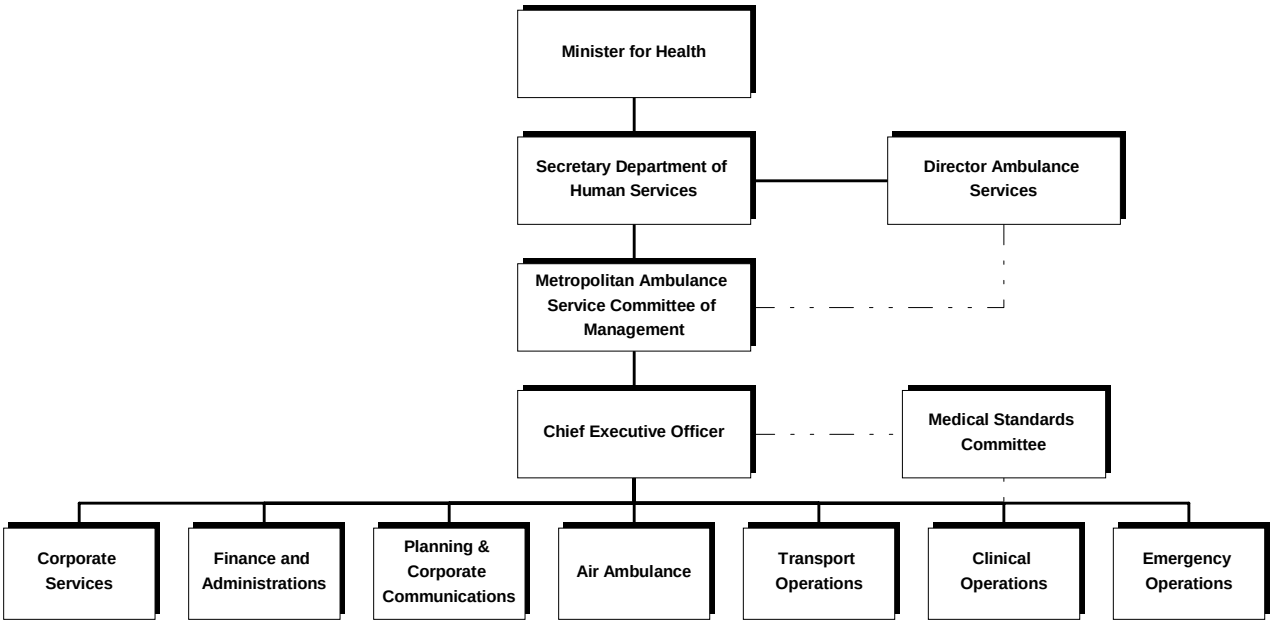
2.3 The Service reports to the Ambulance Services Section within the Department of Human Services. The Department issues policies and directions from time-to-time, and maintains Statewide statistics and information. The Ambulance Services Section is also responsible for the provision of government grants, monitoring the Service's performance and reporting to and advising the Minister on related matters.

2.4 The Service is the largest ambulance service within the State with 62 emergency response locations, 784 staff (excluding non-emergency contractors) and 218 vehicles. Over the past decade, the Service has been subject to extensive review which has prompted structural and management changes, competition from the private sector, industrial unrest and adverse media comment with respect to ambulance response times and several high profile events.

MANAGEMENT STRUCTURE OF THE SERVICE

2.5 The management structure of the Service and its inter-relationship with the Department of Human Services are illustrated in Chart 2A:

CHART 2A
INTER-RELATIONSHIP BETWEEN THE
SERVICE AND THE DEPARTMENT OF HUMAN SERVICES



Source: Department of Human Services.

2.6 Key features of the management structure are:

- the Emergency Operations of the Service (representing its primary function), which seeks to provide rapid response to emergency patients and the delivery of pre-hospital clinical care;
- The Medical Standards Committee which provides advice, information and expertise on issues that affect clinical performance of ambulance crews;
- Transport Operations which encompasses non-emergency stretcher transport (provided by 3 patient transport contractors), in-house transport of ambulatory patients and attendances by the Service at public venues throughout the Melbourne metropolitan area; and
- The Air Ambulance division which manages the Service's air ambulance (helicopter and fixed wing aircraft) operations. The helicopter provides rapid transport to major metropolitan medical facilities for patients primarily within a 150 kilometre radius of Melbourne .The fixed wing aircraft provide emergency services within Victoria and interstate where necessary.

EMERGENCY OPERATIONS

2.7 As indicated above, emergency operations represent the primary function of the Service. During 1996-97, the Service responded to around 160 000 emergency cases in the Melbourne metropolitan area and was involved in the transportation of over 118 000 emergency patients.

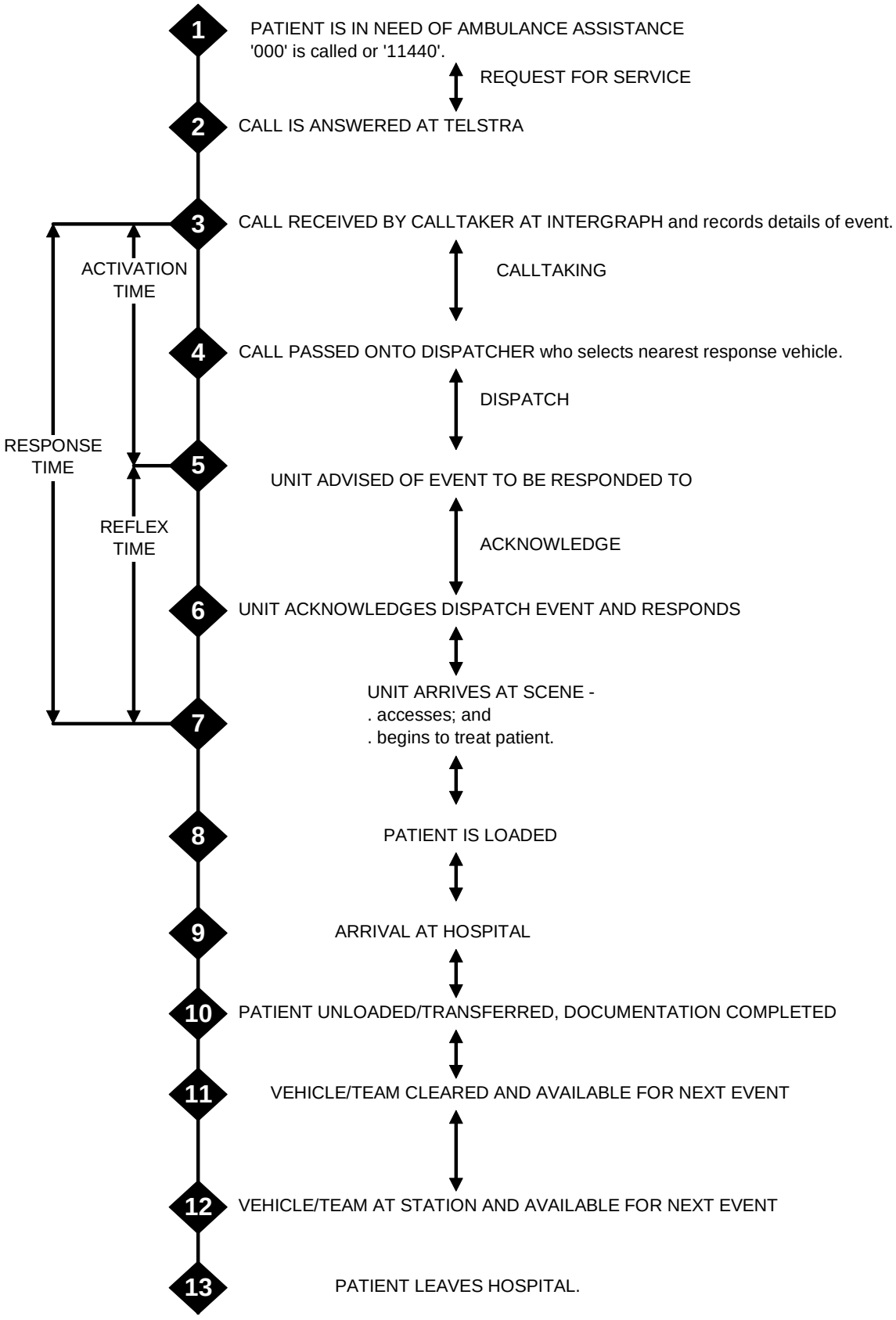
2.8 There is a public expectation that the Service will provide a timely, appropriate and professional response to all calls for emergency assistance. To this end, the Service employs a range of resources to ensure that the best possible response is provided to each case based upon an assessment of the urgency and clinical condition of the patient involved in each emergency event.

Processes involved in the delivery of emergency ambulance services

2.9 A call for emergency ambulance assistance activates a series of events within the Service which often culminates in the handover of a patient to hospital emergency staff for the provision of in-hospital care. Calltaking, dispatching, and communications functions are undertaken by Intergraph on behalf of the Service. The involvement of Intergraph forms only one part of the process involved in the delivery of emergency ambulance services to the community. Telstra is responsible for directing the emergency calls through to Intergraph. In addition, Intergraph is reliant upon external suppliers for the paging system, automatic vehicle location system, call line identification system, mapping system and the Advanced Medical Priority Dispatch System.

2.10 Chart 2B depicts the various processes involved in the delivery of emergency ambulance services.

CHART 2B
PROCESSES INVOLVED IN THE DELIVERY OF EMERGENCY AMBULANCE SERVICES



Source: Chart developed by Victorian Auditor-General's Office.

2.11 As indicated in Chart 2B, the emergency response process is activated by a person dialling Telstra (000) or the Intergraph calltakers direct on 11440. The call to Telstra, based on which emergency response service is required (police, fire, ambulance, or a combination), is directed to Intergraph's communications centre. Once the location and priority of emergency events are determined, they are passed onto dispatchers who identify and dispatch the nearest and most appropriate vehicles in accordance with the Service's dispatch protocols. Ambulance crews are alerted to a case using a communications facility known as a selcall. Details of the event to be attended are provided by radio and pagers (the latter serving as a back-up communication device in the dispatch process). Upon ambulance arrival, the patient is accessed, evaluated as to the clinical condition, provided with clinical services, where necessary, and transported, if required, to the nearest appropriate hospital.

Part 3

Conduct of the audit

AUDIT OBJECTIVE

3.1 The overall objective of the audit was to assess the extent to which the Metropolitan Ambulance Service was achieving its objectives particularly in regard to its ability to respond rapidly to emergency situations, deliver skilled medical services in its role as a first point of contact for Victoria's health care network and provide non-emergency transport to persons requiring these services.

3.2 Specific attention was directed during the audit to determining whether:

- the Service's emergency response capabilities comply with best practice and risk management principles;
- clinical practices of the Service are performed in line with appropriate medical standards;
- non-emergency transport services provided to the community are of a high quality and are effectively regulated; and
- strategic and financial management practices were effective in ensuring the ongoing viability of the Service and maintaining and enhancing the quality of service delivery.

AUDIT SCOPE

3.3 The audit focused primarily on the role of the Metropolitan Ambulance Service in delivering services to the community. It included examination of:

- the communications system operated by Intergraph BEST (Victoria) Pty Ltd (referred to in this Report as Intergraph), under an outsourcing arrangement with the Service, as well as of the system for taking calls requesting emergency assistance and the subsequent dispatch of ambulance vehicles in response to these situations;
- the subsequent response by the Service to these emergency situations including:
    - overall response times by the Service;
    - the time spent by ambulance crews at various stages of the emergency response process including time at the scene, time delivering patients to hospital and the time spent at hospitals;
    - potential for the use of information technology, such as mobile data terminals, to improve the Service's emergency response capability; and
    - the management of the Service's emergency vehicle fleet;
- the standard of clinical care provided by the Service as an initial point of contact with the State's health care system;
- the delivery of services to non-emergency patients; and
- the financial and strategic management framework operating within the Service.

SPECIALIST ASSISTANCE

3.4 Specialist assistance was provided to the audit team by:

- Dr G. Braitberg, Director of Emergency Medicine at the Austin Repatriation Medical Centre, who conducted an examination of the standard of clinical care provided by the Service;
- Mr G. Schomburgk of Lane Communications Pty. Ltd. who completed a technical evaluation of the Service's communications system; and
- Mr N Day, Centre for Program Evaluation - The University of Melbourne, who assisted with the statistical analysis of certain components of calltaking and dispatching functions.

IMPETUS FOR THE AUDIT

3.5 The delivery of ambulance services to the Victorian community was initially identified in July 1995 as an appropriate topic to be subject to a performance audit, because of the importance of these services to the effective operation of the State's overall health care network. It was proposed that this audit would place particular emphasis on the Metropolitan Ambulance Service, given its position as the largest of the State's 7 ambulance services.

3.6 The decision to proceed with the performance audit of ambulance services was endorsed by the Parliament's Public Accounts and Estimates Committee in March 1996 following consultation with the Committee on annual performance audit planning as required by the *Audit Act 1994*.

3.7 Subsequent to this endorsement, the Minister for Health requested in May 1996 that a wide-ranging audit of the Metropolitan Ambulance Service be undertaken, particularly in relation to the major changes that had occurred in recent years including extensive outsourcing of activities and significant financial pressures facing the Service.

PREVIOUS REPORT ON THE METROPOLITAN AMBULANCE SERVICE

3.8 Special Report No. 49 - *Metropolitan Ambulance Service: Contractual and outsourcing practices* was tabled in the Parliament in April 1997 in advance of this current more detailed report on the operations of the Metropolitan Ambulance Service.

3.9 The early tabling of Special Report No. 49 was aimed at informing the Parliament as soon as possible of extremely serious matters relating to consultancy and outsourcing contracts entered into during the term of the Service's previous administration, April 1993 to March 1995.

3.10 In response to the findings included in the April 1997 Report, the Minister announced in Parliament that:

- the Victoria Police had been asked to investigate the matters raised by audit; and
- senior counsel had been engaged to advise whether there were grounds for either the Department or the Service to commence action to recover moneys paid to any person or consulting company engaged by the Service during the period 1993 to 1995. The Department subsequently engaged a financial consultant in order to ascertain the prospect of instituting civil proceedings to recover any amounts paid to persons or corporations as a consequence of matters raised in the April 1997 Report to the Parliament.

3.11 Over the last 6 months, audit has provided assistance, as requested, to these investigations. It is understood that all investigations are currently continuing.

3.12 The audit was performed in accordance with Australian Auditing Standards applicable to performance audits and, accordingly, included such tests and other procedures considered necessary in the circumstances.

ASSISTANCE PROVIDED TO AUDIT

3.13 The current chief executive officer, other management and staff of the Service provided significant support and assistance to audit.

3.14 In addition, Intergraph BEST (Victoria) Pty Ltd was very helpful to audit in relation to examination of matters concerning the calltaking and dispatch functions, including data facilitation and analysis.

3.15 The Department of Human Services, mainly through its Ambulance Section, provided valuable assistance during the conduct of the audit.

3.16 Audit wishes to acknowledge the contribution that assistance from the above sources made to the preparation of material included in this Report.

Part 4

Emergency calltaking and dispatch system

OVERVIEW

4.1 The quality and efficiency with which calltaking and dispatch activities are undertaken by Intergraph on behalf of the Service, is integral to meeting community expectations of a timely, appropriate and professional emergency response service. The Intergraph communications centre is one of the most technologically advanced Centres of its type in the world.

4.2 Since Intergraph's involvement in 1995, problems have been experienced by the Service with Intergraph's performance which the Service mainly attributed to the management of resources by Intergraph in relation to its calltaking and dispatching responsibilities. Other factors which have directly impacted upon the efficiency of these activities have included increasing levels of emergency calls and issues associated with the initial implementation of the Advanced Medical Priority Dispatch system. These issues have, in the main, been progressively addressed by the Service and Intergraph and since March 1997 the performance of Intergraph in undertaking its calltaking and dispatch functions has improved.

4.3 However, performance still remains below the Service's specified performance measures which require Intergraph to answer 90 per cent of emergency calls within 5 seconds and the dispatch of a vehicle to 90 per cent of Code 1 emergencies within 150 seconds. Due to the failure by Intergraph to meet these performance measures, the Service has progressively withheld moneys from its monthly service charges payable to Intergraph.

4.4 Intergraph disputes the ability of the Service to apply the performance measures under the contract without an independent assessment as to their suitability.

4.5 Other significant matters which require timely resolution by the Service, BEST and Intergraph include identification of the factors relating to the current level of abandoned calls, development of quality control processes for the dispatch function, review of the appropriate level of dispatch capacity during peak periods and establishment of a continuous update process of the CAD Map.

CALLTAKING FUNCTION

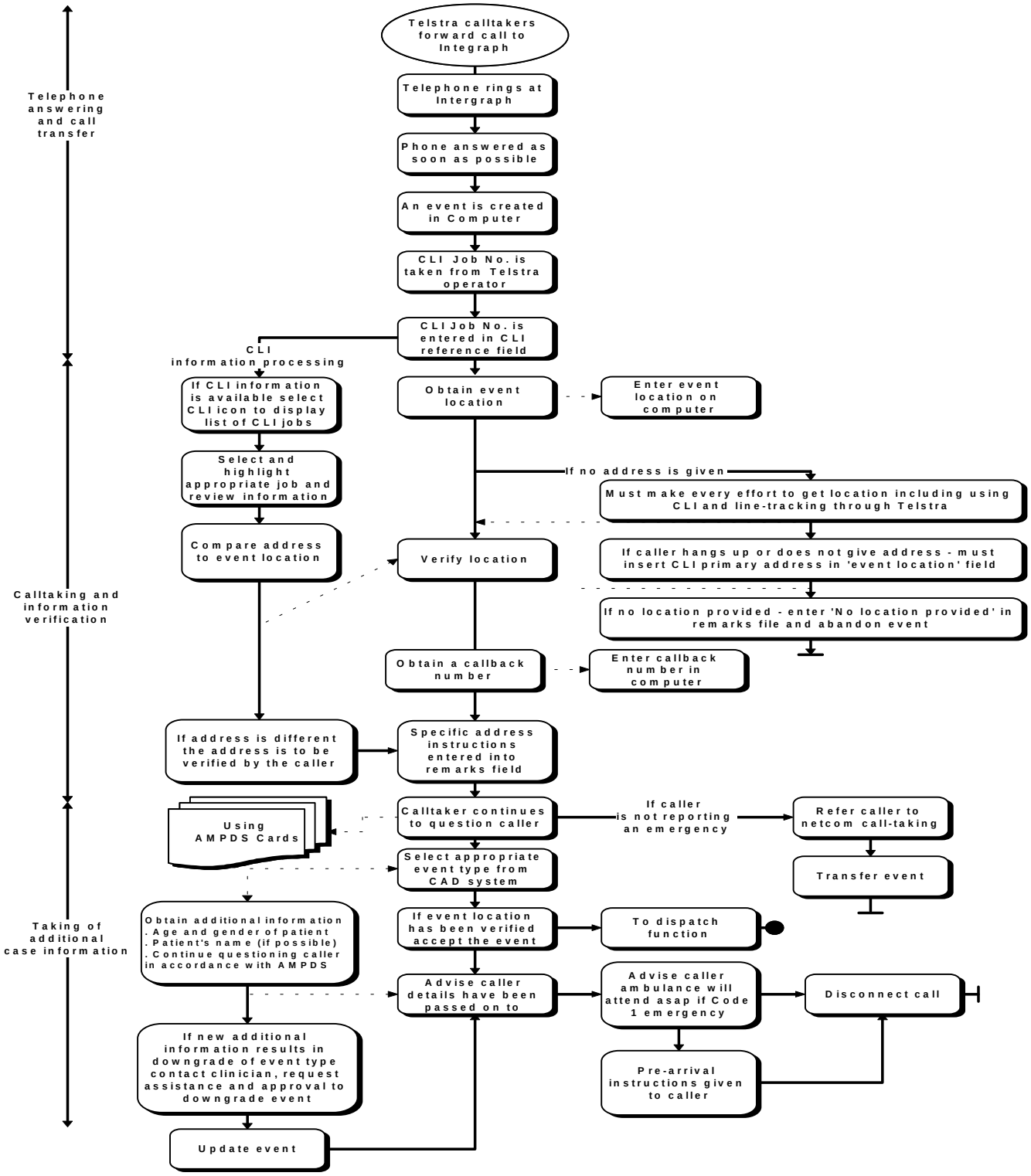
4.6 The need for a person to call for emergency ambulance assistance may arise at any time. For the majority of persons, making such a call can be very stressful and demanding.

4.7 There is a public expectation that the Metropolitan Ambulance Service will provide a timely, appropriate and professional response to any calls for assistance. To this end, the Service employs a range of resources to ensure that the best possible response is provided to each case based upon an assessment of the urgency of each emergency event.

4.8 A call for emergency ambulance assistance received by Intergraph's calltakers on behalf of the Service (this function has been outsourced to Intergraph since August 1995) activates a series of events which often culminates with the admission of a patient to a hospital.

4.9 Chart 4A provides details of the various activities performed by calltakers in responding to telephone requests for emergency ambulance assistance.

CHART 4A
ACTIVITIES PERFORMED BY CALLTAKERS



CLI = Call Line Identification AMPDS = Advanced Medical Priority Dispatch System

4.10 Chart 4A illustrates the important activities undertaken by calltakers. These activities include:

- the speedy answering of calls;
- formal recording of critical information relating to an emergency, such as location, etc. within Intergraph's system;
- determination of the medical condition of the patient and the appropriate priority level to be assigned to the emergency in accordance with the Service's medical calltaking and dispatch protocols;
- transfer of all relevant information to one of Intergraph's 2 emergency dispatchers to arrange for the nearest available ambulance crew to respond; and
- provision of re-assurance and at times, life-saving advice to the caller to assist in the emergency prior to the arrival of the ambulance crew.

4.11 As calltakers are the first point of communication after receipt of a call, the quality and efficiency with which they undertake their tasks will have a direct impact upon the ultimate outcome for the patient.

Importance of speed with which calls are answered

4.12 A caller requesting emergency ambulance assistance will expect the call to be answered immediately.

4.13 The importance of speed in answering emergency calls was first recognised in the BEST Master Services Contract with Intergraph in May 1995 with the inclusion of an initial measure to be applied to all emergency services involved answering 99 per cent of calls within 5 seconds.

4.14 However, it was not until September 1996, when a settlement regarding Intergraph's cost and activity levels was reached and amendments made to the contract, that a formal *call answer* performance measure was agreed between the parties. *Call answer* time is the time taken from when the call enters the queue at the Intergraph communications centre after leaving the Telstra 000 operator to the time the Intergraph calltaker answers the call. At that time, the parties also agreed to adopt a *total time to dispatch* performance measure which covers the time elapsed from when an emergency is created by the calltaker (*event creation*) after answering the call to the time that the Intergraph dispatcher dispatches the emergency to the ambulance crew. As most tasks associated with this latter measure relate to the dispatching function, relevant comment has been included later in this Part of the Report.

4.15 Table 4B provides relevant details of the emergency *call answer* performance measure.

TABLE 4B
THE EMERGENCY *CALL ANSWER* PERFORMANCE MEASURE

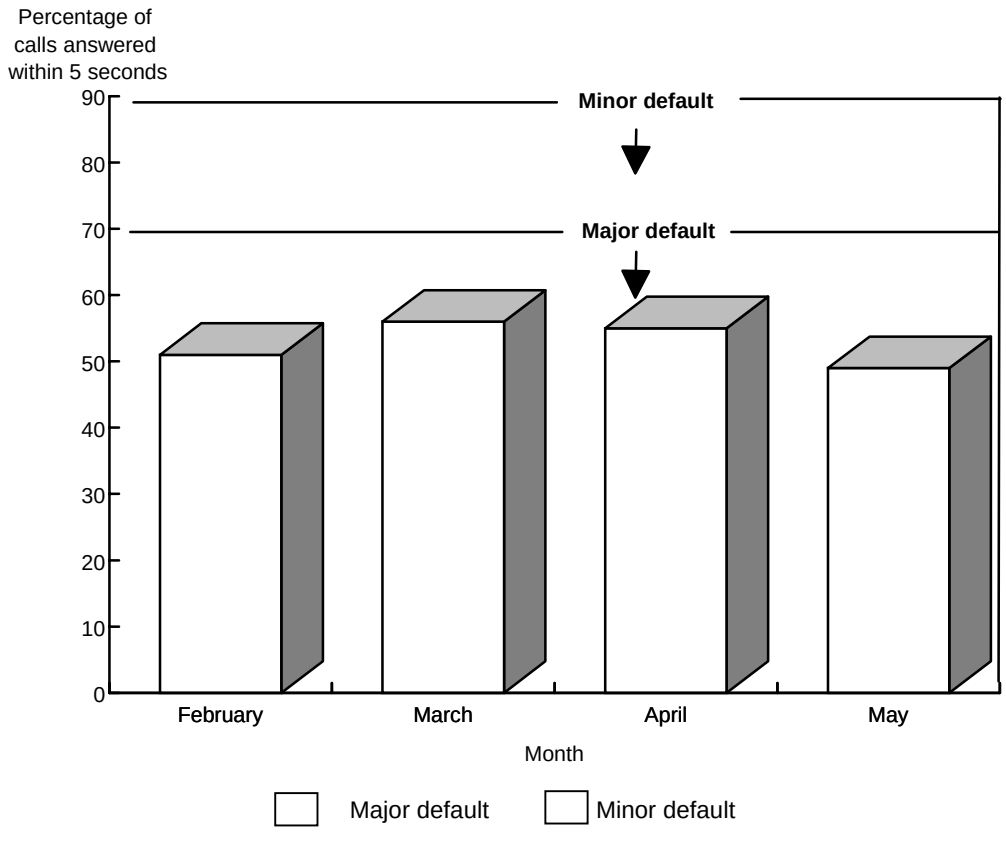
Operative date	*Measure*	*Condition for minor default by Intergraph*	*Condition for major default by Intergraph*
1 September 1996 to 31 January 1997	10 seconds	Measure achieved in less than 80 per cent of cases	Measure achieved in less than 70 per cent of cases
From 1 February 1997	5 seconds	Measure achieved in less than 90 per cent of cases	Measure achieved in less than 70 per cent of cases

4.16 The revision made to the measure from 1 February 1997 was also determined under the September 1996 settlement to account for expected continuous improvement in Intergraph's performance.

4.17 The amendments to the contract arising from the September 1996 settlement provided for an activity benchmark to be set of 828 calls per day, representing an aggregate, according to the Service, of 714 emergency telephone calls and 114 non-emergency transport booking calls. Where the level of actual calls in a month exceeded 110 per cent of the aggregated benchmark level of 828 calls per day, over the month, the performance measure was not to apply for that month.

4.18 Chart 4C provides a comparison of the actual level of performance achieved by Intergraph against the *call answer* performance measure of 5 seconds for the 4 month period 1 February to 31 May 1997.

CHART 4C
ACTUAL EMERGENCY *CALL ANSWER* TIME COMPARED TO THE 5 SECOND PERFORMANCE MEASURE,
1 FEBRUARY TO 31 MAY 1997



Source: Chart developed by Victorian Auditor-General's Office from monthly statistical data provided by Intergraph.

4.19 Chart 4C discloses that Intergraph was in major default status for the period 1 February to 31 May 1997 against the targeted level of at least 70 per cent of calls required to be answered within 5 seconds. It was also evident from the information examined by audit that there was a steady deterioration in Intergraph's performance with 57 per cent of calls answered within 5 seconds in March 1997 falling to only 49 per cent in May 1997.

4.20 For the 3 subsequent months (June to August) performance was also below the major default performance target. However, in July, the actual calls exceeded 110 per cent of the benchmark activity for the month based on 828 calls per day, which meant that the performance measure was not applicable in this month. The latest available information to audit, in August 1997, recorded that the average *call answer* time for emergency calls was 7 seconds, still below the performance measure.

4.21 Because of the failure by Intergraph to achieve the targeted levels of performance for both this measure and the *total time to dispatch* measure (latter measure discussed later in this Part), significant amounts have been withheld from Intergraph by the Service under the terms of the contract. An amount of $186 000 was withheld at 30 June 1997.

4.22 The inability of Intergraph to meet the targets established under the 5 seconds *call answer* performance measure has been attributed by the Service to a combination of the following factors:

- Intergraph did not employ sufficient calltakers to meet its contractual obligations;
- inadequate direct supervision of calltakers;
- high levels of staff turnover; and
- inadequate training of newly recruited calltakers.

4.23 In discussions with audit, Intergraph indicated it had employed an additional 14 calltakers since January 1997. It was of the view that the revised *call answer* performance measure introduced in February 1997 may not be achievable and claimed that the issues identified by the Service had since been addressed, as evidenced by a continuous improvement in its performance, with 91.8 per cent of calls answered within the original 10 seconds target during August 1997. Recent data clearly indicates that the *call answer* speed of 90 per cent within 5 seconds is achievable.

4.24 Notwithstanding that the terms of the contract were amended to reflect the 5 seconds *call answer* performance measure arising from the settlement reached between the parties in September 1996, Intergraph has continued to report to the Service monthly performance information based on the 10 seconds *call answer* performance measure.

4.25 In summary, for the period February to August 1997, the Service maintained that Intergraph was in major default status under its contract with the Service for non-achievement of the more stringent 5 seconds *call answer* performance measure (with the exception of July because of the high activity levels in this month). The Service continues to withhold moneys from Intergraph because of this failure to meet the 5 seconds performance measure, although Intergraph maintains that the Service is acting outside its authority.

Consequences of delays in call answering

4.26 In emergency situations, it would be very distressing for callers to wait excessive periods of time for their calls to be answered. This factor represents the basic rationale for incorporation of performance measures dealing with call answering time within the contract to govern Intergraph's performance in the area.

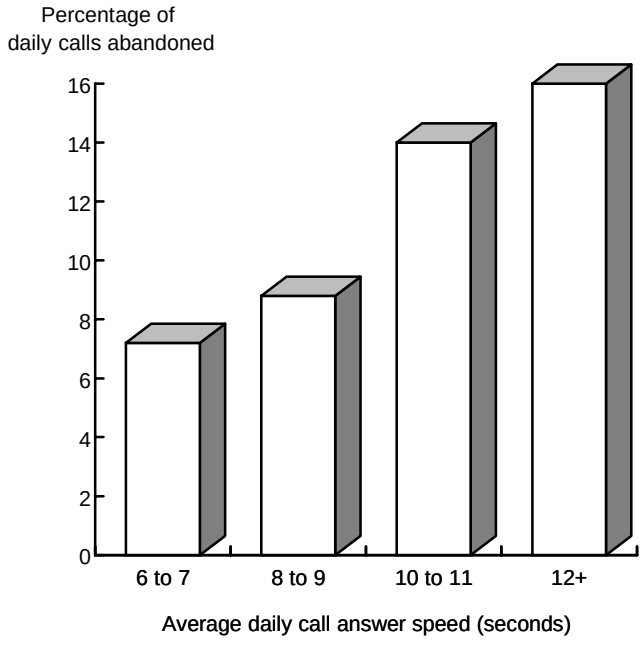
4.27 More importantly, callers may, rather than wait until their calls are answered, decide to abandon their calls and arrange their own transport of the patient to a hospital or doctor for medical care. Such actions have the potential to place the patient at risk and give rise to an erosion of community confidence in the Service's ability to respond quickly to calls for emergency assistance.

Level of abandoned calls

4.28 Based on records maintained by Intergraph, audit determined that around 17 000 calls a year are abandoned by callers to the 11 440 ambulance emergency number and the 000 general emergency number. The 000 calls are abandoned after the Telstra operator has diverted the call to Intergraph and while the caller is waiting for Intergraph to answer the call.

4.29 To assess the relationship between abandoned calls and waiting time, audit compared for the 6 month period 1 January to 30 June 1997, involving 8 800 abandoned calls, the percentage of daily abandoned calls to Intergraph before answer and the average daily waiting time for calls to be answered. The results of the audit analysis are shown in Chart 4D.

CHART 4D
COMPARISON OF LEVEL OF ABANDONED CALLS WITH AVERAGE DAILY CALL ANSWERING TIMES, 1 JANUARY TO 30 JUNE 1997



Source: Chart developed by Victorian Auditor-General's Office from monthly statistical data provided by Intergraph.

4.30 Chart 4D exhibits a very strong interrelationship between the percentage of daily calls abandoned and the average daily call answer time. In essence, the longer it took for Intergraph to answer a call, the greater the likelihood that the caller would abandon the call before it was answered. If Intergraph was to meet the performance measure of answering 90 per cent of calls within 5 seconds, there would be an expectation that the level of abandoned calls would drop significantly.

4.31 Further analysis by audit also disclosed that an interrelationship existed between the daily level of calls (i.e. workload) and the incidence of calls abandoned. In other words, the more calls received on a daily basis the greater the incidence of call abandonment.

4.32 The extent to which calls were abandoned taken as a percentage of total daily calls ranged from a low of 4 per cent to a high of 19 per cent. Notwithstanding the absence of an appropriate benchmark, this latter figure, equalling almost one in 5 calls was seen by audit as a matter for concern, given the serious implications in terms of public wellbeing which arise from delays in calltaking.

4.33 From discussions with the Service, it was evident to audit that issues associated with the level of abandoned calls have not, to date, been regarded as a priority strategic issue. As a consequence, no current research on the subject had been undertaken by the organisation.

4.34 Factors likely to contribute to call abandonments include:

- Insufficient calltakers employed by Intergraph, particularly during peak periods, notwithstanding Intergraph's advice to audit that additional calltakers had been employed since January 1997;
- The failure by Intergraph to achieve the 5 seconds *call answer* performance measure which has formed part of its contractual obligations since February 1997;
- Abandonment by callers after realising that another call has been made in respect of the same emergency incident;
- The likelihood that some calls of a non-emergency nature or hoax calls are directed by Telstra to Intergraph but abandoned before answer; and
- Based on a view expressed by Intergraph, the re-direction by Telstra of an unanswered call from one call line to another, in an attempt to assist the waiting caller, which results in the logging of the re-directed call as abandoned. Surprisingly, no information was available from either the Service or Intergraph on the incidence of this practice.

4.35 There is little doubt that contemporary research, under the overview of the Service and the Bureau of Emergency Services Telecommunications (hereafter referred to as BEST), is needed to accurately identify the factors contributing to the current high level of abandoned calls and to assist in the formulation of corrective strategies.

❑ ***RESPONSE*** *provided by Chief Executive Office, Metropolitan Ambulance Service*

The report recommends research be undertaken into the current number of calls to the communications centre which are abandoned, and MAS supports this recommendation. However, it should be noted that Intergraph is contractually bound to answer 90 per cent of all emergency calls within 5 seconds, and this stringent performance target should ensure that callers are not discouraged. Intergraph has not yet achieved the target over a full month, but recent performance has improved markedly and the target has been consistently achieved in the latter part of October 1997.

Time taken to event acceptance

4.36 The discussion to this point within this Part has centred on time elapsed up to the answering of a call by a calltaker.

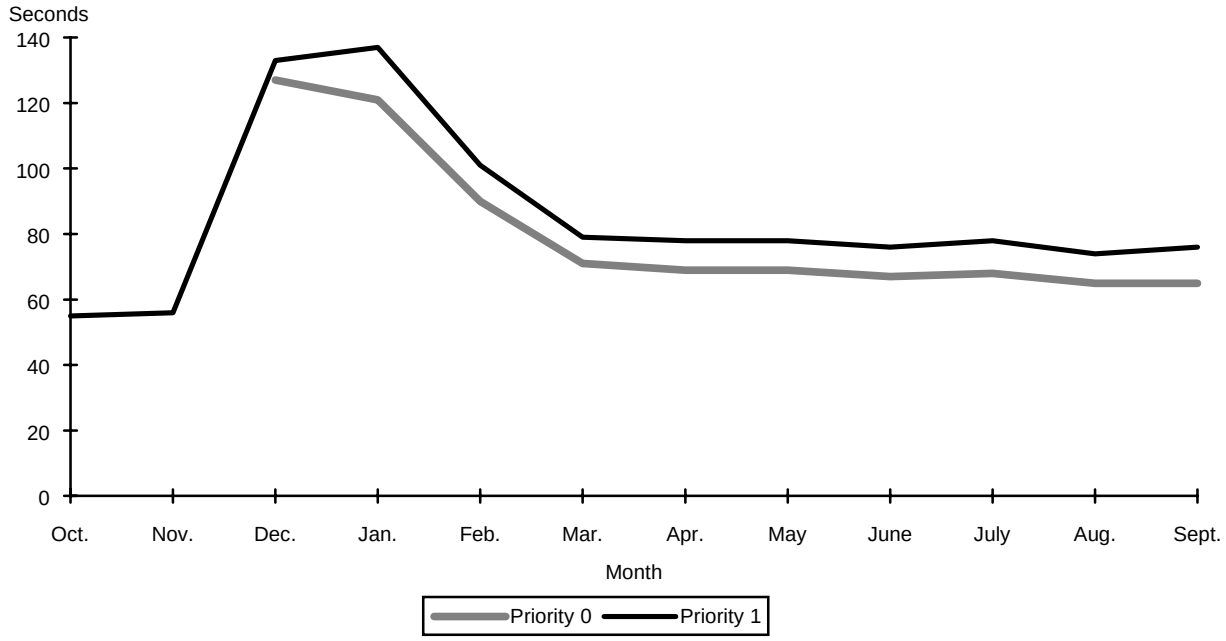
4.37 On answering a call, calltakers immediately begin questioning the caller according to the Advanced Medical Priority Dispatch System and entering data into the communications system (this is referred to as *create event*). When the appropriate data has been collected (as per the Advanced Medical Priority Dispatch System), the calltaker transfers the event to the dispatcher (this is referred to as *accept event*). The time between *create event* and *accept event* is not subject to a separate contract performance measure, but forms part of the *total time to dispatch*, which is covered by a performance measure.

4.38 As explained in the introductory paragraphs to this Part, calltakers are required, during the time taken to event acceptance, to obtain from the caller certain case-critical information such as location of the event and the medical condition of the patient, enabling the priority level to be assigned to the emergency prior to event acceptance and transfer of relevant details to a dispatcher. This event transfer from calltaker to dispatcher occurs instantaneously upon the calltaker selecting the event accept icon on the computer screen.

4.39 Like all other steps in the Service's emergency process, the gathering of case-critical information up to the point of transfer of details to a dispatcher must occur in the shortest possible time in the interests of the patient.

4.40 To determine the level of time taken by calltakers to event acceptance, audit analysed, from information used by Intergraph to assess its operational calltaking needs, daily average event acceptance times covering Code 1, priority 0 and priority 1 emergencies for the period 1 October 1996 to 30 June 1997. In terms of dispatching priority, Code 1 emergencies are defined as time-critical requiring a lights and sirens response. Within this code there are 3 levels of medical conditions referred to as *priority 0*, which means immediately life-threatening, such as cardiac arrest, *priority 1*, which refers to probably life-threatening medical conditions, and *priority 2*, which refers to possible life-threatening medical conditions. Chart 4E provides relevant details of daily average acceptance times for Code 1 - (priority 0 and priority 1 calls).

CHART 4E
MONTHLY AVERAGE EVENT ACCEPTANCE TIMES,
(CODE 1 - PRIORITY 0 AND 1)
1 OCTOBER 1996 TO 30 SEPTEMBER 1997



Note: Dispatch Priority 0 and 1 cases were separated only as of 4 December 1996.

Source: Chart developed by Victorian Auditor-General's Office from monthly statistical data provided by Intergraph.

4.41 As indicated in the chart, call acceptance times were relatively constant for most of the 9 month period but there was a sharp increase in times between December 1996 and mid-February 1997. This increase coincided with the introduction by the Service of new calltaking and dispatch protocols (Advanced Medical Priority Dispatch System, discussed under the next heading).

4.42 It also needs to be recognised that calltakers are, in most situations, required to continue dialogue with the caller, after acceptance of the emergency and transfer of relevant details to the dispatcher. This dialogue is necessary to obtain from the caller additional information, likely to be critical for the ultimate wellbeing of the patient, which is passed electronically to the dispatcher to further assist the assigned ambulance crew. Such information may include:

- the specific medical history and condition of the patient;
- pre-arrival instructions such as the most suitable form of first aid assistance to the patient, e.g. procedures for Cardio-Pulmonary Resuscitation; and
- relevant environmental or physical characteristics that may have a significant bearing upon crew safety such as the potential risk of infection or presence of dangerous gases etc.

4.43 While such time will not impact upon the Service's overall response times, as an ambulance crew will have already been dispatched to the emergency, the level of efficiency with which this task is undertaken by calltakers will influence their capacity to address, in a timely manner, other calls waiting to be answered.

4.44 Any time absorbed in dialogue with the caller after acceptance does not form part of the performance measures specified under the contract. It was, therefore, not possible for audit to determine whether Intergraph's performance was satisfactory or otherwise for this important element of the calltaking function.

4.45 Although audit concurs that the time between *event creation* and *event acceptance*, as a component of the *total time to dispatch* should not form part of the performance measures stipulated under the contract, there would be benefit to management in monitoring this important component given its potential impact on the availability of calltakers.

IMPLEMENTATION OF ADVANCED MEDICAL PRIORITY DISPATCH SYSTEM

Early implementation problems experienced by the parties

4.46 For some years, the Service had been conscious of the impact on calltaking efficiency of the absence of a structured and medically-recognised procedural framework to guide calltakers during their dialogue with callers in assessing emergency situations. It also wished to achieve uniformity of approach within the organisation for the function. Audit was advised by the Service that the main focus of past attention by the organisation was on an American system known as the Advanced Medical Priority Dispatch System which has been utilised within more than 3 500 emergency response centres throughout many countries.

4.47 In October 1996, after several months of planning and training, the Service and Intergraph reached formal agreement on the introduction of this new international system (Advanced Medical Priority Dispatch System) which became operational on 4 December 1996. It consists of 38 cards each containing a small number of highly structured questions for calltakers, designed to assess a patient's condition in specifically designated medical circumstances. The implementation under the system of these revised calltaking and dispatch protocols was intended to result in a better quality dispatch in the shortest possible time based upon greater recognition of the patient's medical needs.

4.48 It was the original intention to introduce PROQA, which is the computerised version of the Advanced Medical Priority Dispatch System. The decision to introduce the Advanced Medical Priority Dispatch System card system was made as a result of the difficulties encountered with the implementation of PROQA. At the date of preparation of this Report, PROQA had not been introduced due to product testing issues, including matters associated with necessary changes to the software to adapt medical protocols to comply with Australian requirements.

4.49 As illustrated earlier in Chart 4E, there was in fact a dramatic decline in Intergraph's performance in terms of daily average emergency acceptance times during the period between December 1996 and mid-February 1997, immediately following the implementation of the new system.

4.50 Following the sharp deterioration in Intergraph's calltaking performance, the Service and Intergraph agreed to re-engage the services of the American supplier of the new system. In this regard, a principal of the supplier visited Australia in late January 1997 and examined the processes followed for introduction of the new system. In a report presented to the Service in February 1997, the principal identified several reasons for the decline in performance, including:

- calltakers had not been asking the questions contained on the system's cards early enough so as to identify the patient's chief complaint up-front;
- calltakers were not asking the key questions exactly as written on the cards and also asked superfluous questions;
- the practice of entering excessive amounts of information received from callers (in accordance with Service instructions) was taking an inordinate amount of time and often resulted in a significant loss of control of the event by the calltaker;
- an insufficient number of monitoring staff was employed by Intergraph to review cases, evaluate staff compliance issues with the methodology, and provide adequate and timely feedback to calltakers; and
- Intergraph supervisors and management staff had not participated in the implementation process in the correct way.

4.51 In response to these findings, corrective action was taken by the respective parties, including the engagement of additional calltakers by Intergraph, to address the issues. As indicated in the earlier Chart 4E, daily average call acceptance times began to improve from about mid-February 1997 and have remained relatively constant in succeeding months.

Significant disagreement between the parties

4.52 From the time of receiving the above external report on implementation of the Advanced Medical Priority Dispatch System in February 1997, a significant disagreement has progressively developed between the Service and Intergraph.

4.53 This disagreement has centred mainly around Intergraph's inability to meet the revised and more stringent performance measures for *call answer* time (described in earlier paragraphs) and *total time to dispatch* (commented on later in this Part) which became operative from 1 February 1997. In this regard, the amendments to the contract governing these revised performance measures specifically stated that Intergraph was required to meet the revised measures at all times other than if it was able to demonstrate, after 3 months of operation of PROQA and through the use of an independent arbiter, that use of the software prevented achievement of the more stringent performance levels. In return for meeting the revised performance measures, Intergraph was entitled to receive increased monthly contract payments. Notwithstanding Intergraph's inability to date to meet the revised performance measures, monthly invoices from it have been based on the higher rate. However, as discussed above, the Service has been withholding substantial amounts because of Intergraph's failure to meet the performance measure.

4.54 In essence, the Service maintains that, irrespective of the fact that PROQA has not yet been introduced, Intergraph's performance must be evaluated against the measures introduced in February 1997 in accordance with the relevant contractual terms. On the other hand, Intergraph contends that PROQA was to have been introduced by the Service in January 1997 as a pre-condition for application of the revised performance measures effective from 1 February. In addition, Intergraph maintains that the Advanced Medical Priority Dispatch System and PROQA are the same product and, consequently, it was entitled to an independent review of the revised performance measures after 3 months of operation. As this has not occurred, Intergraph subsequently considers that the new performance measures introduced from February 1997 are inoperative and illegal as it has not had the opportunity, as provided for under the contract, to have the new performance measures independently assessed as to their appropriateness with regard to the new medical priority dispatch system.

4.55 At the time of the audit examination, the differences between the parties had not been resolved and the Service continued to withhold 10 per cent of each monthly service charge payable to Intergraph due to the non-achievement of the performance measures. In fact, it appeared to audit that the position of each party had significantly polarised and resolution of the issues was far from imminent.

4.56 Because such circumstances are not conducive to efficient and effective operation of the Service's emergency response capability, a positive development towards the end of the audit was a move by the Chairman of the Ministerial Steering Committee for Emergency Services Telecommunications to oversee negotiations between the 2 parties with the objective of achieving a resolution. Clearly, it is most important that this dispute between the parties is resolved as quickly as possible.

4.57 Given the length and nature of this disagreement, it would also be desirable for BEST to consider alternative mechanisms for resolving disputes between the 2 entities in a more timely manner.

Accreditation with the International Academy of Emergency Medical Dispatch

4.58 To attain accreditation as a Dispatch Centre of Excellence with the International Academy of Emergency Medical Dispatch, Medical Priority Consultants require users of Advanced Medical Priority Dispatch Systems to achieve an average compliance score against the System's dispatch protocols for at least 95 per cent of calltaking and dispatching functions for at least 2 months out of a 6 month period. Audit was advised by Intergraph that they had recently qualified for accreditation.

DISPATCHING FUNCTION

Emergency dispatching processes

4.59 The customer *Standard Operating Procedures* govern the functions and responsibilities of emergency ambulance dispatchers employed by Intergraph. Certain of the existing customer *Standard Operating Procedures* which the Service requires Intergraph to operate under are considered by Intergraph to be in draft form only, and have no legal standing under the Master Services Contract. Nevertheless, although not considered by Intergraph to be binding on their operations, the contractor still endeavours to comply with these procedures.

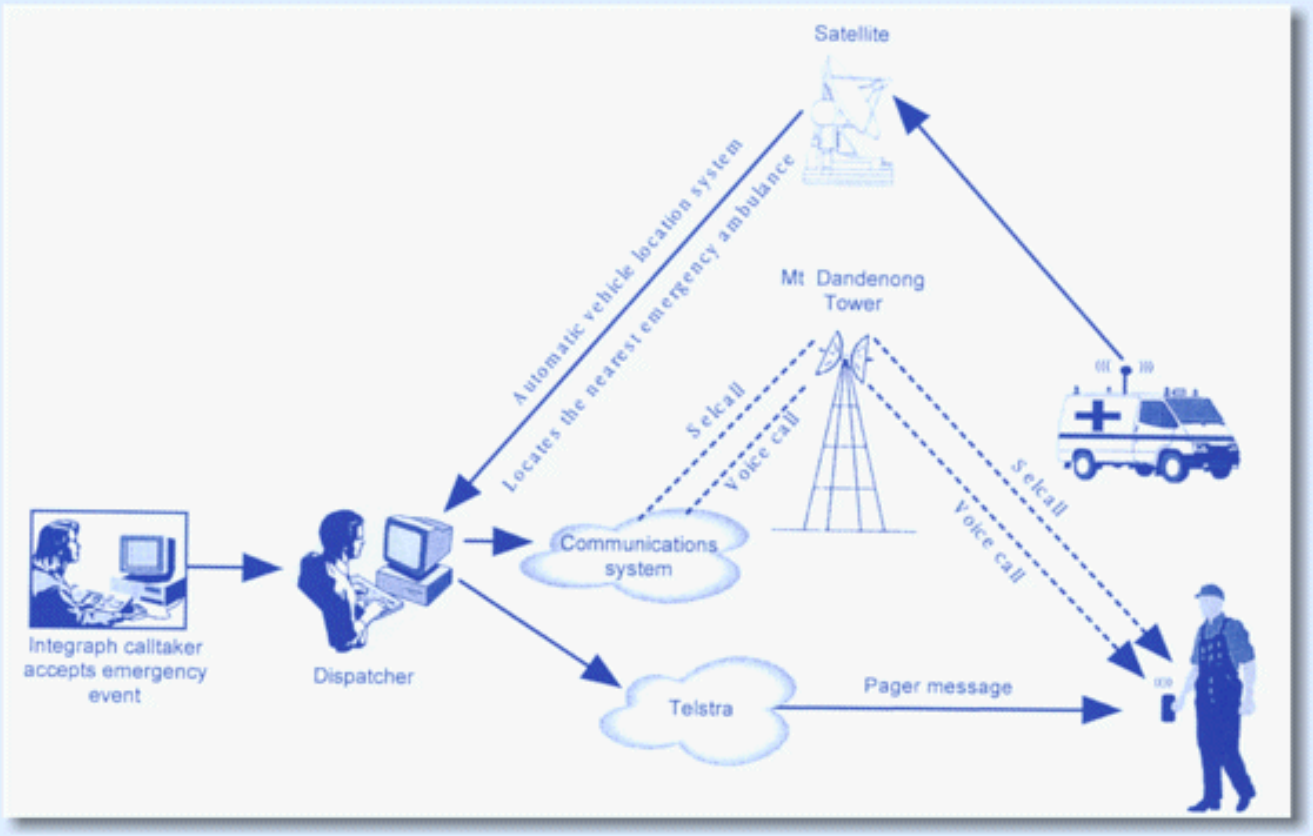
The dispatch function is activated when a calltaker, having determined the case-critical information for an emergency, transfers it to the dispatchers. The communications system matches the emergency's location to either of the 2 geographical areas of responsibility (East or West) applicable to that location. The dispatcher identifies and sends a predetermined combination of emergency vehicles and crews in accordance with the Service's protocols, based on the details provided by the calltaker.

4.60 The process to be followed by dispatchers in the dispatch of emergency vehicles involves 3 key steps, namely:

- issuing a *selcall* (instantaneous alert tones through the crew's portable radios) to the nearest available ambulance crew, as selected from the *automatic vehicle location* system, advising it that a case transfer is imminent;
- as back-up to the *selcall*, sending a *pager message* to the crew, thereby providing the crew with relevant case information; and
- if the ambulance crew does not respond to the *selcall*, sending a *voice call* on the crew's portable radio, providing case-critical information to the crew.

4.61 Chart 4F shows a diagrammatical representation of the above steps.

CHART 4F
DISPATCHING COMMUNICATIONS SYSTEM

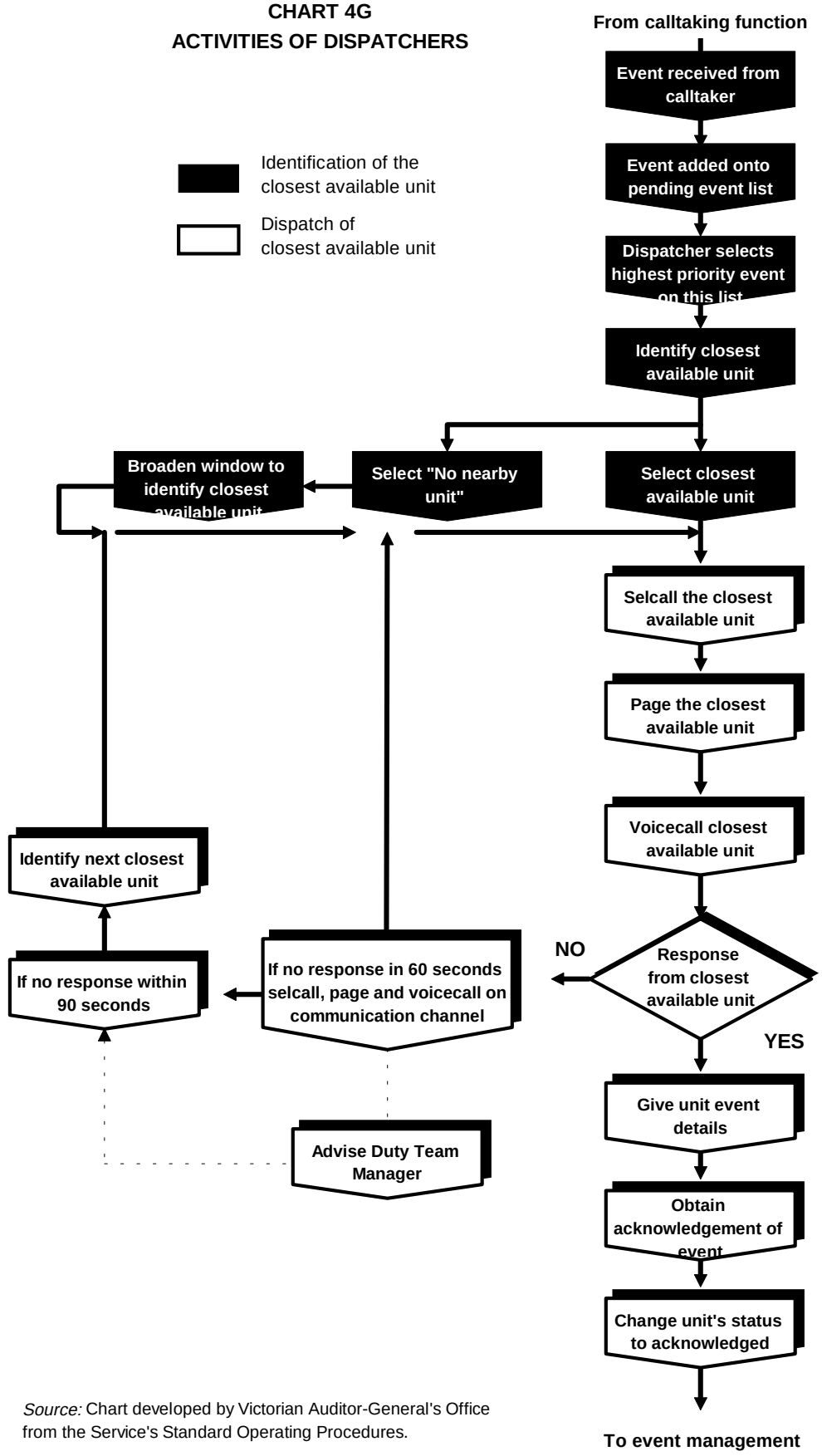


Source: Chart developed by Victorian Auditor-General's Office.

4.62 As explained in Part 2, the above dispatching process is an integral element of the emergency response process and the extent of its effectiveness will directly impact on the quality of patient care.

4.63 Chart 4G outlines the activities performed by dispatchers.

CHART 4G
ACTIVITIES OF DISPATCHERS



Source: Chart developed by Victorian Auditor-General's Office from the Service's Standard Operating Procedures.

Evaluation of Intergraph's performance in undertaking the dispatching function

4.64 Performance measures relating to *total time to dispatch* were not initially established under the BEST Master Services Contract with Intergraph.

4.65 It was not until September 1996 that agreement was reached between the parties for adoption of a *total time to dispatch* performance measure which encompasses the time elapsed from when an emergency event is created by the calltaker through to the dispatch of the emergency vehicle. Table 4H provides relevant details of this measure.

TABLE 4H
THE *TOTAL TIME TO DISPATCH* PERFORMANCE MEASURE FOR CODE 1 EMERGENCIES

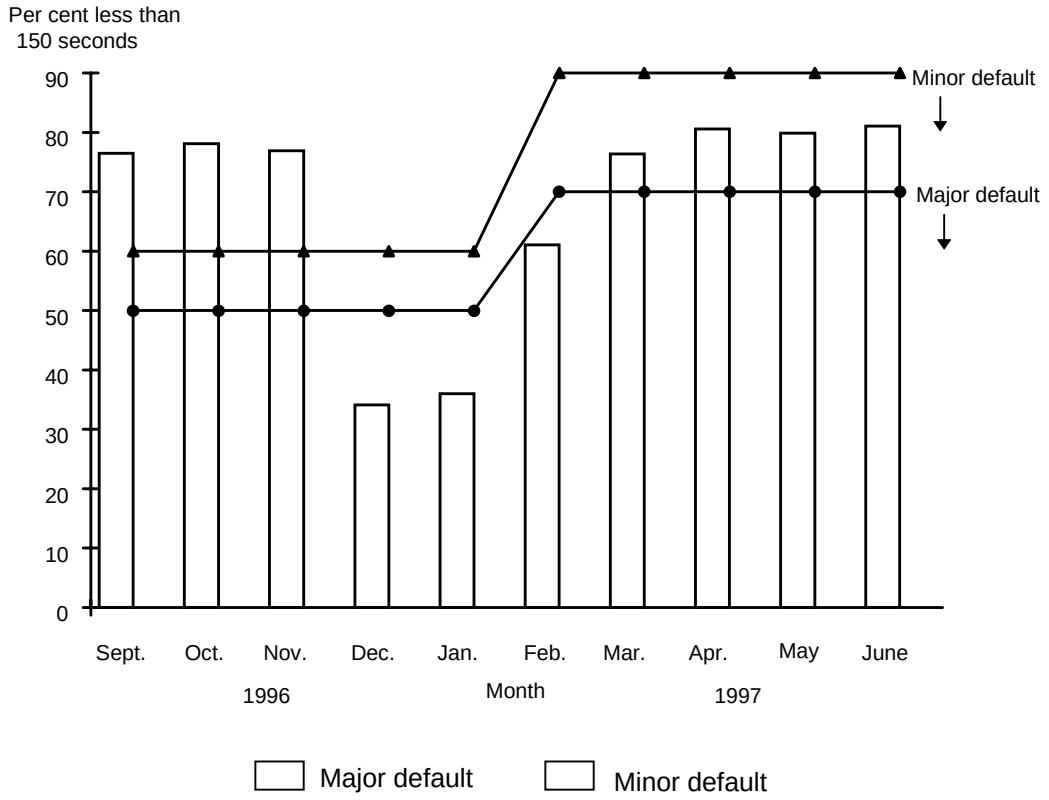
Operative date	*Measure*	*Condition for minor default by Intergraph*	*Condition for major default by Intergraph*
1 September 1996 to 31 January 1997	150 secs.	Measure not achieved in 60 per cent of cases	Measure not achieved in 50 per cent of cases
From 1 February 1997	150 secs.	Measure not achieved in 90 per cent of cases	Measure not achieved in 70 per cent of cases

Source: Master Services Contract.

4.66 The significance of the impact of Intergraph assuming default status under the contract is illustrated by the fact that it gives rise to the incurrence of deferred payments to the contractor. More importantly, from the community's perspective, the failure of Intergraph to meet performance measures can extend total emergency response times, which is clearly not in the public interest.

4.67 Chart 4I provides a comparison of the actual level of performance achieved by Intergraph against the *total time to dispatch* performance measure of 150 seconds for the period 1 September 1996 to 30 June 1997.

CHART 4I
ACTUAL *TOTAL TIME TO DISPATCH* FOR CODE 1 EMERGENCIES COMPARED WITH PERFORMANCE MEASURE, 1 SEPTEMBER 1996 TO 30 JUNE 1997



Source: Chart developed by Victorian Auditor-General's Office extracted from data provided by Intergraph.

4.68 Chart 4I indicates that Intergraph achieved the required level of performance from September to November 1996. It also shows that a significant deterioration occurred in Intergraph's performance in December 1996 and that the targeted level of performance was not achieved during the 3 month period December 1996 to February 1997, a situation which placed Intergraph in major default and was attributed to the problems encountered with the introduction of the Advanced Medical Priority Dispatch System. In addition, Intergraph operated in minor default in the period since February 1997.

4.69 The marked decline in Intergraph's performance during December 1996 (target achieved in only 34 per cent of cases compared with 77 per cent in November 1996) prompted the Service's chief executive officer in January 1997 to formally express disappointment to BEST at the decline in performance by Intergraph. The chief executive officer attributed the reduced performance to:

- *"occasions during December when the number of calltaker and dispatcher staff on duty was inadequate"; and*
- *"a high incidence of dispatcher staff not accepting the AMPDS dispatch code outcomes (dispatch grid) from the use of AMPDS* [Advanced Medical Priority Dispatch System]*."*

4.71 Audit analysis of workload levels of dispatchers (commented on in later paragraphs of this Part) indicated that delays in dispatching can be closely associated with the high level of emergency events requiring dispatch by just 2 operators during daily peak periods.

4.72 As indicated in earlier paragraphs, the failure by Intergraph to achieve performance targets was the primary factor leading to the withholding by the Service of significant amounts under the terms of the contract ($186 000 was withheld at 30 June 1997).

4.73 The circumstances relating to the introduction of the Advanced Medical Priority Dispatch System, which became operational from 4 December 1996 and were discussed in earlier paragraphs, coincided with the need for Intergraph to adequately train its staff in the operation of the new System. It was also around that time that a number of organisational changes occurred within Intergraph.

4.74 In discussions with audit, Intergraph acknowledged the need to upgrade organisational effectiveness but also mentioned some factors emanating at the Service, and particularly relating to implementation of the new dispatch protocols in December 1996, had contributed to the difficulties it had experienced with the new System. It indicated that the corrective actions it had initiated had led to the organisation's improved performance in the period subsequent to January 1997, even though it remained in minor default up to June 1997, the last month covered by the audit analysis. Audit has subsequently been advised that the average time to dispatch has fallen from 193 seconds at January 1997 to 114 seconds at September 1997.

4.75 Because of the direct implications for community health and wellbeing, it is extremely important that the Service and Intergraph continue to direct efforts aimed at further improving dispatching operations. The aim of the parties should be to ensure that the performance measure and targets currently specified under the contract are able to be achieved and to explore the desirability of developing performance measures, for management monitoring and control purposes, specifically relating to the dispatching function.

Major shortcomings in quality control processes for the dispatching function

4.76 In assessing the quality control processes in place for the dispatching function, audit found that, due to the speed with which dispatchers operate and the number of activities performed concurrently, it was only possible to evaluate the dispatching function by reviewing computer reports relating to the *total time to dispatch*`and the time taken from event acceptance to dispatch. Accordingly, from a quality control viewpoint, management has not been in a position to assess the extent to which dispatchers have efficiently and effectively performed in discharging the following key functions:

- Ensuring that the Code 1 priority 0 cases, which are the highest priority events, are dispatched first. Obviously, any time delays arising from departures from the customer *standard operating procedures* are likely to have far-reaching consequences in terms of human life or patient wellbeing;
- Identifying and dispatching the nearest and most appropriate ambulance unit (for example a Mobile Intensive Care Ambulance) to the scene of the emergency;

- Dispatching ambulance crews for each case in accordance with the Service's dispatch protocols which document 240 individual clinical conditions and the required level of response for each condition. Failure to adhere to the dispatch protocols could seriously impact on patient care;
- Drawing on opportunities to utilise vehicles from the alternate region (East or West) in situations where the nearest or most appropriate ambulance unit to the emergency scene is located across the regional border;
- Service team managers managing resources in a manner which ensures that all available ambulance units are systematically located at all times throughout the region in order to achieve optimum area coverage; and
- Following the 3 steps for dispatching of information to ambulance crews as set out in the Service's communication policy, namely, the issuing of a *selcall*, transmission of *a pager message* and sending of a radio *voice call*, if the *selcall* is not received, in that order.

4.77 In any major computer system, it is recognised that there will always be some scope for human error despite the existence of detailed *standard operating procedures* and operator training programs. However, with Intergraph's system which handles life and death situations on a daily basis, even a very low incidence of dispatcher error can have significant consequences for the patient.

4.78 At present, dispatching errors are generally only brought to the attention of the BEST Quality Review Team as a result of observation reports submitted by ambulance crews and the review of events with response times greater than the 16 minute response performance measure (the operation of this Team as a specific quality control mechanism and avenues available for overcoming current weaknesses and improving the effectiveness of the Team are described in later paragraphs of this Part). Other than from observation reports and the work undertaken by the Quality Review Team, it is virtually impossible for management to identify any other dispatching errors that may have occurred as computer programs currently do not capture such data, although audit understands that a capability for capturing such data does exist.

4.79 In audit opinion, it would be mutually beneficial for BEST, the Service and Intergraph to evaluate the feasibility of introducing computerised quality control processes in order to regularly monitor the effectiveness and efficiency of the dispatching function.

Impact of workload levels on the timeliness of the dispatching function

4.80 Under the communication system's specifications documented within the contract, the current configuration provides for the operation of 2 dispatcher stations with each station allocated responsibility for one of the 2 regions (East and West) established for the metropolitan area. This situation means that, at any point in time, only 2 dispatchers cover the whole of the metropolitan area, comprising almost 10 000 square kilometres.

4.81 For some time now, both the Service and Intergraph have been conscious of the fact that workload levels within shifts for the 2 dispatchers vary depending on the hour of the day and the number of emergency calls received by Intergraph's operations centre.

4.82 Audit conducted a computer analysis of data extracted from Intergraph's system to determine the extent to which dispatching workloads varied during different times of the day and to assess the impact of workload variations upon the capacity of dispatchers to allocate emergency events to ambulance crews in a timely manner. The audit analysis covered, on an hour of day basis, all Code 1, *priority 0 and 1* emergency events over the 12 month period 20 April 1996 to 19 April 1997 and measured the time which elapsed between when an event was placed by the calltaker in the dispatch queue and when the dispatcher selected the nearest emergency ambulance unit. Tables 4J and 4K outline details of the audit analysis.

TABLE 4J
ANALYSIS OF CASES DISPATCHED BY HOUR OF DAY
(PRIORITY 0 AND 1),
DISPATCH TIMES 20 APRIL 1996 - 19 APRIL 1997

	Seconds to dispatch					
Hour of day	*0-30*	*31-60*	*61-90*	*91-120*	*> 120*	*Total number of cases*
1 a.m.	1 201	836	402	195	360	2 994
2 a.m.	1 053	731	276	183	280	2 523
3 a.m.	1 050	626	253	144	221	2 294
4 a.m.	978	500	217	90	162	1 947
5 a.m.	1 017	511	173	100	133	1 934
6 a.m.	1 043	635	253	119	235	2 285
7 a.m.	1 263	887	372	173	285	2 980
8 a.m.	1 499	1 146	513	265	493	3 916
9 a.m.	1 799	1 276	621	337	644	4 677
10 a.m.	1 715	1 284	646	333	746	4 724
11 a.m.	1 717	1 302	674	388	838	4 919
Midday	1 655	1 260	644	394	878	4 831
1 p.m.	1 431	1 252	725	401	907	4 716
2 p.m.	1 527	1 265	615	403	816	4 626
3 p.m.	1 564	1 370	580	369	780	4 663
4 p.m.	1 636	1 263	657	362	821	4 739
5 p.m.	1 419	1 352	725	437	979	4 912
6 p.m.	1 651	1 303	680	404	854	4 892
7 p.m.	1 636	1 281	662	373	795	4 747
8 p.m.	1 591	1 229	643	388	732	4 583
9 p.m.	1 585	1 258	585	323	719	4 470
10 p.m.	1 641	1 152	530	281	600	4 204
11 p.m.	1 541	1 051	470	269	523	3 854
Midnight	1 370	916	416	226	468	3 396
Total	**34 582**	**25 686**	**12 332**	**6 957**	**14 269**	**93 826**

Source: Table developed by Victorian Auditor-General's Office from raw data provided by Intergraph.

4.83 Table 4J discloses that dispatcher workloads are at their lowest between the hours of 2 a.m. and 6 a.m. Subsequent to 6 a.m., the workloads steadily increase until they reach a peak at around 11 a.m. and this peak is maintained until around 7 p.m. when the workload commences a continual decline.

4.84 To specifically illustrate the impact of workload variations on dispatching time, Table 4K compares time absorbed in the dispatching function during the low workload times (2 a.m. to 6 a.m.) and the high workload times (11 a.m. to 7 p.m.).

TABLE 4K
COMPARISON OF TIME ABSORBED IN DISPATCHING FUNCTION DURING LOW AND HIGH WORKLOAD PERIODS, 20 APRIL 1996 TO 19 APRIL 1997
(per cent)

Workload	*0-30s*	*31-60s*	*61-90s*	*91-120s*	*Greater than 120s*
Low (2 a.m. - 6 a.m.)	47	27	11	6	9
Progressive %	**47**	**74**	**85**	**91**	**100**
Peak (11 a.m. - 7 p.m.)	32	26	15	9	18
Progressive %	**32**	**58**	**73**	**82**	**100**

Source: Table developed by Victorian Auditor-General's Office from raw data provided by Intergraph.

4.85 Table 4K illustrates that dispatch performance, in terms of time absorbed in the function, is at its peak at low workload periods with the converse situation occurring during high workload hours. The table shows that 74 per cent of all emergency events were dispatched within 60 seconds between the hours of 2 a.m. and 6 a.m. as against only 58 per cent of events during the high workload hours of 11 a.m. and 7 p.m. It also indicates that 9 per cent of events took more than 120 seconds to dispatch in the low workload period and the equivalent percentage during the peak workload period had doubled to 18 per cent of events.

4.86 It was evident to audit that past delays in dispatching brought about by variations in workload would have contributed to the non-achievement by Intergraph of the performance measure *total time to dispatch*, an issue commented upon in earlier paragraphs. As this measure involves an aggregate time of 150 seconds covering the calltaking and dispatch functions, Intergraph would need additional dispatching capacity during daily peak periods in order to at least achieve the performance target of 90 per cent of dispatches within the specified timeframe and avoid a minor default status.

4.87 When discussing the heavy workload of dispatchers during particular hours of a day, it is important to recognise that the system's specifications under the contract were premised on the operation of 2 dispatcher stations only. To introduce a third dispatcher station would require significant re-configuration in terms of further division of the metropolitan area, consequential variations to the system's map base, re-allocation of the metropolitan ambulance depots between the dispatchers and the introduction of a third voice communications channel and associated equipment.

4.88 It is understood that the above ramifications have been the principal reasons why the Service has to date determined not to expand dispatcher capacity through establishment of a third dispatcher station. The introduction of mobile data terminals would assist in relieving the pressure on dispatchers during peak periods, however, alternative strategies also need to be considered to address peak periods, including the potential benefits to be derived from partially utilising the third existing dispatcher station at Intergraph, which is currently dedicated to the State's DISPLAN strategy for major disasters.

4.89 Given that the additional time absorbed in dispatching ambulance crews to emergency events during peak workload periods can have far reaching consequences for patient health, and even survival, the Service and Intergraph need to reach agreement on action necessary to increase dispatching capacity as a matter of priority.

❑ ***RESPONSE*** *provided by Chief Executive Office, Metropolitan Ambulance Service*

Audit suggests that there is a need to increase dispatching capacity as a matter of priority. At the same time, the Report notes that there are significant difficulties associated with the introduction of a third emergency dispatcher, and acknowledges that the introduction of Mobile Data Terminals will reduce dispatcher workload. MAS considers that there are a number of other strategies which will also assist dispatch performance (e.g. automation of the selcall function), and these are currently being pursued. The key issue is to ensure an appropriate level of performance is achieved, and all avenues for improvement should be explored prior to the introduction of an additional dispatcher. Intergraph's current performance is still below the contractual requirement, but has improved significantly and is now close to the target total time to dispatch.

Extent of incidence of "no nearby unit" situations

4.90 As previously mentioned, the primary function of dispatchers is to dispatch to an emergency event the closest available ambulance unit or units depending on the nature of the required response.

4.91 If a dispatcher is unable to locate a suitable available unit to attend the event within the 12 by 16 kilometre rectangular map centred on the emergency displayed on the dispatcher's computer screen, it is necessary for the dispatcher to activate the *no nearby unit* icon. At that point, the system's electronic timing mechanism records the time elapsed to activation of the *no nearby unit* icon as representing Intergraph's dispatching performance for the particular emergency event. In other words, the inability of the dispatcher to locate a nearby unit is recognised as a resource management problem of the Service and outside the scope of Intergraph's commitments under the contract. The introduction of the *no nearby unit* function was an initiative of Intergraph and BEST to define clearly the completion of Intergraph's contractual obligations in relation to dispatching.

4.92 While the measurement of Intergraph's performance ceases once the *no nearby unit* icon is activated, dispatchers are, of course, still required to locate and dispatch an appropriate ambulance unit. Although the additional time for such action is usually within 2 minutes (some isolated cases have absorbed in excess of 10 minutes), such time can be extremely critical in life-threatening situations. In addition, all other emergency events in a dispatcher's queue at the time will experience some delay. However, it should be noted that the activation of *no nearby unit* by a dispatcher does not necessarily mean that a response time within the Service's 16 minute performance measure will not be achieved as the closest available unit may in fact be located marginally outside the 12 by 16 kilometre rectangular map centred on the emergency.

4.93 To identify the extent to which dispatchers have found it necessary to activate the *no nearby unit* icon, audit analysed raw data provided by Intergraph relating to the period December 1996 to April 1997 and covering all 3 categories of emergency events, namely *priority 0, 1 and 2* with *priority 0* representing the most time-critical emergency category. Table 4L provides details of this analysis.

TABLE 4L
EXTENT OF CODE 1 EMERGENCY EVENTS SUBJECT TO A *NO NEARBY UNIT* INCIDENT

Year	*Month*	*Dispatch priority 0*	*Dispatch priority 1*	*Dispatch priority 2*	*Total/ Average*
1996	December	93	328	54	475
1997	January	134	369	71	574
	February	104	365	65	534
	March	70	473	82	625
	April	31	241	45	317
Total *No Nearby Unit* incidents		432	1 776	317	2 525
Total cases (Dec. - April)		6 251	32 948	4 854	44 053
No Nearby Unit incidents as a per cent of total cases		6.91	5.39	6.53	5.73

Source: Table developed by Victorian Auditor-General's Office from raw data provided by Intergraph.

4.94 Table 4L shows that, on average, almost 6 per cent of all emergency cases during December 1996 to April 1997 were subject to a *no nearby unit* incident, with *priority 0* events, the most time-critical and immediately life-threatening category, experiencing the greatest percentage of such incidents.

4.95 In addition to the above analysis, audit examined system-generated maps produced by Intergraph of the Service's 6 regions. These maps identified the area location of all *priority 0 and 1* emergency events for which a *no nearby unit* situation was registered by dispatchers during the 6 month period 1 January to 30 June 1997.

4.96 The audit examination of the maps disclosed that instances where dispatchers were not able to initially locate a nearest available ambulance unit for an emergency event were particularly prevalent in the following areas:

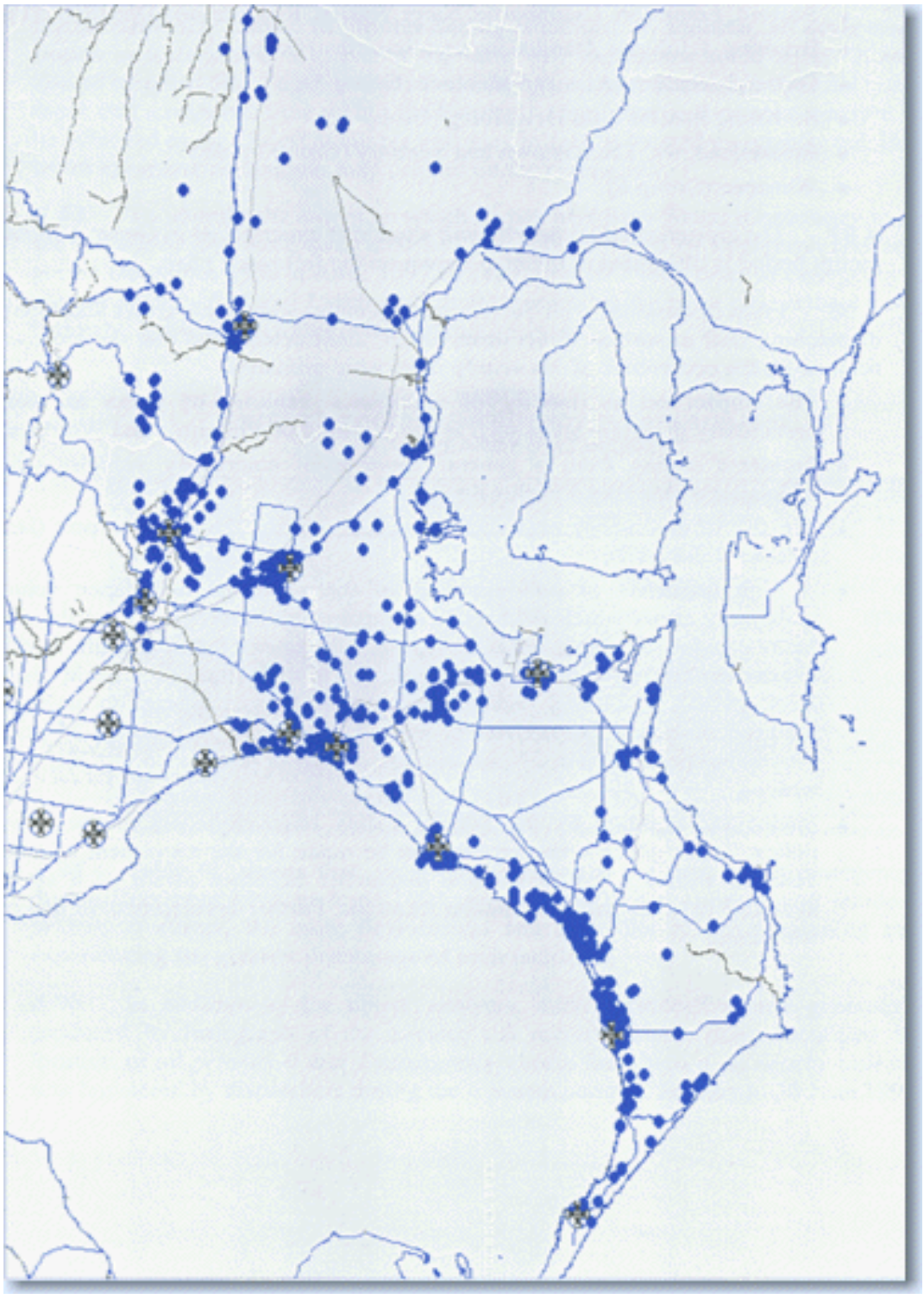
- Seaford, Frankston, Cranbourne, Narre Warren, Rosebud and Dromana (Group 1);
- Brighton, Edithvale, Dandenong and Scoresby (Group 2);
- Oakleigh, Sandringham and Mentone (Group 3);
- St. Kilda, Box Hill and Heidelberg (Group 4);
- Broadmeadows, Thomastown and Sunbury (Group 5); and
- Werribee (Group 6).

4.97 The clustering of *no nearby unit* situations experienced in Group 1 during the 6 month period is illustrated in the map shown on the following page.

4.98 From discussions with Service management, ambulance crews and Intergraph's dispatching staff as well as direct observation, audit determined that the more common reasons for the occurrence of *no nearby units* were primarily:

- The impact on availability of ambulance vehicles of peaks in workloads, particularly in certain areas such as the Mornington Peninsula and Werribee;
- Problems arising from a general shortage of emergency vehicles which are addressed within Part 5 of this Report;
- The use of emergency resources for non-emergency patient transport (issues are discussed in Part 7);
- A high incidence of non-recording of the status of ambulance vehicles by ambulance crews which is likely to be attributable to congestion of the one voice radio channel available in each region, equipment failures, high workload of dispatchers or crews not radioing dispatchers of their status (audit analysis over a 6 week period, excluding cancellations and instances where no transport was required, disclosed that *arrivals at scene* had not been recorded in 35 per cent of events, *patient loaded* in 23 per cent and *arrival at hospital* in virtually all cases); and
- Inadequate attention by the Service's duty team managers to the *"move up"* policy, under which arrangements can be made for the movement of ambulance vehicles within a region when a dispatcher becomes aware of a shortage of available vehicles within particular locations. Further development of this policy is warranted.

**CLUSTERING OF "NO NEARBY UNIT" SITUATIONS
EXPERIENCED IN GROUP 1,
1 JANUARY TO 30 JUNE 1997**



4.99 It is recognised that, in any emergency service operation, there will always be occasions when emergency vehicles are not immediately available. However, given that the additional time absorbed by dispatchers, when not able to initially locate a nearest available unit, can have life-threatening ramifications, it is important that management has effective strategies in place to ensure factors within its control do not contribute to *no nearby unit* situations.

4.100 Many of the actions taken by the Service's chief executive officer, as part of the organisation's continuous improvement strategies, and which have been addressed in other Parts of this Report, are designed to progressively contribute to a reduction in the level of *no nearby unit* incidents. These initiatives include a priority emphasis on improving the timeliness of field operations, particularly in terms of:

- time taken by ambulance crews during their involvement in the various stages of the emergency response process; and
- the Service's targeted reduction in response times for high priority cases from 16 minutes in 1996-97 to 12 minutes by the year 2000, which will require more effective utilisation of the ambulance fleet in order to be achieved.

4.101 Audit considers that further reduction of the incidence of *no nearby unit* situations could also be achieved by:

- reaching agreement with Intergraph on the provision of map data reflecting the incidence of emergencies in each locality, in order to enhance current analysis of resource requirements by location and time of day and to strategically locate ambulances. As indicated in subsequent paragraphs, the availability to the Service of such information would enable it to more effectively plan and manage its emergency operations; and
- early implementation by the Service of mobile data terminals (the factors associated with the extensive delay experienced by the Service in relation to mobile data terminals are discussed in Part 5). Clearly, the overall dispatching function will be enhanced when on-line updating of dispatcher screens of ambulance vehicle movements becomes available following the introduction of mobile data terminals.

❑ ***RESPONSE*** *provided by Chief Executive Office, Metropolitan Ambulance Service*

The Report documents the occurrence of situations where dispatchers are unable to immediately identify an available ambulance for dispatch within 6 to 8 kilometres of an emergency. MAS agrees that this is a matter of some concern. However, failure to immediately identify an ambulance for dispatch in close proximity to an event does not mean that response performance will be outside the accepted performance targets. MAS currently responds to 90 per cent of time critical (Code 1) emergencies in 14 minutes or less, which is better than its target of 90 per cent in 15 minutes. An experienced MAS officer actively monitors the availability of response units at all times, and units are relocated to cover shortages which may develop in particular areas as necessary. This strategy will be further developed, as recommended in the report. MAS has also undertaken detailed analysis of its future resource requirements to ensure delivery of further improvements in performance.

Technical shortcomings in communications system impacting upon dispatcher performance

Scope for further enhancement of the automatic vehicle location system

4.102 As identified in the introductory paragraphs to this Part, an initial key function of the dispatcher, on receipt of an emergency event from a calltaker, is identification of the nearest available ambulance vehicle via the Service's *automatic vehicle location* system. The Service is the only ambulance service in Australia that has an operational *automatic vehicle location* system.

4.103 Under the automatic vehicle location system, the position (within an accuracy level of 20 metres) of ambulance vehicles, determined by a dispatcher as in service for a particular shift, is transmitted from a satellite-based facility (operated by the United States of America Defence Department) installed in vehicles to Intergraph's communications system, utilising a dedicated radio channel. A specific piece of computer hardware known as the *polling controller* regulates the frequency with which the position of vehicles is updated (or *polled*) on the dispatcher's display terminal

4.104 In addition, during the course of each shift of ambulance crews, the position of vehicles is automatically updated at different pre-determined frequencies depending on the status of vehicles, e.g. available, arrived at hospital etc. Currently, the system has the capacity for emergency vehicles to be polling at 5 different polling rates, namely at 30, 60, 90 and 120 second intervals, and at 15 minute intervals when stationary. The accuracy of the status of vehicles is in turn dependent upon the timely notification from crews to dispatchers of their status.

4.105 The audit examination in this area found that the automatic vehicle location system was operating efficiently and that any past technical problems had been satisfactorily addressed by both the Service and Intergraph.

4.106 Both parties are aware of opportunities to further enhance the effectiveness of the automatic vehicle location system. These opportunities, which were considered during the course of the audit, include:

- Currently, the electronic polling controller is the only link between ambulance vehicles and Intergraph's system and no alternative means of polling vehicles exist if this unit fails. Reliance would then have to be placed upon radio links with crews. There would be merit in the Service assessing the feasibility, from both financial and technical perspectives, of having in place a back-up polling facility to minimise its current risk exposure of an inability to immediately locate emergency vehicles in the event of failure of its polling controller;
- The system's configuration is limited to a coverage of 63 vehicles actively moving and polling at a 30 second rate at any one time. This represents over 80 per cent of the maximum response fleet normally rostered for duty and it is highly unlikely that this number will be exceeded. If more than 63 vehicles are active at any one time, the polling rate will reduce. This should not result in significant deterioration of performance, but the adequacy of current capacity should be monitored as the number of emergency vehicles increases commensurate with an increase in workload;

- At present, only 2 polling rates are constantly used, i.e. at 30 seconds and at 15 minutes. Given the wide variance and the capacity of the system to poll at other frequencies, reservations are expressed by audit as to whether optimum use is made of the system compared with operational needs;
- The dedicated radio channel for the system has a smaller coverage area than the 10 voice radio channels used as part of the Service's voice communication facilities which creates the potential for situations under which ambulance crews can communicate verbally with dispatchers but not have their geographical position displayed on dispatchers' screens; and
- Several aspects of Intergraph's system have been identified by dispatchers and representatives of the Service as having scope for upgrading operating facilities available to dispatchers, including:
  - development of a system to highlight when a vehicle becomes available which is closer to an emergency event to which an ambulance has already been dispatched;
  - development of an automatic facility within the system which can highlight to the dispatcher the potential for re-direction of an ambulance vehicle already dispatched but to a lower priority event than that under immediate consideration;
  - inclusion of additional data to assist dispatchers to be aware of and take into account geographical conditions, such as temporary road closures or other variations in road and traffic conditions likely to impact on the timeliness of an ambulance vehicle's journey, when determining the nearest available vehicle to an emergency event; and
  - extend the *recommend closest unit* functionality across the East/West boundary.

4.107 In summary, the automatic vehicle location system fulfils an important role in the Service's delivery of its vital community function. While a satisfactory level of system performance has been experienced to date, avenues are available to further upgrade the system's capability and extend the Service radio network supporting the automatic vehicle location system in order to further improve the quality of the organisation's response to calls for emergency assistance.

Transmission of pager messages

4.108 The introductory paragraphs to this Part identified that the sending of a pager message to ambulance crews on information relating to the emergency event was the second step in the dispatching process. The pager message acts as a back-up to the *selcall* and voice radio contact with the crew providing a screen-based message to the crew containing critical information on the event such as address, sex, age and condition of the patient.

4.109 Although it only acts as a back-up mechanism in the dispatch process, especially where radio transmission is ineffective, any inordinate delays in the transmission of pager messages are likely to adversely impact on the overall effectiveness of the Service's emergency response function. Some limited monitoring of the level of pager messages received by crews over time had been undertaken by the BEST Quality Review Team (operation of this team commented upon in later paragraphs of this Part). This process indicated a reasonably high average level of 97 per cent of pager messages transmitted by dispatchers were actually received by crews. However, there was no evidence that any quality review scrutiny of the length of time absorbed in the transmission of pager messages had been undertaken by the Review Team or directly by management.

4.110 Audit attempted to utilise Intergraph data to analyse pager delays but was unable to do so as it was subsequently established that the co-operation of Telstra would be required for such an exercise and this was not possible. Nevertheless, audit considers that this area warrants research as to the extent of such delays impacting upon an emergency service.

EFFECTIVENESS OF THE COMPUTER-AIDED DISPATCH MAPBASE

State Digital Road Network

4.111 The Office of Geographic Data Coordination was established in 1990 to develop a Statewide strategy for Geographic Information Systems and a single Statewide digital mapbase and facilitate consistent use of geographic data by government agencies. In 1993 the Office commissioned a report into the needs of emergency services for a digital road map, to support the establishment of a Computer Aided Dispatch system by Intergraph.

4.112 The State Digital Road Network was implemented in 1995 and consists of a collection of address points (locations of property addresses), roads, streets and related elements such as tunnels, bridges, traffic light intersections, level crossings and roundabouts. The State Digital Road Network is believed to be the largest map of its type in the world.

4.113 At September 1997, the State Digital Road Network covered an area of around 15 000 square kilometres. The map includes approximately 49 000 kilometres of roads, 62 000 distinct road names and 1.2 million address points.

4.114 The Network is kept up-to-date in line with new subdivisions approved by councils and lodged at the Titles Office, and other changes to Melbourne and Victoria based mainly on information from municipal councils and other agencies such as VicRoads.

Computer-Aided Dispatch Map (CAD Map)

4.115 The map database is provided to Intergraph by LAND*VICTORIA* as a composite of the State Digital Road Network base and a set of *overlays* for each emergency service organisation containing additional general data such as local government areas, suburb boundaries, railways and railway stations, water bodies and water courses and specific emergency service organisation requirements such as their operational boundaries and station locations. The CAD Map utilised by Intergraph is comprised of the information provided by LAND*VICTORIA* which is further refined for Intergraph purposes and is accompanied by appropriate software support and analytical tools to provide the necessary information required by a dispatcher. The CAD Map allows the calltakers and dispatchers of emergency vehicles for police, fire and ambulance services to search an on-line address and street database for the locations of emergencies described by callers and select and dispatch appropriate emergency vehicles to the event.

4.116 To help meet the response time requirements of emergency service organisations, particularly in the face of a range of difficulties in address identification, Intergraph has developed operator support tools in the mapbase, utilising data supplied by LAND*VICTORIA*. These include flexibility in naming (e.g. St or Str), ability to list all streets / avenues / roads etc. with a specific name, sounding like the name or starting with the first few letters, ability to search for streets in surrounding suburbs, and suburb - locality indexes.

4.117 In general, the database is extensively validated through constant use made of it, with over 3 million calls having referenced the database since its implementation.

Quality of data in the map database

4.118 Intergraph calltakers place a very high reliance on the accuracy, completeness and accessibility of data in the mapbase and support from procedures and aids developed by Intergraph to help ensure the best result with the data available.

4.119 Prior to the establishment of the mapbase, ambulance crews relied upon the latest edition of the *Melway* Street Directory or produced their own specialist mapping related to their specific needs. The map database represents a significant advance upon the previous mapping information available to emergency crews.

4.120 The quality of the mapbase can be considered from 4 aspects:

- the accuracy of the data in the mapbase (e.g. correct street names, precise road lengths, intersections and descriptions);
- the completeness of the mapbase, based on the reliability of the source documentation from municipal councils and other agencies and consistency with accredited data sets particularly the *Melway* street directory;
- the ability of calltakers to positively identify event locations from caller information, which may involve use of local or superseded names or which may be incomplete or imprecise; and
- the reliability of the Call Line Identification and Call Address Systems provided by Telstra to immediately locate addresses in the mapbase.

4.121 More detailed comments in regard to each of the above issues are provided in the following paragraphs.

Accuracy of the data contained within the mapbase

4.122 The level of accuracy in respect of spatial (e.g. that roads meet as they should) and attribute (textual and numeric) data is defined in technical specifications for the State Digital Road Network and the overlays. Data quality statements contained in these specifications stipulate percentage accuracies, testing procedures and standards for different data subsets.

4.123 Intergraph considers that the State Digital Road Network is very accurate by world standards, in the context of Intergraph's experience worldwide. Intergraph suggested that in practice the real standard of data exceeds the standards defined in the technical specifications. Notwithstanding compliance with the standards, the technical specifications may still fall short of the more stringent requirements of emergency service organisations. For example, one such standard allows a 2 per cent error that roads have the correct name. Consequently, the Melbourne metropolitan area, with over 62 000 different street names, is subject to a standard which allows for up to 1 200 incorrect names. Intergraph operational experience indicates, however, a higher level of accuracy.

4.124 Now that a stable, high quality database has been established, audit recommends that BEST and the emergency service organisations re-assess the adequacy of the technical specifications in terms of the levels of accuracy and the currency of information critical to emergency service organisations in verifying the location of emergencies.

Completeness of existing mapbase

4.125 In regard to suitable criteria for database completeness, audit considered that, over time, taking into account any changes to localities which had not been recorded in established directories, the community should reasonably expect to be able to summon emergency services to any property, street or other location which has existed for some time.

4.126 The current mapbase represents the fourth release from LAND*VICTORIA* with the benefit of feedback from intensive emergency service use over 2 years and confirms that successive releases have corrected previous faults. Current fault report levels are very low and a new release is expected to clear outstanding faults reported by Intergraph.

4.127 Audit recognises that the dynamic nature of the mapbase means it can never be expected to be absolutely complete and accurate. However, any incompleteness or inaccuracy should be restricted to recent changes and weaknesses in naming conventions.

4.128 While the continuous level of use provides a high degree of self-checking it does not guarantee that the mapbase is absolutely complete and correct in respect of all well established locations (i.e. other than recent changes) in all areas of the mapbase.

4.129 This problem was highlighted by a recent review by the Country Fire Authority of small samples from a total of 43 000 road segments which were registered in the State Digital Road Network and the mapbase as being *unnamed.* The review established that although the vast majority were genuinely unnamed (including access roads to semi-rural properties, and roads in parkland) a small percentage should have been named. The study indicated that potentially 2 per cent of unnamed streets and roads should be named. While acknowledging that the exercise may have limited statistical validity and that many of the potential names are local, unofficial names, the report indicates the potential for calltakers being unable to positively identify certain locations even though a caller may be able to supply a street name.

4.130 Audit understands that LAND*VICTORIA* is undertaking some municipal council record comparisons but receives less than optimal co-operation from certain councils. At least one council has sought payment from LAND*VICTORIA* to allow it to access their records as part of LAND*VICTORIA's* quality assurance process.

4.135 A goal of absolute completeness of State Digital Road Network and the mapbase data (for all but very recent changes) should be approached through progressive validation of existing data against municipal council records and those of other government agencies such as VicRoads. Such a strategy should also be accompanied by physical inspections where appropriate of the locations of unnamed streets, lanes and access roads. Audit considers that in undertaking this activity, LAND*VICTORIA* needs appropriate legislative authority to access all relevant information concerning the mapbase in any agency, public or private, in view of the greater public benefit involved.

Requirement to promptly notify all changes to the mapbase

4.136 Difficulties in maintaining the accuracy of the State Digital Road Network arise from the lack of a legal requirement for councils and other bodies to immediately notify LAND*VICTORIA* of changes. In addition, certain agencies and bodies other than councils make changes to roads, road detail, names and related data without LAND*VICTORIA's* knowledge.

4.137 Audit understands that BEST and the emergency service organisations accept their responsibility to ensure that municipal councils and other agencies promptly advise of all changes, through:

- liaison with councils to raise awareness of the need for accurate and up-to-date road map information in order to assist emergency service organisations in providing high quality services to the community; and
- drafting new legislation, linked to the provision of emergency services, to require mandatory notification of data, from agencies and municipal organisations, required for State Digital Road Network and the mapbase.

4.138 Audit acknowledges that legislation will not necessarily guarantee the provision of accurate and timely update information from councils. However, in conjunction with an education campaign for councils as to the benefits arising from an accurate mapbase, it will serve to focus on the importance to the community of providing this information to enable early responses to emergencies.

4.139 Audit supports the intention of BEST and the emergency service organisations to seek legislation to enforce the prompt notification of changes. In addition, LAND*VICTORIA* needs to review the reliability of existing information sources and ensure that all relevant issues are addressed in the proposed draft legislation.

Ability of calltakers to identify locations from imprecise caller information

4.140 Several aspects of the definition and naming of map features make it difficult to establish an unambiguous computerised mapbase and for some calltakers to positively identify the location of the emergency, particularly if a caller is not familiar with the locality.

4.141 These aspects include:

- use of locality names rather than suburbs and common names for places and intersections;
- ambiguities in naming, such as different names for various sections of main roads. Examples include: Dandenong Valley Highway, of which different sections are more commonly known as Stud Road, Foster Street, Lonsdale Street and Frankston-Dandenong Road; and Flowerdale Road, a locally used name for a short segment of Whittlesea-Yea Road;
- absence of name uniqueness, including duplications of street names arising from amalgamation of municipalities;
- caller uncertainty as to the correct suburb name due to unfamiliarity with the locality or imprecise municipal boundaries;
- development areas where road naming is less controlled by councils, e.g. caravan parks, government housing estates, parks and gardens; and
- lack of established location conventions for new developments such as large, multi-level shopping centres, freeway ramps and multiple interchanges.

4.142 Audit understands that the *Geographic Names Project* currently in progress is reviewing suburb and locality names and boundaries, and that the proposed *Geographic Names* legislation may improve controls over name changes and consistency. However, there will continue to be multiple names for roads. Certain people, particularly the aged population and persons under stress, may still refer to old names or incorrectly identify localities.

4.143 Intergraph has provided operator support functions to help operators identify the correct location when caller information is insufficient or incorrect, or the Call Line Indicator cannot be used for reasons such as calls from mobile phones. For example, a suburb can be identified from a locality name using a LAND*VICTORIA*-supplied list of localities and sub-localities. In the case of a suburb name/road name combination not matching, an operator can check adjacent suburbs, based on an Intergraph routine which lists adjacent suburbs and their relative proximity via the geographic centre-points of suburbs. Notwithstanding these operator support facilities, it will continue to be a primary responsibility of calltakers to definitely confirm with callers the correct address of an emergency prior to *event acceptance*.

4.144 LAND*VICTORIA*, through BEST, has provided the emergency service organisations with a list of options that will further improve the capability of the Intergraph operators to locate difficult addresses. To date, the emergency service organisations have not taken up any of these options although their benefits are apparent.

4.145 The above matters represent extensions to the basic State Digital Road Network in order to serve emergency service organisation requirements. It is important for these organisations to jointly and individually determine their specific needs and agree with Intergraph on the extent to which any additional information can be incorporated into the CAD Map system and the costs thereof.

Call Line and Call Address Identification

4.146 The Call Line Identification and the Call Address Identification facilities form a crucial component in the calltaking process, in that when a 000 call is received from Telstra, the Call Line Identification provides the calltaker with an indication of the telephone number and the caller's address as registered with Telstra. This data is delivered independently from 2 separate Telstra databases. BEST advised audit that Telstra has the capacity to deliver both sets of information simultaneously but has not done so, to date. The calltaker confirms the telephone number and address with the caller. If correct, the address will be immediately located on the CAD Map and the event will be transferred to the dispatcher for dispatch of an emergency response crew.

4.147 Where Call Line Identification is not provided or an address cannot be readily verified on the computer-assisted dispatch map base from Call Line Identification, it normally takes the calltaker at least an additional 20 seconds to establish the address from the caller and to locate it on the CAD Map. This additional time taken can be crucial in certain time critical events.

4.148 The Call Line Identification is a very valuable aide to the calltaker in quickly identifying an address and dispatching a response. However, its value is limited and currently can only be relied upon in around 50 per cent of cases due to the following factors:

- Call Line Identification only provides a telephone number associated with an exchange line and, therefore, is of little value when the call originates from a large PABX site, such as a large industrial site or office building within which there may exist many individual extensions;
- mobile phone calls do not identify the location of the caller, and even if this was established, the location of the caller may not necessarily coincide with the location of the event;
- excluding calls from mobile phones, Intergraph staff consider the reliability of information from Call Line Identification is between 70-80 per cent. Telstra regards the Call Line Identification function as 80 per cent accurate, a figure which audit was unable to verify from Telstra as a consequence of this entity's refusal to provide co-operation to the audit team; and
- the address information held in Telstra's Emergency Calling Line Indicator Process Server database is not current, due to continual changes, nor does the address information conform to clearly defined standards subject to high level quality control, as can be found in the CAD Map database.

4.149 Audit acknowledges the limitations of the Call Line Identification function in assisting calltakers. Nevertheless, a significant improvement in its functionality and, consequently, emergency response times, could be achieved if the address details which are recorded by Telstra in its Emergency Calling Line Indicator Process Server database were consistent with those recorded in the CAD Map held by Intergraph and both databases were updated simultaneously.

4.150 Audit strongly supports the concept of negotiations being entered into between Telstra and BEST as to the matching and simultaneous updating of address information held in the CAD Map and the Emergency Calling Line Indicator Process Server database of Telstra. The benefits of such an exercise are self evident in that emergency response times could be further improved and the public concern for emergency services attending the wrong address would be further minimised. In supporting such a concept, audit acknowledges the increased level of funding that would be required for such an exercise and the implications for Telstra as a commercial entity. Nevertheless, what government sees as acting in the best interests of the public in further improving the capability of Intergraph to more accurately and promptly dispatch an emergency vehicle is seen by audit as the ultimate determining factor.

Maintaining the CAD Map

4.151 The maintenance of the CAD Map involves a number of necessary tasks, principally the capturing and processing by LAND*VICTORIA* of State Digital Road Network changes from appropriate sources and the updating of the CAD Map itself, including emergency service organisation map overlays, linkages between Intergraph system components and operator support tools.

4.152 Prior to June 1997, the CAD Map was founded on a State Digital Road Network update supplied in March 1996 which was current to January 1996. Audit was informed that between the March 1996 and February 1997 releases to Intergraph, LAND*VICTORIA* added 15 000 new address points to the State Digital Road Network. At the date of the audit examination, the CAD Map was current only in respect of changes made up to January 1997, with the next update, containing around 19 000 new address points, expected in November 1997.

4.153 Audit understands that the forthcoming update will contain general updates provided to LAND*VICTORIA* up until mid-August and cadastral updates provided and processed before the end of June. Accordingly when the update is completed in November 1997, the “new” CAD Map will still be out of date by between 3 and 5 months.

4.154 Despite the importance of the CAD Map being current, the Master Services Contract with Intergraph requires only a 6 monthly update frequency and a draft agreement between Intergraph and LAND*VICTORIA* reducing this time period to 3 months has not yet been signed, primarily due to the inability of all emergency service organisations to agree on an update frequency. The Service supports the 3 monthly update.

4.155 With the CAD Map remaining constantly out of date by several months, the resultant consequence is that additional time can be spent by calltakers in establishing the exact location of events, particularly in new housing estates.

4.156 Instead of the existing, outmoded system whereby accumulated changes to the State Digital Road Network are "batched" and processed on the CAD Map at infrequent intervals, simultaneous updating of the State Digital Road Network and the mapbase needs to occur This concept was envisaged in initial proposals for the system in 1994, as evidenced by the tender documentation which stated that "*... the mapbase spatial and aspatial databases must be able to be updated on-line and in real time without the CAD system being taken off-line"*. However, this intention has never been acted upon. If emergency service organisations, particularly the Metropolitan Ambulance Service, are to respond rapidly to emergencies, then it is critical that any impediments to Intergraph identifying the correct address in the shortest possible time are addressed. If the capability exists, as audit believes it does, to further improve the system, then this should be promptly acted upon in the better interests of the public.

4.157 A key factor in the delays to date in updating the CAD Map is that a regular routine update process has not been established. In October 1995, LAND*VICTORIA* recommended updates of CAD Map every 2 months, as a minimum. An agreement was drafted between Intergraph and LAND*VICTORIA* to this effect in April 1997 but was not acted upon.

4.158 Audit considers that updating of the State Digital Road Network and the CAD Map should be more frequent than 3 monthly, particularly in respect of time-critical emergencies responded to by ambulance and fire authorities where rapidly pinpointing the exact location of an event is vital. The implications of a 3 month update cycle in terms of the volume of CAD Map changes likely to occur in the interim were articulated to a BEST customer steering group in October 1995, using *Melway*-based estimates of approximately 2 000 new streets and 30 000 new address points each year.

4.159 Major factors in failing to reach a consensus among emergency service organisations on the need for more frequent updates were:

- emergency service organisations not clearly defining their needs;
- failure among emergency service organisations to reach agreement on a funding formula;
- absence of a government direction to emergency service organisations to commit themselves to more frequent updates; and
- a reluctance by Victoria Police to agree to the need for frequent updating, an attitude which is influenced by the costs involved with Victoria Police, as the largest emergency service organisation, contributing the major share.

4.160 Audit understands that LAND*VICTORIA* has proposed an annual maintenance charge of $410 000 for quarterly updating, a price which BEST has had independently confirmed as reasonable. In addition, Intergraph has quoted $30 000 for its work to process each update.

4.161 BEST is currently seeking approval from the Ministerial Steering Committee for the use of a funding formula which will allocate the cost of maintenance of the CAD Map across its users on a user-pays basis, related to factors such as the frequency of use of the CAD Map and the criticality of the update frequency to the operational needs of individual emergency service organisations.

4.162 If a commitment can be obtained from the emergency service organisations as to regular updating and sharing of the costs, LAND*VICTORIA* and Intergraph consider that the total update process can be significantly streamlined through process and system changes.

4.163 Subject possibly to certain technical modifications Intergraph has the capability to accept continuous updating from LAND*VICTORIA*. Any updates, however, would need to be subject to stringent quality control standards by LAND*VICTORIA* prior to their submission to Intergraph for incorporation in the CAD Map.

4.164 Under existing arrangements, the CAD Map will continue to fall short of its full potential to provide critical, current information for emergency applications. BEST needs to take action towards achieving a much higher level of currency for the CAD Map, and for these arrangements to be further defined in contractual arrangements between Intergraph, the emergency service organisations and LAND*VICTORIA*.

4.165 High priority should be given to the establishment of a continuous update process of CAD Map based on the minimum requirements of those emergency service organisations that have the greatest need for current map information.

❑ ***RESPONSE*** *provided by Secretary, Department of Natural Resources and Environment*

The Department of Natural Resources and Environment broadly supports the comments made on the State Digital Road network (SDRN) and the general thrust of the conclusions reached.

However, I would like to draw attention to the comment made in the Report on the goal of absolute completeness of the SDRN. My Department shares this goal, but we need to ensure a strategic and co-operative approach to achieving an outcome of high quality, accurate and useable data in partnership with the various providers of information to the SDRN.

The commitment of notifiable authorities, including municipal councils and VicRoads, to supplying updated information in a suitable and timely manner is critical to the completeness of the database. Allocation of appropriate resources is also essential if the timeframes and specifications required by the Emergency Services organisations are to be met.

QUALITY CONTROL MECHANISMS IN CALLTAKING AND DISPATCHING

4.166 A network of quality improvement teams has been established by BEST and Intergraph, including the BEST Quality Review Team and the Intergraph Medical Priority Quality Assurance/Quality Improvement Team. These Teams are dedicated to monitoring the calltaking and dispatch functions and levels of compliance with Advanced Medical Priority Dispatch System.

Operation of the BEST Quality Review Team

4.167 The BEST Quality Review Team, comprising 2 senior Service managers who are also experienced ambulance officers, is dedicated to the continuous improvement of services provided by Intergraph through such mechanisms as:

- investigating and reporting on all observation reports documenting complaints or problems identified by ambulance personnel;
- responding to external complaints;
- communications system performance evaluation and provision of statistical data for evaluation purposes; and
- assisting with Service training activities.

4.168 The Team places strong emphasis upon investigation of issues of a contentious nature. Given the sensitivity of certain of these issues, BEST has adopted a policy of only verbally reporting outcomes of investigations to those persons from whom observation reports and other issues originated. However, ambulance teams are invited to view the report files and visit Intergraph to gain a better understanding of all systems, including the communications system.

Issues investigated by the BEST Quality Review Team

4.169 During the period from the Review Team's formation in August 1995 through to May 1997, the Team investigated 1 685 observation reports. During this period, the Service received around 400 000 calls involving approximately 290 000 emergency events. Relative to the number of events reported, observation reports submitted to the Team represented only 0.6 per cent of all emergency events, of which 50 per cent of complaints raised by ambulance personnel were substantiated. Since the initial establishment of the Team, the volume of observation reports has steadily declined, which prima-facie, indicates ongoing improvement in quality control.

4.170 The very low level of observation reports submitted by ambulance personnel needs to be placed in perspective in that:

- incidents will occur that are not reported;
- ambulance staff can have reservations as to actions taken in respect of reports submitted, leading to a reluctance to report other incidents; and
- while many reports refer to isolated incidents unlikely to be repeated, other reports, particularly in relation to technology issues such as the communications system's map bases, automatic vehicle location system and communication problems, represent issues which unless addressed have the potential to contribute to high profile incidents occurring at future dates.

4.171 Audit examined the results of the Team's examination of observation reports submitted during the period 1 October 1995 to 31 May 1997. In broad terms, the classification of matters contained in the observation reports investigated during the period were as outlined in Table 4N.

TABLE 4N
MATTERS EXAMINED BY THE BEST QUALITY REVIEW TEAM EMANATING FROM SUBMISSION OF OBSERVATION REPORTS
1 OCTOBER 1995 TO 31 MAY 1997

Description of matters	*Cases*	*% of total cases*
Operator errors	403	23.9
Technology problems	165	9.8
Lack of resources	41	2.5
Field status issues	80	4.7
Misleading information	18	1.1
Other	52	3.1
Service Issue	83	4.9
Subtotal	**842**	**50.0**
No case to answer	713	42.3
Not fully investigated	**130**	**7.7**
Total	**1 685**	**100.0**

4.172 The reference to "operator errors" in the table refers to both the calltaking and dispatching functions. It was not until October 1996 that cases were recorded separately for these functions, which indicated that dispatching errors since then were 3 times more likely to occur than calltaking errors.

Operator errors

4.173 Operator errors confirmed by the Team relating to the calltaking function included:

- inappropriate classification of emergencies resulting in the wrong emergency response;
- situations where cases should have been referred to clinicians; and
- isolated instances, sometimes involving quite serious circumstances, where ambulances were sent to the wrong address due to the calltakers not positively verifying the address in the communications system.

4.174 Errors relating to the dispatching function encompassed:

- occasions where the closest available ambulance was not dispatched, usually occurring as a result of high workloads or human error;
- instances where the dispatch grids were not complied with;
- occurrence of significant delays in dispatching which could not be justified; and
- the incidence of multiple responses where the events did not justify such a response.

4.175 Audit strongly emphasises, that relative to the number of events requiring an emergency response, the incidence of reported calltaker and dispatching error is very small. Nevertheless, it is very important that, in addition to bringing conclusions of investigators to the attention of the Service, BEST and Intergraph, the Team is also satisfied that all reported issues have been adequately addressed by management.

4.176 Audit established that reports submitted by the Team to the Service were often either not responded to, or excessive delays occurred before feedback was received. The Service maintained that complaints about Service operational policies and procedures from ambulance teams were referred to the relevant emergency operations group manager and dealt with through the normal management processes and, therefore, did not warrant a response to the Quality Review Team.

4.177 BEST needs to ensure that a standard operating procedure is introduced in order to obtain maximum benefit from the work undertaken by its Team, in that management responses to issues raised should be provided within a specified time frame. It should only be after this process occurs that individual investigations are closed.

Technology problems

4.178 Observation reports relating to technology problems related almost exclusively to issues involving external service providers to Intergraph and the Service. Problems identified by the Team related to:

- The paging network and the handling of emergency calls;
- Problems previously identified by audit in relation to the mapbase and the Call Line Identification system;
- Delayed call answering at Intergraph involving the time delay between calls sent to Intergraph from Telstra and the actual acceptance of the calls by Intergraph;
- The occasional failure of ambulance teams to receive a selcall message, mainly as a result of the particular geographic location; and
- Incorrect polling frequencies by the automatic vehicle location system due mainly to ambulance teams not notifying their status because of inadequacies in the communications network. This situation can mean that the nearest available unit may not be identified for dispatch.

4.179 The above issues are addressed separately within this Report. Audit acknowledges that while the Team is able to establish that available technology is the likely cause of delays in providing emergency responses, it cannot be expected to fully investigate potential solutions to these factors due to their technical nature. The Team's responsibility should be to provide input into research involving both the Ambulance Service and service providers as to how such deficiencies can be overcome.

No case to answer

4.180 Around half of the observation reports referred to the Team resulted in a conclusion that there was either "no case to answer" or that a full investigation would not be conducted. However, upon audit examination, it become apparent that most cases were either attributed to technology issues, policy decisions by the Service or inadequate information.

4.181 Audit believes that it is inappropriate to classify a technology problem as "no case to answer" purely on the basis that the problems related to an external service provider and not Intergraph or the Service.

4.182 A number of complaints involved response times for Code 1 emergencies exceeding by considerable margins the Service's performance measure of 16 minutes (detailed comment on response times is included in Part 5). Although these cases were classified as "no case to answer", and were reported back to the BEST Review Team, in reality they were not investigated by the Team as they were seen to be the responsibility of the Service's Team Managers.

4.183 However, while performance monitoring is the prime responsibility of teams and management information is now provided to each branch for this purpose, audit established that the extent to which this occurs varies markedly between branches and is not centrally monitored. Many extended response times are not adequately explained.

4.184 Audit considers that the Best Quality Review Team could provide additional benefit by undertaking a review of the extent to which responses are monitored by Team Managers and Group Managers and to seek to identify areas for improvement.

Future directions of the BEST Quality Review Team

4.185 Since the audit, a number of actions have taken place to upgrade the Team's operational ability and its quality of output, including an improved register of observation reports and better liaison with officers in the field. However, audit is of the view that if the Team is to make a substantial contribution towards enhancing the overall quality of calltaking, dispatching and field operations, its role needs to be redeveloped. This aspect is particularly important in view of the contribution an efficient quality control process could make towards achievement of the Service's objective of meeting a response time target of 90 per cent of Code 1 responses within 12 minutes, by the year 2000.

4.186 Audit is of the opinion that the BEST Quality Review Team could make a greater contribution towards quality control and improved efficiencies through such measures as:

- Moving beyond their reactive approach of concentrating on observation reports, exceptions and complaints, to a more pro-active approach of data analysis and use of exception reports, including data capable of production by Intergraph, for the purpose of identifying areas where performance could be improved. Detailed examinations in these areas could then be undertaken by the Team;
- Contributing to any technical evaluations undertaken relating to external service providers such as Telstra or Geographic Data Victoria;

- Critically evaluating the extent to which calltakers and dispatchers comply with standard operating procedures in terms of quality of service provided. Areas subject to examination could include the extent to which the use of clinicians should be made, knowledge of the map database and quality of information relayed to ambulance teams; and
- Contributing to the development of qualitative benchmarks specific to calltaking and dispatch, as will be required when a third level of performance measures of a qualitative nature are introduced for Intergraph.

4.187 In summary, the BEST Quality Review Team plays an important role in exercising an oversight over incidents reported in observation reports and extended response times. However, there is considerable scope for extending the important work of the Team through seeking to establish that high standards of quality control and service exist in all areas of Intergraph's operations specific to the Service. However, in doing so, attention needs to be given to the methodology utilised by the Team, their standard of training, documentation standards and communications both with management and operational staff.

Part 5

Effectiveness of the Service's emergency response

OVERVIEW

5.1 The critical elements of an effective ambulance service are the speed of response to requests for emergency assistance and the quality of clinical care provided to patients.

5.2 The Service has achieved progressive improvement in the speed of its response as evidenced by significant reductions in response times. In early 1996, response to 90 per cent of Code 1 emergencies was within 17 minutes, but this had reduced to 14 minutes by August 1997. This improvement has occurred despite the impact of increased numbers of requests for emergency assistance and constraints on financial resources. Information systems in place prior to 1994 are no longer accessible, and comparable performance data is therefore not available for earlier periods.

5.3 In its draft operational plan for the period 1997-2000, submitted to government, the Service has outlined its aim of applying more stringent response time targets consistent with international best practice. The plan identifies strategies to improve the performance of existing resources and a requirement for additional resources in order to meet the proposed targets and accommodate the increasing workload. To facilitate achievement of these targeted improvements, it will be necessary for the Service to increase the availability of ambulance crews through investigation of clinical and operational factors currently influencing the performance of ambulance crews, establishment of appropriate time standards for each key stage of the response process and improvements to the quality of information available to monitor actual performance against these standards.

5.4 The introduction of mobile data terminals would improve the efficiency of the dispatch process and the quality of the performance data collected. Apart from the introduction of mobile data terminals, the scope for further improvement in performance is becoming increasingly limited without the provision of additional resources. Other issues which should be pursued by the Service include further reduction in the level of multiple responses, mainly through the introduction of Paramedic Response Units, and investigation of an expanded role for helicopters in peripheral areas.

5.5 Overall, the adoption of a forward-looking approach by the Service's current management team has led to progressive improvements in the effectiveness of emergency ambulance services provided to the community. Further enhancement to the quality of emergency services will be dependent on continuation of this direction and the availability of the resources necessary to improve the speed of response and the quality of clinical care.

RESPONSE TIMES

5.7 The calltaking and dispatching functions, commented upon in Part 4, essentially involve activities which fall within the direct responsibility of Intergraph.

5.8 Certain of the time absorbed with the calltaking and dispatching functions, together with time elapsed to the point of arrival of the first ambulance crew at an emergency scene, comprise the overall performance measure known as *response times* adopted by the Service for its various categories of emergencies. These measures are established periodically by the Service under its strategic planning processes. Only the calltaking and dispatching component of this time, which is controlled by Intergraph, is subject to a contractual perfomance measure.

5.9 This Part focuses on issues relating to response times for Code 1 emergencies.

5.10 Table 5A provides relevant details of past and proposed decisions of the Service relating to the response times measure and associated performance target for Code 1 emergencies.

TABLE 5A
RESPONSE TIMES PERFORMANCE MEASURES AND RELATED TARGETS FOR CODE 1 EMERGENCIES

Operative date (from 1 July)	*Measure (minutes)*	*Target*
1992	16	Measure achieved in 90 per cent of emergencies
1997	15	" "
1998	14	" "
1999	13	" "
2000	12	" "

Source: The Service's draft Emergency Operations - Operational Plan, 1997-98 to 2000.

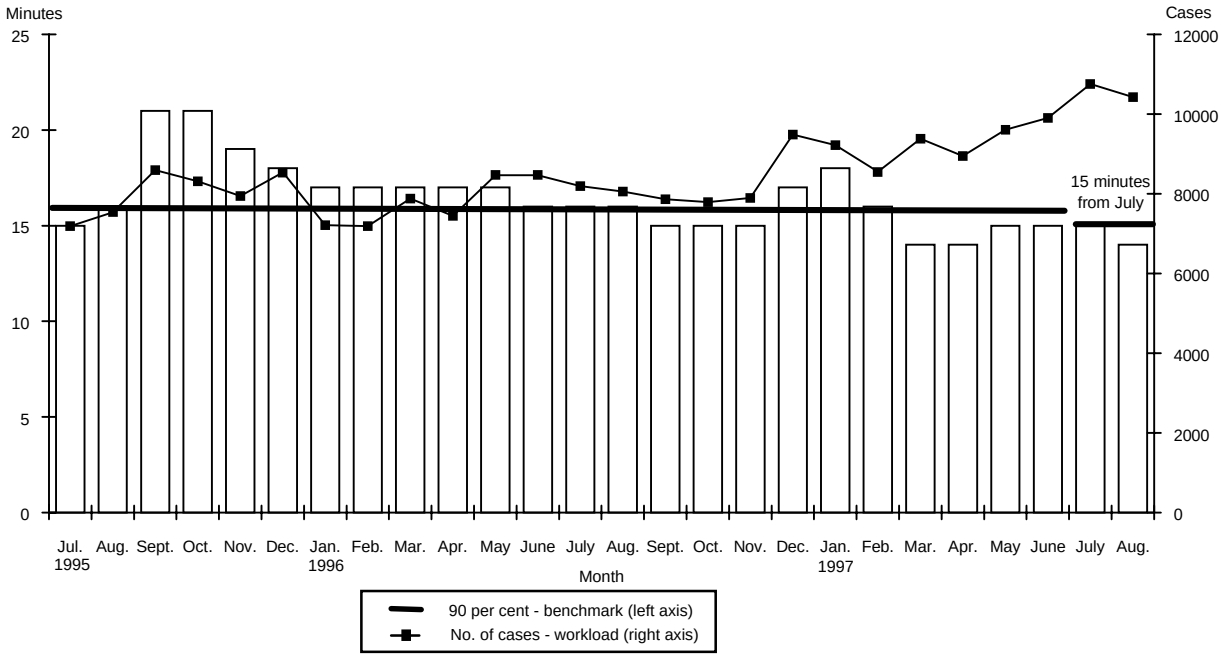
5.11 The performance measure of 12 minutes set by the Service for achievement from 1 July 2000 followed an analysis by it of emergency response benchmarks in place internationally. It represents an important element of the Service's forward planning and continuous improvement initiatives.

Performance of the Service for *response times*

Performance in respect of Code 1 emergencies

5.12 Chart 5B summarises the Service's performance against the response times measure and associated performance target for Code 1 emergencies during the period July 1995 to August 1997, with the exception of the period October to December 1995 where the data was incomplete due to industrial action. Case numbers for these latter months have been estimated by the Service. The Chart also relates response times to workload demands.

CHART 5B
CODE 1 EMERGENCY RESPONSE TIMES AND WORKLOAD DEMANDS, JULY 1995 TO AUGUST 1997



Source: Chart developed by the Victorian Auditor-General's Office from Metropolitan Ambulance Service monthly response and workload statistics.

5.13 Chart 5B indicates that, apart from the period December to February 1997, which coincided with the introduction of the Advanced Medical Priority Dispatch System, the Service's performance for response times has been mainly within its target for 90 per cent of emergencies. The chart also identifies that response times have improved from around 21 minutes in September 1995 to about 14 minutes in August 1997.

5.14 The Service's ability to progressively reduce its response times to around 14 minutes at a time when its workload has increased sharply for Code 1 responses is a reflection on the high quality management of the Service's resources. Major factors contributing to this performance include:

- the gradually improving performance of Intergraph in calltaking and dispatching which, although still below the level required under the contract, is now (and as explained in Part 4) resulting in excess of 80 per cent of emergency vehicles dispatched within 150 seconds of event creation;
- strategic monitoring at all levels, through the provision of quality management information, which enables the various components of responses, such as reflex time, transport time, at scene time and hospital time to be monitored closely, resulting in vehicles cleared for dispatch sooner than used to be the case;

- supplementation of available resources within locations, through strategies such as moving emergency vehicles between locations to cover vehicles that are attending events and use of clinical support officers in cars as first responders where available; and
- improving morale within ambulance officer ranks contributing to increased commitment to high quality service to the public.

5.15 In recognising the improving performance of the Service, the scope for further improvement is becoming increasingly limited with the possible exception, as explained in later paragraphs of this Part, of the introduction of mobile data terminals. Without a firm funding commitment to provide the resources needed by the Service, such as additional staff, ambulance vehicles, the mobile data terminals and information technology advancements, a continuing increase in workload is likely to bring about, probably in the near future, a deterioration in response times.

Issues relating to priority 0 emergencies

5.16 Although the Service had, for some time, separately categorised the most time-critical Code 1 emergencies under the *priority 0* heading, it was only from December 1996, following revision of dispatch protocols and a rationalisation of situations falling within the *priority 0* description, that the Service began to receive from Intergraph specific information on response times for *priority 0* emergencies.

5.17 From a management viewpoint, the availability of regular information on *priority 0* response times represents a significant development in that the Service is now in a position to periodically assess its response times performance for the most critical and life-threatening emergencies. However, at the time of the audit examination, the Service had not formulated a specific performance measure for *priority 0* situations and its assessment of response times activity in this area was limited to consolidated time data covering both *priority 0 and 1* emergencies, as discussed in the preceding paragraphs.

5.18 In order to gain some indication of the Service's performance for *priority 0* emergencies, audit analysed response times for such emergencies covering the period 4 December 1996 to 20 April 1997. This analysis showed that, of the 7 621 *priority 0* cases which occurred during this period, 1 016 cases or just 13.3 per cent were responded to in less than 7 minutes.

5.19 From information gathered during the audit, it was clear that ambulance services worldwide are grappling with the problems associated with achieving timely responses on a continuous basis to the most time-critical emergency situations. In addition, there appears to be very limited guidance available in terms of international benchmarks solely relating to such situations. Some guidance is available from the American architect of the Service's dispatch protocols, Dr J. Clawson, who, although not managing an ambulance service, has stated in his internationally recognised text "*Principles of Emergency Medical Dispatch*" that "*all callers with true time priority items should get an emergency response of less than 5 minutes when this is physically possible in a given system*". Also, a 1996 review of ambulance performance standards in the United Kingdom has recommended "*... that immediately life-threatening calls should receive an appropriate response in 90 per cent of cases within 8 minutes in both urban and rural areas*", however, this recommendation is yet to be adopted.

5.20 It is appropriate to recognise the following 3 recent initiatives which have been taken by the Service directed primarily at reducing response times for time-critical emergencies:

- The development of the *Hatzolah* team in July 1995 to provide an emergency and cultural support service to the Jewish community situated in the Caulfield and St. Kilda areas of Melbourne. The *Hatzolah* team, comprising volunteers trained and accredited by the Ambulance Officers Training Centre and equipped with emergency care equipment, arrive at the scene of an emergency within an average of 3 minutes from receipt of a call. The aim of the team is to administer appropriate medical treatment until the arrival of an emergency ambulance vehicle;
- The introduction of the Craigieburn Emergency Response Program under which a volunteer emergency team has been formed to work in conjunction with the Service and provide early clinical assistance in medical and trauma emergencies to surrounding residents prior to arrival of the nearest ambulance vehicle. In the short period since October 1996 when the volunteer team became operational, the average elapsed time before some form of assistance was available to the patient has been around 4 and a half minutes, compared with the average waiting time for an ambulance of between 14 and 18 minutes; and
- The establishment of Single Responder Units which comprise MICA paramedics who use sedans or station wagons when responding to emergency events.

5.21 It is also relevant to mention some of the strategies that have been employed by overseas ambulance services to assist in achieving timely responses to critical emergency situations such as the:

- use of motor bikes by paramedics in very large, traffic-congested cities, for ease of mobility;
- training of officers of other emergency services to provide a first responder capability (a similar initiative by the Government involving the Metropolitan Fire and Emergency Services Board is due to commence in Melbourne early in 1998); and
- involvement of community members, after training, in the provision of basic first aid such as Cardio-Pulmonary Resuscitation.

5.22 To complement its initiatives taken to date, the Service should now move to formulate specific performance measures and targets covering *priority 0* (the highest priority) emergencies so that it can periodically assess the adequacy of its response capability in the most life-threatening situations. It is acknowledged that, as part of this action, several factors, including cost ramifications, will require careful consideration by the Service and a graduated approach, over time, to the setting of goals for improved *priority 0* performance may well be an appropriate strategy for the organisation.

Comparison of the Service's performance benchmarks with available international benchmarks

5.23 The 16 minute performance measure for response times, which operated up to 1997-98, was set by the previous management of the Service. In discussions with current management, audit was informed that the measure was probably selected on the basis that it represented a reasonable expectation of the organisation's emergency response capability, having regard to resource availability, rather than clinical, empirical and statistical evidence.

5.24 Audit gathered information, as available, relating to performance measures and targets for *response times* adopted by overseas countries for comparison of the Service's 16 minute measure with the international position. Table 5C below provides relevant details.

TABLE 5C
COMPARISON OF INTERNATIONAL EMERGENCY TARGET RESPONSE TIMES FOR AMBULANCE SERVICES
(URBAN AREAS)

Country	*Source*	*Response times (mins) and targets (%)*
United States of America	Dr J Clawson, Developer of *PROQA* (1990)	5 (time-critical) 10 (inner city) 15 (urban-peripheral)
	Standards for Accreditation of Ambulance Services	8 (100% of emergencies)
	Congress (1974)	10 (95 % of emergencies)
United Kingdom	Review of Ambulance Performance Standards	8 (90% of time-critical emergencies) 14 (95% of emergencies)
Canada	Montreal Ambulance Service	12 (90% of emergencies)
	Toronto Ambulance Service	9 (90% of emergencies)
New Zealand	Auckland Ambulance Service	10 (80% of emergencies) 20 (95% of emergencies)
Australia	Ambulance Service of NSW. Sydney Division	14 (95% of emergencies)

5.25 Even after allowing for the fact that international comparisons of emergency *response times* are made difficult by differences between countries in such matters as the type of communications system in place, operating practices and geographic conditions, the information set out in Table 5C suggests that the 16 minute measure and the related 90 per cent target set by former management of the Service was quite conservative.

5.26 Current management of the Service has recognised this position. As identified in the earlier Table 5A, the Service's draft Emergency Operations - Operational Plan for the period 1997-2000 incorporates more challenging goals which, subject to the provision of appropriate funding, are to be progressively implemented over the next 4 years, culminating with a measure of 12 minutes targeted to be met in 90 per cent of Code 1 emergencies from 1 July 2000.

5.27 As such, the Service expects within 4 years to be utilising a performance measure for response times which is broadly in line with existing international benchmarks. It will be important for the Service to regularly monitor its performance against international developments so that it can progressively demonstrate to the Victorian community that its emergency response times are consistent with world best practice. It is understood that the Service intends to report publicly on a quarterly basis on their response times, an initiative which will complement the current practice of the Department of Human Services in providing the response times of emergency services to the public in quarterly publications.

Service emergency response vehicles intend to achieve a 12 minute response time by 1 July 2000.

Extended reflex times of peripheral and outer suburban teams

5.28 Reflex time represents the time elapsed between the initial alert of the ambulance crew and its arrival at the scene of the emergency.

5.29 Within the Melbourne metropolitan region there are peripheral or outer suburban ambulance teams with lower workloads and sparser population densities. Due to their longer travel distances, these teams often cannot respond within the prescribed performance measure for response times. Table 5D identifies teams within this category together with their reflex times for Code 1 emergencies during the 6 month period 1 January to 30 June 1997.

TABLE 5D
REFLEX TIMES OF PERIPHERAL OR OUTER SUBURBAN TEAMS, 1 JANUARY TO 30 JUNE 1997

Team	*Reflex time for 90% of Code 1 emergencies (minutes)*	*Workload Code 1 responses*	*Utilisation rate (%)*
Bacchus Marsh	15.0	263	10.3
Emerald	24.0	384	15.0
Epping	17.0	1 131	30.5
Hastings	17.0	404	12.2
Healesville	27.0	275	11.8
Mornington	16.0	547	16.0
Pakenham	19.0	388	15.0
Sorrento	16.0	316	9.8
Yarra Junction	19.5	293	12.6

Source: Table compiled by the Victorian Auditor-General's Office from the Service's Team Reports. January - June 1997.

5.30 The outer suburban and peripheral teams' inability to respond promptly is a contributing factor to the Service's non-achievement of its response time performance measure. However, this situation is difficult to resolve because, as mentioned, these teams generally have lower workloads, sparser population densities and larger geographical areas to service. An additional factor is that if a single unit station is responding to an emergency, and the nearest hospital is located a considerable distance away, the unit will be unavailable for some time. Should another emergency occur in the area during this period, response times will obviously be extended due to the need for a unit to respond from a neighbouring station, likely to be some distance away.

5.31 The interrelationship of these factors, therefore, makes it economically unfeasible to locate additional ambulances or human resources to assist in reducing the reflex times of these teams. In addition, some teams (such as Healesville) are essentially on standby due to low workloads at certain times of the day. Consequently, officers respond from their private residences which, although providing a resource saving, results in an extended reflex time.

5.32 In audit opinion, it would be appropriate for the Service to establish a range of reflex times to take into account such factors as varying team workloads, proximity to the inner metropolitan area and hospitals, population and case densities and geographical areas of coverage. To some extent, the Service's draft Emergency Operations - Operational Plan for the period 1997-2000 goes part of the way to recognising these factors by proposing differing performance measures for urban and non-urban zones. However, audit considers that further refinement is warranted to differentiate between teams in a manner such as:

- inner city - which would be characterised by high population densities, high workloads but small geographical areas of coverage resulting in shorter reflex times;

- outer-suburban - exhibiting lower population densities, lower workloads but larger geographical areas of coverage; and
- peripheral - positioned in the more remote outreaches of the metropolitan area and which have low population densities, low workloads, but very significant geographical areas of coverage.

5.33 In addition, the adoption of the following strategies could help reduce overall reflex times in some of the outer areas:

- Enhancement of communication facilities, as several of these teams also experience communication difficulties, such as poor radio reception and selcall failure;
- Providing each team with detailed performance related information on a real time basis so as to be able to analyse team performance in a more timely manner after recognition of local factors (at present, performance information is provided on a monthly basis);
- Greater use of the Service's Air Wing's helicopter facilities to respond and transport patients from the peripheral areas of Melbourne to hospitals. While this option may appear costly, it has the advantage of reducing the response times for critical patients needing to be transported to major hospitals located a long distance from the stations. It also has the advantage of maintaining coverage for the locality, in that helicopter transport will allow single ambulance stations to remain staffed while the patient transport is undertaken by the helicopter;
- Consideration be given to the feasibility of introducing additional first responder teams such as the Craigieburn Emergency Response Team (referred to in an earlier paragraph in this Part) and the *Hatzolah* team so that the capacity of the professional ambulance teams can be supplemented with trained advanced first aid capacity interspersed throughout the larger regional boundaries of peripheral stations; and
- The adoption and encouragement of broader general community training in first aid and Cardio-Pulmonary Resuscitation to provide an expanded citizen-based first aid capacity.

Incidence and consequences of multiple responses

5.34 A multiple response by the Service occurs when, in accordance with its dispatch protocols, more than one ambulance vehicle is dispatched to the scene of an emergency. Certain emergency situations, such as life-threatening circumstances especially involving more than one patient, will automatically demand multiple responses by the Service.

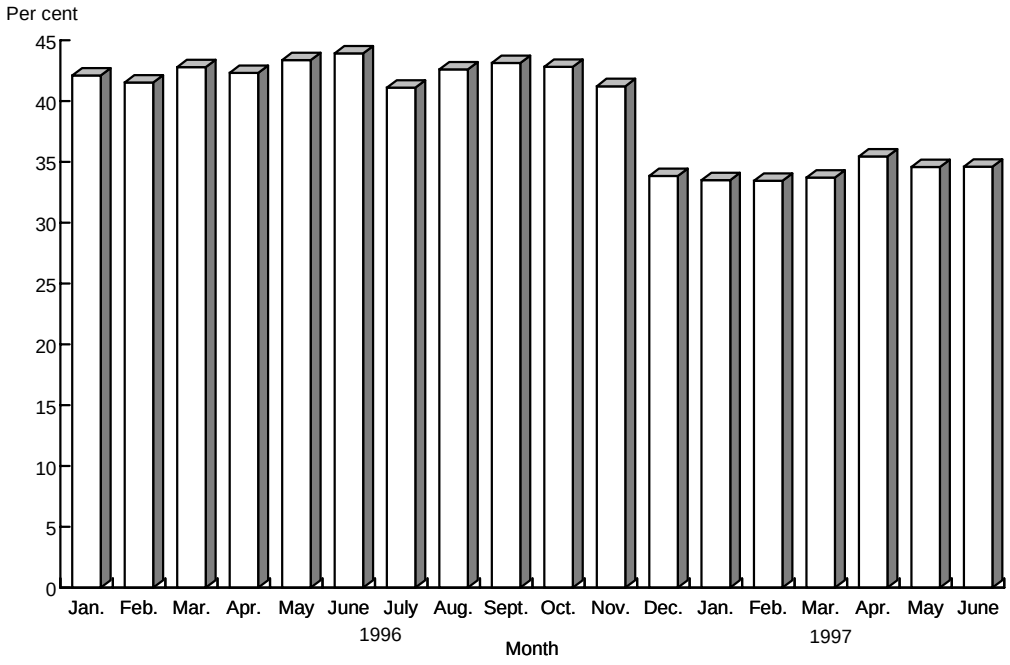
5.35 In addition, the Service's dispatch protocols provide that, if the most appropriate response unit (e.g. a MICA vehicle or paramedic expertise) is not immediately available, some other form of response, e.g. a general purpose ambulance, must be dispatched pending the arrival of the initially-identified necessary expertise. It is with this category of multiple response activity that the Service has the challenge of ensuring that multiple responses are minimised without compromising the quality of patient care.

5.36 The importance of this management challenge to the Service is reinforced by the fact that the occurrence of multiple responses in situations where such a response is not absolutely necessary can impact on the availability of ambulance crews for other emergencies (later paragraphs within this Part comment on the Service's current shortage of emergency ambulance vehicles). It can also lead to:

- additional stress on crews;
- extra wear and tear on ambulance vehicles; and
- inefficient use of scarce resources.

5.37 Chart 5E shows the incidence, expressed as a percentage of total emergencies, of multiple responses by the Service during the period 1 January 1996 to 30 June 1997.

CHART 5E
MULTIPLE RESPONSE CASES AS A PERCENTAGE OF TOTAL EMERGENCY CASES, 1 JANUARY 1996 TO 30 JUNE 1997



Source: Chart compiled by the Victorian Auditor-General's Office from the Service's Multiple Response statistics. July 1995 - June 1997.

5.38 Chart 5E shows that, for the period under examination, the level of monthly multiple responses fell from a peak of around 44 per cent (which equated to 5 718 multiple response instances) in June 1996 to average around 35 per cent (4 574 instances per month) in the 6 months to June 1997.

5.39 Chart 5E also discloses that the incidence of a lower level of multiple responses coincided with the introduction, in December 1996, by the Service of revised dispatch protocols under the Advanced Medical Priority Dispatch System. As mentioned in Part 4, implementation of the revised dispatch protocols was intended to result in a better quality dispatch in the shortest possible time based upon greater recognition of the patient's medical needs. Both the Service and Intergraph were firmly of the view that the lower incidence of multiple responses of around 1 140 instances per month could be directly attributable to the new arrangements.

5.40 The Service is also very conscious of the fact that significant scope exists to further reduce the incidence of multiple responses. By way of illustration, during the 6 month period 1 January to 30 June 1997, a total of 27 400 multiple responses occurred, of which only 12 600 were regarded by the Service as falling within the categories of emergencies specified within the dispatch protocols as requiring, on clinical grounds, a multiple response in the first instance. In making this comment it is recognised that multiple responses may be unavoidable in instances where the nearest unit to the scene of the emergency is not the most appropriate unit.

5.41 The Service indicated to audit that it has identified options to reduce multiple responses while improving the current level of service to the community. One strategy is the use of Paramedic Response Units (ambulances staffed by a MICA paramedic and a qualified ambulance officer), which would enable wider deployment of MICA paramedics than at present. The Service's Medical Standards Committee has endorsed the appropriateness of these units from a clinical perspective. The Service estimates that 14 Paramedic Response Units could be introduced by the year 2000, while maintaining the existing 10 MICA units staffed by 2 MICA paramedics (principally for training purposes). Audit considers the introduction of Paramedic Response Units to be a potentially effective strategy which would be likely to substantially reduce or even eliminate the current level of multiple responses caused by the scarcity of MICA units, and at the same time widen the availability of MICA paramedic skills.

5.42 As with all other aspects of its continuous improvement strategies, the Service will need to carefully oversee future developments in this area. In addition to assessing the progressive impact on the incidence of multiple responses from its deployment of additional Paramedic Response Units, the Service should ensure that appropriate action is taken to address those occurrences of multiple responses where the clinical specifications do not automatically justify such a response.

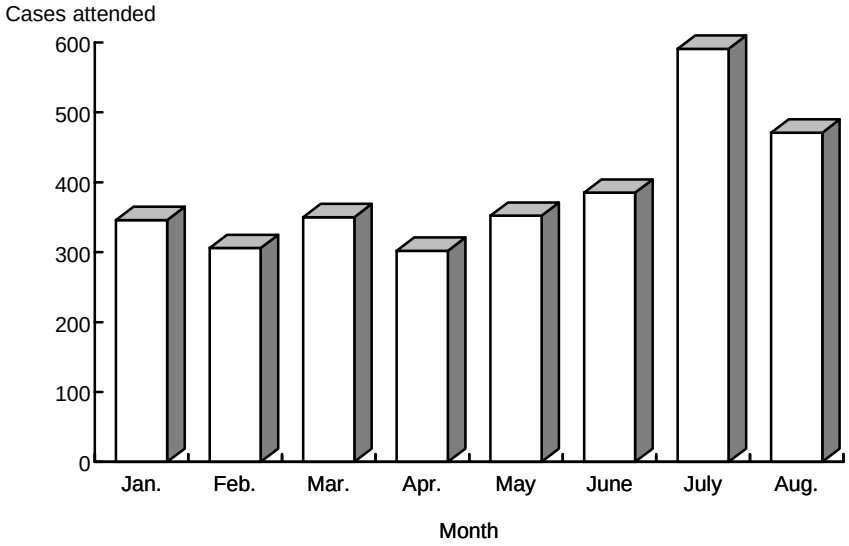
Recent increase in use of Clinical Support Officers in a response capacity

5.53 The Service's response strategy includes a group of trained paramedics known as Clinical Support Officers. These officers, 20 in all, with 16 available at any one time, are located throughout the metropolitan area and operate out of fully equipped MICA station wagons. The officers provide a paramedic back-up facility to emergency ambulance crews but their primary role is to perform a clinical internal audit function of medical standards applied by these crews. Additional activities on which these clinical support officers are utilised include:

- the undertaking of formal clinical reviews of cases;
- selected reviews of manual patient care records; and
- providing feedback and additional training to field crews.

5.54 Chart 5F discloses that during the period 1 January to 31 August 1997 there was an increasing use of Clinical Support Officers in a first responder capacity for Code 1 emergencies to assist ambulance crews to cope with an increasing workload.

CHART 5F
NUMBER OF CODE 1 CASES ATTENDED
BY CLINICAL SUPPORT OFFICERS,
1 JANUARY TO 31 AUGUST 1997



Source: Chart compiled by the Victorian Auditor-General's Office from information provided by the Service's Clinical Services Department.

5.55 Notwithstanding that the primary role of Clinical Support Officers relates to clinical reviews and supplementary training of ambulance officers, it is apparent from Chart 5F that they are being increasingly used as a back-up for emergency responses.

5.56 An increasing annual workload of the Service has meant that Clinical Support Officers have been increasingly utilised in a primary response capacity rather than their extremely important role of monitoring clinical standards.

5.57 Audit is of the opinion that the establishment by the Service of the Clinical Support Officer function has been very beneficial. However, there is an ongoing need for the Service to ensure that the prime role of such officers in monitoring clinical standards is not significantly diminished.

TIME SPENT AT SCENE BY AMBULANCE CREWS

5.58 Time spent at scene is defined as the time of the first response unit arriving at the address of the emergency to departure from the scene following completion of immediate treatment and loading of the patient.

5.59 Upon reaching the scene of an emergency, the ambulance crew is required to notify the dispatcher of its arrival. The dispatcher then enters the status change into the communications system while the crew commences the process of providing clinical care to the patient. However, as previously commented upon in Part 4, an audit analysis of Intergraph data identified that *arrivals at scene* had not been notified or recorded in 35 per cent of emergencies. Similarly, departures from the scene were not notified in 23 per cent of emergencies. Audit acknowledges that the information provided by Intergraph was unable to separately identify instances where responses were cancelled prior to arrival or where no transport was required which would inflate the above figures. Nevertheless, audit still considers that there is a high degree of non-compliance by ambulance crews in notifying Intergraph of their arrival at, and departure from, the scene. This was further confirmed in discussions between audit and various ambulance crews.

5.60 Alternatively, at-scene times may have been sent by crews to Intergraph but due to dispatcher workloads, were not immediately entered into the communications system. In this regard, status times cannot now be entered retrospectively in the system by dispatchers as previously occurred. In view of the level of non-compliance, the amount of time spent at the scene is not readily available to the Service in summary form until information is extracted from patient care records some weeks later.

Quality of calltaker instructions

5.61 An important factor influencing the effectiveness of the time at the scene is the quality of instructions provided by the calltaker to the patient and/or caller. This is of particular importance in cases where the patient requires immediate first aid assistance prior to the ambulance crew arriving at the scene of the emergency. Instructions given by calltakers include:

- directions to the caller as to the provision of first aid to the patient such as Cardio-Pulmonary Resuscitation, assistance with breathing, minimisation of bleeding etc.;
- asking the patient/caller to prepare for the crew's arrival by carrying out certain preparatory activities such as locking up any pets, identifying any medicines taken by the patient and having someone wait for the ambulance in the street for ease of location by the crew; and
- matters that may impact on crew safety such as determining whether any bleeding was caused by a gunshot or stab wound, any potential for violence or a need for police attendance.

5.62 Prior to the introduction of the Advanced Medical Priority Dispatch System, structured assistance to callers by calltakers was only provided on an ad hoc basis, with virtually no monitoring.

5.63 Audit examined pre-arrival instructions given by calltakers both prior and subsequent to the introduction of the Advanced Medical Priority Dispatch System. The implementation of this System in December 1996 has, as previously mentioned in earlier paragraphs, introduced a superior, tried and proven systematic means whereby calltaker instructions to the callers are now clear, concise, clinically focused and standardised to a high quality. After some initial "bedding down" problems, calltaker compliance with the new System is now at a highly satisfactory level of 95 per cent.

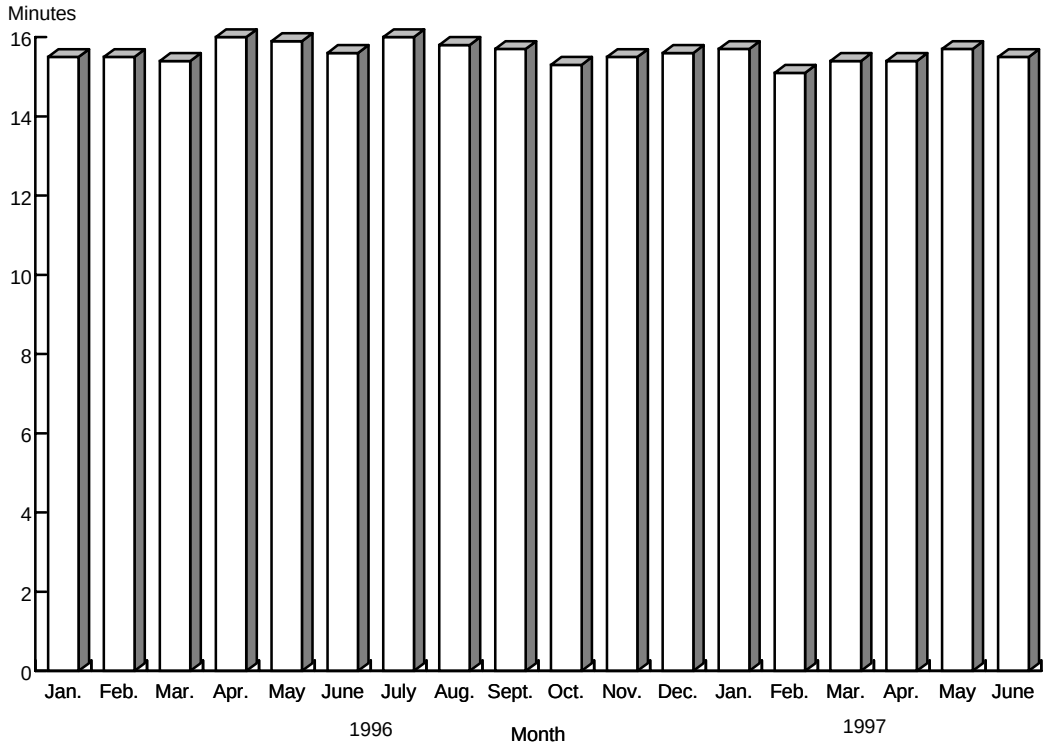
Time spent at the scene of an emergency

5.64 The amount of time spent at the scene of an emergency will essentially be determined by the condition of the patient, access to the patient, the environment and the resultant amount of clinical work to be performed by the crew to stabilise and treat the patient. Importantly also, is the need to provide sufficient high quality clinical treatment so as to endeavour to ensure the best possible prognosis for the patient.

5.65 The amount of time spent by the crew at the scene will obviously influence the final arrival time of the patient at the hospital, and ultimately the availability of the ambulance once delivery to the hospital is completed.

5.66 Chart 5H below provides a summary of the Service's monthly average at-scene times for Code 1 emergencies for the period 1 January 1996 to 30 June 1997.

CHART 5H
AVERAGE AT-SCENE TIMES FOR CODE 1 EMERGENCIES,
1 JANUARY 1996 TO 30 JUNE 1997



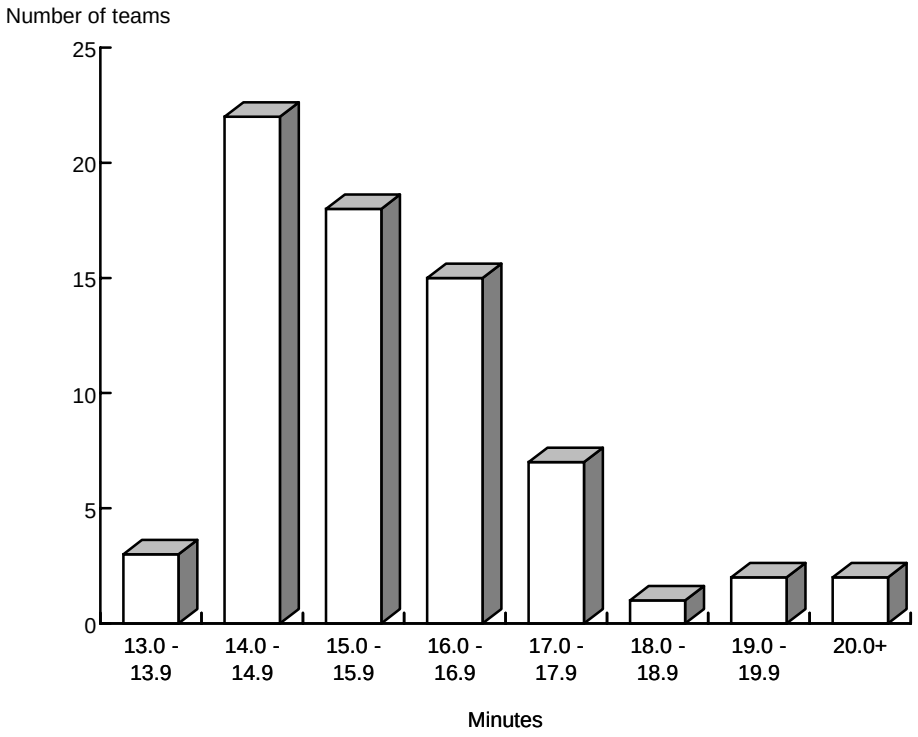
Source: Analysis undertaken by the Victorian Auditor-General's Office based on the Service's statistical records.

5.67 Chart 5H indicates that, notwithstanding minor fluctuations from month to month, a consistent at-scene time has been recorded by the Service over the period January 1996 to June 1997. Fluctuations were relatively minor and occurred within a one minute range (from a minimum of 15.1 minutes in February 1997 to a maximum of 16.1 minutes in July 1996). It is difficult to evaluate the reasonableness of these figures as a formal performance measure has not been established by the Service. However, given the Service average, it could be expected that, unless special circumstances exist, at-scene time would not normally exceed 20 minutes.

5.68 Audit decided that a more accurate indication of at-scene times could be determined by matching the performance of individual ambulance teams against a 15 minute performance measure which a large number of teams are achieving.

5.69 Chart 5I provides an illustration of the average at-scene times for individual teams over the period 1 January to 30 June 1997.

CHART 5I
AVERAGE AT-SCENE TIMES FOR INDIVIDUAL TEAMS,
1 JANUARY TO 30 JUNE 1997



Source: Analysis undertaken by Victorian Auditor-General's Office based on the Service's statistical records.

5.70 Chart 5I indicates that out of 70 teams included in the analysis (excluded were Air MICA and Clinical Support Officers) 27 teams (38.6 per cent) performed within 15 minutes. Eighteen teams (25.7 per cent) had an average at-scene time of between 15.0 and 15.9 minutes, 15 teams (21 per cent) averaged between 16.0 and 16.9 minutes with 10 teams averaging above 17.0 minutes. Audit concluded that certain individual teams consistently spent, on average, longer times at the scene than other teams.

5.71 Assuming that teams receive an even range of emergencies from high priority to low priority, it was evident to audit that those teams with higher averages at the scene warranted attention by the Service as to the reasons why their at scene time was consistently high.

5.72 Some caution, however, has to be taken in assuming that those teams that spend the greatest amount of time at the scene of emergencies are necessarily less efficient. The amount of time spent will be determined by a range of factors, including the physical and medical condition of the patient and the actual location of the patient. For example, it may take some time to extract a person from a motor vehicle that has been badly damaged. It is, therefore, important to ensure that in emphasising the need for reducing at-scene times, quality of service to the patient does not suffer. In addition, a distinction also has to be made between time spent at the scene treating a patient, and scene management which includes accessing and loading the patient.

Emergency Ambulance crews at the scene of a major motor vehicle accident attempting to retrieve entrapped patients from vehicles.

5.73 Currently, all teams receive from the Service a monthly summary of at-scene times. These summaries are analysed by team managers and group managers and explanations sought as to the specific reasons for excessive at-scene times incurred by the teams at specific events. Reasons most commonly advanced by the teams included:

- treatment required by the patient at the scene of the event prior to loading;
- poor access to patient leading to added time at the scene;
- security problems, including violent patients, requiring a police presence;
- difficulties in locating the patient; and
- the need to await the arrival of a second response unit such as a MICA unit.

5.74 On other occasions, no reasons could be provided for delays, thereby necessitating corrective actions by team managers or clinical support officers.

5.75 In audit opinion, it would be beneficial for the Service to undertake research as to the specific reasons why at-scene times may be excessive. The results of such research should lead to the formulation of specific strategies aimed at ensuring that, over the long-term, major factors influencing at-scene times are systematically addressed. Such strategies could include:

- automatically subjecting to review any at-scene time greater than 20 minutes with a distinction made between scene management and clinical treatment;
- setting performance measures in conjunction with the Medical Standards Committee for time-critical clinical conditions such as trauma, and monitoring individual crew performance against these benchmarks; and

- constantly ensuring that information contained within patient care records is high quality, including documented explanations for all cases where at-scene time appears excessive in respect of the clinical condition of the patient.

Need for clarification of "load and go" and "meet and treat" policy

5.76 Traditionally, virtually all ambulance services around the world have followed a *load and go* strategy which focuses on picking up the patients and transporting them to hospital in the shortest possible time with minimal treatment provided to the patient. The Service has pursued a strategy of providing definitive care to the patient as quickly as possible prior to transport to hospital. This is evident by the early introduction of the MICA system in 1971 and the equipping of each ambulance with a defibrillator in 1986. This philosophy allowed patients to receive early advanced treatment prior to transport to hospital. In recent years, a greater emphasis has been placed by the Service on reduction of the time spent at the scene while still providing advanced care prior to transport to hospital. Other ambulance services worldwide have also been concentrating on *meet and treat strategies* in introducing advanced care to patients prior to transport to hospital.

5.77 The above direction is evidenced through a proposed strategic arrangement with the Medical School at Monash University, training more qualified ambulance officers as paramedics and enhancing the levels of training provided to qualified ambulance officers. These actions will ensure that an increasing proportion of ambulance personnel will be capable of providing additional clinical services to the patient aimed at improving final patient outcomes.

5.78 Notwithstanding a clear direction by the Service towards providing patients with high calibre clinical care, audit observed an understandable diversity of views among staff as to the appropriate balance between the *meet and treat* and *load and go* philosophies.

5.79 Audit is not qualified to comment on the merits or otherwise of which of the 2 approaches is the more appropriate in specific circumstances. However, in the discussion on standards of clinical care contained in Part 6 of this Report, audit strongly recommends the establishment by the Service of a clinical database to capture data on clinical performance at scene and during transport. Analysis of data contained in such a database should enable the Service's Medical Standards Committee, over time, to form a view on strategies adopted at the scene and their subsequent impact on patient outcomes.

Ambulance crews must decide whether to "meet and treat" the patient or "load and go".

TRANSPORT TIME TO HOSPITAL

5.80 The time taken by an ambulance from departure of scene to arrival at a hospital is critically important for 2 reasons; namely:

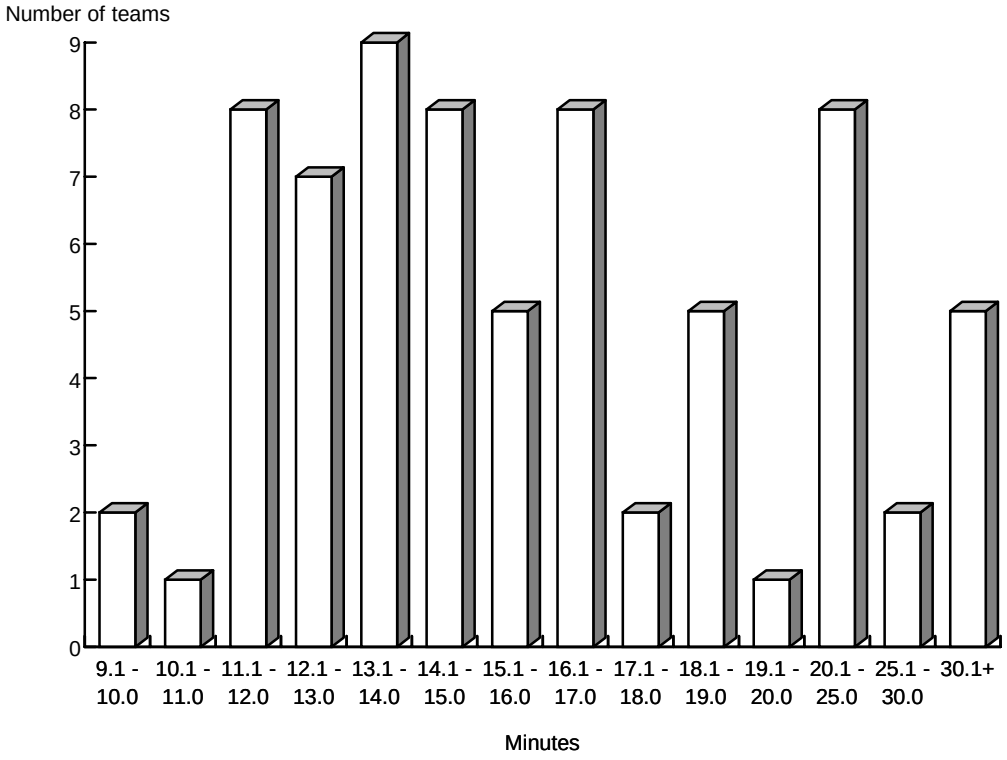
- the ability of an ambulance crew with a time-critical patient to reach a hospital in the shortest possible time can, in certain circumstances such as trauma patients, influence the patient's clinical outcome; and
- secondly, the less time expended on transport to the hospital will most likely reduce the length of time that the vehicle and crew remain unavailable for dispatch to other emergencies.

5.81 Depending on the level of advanced definitive care able to be administered at the scene, it is in the health interests of the patient and of the overall efficiency of the Service for minimisation of the amount of time that expires between when a patient is treated at the scene of the emergency to when a patient has received definitive hospital care. However, the ability to reduce transport time is limited and is directly related to the distance from the emergency to the nearest hospital.

Average transport times

5.82 Chart 5J below provides a summary of average transport times taken by ambulance teams to reach hospitals or other destinations over the 6 month period 1 January to 30 June 1997.

CHART 5J
AVERAGE TRANSPORT TIMES TAKEN BY AMBULANCE TEAMS TO REACH HOSPITAL
1 JANUARY TO 30 JUNE 1997



Source: Analysis undertaken by Victorian Auditor-General's Office based on the Service's statistical records.

5.83 Chart 5J discloses that average transport times taken by individual teams to reach hospital destinations varied considerably from a low of 9 minutes to in excess of 30 minutes. However, the longer transport times to hospital do not necessarily reflect a team's level of efficiency. For example:

- Those teams identified in the audit analysis to take the longest transport times (Pakenham 31.4 minutes, Emerald 28.3 minutes, Healesville 33.5 minutes, Yarra Junction 35.1 minutes, Sunbury 32.1 minutes, Bacchus Marsh 28.1 minutes and Melton 31.5 minutes) are all located on the fringe of Melbourne and consequently have the longest distances to travel to the nearest public hospitals. As such, patients requiring emergency transport from these areas have a reduced probability of survival in time-critical cases, except where use is made of the Service's helicopter; and
- Those teams that have the shortest transport times (Central 9.6 minutes, Footscray 11.8 minutes, Frankston 10.6 minutes, St Vincent's 11.6 minutes, Windsor 11.5 minutes and Richmond 11.5 minutes) are all located within short travel distances of Melbourne's central business district or are located near major hospitals. Clearly, time-critical patients who require emergency transport to hospital within these areas have an advantage compared with patients serviced by outer suburban stations.

5.84 Despite the obvious relationship in the length of transport time to hospital between ambulance station locations and the proximity of hospitals, it is still important to monitor this component in terms of team performance.

5.85 The Service should develop performance measures governing transport times to hospital as a means of evaluating individual team performance in this area.

Important factors that can influence transport times to hospital

5.86 There are a number of factors, including road and weather conditions, that can influence the time it takes for an ambulance to reach hospital. In addition, there are avenues available to the Service to help minimise transport times to hospital, as indicated below.

Better access in heavy traffic

5.87 Congested roads can often cause delays in ambulances reaching hospitals in the shortest possible time. The Service's Emergency Operations Operational Plan 1997-2000 gives consideration to the potential introduction of *traffic light sequence override facilities* and indicates that the technological and operational feasibility of this option is under investigation and consideration as a longer-term strategy. Such a facility has been used by the tramways network for many years.

Greater use of the helicopter

5.88 In time-critical cases, particularly in outer suburban areas, it may be appropriate for the Service to make more extensive use of its helicopter service to transport patients to hospital. Implementation of such a strategy would not only provide a faster patient transport to hospital but would also allow the local ambulance team to become available for other emergencies.

Use of the Air Wing's helicopter service will result in shorter travel times for patients.

5.89 In audit opinion, it would seem beneficial for the Service to conduct a feasibility study to determine the potential benefits and the likely costs of increased use of helicopters to undertake more patient transports from the peripheral areas of Melbourne.

Hospital by-passes and hospital closures

5.90 The extent to which hospital emergency departments go on ambulance by-pass and hospital closures can reflect upon the transport times taken to the next available hospital. Information on the implications of such factors on the Service's operations had not been compiled. Such information needs to be gathered and analysed to determine whether patient outcomes are adversely impacted as a result of extra travel times specifically attributable to ambulance by-pass and hospital closures. The need for ambulance crews to transport certain patients to networks specialising in particular forms of clinical care, such as cardiac or trauma patients, can also contribute to increased transport times to hospital.

5.91 In addition, certain hospitals although reported as on ambulance by-pass, encourage ambulance crews to contact them directly as they may have beds for particular categories of patients. Such actions can create uncertainty as to the closest available hospital.

5.92 The above issues need to be addressed by the Service in consultation with hospital networks.

AT-HOSPITAL TIMES

5.93 Time spent at hospitals by emergency ambulance crews involves a number of varied activities ranging from the transfer of the patient into the care of hospital staff, completion of administrative tasks such as restocking of drugs and medical supplies, completion of the patient care record, or simply resting due to a particularly demanding workload.

Ambulance Officer in the process of briefing hospital emergency staff upon transfer of patient.

5.94 Ambulance crews are required to communicate their status to Intergraph dispatchers when they arrive at a hospital, when they depart hospital, or when they remain within the hospital but nevertheless are available for dispatch to another event.

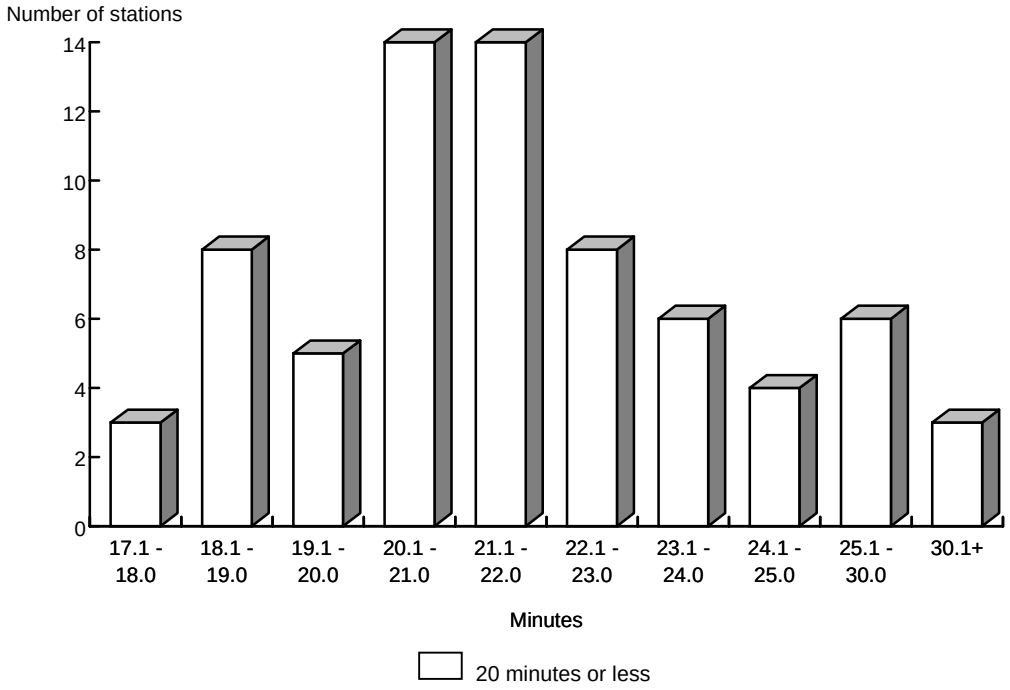
5.95 Ambulance teams invariably do not notify Intergraph of their time of arrival at hospitals. In this regard, Intergraph provided audit with the following comment:

> *"It is possible for the communications system to record the 'arrived at hospital' time and therefore to calculate the time to transfer the patient. However, the arrived at hospital time is not reported by the ambulance crews so this time stamp is hardly ever recorded. In fact, the whole time between loading a patient and the ambulance becoming clear is just recorded as 'loaded'. This time covers all sorts of activities such as transfer time, unloading time, time to clean and sterilise the ambulance, tea break, administration etc."*

5.96 The determination of whether time used by ambulance crews at hospitals is reasonable or not has proved a contentious issue between Service management and crews because of the competing necessity for crews to be afforded a sufficient amount of time to complete administrative tasks at the hospital and of the need for those crews to advise Intergraph of their availability for the next case as soon as possible. Extended times spent by emergency ambulance crews within the hospital and in a "loaded" status will be reflected in the number of ambulances available for dispatch and consequently, on the capability of the emergency fleet to service overall community needs.

5.97 In the absence of available data from Intergraph, audit extracted information from data compiled by the Service from its patient care records. Chart 5K provides a summary of the average at-hospital times of ambulance teams over the period 1 January to 30 June 1997.

CHART 5K
AVERAGE AT-HOSPITAL TIMES BY AMBULANCE TEAMS,
1 JANUARY TO 30 JUNE 1997



Source: Analysis conducted by Victorian Auditor-General's Office based on the Service's statistical records.

5.98 The Service has not established a performance measure for time spent at a hospital although it considers that a span of 25 minutes is a reasonable measure to be achieved for 90 per cent of emergencies.

5.99 Based on specialist advice provided to audit, a performance measure of an average of 20 minutes is considered a reasonable time to be spent by an ambulance team at a hospital. In this regard, Chart 5K discloses that only 16 out of 71 teams (22.5 per cent) had achieved a 20 minute or less average at-hospital time, with the remaining 55 teams exceeding this measure. Of the remaining teams, however, 14 teams comprised MICA or other advanced teams which, due to the more complicated and severe cases handled, can justify spending additional time at a hospital.

5.100 Reasons advanced to audit by the Service for longer at-hospital times, and resultant non-availability of ambulance crews for dispatch to other emergencies, included:

- Multi-trauma, violent, or psychiatric patients delaying their admission to hospital;
- Condition of patients requiring greater attention, e.g. spinal injuries;
- Significant amounts of time waiting for hospital admittance and availability of hospital staff to accept patients and to finalise patient information requirements. According to the Service, recent hospital network changes to admission procedures without consultation with it have had negative impacts on ambulance availability;
- Time required to complete patient care records in those instances where records could not be completed while in transit;
- The involvement of MICA units in critical and complex cases;
- Additional time required to clean and replenish ambulances after transport of seriously injured patients; and
- Need to wait for hospital beds to become available in order to remove the patient from the ambulance stretcher.

5.101 Notwithstanding the many factors, as presented above, that can contribute to extended at-hospital times, there was a range of other cases where no documented explanations for delays were recorded.

5.102 Audit acknowledges that there are valid reasons why ambulance crews are, from time-to-time, held up within hospitals for unduly lengthy periods of time and under circumstances which are often beyond their control. For example, ambulance crews indicated to audit that after stressful and protracted cases, often when they have gone without scheduled breaks, crews are entitled to take time to unwind, complete their at-hospital administrative tasks, and perform a minimal amount of cleaning and preparatory work prior to calling in to Intergraph as ready for the next case.

5.103 However, assuming that each ambulance crew was subjected to the same level of delays and a similar range and volume of clinical case types over the 6 month period examined by audit, it became apparent that some teams (except for MICA teams), consistently had higher at-hospital times than others.

5.104 Ambulance team managers and group managers have indicated to audit that they are sensitive to crews' needs and are not against a crew taking a break or performing various post-case administrative activities while at the hospital. However, they expressed the concern that, while crews are carrying out these activities, dispatchers at Intergraph are not aware of their current status and they are likely to be updating vehicle movements at a rate which is not appropriate to that status. In addition, the practice of some crews, without authorisation, returning to base stations to clean, disinfect and replenish vehicles prior to making themselves available for dispatch was not appropriate. Under these circumstances total fleet availability is extremely difficult to monitor, it places other crews under additional pressure to respond to cases in which they may not be the nearest unit, results in the registering of *no nearby unit* situations and may place patients at greater risk than necessary.

5.105 The reduction in time spent at hospitals has been identified by the Service as an important priority in order to increase the availability of ambulance crews to respond. Through improved monitoring, reductions in at-hospital time of 5 minutes at the 90th percentile have been achieved by the Service in recent times, although scope remains for further improvement. The overriding factors to be considered in further reducing this time are:

- At present, if ambulance crews need to contact the destination hospital, direct contact is not made, but is undertaken via the Service's clinician stationed at Intergraph. Exceptions have occurred where certain private hospitals and cardiac units of major public and private hospitals have provided ambulance teams with mobile phones in order that direct contact can be made. The advantage of direct communication with the hospital is that the hospital can be prepared for admission of a seriously ill patient. This approach is obviously advantageous to the hospital, the patient and the ambulance crew which is likely to save time in having the patient accepted immediately, and would be facilitated if conversations between ambulance officers and hospital emergency departments can be audio taped;
- A need to evaluate the proportion of at-hospital time attributable to delays caused by factors such as the unavailability of hospital staff to promptly admit patients to emergency beds, prolonged admission procedures and time spent by ambulance crews waiting to discuss clinical treatment with medical staff prior to patient handover. Direct observations by audit, albeit in only a small number of cases, indicated that delays of this nature are likely to constitute the major component of at-hospital time and need to be addressed in conjunction with improved liaison with certain hospitals;
- Assessing the potential for introduction of automated admission mechanisms, such as the planned (but extensively delayed) mobile data terminals and voice recording machines for patient condition reports to be taped in transit and handed over with the patient to hospital staff;
- Directing priority to achieving introduction of mobile data terminals without any further delay for use by Intergraph in automatically contacting ambulance crews for confirmation of their status when they have exceeded a predetermined at-hospital time (the communications system has the facility for an alarm to be activated after a specified period and for a team to be automatically contacted);
- The need to more clearly define and reinforce when ambulance crews must notify availability prior to undertaking such tasks as cleaning, disinfection, replenishment, etc., or returning to the station to undertake these tasks;
- Once all arrivals at hospital are notified to Intergraph, standard operating procedures could be amended to enable dispatchers to utilise the alarm mechanism in the communications system to selcall and page ambulance teams to establish status of availability in emergency situations where the crew may be the closest available unit; and

- Liaison between the Service and major hospitals needs to occur as to streamlining processes, where possible, to handover patients transported in a more timely manner. As part of this process, more use of direct communications under strict clinical and operational guidelines, including taping of conversations between ambulance teams and hospital emergency departments may assist.

IMPLEMENTATION OF MOBILE DATA TECHNOLOGY

5.106 A mobile data network facilitates the forwarding and receipt of messages to emergency vehicles and their crews in a reliable, pre-determined format via 5 radio channels separate to the voice channel. Installation of the network constitutes the most important component still remaining to be implemented by BEST into the Statewide communications system.

5.107 The implementation of mobile data technology as a means of electronically transmitting data between ambulances crews and the communications centre at Intergraph, was recognised in the August 1993 tender process, to be an "*integral component*" of the Service's emergency communications system. Contractual arrangements between the Service and Intergraph, specified the provision of a communications system incorporating mobile data technology and an automatic vehicle location system by May 1994. It was envisaged that the technology would have the following capabilities:

- recording of emergency crew status changes (acknowledge event, transit time, arrive at scene, patient loaded, arrive at destination, clear and available);
- electronic transfer of data including address of emergency event, from Intergraph dispatchers to ambulance crews;
- access to other on-line data sources;
- patient case history, if available;
- improved vehicle status monitoring; and
- reduced radio traffic.

5.108 Installation of the necessary infrastructure (radio data channels) to introduce the mobile data technology into the communications system was completed during the fit-out of the Intergraph communications centre. The mobile data terminal components to be installed in ambulance vehicles were purchased by Intergraph and have been stored in South Australia with the supplier since 1995. However, ownership has not been transferred to the Service due to suspension of that part of the contract. Nevertheless, the Service incurs a monthly contract payment of $21 057 to retain the option of introducing mobile data technology at some future date. This technology, despite forming an integral component of the communications system, is yet to be introduced by the Service more than 3 years after the 1994 initial implementation target.

Justification for the introduction of mobile data technology

5.109 The key to efficient and effective computer aided dispatching of emergency resources is based on:

- a knowledge of where all available emergency vehicles are located according to the automatic vehicle location system;
- accurate recording of the status of teams (status messaging) to allow the automatic vehicle location system to allocate the nearest available unit to an emergency; and
- a communications system which can contact the crews (dispatch call-out) and advise them of task details in a reliable and timely manner.

5.110 The Service has identified several deficiencies which reduce the reliability of the communications system in allocating emergency resources. These include:

- failure of ambulance crews to routinely advise the Intergraph dispatcher of status changes, due to such factors as radio congestion, the pre-occupation of the crew in attending a patient or a reluctance of crews to provide certain information. Audit analysis of the extent to which crews did not call in their status is reported in Part 5 of this report. In addition, even where status changes are advised, dispatchers during peak workload times may miss status changes or fail to log them as they occur.

  This situation potentially results in:

  - the most appropriate available unit not being dispatched to an event;
  - diminished information, consistency and reliability to assess ambulance team/crew performance and, to develop strategies for productivity improvements;
  - the Service having to resort to extracting performance data from manually prepared patient care records (located at the Service) and event information provided by Intergraph; and
  - a lack of consistent and reliable information to plan for the optimum deployment of resources.
- registering the availability of ambulance crews by radio communication in the communications system at shift change-over is cumbersome with existing communication modes, with delays often occurring due to the volume of radio traffic. Furthermore, the ability of the dispatcher to concentrate on dispatching ambulances to emergencies is compromised by the need for every in-coming ambulance crew to call-in and register the crew, vehicle, selcall and pager numbers.

5.111 The introduction of mobile data terminals would ensure status changes are consistently and accurately recorded in the communications system in real time, virtually at the "push of a button". The Service considers that the introduction of mobile data technology will be a key component in future strategies to reduce overall response times and reduce the incidence of events which have an unacceptable response delay.

5.112 The use of mobile terminals to communicate case details (event number, address, code and event type/patient clinical information) to the ambulance crew directly from the communications system will eliminate the need for the dispatcher to provide these details by pager and radio. This will significantly reduce the time taken in the dispatch process, result in an overall reduction in the volume of radio traffic, improve the clarity of communications and assist Intergraph in meeting performance measures stipulated in the contract.

5.113 In addition to improving the dispatching function, introduction of mobile data technology will make it easier for ambulance crews to advise Intergraph of their status during the various stages of a response to emergencies. As a consequence, Intergraph will be able to produce timely, more meaningful management information from its communications system to assist the Service in monitoring the performance of ambulance crews, leading potentially to increased availability of ambulances for dispatching and, therefore, reduced response times.

Business case for mobile data technology

5.114 During 1996, the Service was prompted to review the case for introducing mobile data technology following difficulties experienced by Intergraph dispatchers relating to the call-in of crews at the cessation of shifts and on-going problems involving congestion of the radio network.

5.115 In September 1996, the Service appointed consultants to prepare a report outlining the business case justification for the Service to proceed with the implementation of mobile data technology. The report recommended that the Service proceed to implement the technology independently of the BEST mobile data implementation project. The consultant's recommendation was based upon the following factors:

- *"the existing investment in communications infrastructure has the capacity and capability of integrating mobile data technology quickly and cost effectively;*
- *continuing with Intergraph is the most cost effective solution with the lowest risk and highest feasibility; and*
- *mobile data technology implementation time will be faster by implementing the Intergraph solution"*.

5.116 The Service's Administrator approved the business case report in October 1996 with the expectation that mobile data technology would be fully implemented in July to September 1997.

5.117 At the request of BEST, the Service's business case report was also reviewed by consultants appointed by BEST who expressed the view that there was only a 6 month implementation time frame differential between the Service proceeding independently and the BEST development path. Subsequently, the Service agreed to commit to the BEST project on the basis that they would not be commercially disadvantaged in doing so.

5.118 Concerns, however, have since been expressed by the Service as to the likelihood of the BEST mobile data network project achieving the timelines specified in its updated Strategic Implementation Plan issued in July 1997. Commitment to the project from all emergency service organisations is yet to be obtained and BEST has not yet been able to effectively demonstrate to the Government the net cost-benefit to the State to be derived from mobile data technology. BEST's updated Plan indicated mobile data technology would be available to the Service in mid-1999. However, given the uncertainty surrounding the viability of the BEST project, it is likely that the Service will not have access to this technology until at least late in 1999, 5 years later than was originally projected in the contract entered into between the Service and Intergraph in 1994.

Reasons for delays in implementation of mobile data technology

5.119 The decision to advance the implementation of mobile data terminals into the communications system has been "put on hold" by the Service on numerous occasions over the years, due to the following reasons:

- Uncertainty by the Service in 1995 as to whether there were more advanced technologies other than the mobile data technology and its application to emergency operations, (this resulted in a re-assessment of various data communication options including pen-based computing terminals, alphanumeric capability and text-based technology);
- A desire to initially overcome problems experienced with the automatic vehicle location component of the communications system;
- The industrial environment at the time in late 1995 which was not conducive to proceeding with mobile data technology as operational difficulties were being experienced with the introduction of the new communications system;
- The need to develop an interface between the mobile data network and the Intergraph communications system. Audit understands that providing access to the interface would take at least 12 months for Intergraph to develop, exclusive of the testing period, as the software modifications would need to be undertaken in the United States of America; and
- The preference of BEST, as facilitator of Government policy, on the matter to implement the mobile data technology across all emergency service organisations on a Statewide basis. There are major advantages to be gained from such an approach, however, the presentation of a consolidated business case to Cabinet, representing the views of all emergency service organisations, including the Service, is taking a considerable time to develop.

Consequences of the failure to introduce mobile data technology

5.120 Without the introduction of mobile data technology, the full benefits of the Intergraph communications system have yet to be realised by the Service in its role of providing emergency response to the community. The delay in implementing this technology has adversely impacted upon the efficiency of the communications system in dispatching emergency resources.

5.121 Although the Service was committed to introducing mobile data technology as part of the contractual arrangements entered into with Intergraph in 1994, it was advised by Intergraph that should it determine to implement the technology as part of the BEST project, instead of the original Intergraph option, it would be required to compensate Intergraph $7 954 each month (for costs incurred to date in respect of licences, equipment, software, pilot studies, etc) for the duration of the contract. Should the Service, however, proceed with implementation of the existing contractual arrangements with Intergraph, the monthly service charge payable to Intergraph would increase from $21 057 to $47 548. The additional cost is due mainly to the revised and more detailed Service specification for the technology.

5.122 Failure to implement the technology has resulted in an additional cost to the Service of around $85 200 per month, reflecting productivity gains forgone calculated by the Service at $60 000 and the cost of extra staff at Intergraph of $25 200.

5.123 The ongoing deferral of mobile data technology from 1994 led to Intergraph engaging additional staff to operate the communications system as efficiencies from this technology were not available. The Service, in September 1996, agreed to reimburse Intergraph for the cost of the additional staff resources amounting to $25 200 each month. The cost of the additional staff would be eliminated with the introduction of the technology, however, this cost will effectively transfer to the monthly contract payments which will increase by a similar amount.

5.124 One option would be for the Service to proceed on its own with the introduction of mobile data terminals using its existing communications system and the components purchased by Intergraph, which are currently held in storage by the supplier in South Australia. However, this technology is now dated and, in conjunction with the minimal 12 month timeframe involved in developing the interface with the Intergraph communications system, there may only be a marginal time advantage in doing so as compared to the preferred solution of BEST. The BEST solution would, however, be dependent on approval by Cabinet and the calling of tenders early in 1998. The Service also faces the prospect of upgrading its communications system to ensure full area coverage.

5.125 The mobile data network phase of the Government's strategy for a Statewide emergency communications system is the most critical component remaining to be implemented in order to maximise the overall efficiency and effectiveness of the State's emergency response capabilities. Pending agreement between all emergency service organisations on the strategy to be adopted and Cabinet approval, it is essential that mobile data technology be introduced as soon as possible, with the Service being given high priority in view of its immediate operational needs. In this regard, use of an existing data network service provider could be considered for the Service's mobile data network requirements.

❑ ***RESPONSE*** *provided by Chief Executive Office, Metropolitan Ambulance Service*

MAS strongly supports the recommendation that Mobile Data Terminals should be introduced as soon as possible.

❑ ***RESPONSE*** *provided by Secretary, Department of Justice*

The next major component of the CAD Project will be the introduction of a mobile data service for the emergency service organisations. Audit has commented on the delays to the introduction of mobile data capability for MAS. While this is an issue, the development of a well researched business Plan and Functional Requirements Specification for mobile data functionality for all emergency services organisations is being progressed. It is important that this is undertaken collaboratively by all the ESOs to avoid a fragmented approach and to reap the cost and functional benefits of a shared common system, with the most up-to-date technology. Audit findings in relation to this issue appear to be the result of a superficial understanding of the complexities involved.

MANAGEMENT OF THE EMERGENCY VEHICLE FLEET

5.126 At 30 June 1997, the Service's emergency vehicle fleet was nominally 116 vehicles made up of 101 general purpose ambulance vehicles and 15 MICA vehicles.

5.127 The Service replaces emergency vehicles after the expiration of 7 years in operation or after travelling 200 000 kilometres, whichever is first achieved. This practice results from a long standing industrial agreement.

5.128 Under current operating conditions, most vehicles are replaced by the Service based on kilometres travelled.

5.129 In 1994, the Service outsourced its entire fleet management and maintenance operations as part of an overall organisational strategy designed to achieve more efficient and effective services to the community.

Shortage of emergency vehicles

5.130 For some time, current management of the Service has been critically analysing whether the organisation had, and is likely to have, sufficient emergency vehicles to fully meet its obligations to the community.

5.131 This concern had arisen principally from an approach adopted by the previous Chief Executive Officer in relation to vehicle replacements. In this regard, this former executive formed the view that the Service had an excessive capital investment in emergency vehicles and embarked on a strategy, between 1993 and 1995, of progressively reducing the number of vehicles by not replacing them at expiration of their service life. A further consequence of this strategy has been the lack of development of a standard specification for vehicles, over the 2 year period. It was seen by current management as critically important that any emergency vehicles to be purchased and modified were suited to the very demanding conditions which are experienced in field operations. This issue has significantly hindered the Service's ability to address the shortage of emergency vehicles in recent years.

5.132 In recognition of these critical issues, the Service over the past 2 years has, in conjunction with ambulance teams, the Department of Human Services, the Ambulance Employees Association and country ambulances services, developed a vehicle specification from which new vehicles could be purchased. Furthermore, the Service commenced in November 1996, an internal review to initially determine the optimal number of emergency vehicles necessary to meet its existing workload requirements and to formulate a strategy which would enable the Service to progressively achieve the identified optimum number of vehicles. A further element of the review was to develop a forward vehicle strategy covering a 5 year period, to determine vehicle requirements given forecast workload levels.

5.133 A draft report dated March 1997 arising from the internal review recommended that the current level of emergency vehicles be increased to an optimum level of 144 to enable the Service to *"... fulfil its responsibilities to the community"*. This recommendation was considered to represent "*medium risk*" to the Service in terms of adequacy of vehicle capacity to meet its obligations to the community (high risk was assessed at 123 vehicles and full capacity or, no risk, at 178 vehicles).

5.134 Since June 1993, the average number of vehicles within the Service's emergency ambulance fleet has been 125, well below the level now identified as necessary to maintain a medium risk position to the Service. Also, as previously mentioned, the Service's emergency vehicle fleet at 30 June 1997 was 116 vehicles, which had fallen to 108 vehicles at 30 September 1997, a position below the identified high risk level. The maximum number of ambulances, including MICA units, normally on duty for response is 67.

5.135 In discussions with audit, the Service considered that the shortfall in emergency vehicles along with the condition of the fleet and the high incidence of multiple responses creating additional strain on vehicles, placed considerable pressure on its emergency fleet. It advised audit that, as a result of this pressure, its fleet is "*... significantly less flexible and the deployment of resources at times can be strained in order to meet Service requirements*".

5.136 In addition, the Service indicated that, because of its inadequate number of emergency vehicles, existing arrangements whereby the resources of the non-emergency fleet, the resources of adjoining country ambulance services and the resources of certain bus lines would have to be invoked in order to satisfy its obligations under the State's Disaster Plan in the event of a major disaster.

5.137 It was evident to audit that the above circumstances could be attributed, to a large extent, to the strategy adopted by the former Chief Executive Officer in determining not to replace emergency vehicles at the expiration of their service lives. This action has resulted in an aged emergency vehicle fleet which has seen a higher than anticipated incidence of mechanical breakdowns experienced since the outsourcing in 1994 of fleet management and maintenance operations. Audit was advised that this situation was the principal factor leading to an agreed variation to the outsourcing contract in June 1996, under which an additional annual amount of $300 000 was payable by the Service to the contractor.

5.138 A clearly held view within the Service is that the shortage of emergency vehicles, which is assessed as a serious situation, has increased the risk of having sufficient vehicles available to deliver emergency ambulance services to the community.

Strategies initiated to address shortage in emergency vehicles

5.139 Although a final decision by the Service is yet to be made on the adoption of an optimum size for its fleet of emergency vehicles, it has taken action in the following 3 areas to address the adverse consequences which have arisen from the existing shortage in such vehicles:

- implementation of an accelerated procurement program;
- establishment of an industrial agreement to extend the service life of a limited number of vehicles; and
- a review of the maintenance of emergency vehicles.

Implementation of an accelerated procurement program

5.140 Commencing in February 1996, the Service embarked upon a major procurement program involving the acquisition of up to 105 new emergency vehicles, 60 to be supplied over the period to March 1998 at a cost of $7.3 million and a further 45 vehicles over the period to July 1999 at a cost of $5.7 million. The Service indicated to audit that this program involved the largest number of emergency vehicles ever purchased by the organisation.

5.141 It needs to be recognised that, notwithstanding its procurement program, the Service's emergency vehicle fleet is not likely to reach its optimum level until at least mid-1998 due to:

- "industry-specific" factors including the limited number of suppliers in the market and the considerable lead times associated with the tender process, production and delivery of the emergency vehicles (suppliers are located overseas and vehicle assembly takes place interstate); and
- the fact that the considerable strain on the emergency vehicle fleet already experienced by the Service will continue for some time as vehicle acquisitions will be offset by a large number of vehicle retirements (approximately 72 per cent of the emergency fleet or, 83 vehicles, will need to be retired over the period to June 2000).

Industrial agreement to extend service life of limited number of vehicles

5.142 Under a longstanding industrial agreement, the retirement from service of emergency vehicles has occurred strictly in accordance with the existing replacement criteria of 200 000 kilometres (which usually occurs first) or 7 years. This approach has been followed without any assessment of the engineering capability of retired vehicles to perform beyond this level.

5.143 The Service advised audit that it has recently completed negotiations with the Ambulance Employees Association and reached agreement under which 10 emergency vehicles will be retained for an additional 30 000 kilometres, subject to the performance of specified vehicle safety checks. The Service views this development as worthy of trialing, subject to careful attention to the safety aspect, in order to apply a degree of flexibility to its fleet management practices. It will also enable an assessment of the vehicle from a technical/engineering perspective which may provide the Service with the capacity to change current industrial agreements limiting the life of ambulances to one which is based upon safety, engineering integrity and fitness for purpose.

5.144 It is expected that, with the results of this limited trial, the Service will be better placed to assess the merits or otherwise, from both safety and cost viewpoints, of revising the replacement criteria for emergency vehicles.

Internal review of emergency vehicle maintenance

5.145 As identified in my April 1997 Special Report No. 49 "*Metropolitan Ambulance Service: Contractual and outsourcing practices*", the Service entered into a 4 year contract during 1994-95 for the outsourcing of fleet management and maintenance to an external service provider. That Report identified that no cost savings had been generated by the Service under the outsourcing arrangement (the Service had projected that savings of around $500 000 were expected to be achieved over the 4 year period of the contract).

5.146 The Service determined in July 1997 to appoint an internal Fleet and Property Manager. A priority assigned to the newly-appointed manager was to review management procedures under the outsourcing arrangements relating to the emergency fleet. This review was recently finalised and the following findings have been submitted to the Service's Chief Executive Officer:

- Although the management contract required the external service provider to regularly monitor the level of vehicle downtime arising from maintenance and repairs, the Service had not systematically measured the contractor's performance in this important area. In this regard, performance reports required to be furnished to the Service related to general operational information on the vehicle fleet rather than the actual performance of the contractor. The review found instances where turnaround times for scheduled maintenance activities were unsatisfactory, in that vehicles were not returned to the Service in accordance with the performance indicators stipulated within the maintenance contract. The contractor has since acknowledged to the Service that turnaround times need to be improved;
- Indications within the Service of a lack of discipline and commitment in relation to the care, maintenance and treatment of vehicles, a situation compounded by a high level of movement of vehicles between branches;
- MICA ambulances, which are required to be serviced at more frequent intervals than other emergency vehicles (every 4 000 kilometres), were found to be "*... under-serviced with periods between service slipping by approximately 40 per cent.*";
- The incidence in the period of vehicle breakdowns between scheduled service dates was "*extremely high*"; and
- Absence of a "*real external check*" on the maintenance process from the Service's perspective arising from the one party having responsibility under the contract for both maintenance and the overall management of the vehicle fleet.

5.147 The Service has recently advised audit that action is currently under way in respect of the abovementioned findings. Specifically, key reports and data required to assess the performance of the Service's fleet management and maintenance service provider have been identified and are now regularly provided to the Service. In addition, procedures relating to vehicle sign-off by crews for minor repairs have been revised to ensure vehicles are not unnecessarily "out of service", and to instil a culture among officers to care for the vehicles assigned to teams.

A well cared for and maintained ambulance
will assist in providing a more efficient patient transport service.

5.148 Given that no cost savings from the outsourcing arrangements have been generated to date, it will remain important for the Service, during the remainder of the contract, to closely monitor the contractor's performance in ensuring that the vehicle fleet is mechanically sound, properly maintained and that maximum availability occurs. Lessons learnt from this experience will prove valuable when the contract is re-tendered.

❑ ***RESPONSE*** *provided by Chief Executive Office, Metropolitan Ambulance Service*

The Report notes the current shortage of emergency vehicles, and refers to a draft MAS report which identifies an optimum fleet size of 144. Further analysis of fleet requirements has since been undertaken, and the estimated optimum has now been reduced to 131. It should be emphasised that this figure is much higher than the actual number of vehicles required to be operational at any one time, to allow for maintenance requirements, major disasters, accidents etc. An accelerated vehicle procurement program has been implemented, and new vehicles are currently being delivered. Taenders for further vehicle purchases have been received and are currently being evaluated.

Part 6

Standard of clinical care

OVERVIEW

6.1 Ensuring a high standard of clinical care is a key element to be continually addressed by the Service as it strives to achieve its aim of providing skilled medical assistance to the community.

6.2 For a period between April 1993 and May 1995, prior to the appointment of the current administration of the Service, insufficient attention had been directed towards many key areas crucial to the effective delivery of clinical services, e.g. ambulance officers received limited, if any, training in clinical skills during this period.

6.3 Since the appointment of the current Chief Executive Officer in May 1995, far greater attention has been directed towards enhancing the quality of clinical care. As a consequence, the Service has made substantial progress towards examining and refocussing its clinical role and is clearly on course to improve the quality of its clinical services. Specific actions taken by the Service have included:

- finalisation of a comprehensive *Clinical Quality Assurance Plan* as a basis for managing clinical activities and addressing specific issues relating to clinical standards;
- streamlining calltaking and ensuring rapid dispatch of ambulances through the use of a state-of-the-art system, the Advanced Medical Priority Dispatch System, which has provided substantial benefits to the effectiveness of ambulance dispatch and, as a result, the quality of clinical response to emergency situations;
- development of a *Strategic Information Technology Plan* aimed at more timely and accurate data collection and distribution; and
- progressive development of performance indicators to allow more effective assessment of delivery of clinical services.

6.4 This current approach by management to improving the delivery of clinical services could be enhanced in a number of areas through:

- expanding the role of the Service's Medical Standards Committee to incorporate responsibility for high level monitoring of the implementation of clinical standards;
- further enhancing the already high standard of patient care records through improving recording of clinical information such as medication provided, including dosage, and the past medical history of patients, especially in relation to allergies;
- ensuring that ultimate responsibility for all changes in clinical practice always rests with a qualified medical practitioner, including on a Statewide basis;
- the medical standards committee investigating whether a need exists to implement protocols for ambulance officers to consult with medical practitioners in specific circumstances when dealing with the clinical duty of care issues; and
- strengthening the interaction between the Service and the emergency departments of hospitals.

OVERVIEW *- continued*

6.5 Overall, the Melbourne metropolitan community can gain confidence from the actions implemented by current Service management to further enhance the quality of clinical services.

Introduction

6.6 The mission of the Service, in its draft business plan, refers to the need to provide *"... access to efficient and skilled ambulance based medical care which aims for the best possible patient outcome at a cost acceptable to the community."* A key factor to be addressed by the Service in its efforts to achieve this mission is the development and maintenance of specialised clinical (medical) skills.

6.7 The quality of clinical care provided by the Service is also of vital importance to ensuring confidence in the State's health care system. The community needs to feel safe and secure in the belief that their needs will be met at their initial point of contact with the health system, that is the ambulance service. The Service aims to meet this community need through the establishment of internal quality assurance and clinical supervision programs.

6.8 The Service has made significant progress in examining and refocussing its clinical programs with the aim of improving the quality of ambulance-based medical services it provides to the community.

Emergency ambulance crews providing critical lifesaving clinical services to a road accident patient.

Role of the Service's Medical Standards Committee

6.9 To ensure that the Service provides the highest standards of patient care, it is important that there is extensive involvement of qualified medical personnel not only in an advisory role on clinical standards but in the day to day operational issues affecting the delivery of clinical services. In managing this involvement, the Service must develop an appropriate balance between maintaining sufficient medical control of clinical operations and accountability in contrast to a medical bureaucracy which may not add value to either operational clinical activities or the Service as a whole.

6.10 Traditionally, clinical expertise in the Service was provided by a single medical officer. Over the years, this arrangement progressively expanded through the appointment of additional medical officers and eventually by the establishment of the current positions of senior medical director and other medical directors. Throughout this time, the role of these medical personnel evolved from one of retrospective examinations of the clinical care provided by the Service to a more direct involvement in issues regarding occupational health and clinical practice.

6.11 In June 1994, the Service's medical directors became part of a multi-disciplinary team known as the Medical Standards Committee. Membership of the Committee comprises the Service's senior medical director, associated medical directors and the managers of the key areas of the Service with an impact on the delivery of clinical services, e.g. the manager of clinical operations, the manager of clinical policies, standards and training, the manager of business development, manager of communications and the manager of emergency operations.

6.12 The Committee exercises a wide range of responsibilities, such as:

- the issues of clinical policies and setting and monitoring of clinical standards;
- provision of medical advice and support, as required, on operational policies;
- approval of clinical research and new medical equipment;
- oversight of the clinical audit and review process; and
- communication with other health care agencies on clinical issues.

6.13 In practice, the Committee functions as a review and standard setting body responsible to the Chief Executive Officer. It currently does not play a major role in monitoring the extent to which the clinical standards it has set are actually implemented by Service personnel.

6.14 The Committee is independent of day-to-day clinical responsibilities, including monitoring of the application of clinical standards, and has no direct line of communication with ambulance officers in the field. The Service's manager of clinical operations has overall responsibility for the oversight of day-to-day clinical activities including clinical support, clinical reviews and examinations of patient care records prepared by ambulance officers.

6.15 The current lines of responsibility for clinical activities within the Service result in an anomaly in that while the manager of clinical operations is responsible to the chief executive officer for implementation of the Service's clinical policy, the senior medical director also reports directly to the chief executive officer on all matters of clinical policy, including clinical standards. The existence of 2 lines of communication on clinical matters is considered unproductive and increases the risk that inconsistent information could be conveyed to the chief executive officer.

6.16 Overall, the operation of the Medical Standards Committee is considered an appropriate mechanism for establishing the appropriate mix of medical and ambulance personnel to control the clinical activities of the Service.

6.17 However, the role of the Committee would be enhanced if, in addition to standard setting and clinical advice, it was given responsibility for high-level monitoring of the implementation of clinical standards. This monitoring role should be geared towards the clinical performance of the Service as a whole with oversight of individual and group performance best left to clinical managers and supervisors.

6.18 In addition, the current anomaly in responsibility relationships for clinical services should be addressed by:

- the manager of clinical operations reporting directly to the Committee on all clinical matters including those related to the implementation of clinical standards; and
- the Committee, via its chairperson, reporting to the Chief Executive Officer on all issues associated with clinical policy, standards and clinical auditing practices.

6.19 In addition, consideration could be given to the introduction of a policy under which the chairperson of the Medical Standards Committee must be a qualified, independent medical practitioner, in order that all matters of a clinical nature are viewed objectively and without any external or internal direction.

❑ ***RESPONSE*** *provided by Chief Executive Office, Metropolitan Ambulance Service*

Audit recommends some changes to current reporting lines relating to clinical functions. MAS will give this recommendation serious consideration, however, it should be noted that any changes to clinical practices or standards are at present adopted only on the recommendation of a senior qualified medical practitioner. MAS's medical directors and Medical Standards Committee play a very active role in reviewing standards and monitoring clinical service delivery.

Potential for enhancement of clinical data and performance measures

6.20 As referred to in the previous paragraph, there is scope for inclusion of a high-level monitoring role within the ambit of the Medical Standards Committee's responsibilities.

6.21 The ability of the Committee, and all other managers of the Service with involvement in the clinical services area, to effectively monitor clinical activities will be largely reliant on the quality of information available. It is therefore necessary for the Service to establish high-level performance measures related to the standard of clinical performance. These measures should be consistent with the Government's and the Service's objectives and community expectations for ambulance services. In addition, appropriate management information systems must be in place to accurately and completely record and report data in a form compatible with these measures.

6.22 The Service is currently devoting significant attention to the development of performance measures for its activities, including the area of clinical services. In this regard, the Service issued a draft document in May 1997 entitled *Ambulance Services Management Information System Performance Indicators* which comprehensively outlines all performance measures that should be implemented by the Service, including those related to clinical services. The document incorporates details of data currently collected by the Service, the proposed changes to data collection and the consistency of data with the performance measures recommended for nationwide implementation by the Convention of Ambulance Authorities, a body with representation from the majority of Australian ambulance services.

6.23 Table 6A provides examples of the current status of the Service's performance measures relevant to clinical services, proposed changes and overall compatibility with recommendations of the Convention of Ambulance Authorities.

TABLE 6A
CURRENT AND PROPOSED PERFORMANCE MEASURES FOR CLINICAL SERVICES

Performance Measure	*Current status*	*Proposed status*	*Compatibility with recommendations of Convention of Ambulance Authorities*
Response times	• Aggregate response times collected for all emergency services.	• Categorise response times in relation to severity and type of illness.	• Full compliance
	• No record of helicopter ambulance response times.	• Include response times of helicopter ambulance.	• Full compliance
	• Calltaking, dispatch, arrival and time on scene data not reported to Medical Standards Committee.	• To be collected and reported on a regular basis.	• Full compliance
Number of patients attended to	• Collected for total patients.	• Categorise ambulance modes of transport attending patients e.g. MICA.	• Categories to be based on those agreed by Convention.
Interventional management	• No current reporting of actual treatment delivered by ambulance officers.	• Collection of data on the numbers of cases and patients, case mix, patients transported, patients attended but not transported, and patient care outcome by category, including hospital outcomes.	• Generally consistent with those adopted by Convention.
Complaints	• Written and verbal complaints.	• Time taken to respond. • Complaints as a proportion of patient attendances on a monthly basis.	• No standard adopted by Convention.

Sources: Metropolitan Ambulance Service's Clinical Services Department and the Australian Convention of Ambulance Authorities.

6.24 While measures proposed in the Service's performance measures document are valuable and should be accessible with improvements in information technology, they are not necessarily suitable for timely and ongoing monitoring of overall service activities. Accordingly, attention should be given to the development of measures and associated data which facilitate assessment of performance at a particular point in time. Specific measures of this nature, other than those which have already been implemented by the Service in relation to reflex and response times, could include:

- time on the scene classified depending on the type of event, i.e. time-critical cases or where access to an accident victim was delayed;
- relationship of response times and/or outcomes to illness severity, e.g. a reduced response time for a cardiac patient is desirable;
- rate of dispatch "risk" (when a dispatch code assigned is insufficient resulting in an inadequate clinical response to the needs of a case) or "wastage" (where the type of response is in excess of the necessary clinical requirements for a case);
- time of onset of symptoms to provision of definitive medical care;

- rate of recall to patients where, during the previous 12 or 24 hours, ambulance officers had attended but transport of the patient for further medical care did not occur;
- level of compliance with minimum documentation standards for patient care records;
- number and type of complaints; and
- rate of compliance with established standards for the timeliness and appropriateness of dispatch, e.g. the response time and type of ambulance and personnel dispatched in response for a patient with chest pain.

6.25 It is recognised that implementation of several of these suggested measures would be reliant on improvements to current management information systems and technology enhancements such as the introduction of mobile data terminals.

6.26 Monthly data related to these measures should be reported to the Medical Standards Committee. The Committee would review trends and forward an appropriate report to the chief executive officer on the key actions required to ensure that established targets are met and to address any other emerging clinical issues. This process would ensure that the Committee is aware of clinical issues, is accountable to the chief executive officer and plays a pro-active role in the delivery of clinical services.

Collection and recording of clinical data

6.27 Clinical data within the Service is currently available from a number of sources including:

- the calltaking and dispatch system which can provide access to:
  - details of incidents; and
  - the response process incorporating time of dispatch, time at the scene of the incident, time at the destination and time cleared at the destination;
- patient care records;
- the details of clinical audits undertaken within the Service; and
- patient outcome information available from relevant hospitals.

6.28 Despite the existence of these sources, evaluation of clinical performance is currently limited by the fact that data is not in a form suitable for monitoring information on particular patients or patient groups.

6.29 The Service has addressed the need for improvements to the collection of clinical data in its May 1997 Strategic Information Technology Plan which includes recommendations for:

- establishment of a single source of data;
- upgrading of technology to enable more timely and accurate data collection and distribution; and
- implementation of a formal management system using information technology.

6.30 The upgrading of information technology is essential to improve the timeliness and accuracy of statistical data concerning patients attended to by the Service. However, prior to investment in new technology, the Service should establish the priorities and objectives for collecting data and decide on the level and quality of information that is required.

6.31 The Service's Strategic Information Technology Plan outlines the need to explore a number of alternative mechanisms for the capture of clinical data including image processing and scanning of manual patient care records, voice recognition to encode data into electronic form, mobile data terminals and smart card technology.

6.32 The Service should, with the support of the Department, aim for implementation of a computerised version of patient care records which instantaneously updates a clinical database. It is recognised that such technology would be progressively implemented over time and would require the resolution of a number of associated issues, such as workforce training.

Quality of patient care records

6.33 The Service's patient care records are a source of key information concerning the quality of clinical care administered to patients by ambulance officers.

6.34 Overall, it was found that the quality of the patient care records examined was of a uniformly high standard. In general, critical actions required in response to each situation were appropriately performed and the "back-up" by paramedic personnel either appropriately utilised or, where relevant, or paramedics advised their expertise was not required.

6.35 A number of potential areas for improvement to patient care records were identified, namely:

- the recording of medication provided including dosages where available;
- documenting known allergies of patients;
- documenting past patient history particularly where relevant to the current request for ambulance assistance; and
- the need for greater use of descriptive information rather than medical terms as, while not affecting the assessment of patients, medical terms were incorrectly used in approximately 10 per cent of patient care records examined.

6.36 Addressing the above deficiencies would further enhance the already high quality of patient care records, as well as providing essential data in the event of the establishment of a clinical database.

Improving the quality of clinical standards and performance

6.37 Within Victoria, the Ambulance Officers Training Centre (a separate body constituted under the *Ambulance Services Act* 1986) is responsible for the initial training of metropolitan and regional ambulance officers and the initial and ongoing training of paramedics. As a result, on commencing patient care duties as part of operations, all ambulance officers are expected to have a uniform level of background knowledge. Each ambulance service is then responsible for ensuring that the clinical skills of ambulance officers are maintained and the level of care delivered to patients is appropriate and of the highest professional standard.

6.38 For a period between April 1993 and May 1995, prior to the appointment of the Service's current administration, ambulance officers received only ad hoc, if any, training in clinical skills, with the result that many officers were not provided with the opportunity to maintain their skills base. This situation has now been partly addressed with all operational staff to receive at least 2 days training and skills update each year.

6.39 In recognition of the importance of clinical skills, the Service's mission statement identifies the need to maintain clinical standards, provide education, monitor performance and be in a position to adjust and improve performance as required. Mechanisms currently in place to achieve this are:

- objectives set within training centre courses;
- a clinical reference manual;
- a continuous education program;
- a drugs and protocols review process for all ambulance services;
- courses approved by the Medical Standards Committee; and
- procedural notices and information circulars issued to personnel on an ad hoc basis as deemed necessary.

6.40 Within the Service's organisational structure, those playing a key role in achieving the objectives of this mission are:

- the Medical Standards Committee, responsible for the approval of clinical standards;
- the Clinical Operations Group, responsible for guiding the development and implementation of clinical standards and covering activities such as co-ordination of the clinical response at scenes requiring ambulance assistance, the audit of patient care records, clinical reviews of ambulance officer performance and the support and training of ambulance officers;
- the Manager of Emergency Operations, charged with ensuring that the performance of operational staff complies with established standards; and
- the Manager of Business Development, responsible for ensuring compliance with relevant standards by the providers of non-emergency ambulance services.

6.41 A key factor governing the performance of the Service in the future will be its 1997 Clinical Quality Assurance Plan. The Plan provides a sound and comprehensive basis for the Service to manage its clinical activities and addresses issues relating to the accountability, review and improvement of clinical standards.

6.42 The Plan outlines the process to be followed for the continuous improvement to clinical standards. Under this process, ultimate responsibility for amendment of standards rests with the Medical Standards Committee, which comprises members from various disciplines. In practice, formal approval for new or amended standards varies, with adjustments to Service clinical standards approved by the Committee, whereas amendments with Statewide implications, such as a new drug initiative, require final approval by the State Ambulance Service Medical Officer within the Department of Human Services.

6.43 While the above process may be appropriate in relation to minor adjustments, it is considered that a qualified medical practitioner must always be ultimately responsible for all changes in clinical standards or practice. This is the current practice at the Service but there is no assurance that this would always occur.

Clinical audits

6.44 The audit of patient care records by clinical support officers within the Clinical Operations Group is a key function in monitoring the clinical performance of the Service's ambulance officers. Audits are conducted on a random basis, estimated to cover approximately 3 per cent of cases undertaken by the Service, and in accordance with comprehensive guidelines and standards. Detailed patient care records involving non-emergency services are also reviewed. Team managers are responsible for reviewing all patient care records.

6.45 The Service's Quality Assurance Plan incorporates a recommendation that, in addition to the current random selection basis, future reviews be targeted towards specific illnesses, diagnoses, procedures or standards. This targeting of reviews would, over time, allow identification and more detailed analysis of problems and trends of performance in specific clinical areas.

6.46 Reports resulting from clinical audits are currently provided to relevant operational personnel, the manager of the clinical support officers and, in consolidated form, to the manager of the Clinical Operations Group. However, reports on the results of clinical audits are not currently forwarded to the Medical Standards Committee, despite the benefits to the Committee to become aware of the standard of clinical care delivered in the field, and common areas of concern.

6.47 To ensure that appropriate medical input and action is provided in cases of poor or inappropriate clinical performance identified through the audit process, the Committee should in future also receive copies of clinical audit reports directly from the Manager of Clinical Operations.

Ensuring an appropriate clinical response to emergency situations

Use of the Advanced Medical Priority Dispatch System

6.48 In responding to requests for emergency assistance, ambulance services must decide on the balance between:

- the relative costs and benefits, in terms of patient outcomes and operational efficiency, of obtaining detailed clinical information on the patient's condition prior to deciding and implementing the most appropriate response; and
- the use of highest priority dispatches (lights and sirens) to all cases not seen by a medical practitioner, with the potential sacrifice of not obtaining detailed clinical information.

6.49 The second approach is currently used in New South Wales and in many cities throughout the world, although this is currently under review in New South Wales. This approach increases risks to the public and ambulance officers by increasing the number of high priority responses. The risks to ambulance services of its use are mostly of an efficiency nature in that ambulance vehicles and personnel may be rapidly dispatched to a situation where it is subsequently determined that such an emergency response was not required.

6.50 Traditionally, the dispatch system of the Service had been heavily diagnosis-based, with attempts by calltakers to build up an accurate clinical picture of the condition of patients prior to dispatching an ambulance. This process had the potential for significant delays in ambulance dispatch, inappropriate responses and a high incidence of dual or multiple responses resulting on many occasions in inappropriate use of resources. Conversely, ambulances on occasions were not sent to patients in need due to inconsistent interpretations of clinical conditions by calltakers. Occupational health and safety of staff and the public are also an important consideration.

6.51 To address this issue, a system, known as Priority Medical Dispatch, was jointly developed by representatives of the Service and Intergraph. The system was a conglomerate of existing systems from various parts of the world and was aimed at improving response times due to better and quicker identification of the potential patient problem by calltakers. The system was implemented prior to detailed testing. Service medical officers were charged with making medical refinements post-implementation. The operation of the system, over a 12 month period, was heavy on resource utilisation, basically due to the perceived need to apply a conservative approach, which was evidenced by a substantial increase in the level of dual ambulance response.

6.52 The system was replaced in December 1996 by the Advanced Medical Priority Dispatch System, a structured, tested system developed in the United States, which was adapted to local conditions and trialed over a period of time prior to implementation. Detailed comment on this new system has been provided in earlier Parts of this Report.

6.53 The new system is linked to both speed of deployment and the type of ambulance vehicle deployed. Justification for the type of response is based on clinical assessment for each type of case and is under constant medical review.

6.54 Use of the new system initially reduced the rate of dual and multiple responses, but not to the extent anticipated. Consequently, attention was focused on the adequacy of the dispatch grid and, as a result, only 12 clinical conditions were identified as automatically requiring a dual response.

6.55 Certain actions have been taken to reduce the level of dual responses attributed to Advanced Medical Priority Dispatch System, mainly through amendments to the dispatch grid, to better reflect the appropriate response to certain medical conditions, Further actions to reduce dual responses should involve an increase in paramedic response units crewed by a qualified ambulance officer and a paramedic.

6.56 Apart from addressing the incidence of dual responses, it is clear that, by both streamlining calltaking processes and ensuring rapid dispatch, use of the new state-of-the-art system has provided substantial benefits to the effectiveness of ambulance dispatch and, as a result, the quality of clinical response to emergency situations. The modifications made to the new system to reflect Australian conditions and terminology has made the system one of the most technically advanced and efficient dispatch systems in the world.

6.57 The anticipated implementation in the near future of the next stage of the system known as PROQA, its computerised version, is likely to provide even further benefits by providing as near as possible to instantaneous dispatch once a call is taken requesting emergency ambulance assistance.

Duty of care for patients not transported

6.58 Reasons for ambulances not transporting patients after responding to a call for assistance are due mainly to either:

- the patient refusing transport; or
- the patient is deemed by the ambulance crew not to require emergency transportation.

6.59 The issue of duty of care is paramount in both these situations.

6.60 The first scenario, a patient refusing transport, poses a difficult problem for ambulance services and, in all cases, must be reviewed retrospectively. In addition, where a conflict arises between the wishes of the patient and the clinical assessment by the ambulance officer, that the patient requires further medical evaluation or care, ideally a mechanism should be in place that allows immediate medical consultation to support the actions of the ambulance officer. This consultation could be with either the receiving hospital, if appropriate communication channels had been established, or with an on-call medical director of the Service. To give effect to this principle, a protocol could be established that allows medical consultation to deal with duty of care issues in the case of a patient refusing transport, but who the ambulance officer considers requires further medical attention. However, the benefits of such a process need to be carefully measured against the additional time at scene which would eventuate and the delay in ambulance team availability.

6.61 Ambulance officers are currently required to make every effort to obtain proper documentation, including the patient's signature, where patients are not transported.

Emergency ambulance officers must assess whether a patient should be transported to hospital.

6.62 In the second situation, involving patients deemed not to require further care, the assessment is based on the judgement of the ambulance officer concerned. Examination of patient care records raised a number of questions concerning the appropriateness of such assessments. Examples of situations that could be questioned included:

- a patient with a past cardiac history with left sided chest pain advised to stay at home for review by a local medical practitioner;
- a patient who had complained of breathing difficulties, but, feeling better by the time of the ambulance arrival, was reassured and allowed to stay at home with no diagnosis made; and
- a patient, who fell out of her wheelchair, was left at home without any documentary evidence of an examination by ambulance personnel.

6.63 No recorded reference in these cases was made by attending ambulance officers to available clinical support personnel.

6.64 Decisions to leave patients due to transportation not required should be vetted and supported by clinicians prior to ambulance officers leaving the scene and the basis for such decisions clearly documented on the patient care record. Audit acknowledges that implementation of this process would most likely increase at scene time. Nevertheless, it is considered that the additional time is warranted in view of the Service's obligation to provide a duty of care to such patients. The Service is currently addressing the situation of patients not transported in its Clinical Quality Assurance Plan, and has instigated a review to detect any areas of concern in cases where the Service is recalled within 30 hours to patients attended but not transported.

6.65 Research by the Medical Standards Committee is suggested to establish whether a protocol is needed to allow ambulance officers to consult with the medical director on call within the Service or appropriately designated officers in Emergency Departments of hospitals, to deal with issues arising out of duty of care to a patient who refuses transport and who the officers feel requires further medical attention.

Scope for increased involvement of specialist medical staff

6.66 In addition to the role played by the Medical Standards Committee in clinical matters, potential exists for expanding the clinical expertise available to the Service.

6.67 The growth in numbers and increased availability of emergency trained medical specialists within hospitals, including up to 60 per cent of nurses having a critical care or emergency care certificate, provides both the Service and hospitals with the opportunity to expand the level of clinical interaction between ambulance officers, paramedics and hospital emergency department personnel. Currently, this opportunity is not used to its fullest advantage.

6.68 With the aim of strengthening the interaction between the Service and the emergency departments of hospitals, consideration should be given to:

- establishing a working party, with representation of the Service, Hospital Networks, the Australasian College for Emergency Medicine and other relevant parties, to examine the current interface between the Service and emergency medicine;
- adopting a model, based on the current networks of hospitals in the metropolitan area, for utilising specialist medical expertise, as necessary, to complement the Service's Medical Standards Committee; and
- investigating the feasibility of establishing positions of liaison emergency physicians within these hospital networks to provide, as required, direct communication with ambulance officers on clinical matters associated with individual patients, to participate in reviews of the Service's clinical performance and to assist in the maintenance and continuing development of the clinical skills of ambulance officers.

6.69 Audit appreciates that the Service is committed to further developing the clinical skills of ambulance officers and introducing more paramedics over time and is not suggesting that the medical expertise in hospitals should assume more importance. However, audit considers that encouraging more interaction between Service staff and hospital network staff would be mutually beneficial in appreciating the respective roles of each sector in bringing about better outcomes for patients and providing a catalyst for ongoing improvements.

Part 7

Non-emergency patient transport services

OVERVIEW

7.1 The Metropolitan Ambulance Service has, over the past 4 years, sought to establish co-operative working relationships between the 3 private sector stretcher transport firms contracted to the Service, Intergraph and itself as the major parties involved in the provision of non-emergency stretcher transport. Problems arising from the relationships, mainly with regard to the timeliness of service delivery, have resulted in the implementation of a range of initiatives designed by the Service to maximise the efficiency of non-emergency patient transport. Such initiatives have directly resulted in improvements in the timeliness of service delivery to the community as evidenced by more consistent achievement of performance targets.

7.2 Nevertheless, there remains scope for further efficiencies to be achieved and the Service needs to give consideration to the following factors:

- development of new strategies to significantly increase the level of pre-bookings of non-emergency transport, which is presently only around 25 per cent of the non-emergency workload. Increasing the level of pre-bookings is an *integral* factor in achieving more efficient utilisation of contractor staff and resources leading to improved service standards;
- development of qualitative performance standards which would enable assessment of Intergraph's ability to effectively schedule the workload of non-emergency contractors on behalf of the Service;
- the setting of more challenging performance targets which will require the non-emergency transport contractors to deliver a more efficient and effective non-emergency patient transport service;
- prompt resolution with Intergraph of issues which have seen enhancements to the non-emergency communications system deferred since they were initially identified in 1996; and
- the need for the Service to review the appropriateness with which emergency and non-emergency resources are utilised in responding to cases, in that emergency resources were being utilised to undertake transports that could have been undertaken by non-emergency resources, had they been available. This action impacted upon the availability of ambulances for emergency responses.

7.3 Non-emergency patient transport operations within the State are presently the subject of a Ministerial Review in relation to industry standards, regulatory framework and competition policy issues. It is envisaged that matters relating to the role of the Service as the single provider in the free transportation of pensioners and other welfare recipients and, the future direction of the Service in non-emergency patient transport will be addressed in this Review.

BACKGROUND

7.4 Provision by the Service of non-emergency patient transport services comprises 2 categories, namely:

- transport of *stretcher patients* who, because of their clinical condition, require ambulance transport primarily for movement between hospitals, but do not warrant an emergency ambulance response; and
- the carriage of *ambulatory patients*, i.e. patients able to walk, with some assistance, to and sit in vehicles such as mini buses and sedans, and who require transport, usually from home to a medical facility.

Transport of non-emergency patient.

7.5 Since 1993, stretcher transport services have been outsourced to 3 private sector transport firms. In 1996-97, these firms were paid $7.3 million for the transportation of around 63 900 stretcher patients, using ambulances leased from the Service. In the same year, approximately 31 100 ambulatory patients were transported as part of the Service's inhouse vehicle operations.

The Service has delineated between emergency and non-emergency cases by ensuring that non-emergency cases meet the following criteria:

- transport time is not required within one hour; and
- the patient has been reviewed by a medical practitioner.

If these criteria are not met the case is deemed as an emergency request.

7.6 In broad quantitative terms, non-emergency patient transport services constituted about 44 per cent of the Service's total operations in 1996-97.

7.7 The major non-emergency clients of the Service are pensioners and health card holders who accounted for around 67 per cent of all stretcher and ambulatory patients in 1996-97 and receive transport free of charge. The Government partially reimburses the Service for the transport of pensioners and other welfare recipients. Private operators are not reimbursed for transport of pensioners and health care card holders.

7.8 Calltaking and dispatch communications facilities supporting the Service's non-emergency stretcher transport operations are provided by Intergraph. In 1996-97, the cost assessed by the Service of non-emergency functions undertaken by Intergraph was around $1.6 million.

MANAGEMENT OF TRANSPORT SERVICES FOR STRETCHER PATIENTS

Qualitative assessment of patient care

7.9 An important element of the Service's qualitative evaluation of the level of patient care provided by non-emergency contractors involves periodic clinical audits (or reviews) undertaken by clinical support officers, who are qualified paramedics. Similar clinical reviews are also applied to the Service's emergency operations. The clinical review function incorporates an examination of all patient care records compiled by the contractors where some form of clinical care was required for a patient during transport, supplemented by inspections of field procedures.

7.10 Notwithstanding the significance of the specialised clinical assessments of patient care records which had been performed as early as 1994, it was not until April 1997 that the Service introduced a comprehensive system of recording and reporting the results of these assessments.

7.11 The Service now needs to implement procedures under which the results of clinical assessments are periodically consolidated and available for strategic analysis by the Service's Committee of Management and Medical Standards Committee (more detailed comment in this area was provided in Part 6).

Patient and hospital feedback

7.12 Since 1995 the Service has undertaken, on a periodic basis, separate surveys of patients and hospitals to determine levels of satisfaction with the transport services provided by contractors.

7.13 The Service also obtains information on the quality of contractors' performance through specific feedback in the form of correspondence or telephone calls received from both patients and hospitals.

7.14 The surveys and other feedback obtained by the Service indicate a creditable level of client and patient satisfaction with the Service's non-emergency transport operations.

Patients have indicated their satisfaction with the quality of non-emergency services.

Need to address absence of specific performance criteria within contract

7.15 My earlier April 1997 Special Report No. 49 - *Metropolitan Ambulance Service: Contractual and outsourcing practices* to the Parliament identified that there were no minimum performance criteria or service standards other than the qualifications of contractor staff, in respect of quality of care specified in the 3 contracts for non-emergency stretcher transport services.

7.16 In addition to these shortcomings, the copy of the register detailing staff qualifications that was provided to audit was incomplete. As such it was the opinion of audit that the Service could not be assured that all its contractors employed suitably qualified and accredited ambulance staff.

7.17 The Service provides the contractors with fully equipped ambulances suitable for non-emergency patient transport (under lease arrangements) as well as the communications network to enable them to provide non-emergency services under their contract. The existing contracts do not impose upon the contractors any specific obligation in respect of contributing towards the cost of the communications network. In essence, the Service bears all the risks associated with provision of the non-emergency service, and although able to monitor the quality of the service provided by the contractors, it is limited in its contractual remedies for poor performance.

7.18 The Service acknowledges the need for revision of the contractual arrangements in place dealing with performance specification and measurement for its 3 providers of stretcher transport services. In addition, it is desirable that the risks associated with the provision of non-emergency transport should be borne by the contractors where appropriate. The Service has indicated to audit that it intends to take the necessary remedial action when new contracts are let following a re-tendering process in 1998.

❑ ***RESPONSE*** *provided by Chief Executive Office, Metropolitan Ambulance Service*

The Report notes that the register of contractors' non-emergency stretcher staff provided to audit was incomplete. MAS has since been confirmed that all relevant contractors' staff are appropriately qualified. The register has been brought up-to-date and processes established to ensure it remains current.

Assessing the performance of Intergraph's calltaking and dispatch communications facilities

7.19 As indicated in Part 2, calltaking and dispatch communications facilities supporting the Service's emergency and non-emergency stretcher transport operations are provided by Intergraph. While the provision of these facilities to the Service forms part of the major communications contract with Intergraph, there is only a brief reference to this element of Intergraph's operations in the contract, indicating clearly an emphasis on emergency operations, despite the non-emergency communications system constituting a distinctly separate facility.

7.20 In fact, the only 3 direct references in the contract to Intergraph's responsibility in the non-emergency area are expressed in the following terms:

- *"Call takers means the persons employed or contracted ... who will be responsible for receiving and processing emergency and non-emergency telephone calls ..."*.
- *"Dispatchers ... shall be responsible for confirming priority requests for emergency and non-emergency transport ..."*.
- *"The parties agree ... Intergraph shall supply the CAD system to the Customer and provide and maintain the Customer's emergency and non-emergency dispatch and communications operations in accordance with the Master Services Contract ..."*.

7.21 In addition, Schedule 17 of the contract specifies only one non-emergency performance measure relating to the speed in which calltakers pick up non-emergency telephone calls (Intergraph calltakers are required to answer 90 per cent of non-emergency calls within 30 seconds). At the date of audit, Intergraph was responding to 94 per cent of non-emergency telephone calls within 30 seconds, a level well within the established performance measure and target.

7.22 While audit acknowledges that performance measures for dispatch times applicable to emergency operations are not appropriate for non-emergency transport operations, qualitative standards could be developed in relation to the ability of Intergraph to adequately schedule and dispatch non-emergency cases.

7.23 Intergraph, when receiving non-emergency calls for stretcher transport from hospitals, doctors and patients, has the responsibility to ensure information is quickly passed onto the Service's 3 contractors so that ambulances can be sent to transport patients according to the times specified by callers, wherever possible.

7.24 Accordingly, the extent to which the transport needs of callers are adequately met is dependent upon the ability of Intergraph to allocate daily workloads including pre-booked cases between contractors in line with the availability of ambulance vehicles. It would be desirable if this element of Intergraph's responsibilities for non-emergency services was subject to periodic scrutiny against a specific performance measure.

PERFORMANCE MEASUREMENT OF CONTRACTORS

7.25 Under a draft Service Plan developed by the Service, the performance targets shown in Table 7A below were formulated for the non-emergency transport area and have been used to provide some indication of performance trends of contractors.

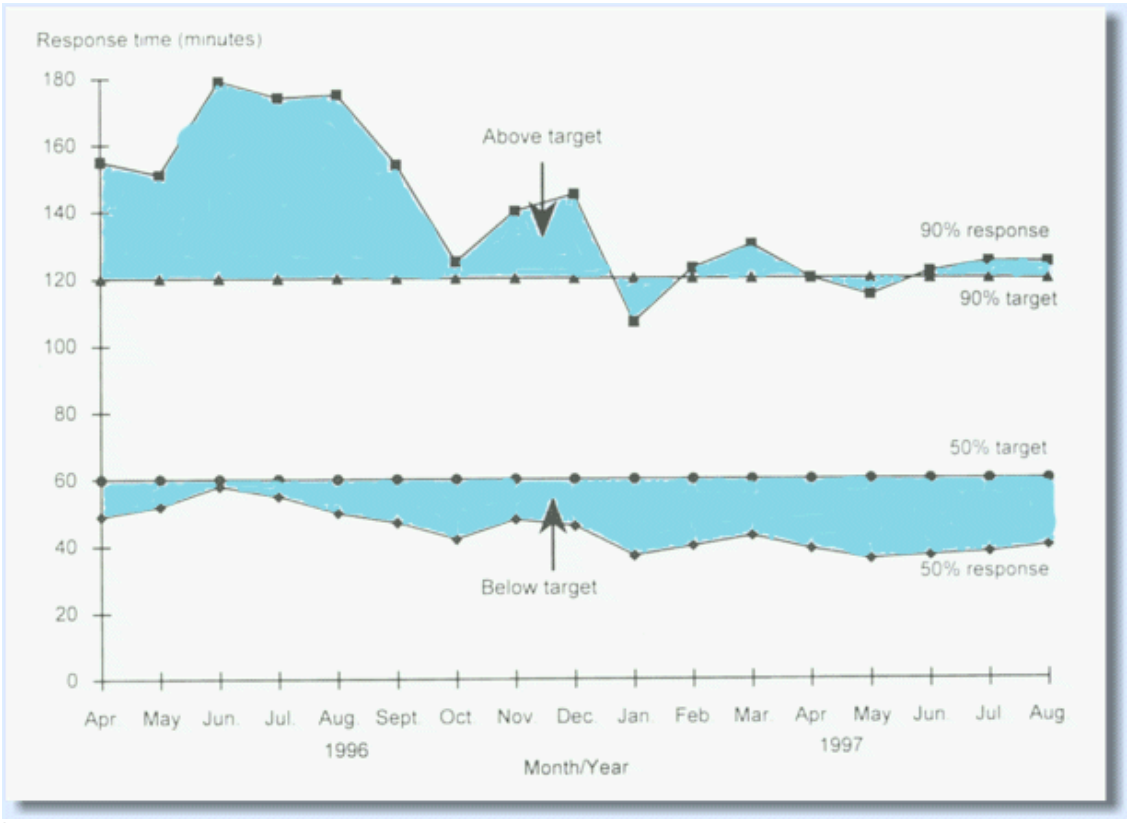
TABLE 7A
DRAFT NON-EMERGENCY TRANSPORT PERFORMANCE TARGETS

Same day bookings • 50% of patients picked up within 1 hour of the agreed time • 90% of patients picked up within 2 hours of the agreed time
Pre-bookings (made prior to 5 p.m. the day before the transport is required) • 90% of patients picked up within 15 minutes of the agreed time

Source: The Metropolitan Ambulance Service's draft Service Plan.

7.26 Details of contractors' performance during the period 1 April 1996 to 31 August 1997, as against the proposed targets set for same day bookings in the Service's draft Service Plan, are presented in Chart 7B.

CHART 7B
PERFORMANCE AGAINST DRAFT TARGETS FOR SAME DAY BOOKINGS FOR NON-EMERGENCY STRETCHER TRANSPORT,
1 APRIL 1996 TO 31 AUGUST 1997



Source: Chart provided by the Metropolitan Ambulance Service.

7.27 Chart 7B shows that contractors' performance for same day bookings has consistently exceeded the 50 per cent target for patients picked up within one hour. Although the 90 per cent response target within 2 hours was not achieved during 1996, considerable improvement has occurred in 1997, with the measure achieved between April 1997 and June 1997. This has occurred in spite of significant and steady workload growth.

7.28 This improved performance can be attributed to a number of factors including:

- the placement of Service staff in the communications room to advise and assist Intergraph personnel;
- increasing shift levels and re-allocating shift times so as to attempt to achieve equilibrium between availability of the service and demand for the service;
- stationing of non-emergency vehicles at specific hospitals in order to reduce patient waiting times;
- emphasis placed upon minimising contractor time at hospitals; and
- requesting hospitals to spread bookings over the entire day as opposed to a concentration of bookings at certain times.

7.29 While it is appropriate to acknowledge the improved contractor performance against the targets set by the Service, audit considers that the Service should negotiate with the contractors on the setting of more challenging performance targets. For example, increasing the percentage of patients picked up within the hour from 50 per cent to 80 per cent would place greater emphasis on contractor productivity and, at the same time, reinforce the need for Intergraph to place high priority on the effective scheduling of workloads between contractors.

7.30 As indicated earlier in Table 7A, a more stringent target was included within the Service's draft Service Plan for bookings made in advance (prior to 5 p.m. on the day before the transport is required) for non-emergency stretcher transport. The target specified that 90 per cent of patients should be collected within 15 minutes of the agreed pick-up time.

7.31 To measure performance against this target it is necessary for Intergraph to record in the communications system whether a non-emergency transport has been pre-booked or requested on the day. Unless this is done, it is not possible to determine contractors' performance against each category when the transport pick-up time is advised, other than comparing times against information recorded on the patient care records.

7.32 The Service set the above target in the Service Plan on the basis of what it perceived to be a reasonable level of customer service if a patient or hospital pre-books the transport on the preceding day. The Service did not commence actively measuring performance until early in 1997 and found that the relevant information was not recorded by Intergraph in the communications system. Subsequently, the Service undertook an analysis in March 1997 (based upon patient care records) which identified that the target of picking up 90 per cent of patients within 15 minutes of the agreed time was only achieved in 30 per cent of pre-booked cases.

7.33 The Service advised audit that it had raised with Intergraph the need for it to ensure that relevant information was available from the communications system in order to promptly and accurately monitor and assess contractors' performance. It indicated that some improvement in recording of information has occurred since, however, the target has still not been achieved by contractors in that at September 1997 only around 60 per cent of transport pre-bookings were attended within 15 minutes of the pre-booked time. This performance is probably reasonable given the low level of pre-bookings and that this division is also responsible on a daily basis for a significant number of unplanned cases requiring transport in short time frames on clinical grounds from the clinician agency. These objectives compete with, rather than augment, each other.

7.34 The Service's analysis disclosed that only 25 per cent of all calls received for non-emergency stretcher transport involved advance bookings. As a consequence, Intergraph has been required to manage a significant level of daily unplanned work, where at times demand exceeds supply. This situation gives rise to a number of operational problems including:

- a reduction in the ability to meet requests for transport at certain times such as peak periods;
- a requirement at times to use emergency ambulance vehicles to service non-emergency transport bookings (the impact of which is discussed in a subsequent paragraph);
- a need to contact hospitals to negotiate deferrals of pick-up times in cases where patient transport is not time-critical. This need was created by the large and unpredictable fluctuation of demand on a daily basis; and
- hospitals have expressed a concern that timeliness of service delivery is leading some hospitals to utilise private transport operators to move patients more quickly. However, these private transport operators service hospitals only within defined hours and tend to cover the more productive high workload areas. This leaves the Service as the fall back position to service the unproductive, low workload areas which has an obvious effect on their performance by comparison.

7.35 It was clear to audit that, if the number of pre-booked transport requests could be increased, Intergraph would have a better basis to match, in advance, requests for transport within the geographical areas covered by contractors' available vehicles. With this approach, daily workloads could be allocated in advance to particular vehicles taking into account pick-up and destination points. The likely resultant outcome would be more efficient utilisation of both contractors' staff and vehicles and a significant improvement in performance against the specified performance target for pre-bookings.

7.36 Audit acknowledges that the Service has attempted to increase the level of pre-bookings, which in addition to enabling better scheduling of workloads, would also enable performance targets for contractors to be more readily achieved. However, such efforts to date have been largely unsuccessful.

7.37 In summary, continuing attention needs to be directed by the Service towards new initiatives to lift the level of pre-bookings, in conjunction with seeking further improvements in scheduling of workloads by Intergraph. When improvements are achieved in these areas, the setting of more demanding performance measurement of contractors would be desirable.

Working relationships between the parties

7.38 The ability of the Service to manage and deliver an efficient non-emergency transport service is limited by the present arrangements covering the roles and relationships of the major parties involved. The 3 private sector transport firms and Intergraph are individually contracted to provide inter-related services on behalf of the Service. The performance and particularly the productivity of the contractors are directly influenced by the quality of the calltaking and dispatch services provided by Intergraph. However, Intergraph does not have direct control in respect of the subsequent performance of the contractors as this is a Service responsibility.

7.39 Audit was advised by Intergraph, that this situation has at times contributed to conflicts arising between the contractors and itself which have had a negative impact on the provision of non-emergency patient transport. While both the Service and Intergraph have indicated that the current arrangements are not ideal, the Service is presently obliged to continue to manage within the outsourcing contractual framework.

7.40 The Service has a number of mechanisms in place to address specific concerns arising from non-emergency operations, including monthly meetings with contractors and the lodging of complaints and observation reports for further investigation by quality improvement teams established by BEST.

7.41 However, no documentary evidence could be provided to audit to indicate that matters contained in observation reports had been followed-up by the Service or that feedback on matters raised had been provided to the relevant contractors. Audit understands that the BEST process does not routinely incorporate written feedback. In audit opinion, the lack of documented investigation and feedback to contractors and Intergraph on issues raised in observation reports does not provide an assurance to the Service that the quality of non-emergency patient transport operations is constantly monitored.

7.42 The potential for further improved service delivery in non-emergency transport operations is partially dependent upon enhancing the communications system. Although identified in 1996, the enhancements have not been implemented due to a range of reasons, such as the shared responsibility of the parties to bear the cost of system improvements by Intergraph and, the uncertainty as to whether the Service will continue in the future to provide non-emergency transport in competition with the private sector.

7.43 Potential enhancements to the non-emergency system, which have been the subject of discussions between the Service and Intergraph since 1996, include:

- A bookings management system which has the capability to limit the number of bookings taken at peak periods;
- Improving the knowledge of non-emergency calltakers in areas such as customer service standards, medical knowledge and increased awareness of the logistics of non-emergency transport;
- Re-configuration of the dispatcher screens to provide more data for decision-making purposes; and

- Minimising the extent to which non-emergency contractors are on standby waiting for an allocation of work from Intergraph. Audit acknowledges that demand for services can vary depending upon the locality, night shift allocations and bookings from hospitals, doctors, etc. Nevertheless, audit considers that the circumstances that allowed one contractor during 1996-97 to bear in excess of 25 per cent of unproductive time due to the non-allocation of jobs, compared with around 5 per cent of unproductive time borne other contractors, warrants review so as to achieve the equitable distribution of workloads.

7.44 If the Service is to continue to actively compete with the private sector and to operate at a profit, the abovementioned matters will, in audit opinion, need to be addressed as a matter of urgency.

INTER-RELATIONSHIP BETWEEN EMERGENCY AND NON-EMERGENCY OPERATIONS

7.45 To alleviate pressure on emergency response times, the Service, over the past 3 years, expanded the clinical profile of non-emergency cases which has enabled migration of certain cases from emergency operations to non-emergency transport.

7.46 The Service estimates that non-emergency resources transport approximately 14 000 patients each year that have been assessed by its clinician within the Intergraph communications room, as appropriate for non-emergency transport. Of these, about 6 000 are considered at "*the higher end of the non-emergency clinical scale*". Such cases encompass patient transport to hospital emergency departments, acute inter-hospital transfers and psychiatric cases. This interchange between emergency and non-emergency cases is facilitated by the fact that the Service's contractors are equipped to levels similar to emergency ambulance vehicles, have emergency warning devices on their vehicles and employ appropriately qualified ambulance officers.

7.47 During the audit, it was evident from observation reports, Duty Team Manager logs and discussions with ambulance crews that there was a growing concern over "*inappropriate allocations*" of cases to both emergency and non-emergency resources. While the Service has established guidelines including dispatch criteria to assist clinicians in their assessment and allocation of cases to the appropriate response category, several situations were identified by audit where the level of response or service may not have been based upon the condition of the patient, but upon the availability of either the Service's emergency or non-emergency transport resources.

Impact on emergency operations

7.48 The inability of the non-emergency transport operations to meet work demands at certain times can result in the allocation of non-emergency work to emergency resources in a diverse range of situations as indicated below:

- Clinicians upgrading non-emergency cases where contractors are not immediately available to emergency responses necessitating transport within one hour. Audit acknowledges that the Service's Medical Standards Committee has accepted that if a patient needs transport within one hour or has not been assessed by a doctor, it should be regarded as an emergency response. (Audit analysis identified during the 12 month period to 19 April 1997 that at least 920 instances occurred where non-emergency cases were transferred to emergency response, mainly on the basis of non-availability of non-emergency resources. It was also apparent that a proportion should have been categorised as emergency cases in the first instance according to guidelines.) While audit acknowledges that the reasons for re-allocation by the clinician of resources in these cases warrants further investigation by the Service, the extent of this practice indicates a potentially significant resource allocation problem;
- Based on advice provided by the Service, doctors at hospitals, when realising that non-emergency transport operations are busy, may arrange for patients to be transported by emergency resources as an emergency requiring transport within one hour; and
- The Service also indicated that medical practitioners, as an alternative to undertaking house calls outside of surgery hours, arrange for their patients (usually pensioners) to be assessed by ambulance officers, necessitating an emergency response. While audit acknowledges that the Service's clinician, stationed at Intergraph, will often question doctors as to the appropriateness of using emergency resources in these circumstances, it is uncommon for transport to be refused. Research undertaken by the Service disclosed that, in many instances, transport of the patient was not necessary or non-emergency transport would have been appropriate had the patient been visited by a doctor.

7.49 The extent of the abovementioned circumstances is difficult to establish from available documentation, particularly in that event registers were often deficient in terms of justifying a particular response or providing the rationale for amending transport priorities. Audit acknowledges that there is a certain element of subjectivity which clinicians will face in distinguishing whether an event should be classified as emergency or non-emergency and will invariably treat the event as requiring an emergency response rather than take a risk that patient care could be compromised.

7.50 It was strongly suggested to audit in discussions with ambulance crews, that the inappropriate use of emergency resources for transport that could be handled by non-emergency contractors, is the single biggest factor contributing to the incidence of *no nearby unit* situations (as discussed in Part 4). However, it was also noted by audit that crew perception about what constituted a non-emergency case often fell within the boundaries of emergency cases according to the predefined criteria established by the Medical Standards Committee.

Impact on non-emergency operations

7.51 The audit also identified that a considerable number of cases were transferred from an emergency to a non-emergency response which, on the basis of available information in event registers, were viewed by the Service as probably necessitating an emergency response. The event registers were often deficient in terms of justifying a particular response or providing the rationale for amending transport priorities. While the majority of these transfers involved emergencies requiring transport within one hour, which arguably could be undertaken by non-emergency transport if resources were available, isolated examples were also found involving time-critical responses with lights and sirens to non-emergency cases.

7.52 Audit recommends that research be undertaken by the Service with respect to referrals to and from emergency and non-emergency responses to assess whether the clinical conditions of such patients justified the Service's transport response. Issues which could be considered as part of this research include:

- an education program for medical practitioners as to the implications for the Service arising from unnecessary emergency responses;
- a clearer distinction between the clinical conditions requiring an emergency response as opposed to a non-emergency response (the establishment of a clinical database would assist in this regard); and
- clinical auditing procedures highlighting to management instances where emergency responses have been inappropriate.

7.53 The lack of a clear distinction between emergency and non-emergency transport cases will assume greater importance as the Service implements National Competition Policy for non-emergency transport services. Under such arrangements whereby non-emergency transport, as a non-core activity of the Service, could fully become privatised, the potential exists for cases which have in the past been referred to non-emergency via the clinician, to flow back to the Service's emergency ambulance resources, resulting in considerable additional workload. Such a scenario would require careful consideration by the Government given the serious implications should errors in delineating between emergency and non-emergency cases be made. Documentation of reasons for the transfer of cases between emergency and non-emergency transport should be clearly recorded in event registers and should only be undertaken in accordance with the existing guidelines provided to clinicians by the Service.

❑ ***RESPONSE*** *provided by Chief Executive Office, Metropolitan Ambulance Service*

The Report also comments on the use of emergency vehicles to undertake non-emergency work. The current arrangements allow some flexibility in the allocation of work between the emergency and non-emergency divisions. The final decision about the allocation of cases rests with MAS's highly qualified clinicians, working within standards set by MAS's Medical Standards Committee. The aim is to achieve the best possible level of service for both emergency and non-emergency patients, and patient requirements are always the primary consideration. Enforcement of a rigid distinction between emergency and non-emergency cases may in fact lead to a deterioration in performance in both areas. However, MAS acknowledges that further review of this issue is appropriate.

TRANSPORT OF AMBULATORY PATIENTS BY THE SERVICE

7.54 Around 19 Service staff and a similar number of vehicles are employed by the Service in the provision of transport services for ambulatory patients. Approximately 65 per cent of patients transported by the Service's clinic cars are dialysis patients who utilise this service at least 3 times a week. Each vehicle comprises a clinic transport officer with basic first aid training.

7.55 The examination by audit of matters relating to transport of ambulatory patients identified that:

- Service resources are occasionally supplemented by private taxi services in order that patient transport requests are met;
- The Service has submitted tenders for the provision of clinic car services to major public hospitals on a number of occasions. However, the Service has failed to win contracts due to its inability to compete on price with the private sector. In fact, a major hospital has recently awarded a contract to a metropolitan taxi service;
- In a fully deregulated market, the Service is unlikely to compete on price in the transport of ambulatory patients by clinic car. Such a scenario is further supported by the potential for clinic car charges to rise, given the requirement for the Service to implement competitive neutral pricing from 1 July 1997; and
- Most ambulatory patients could potentially travel by less expensive options.

7.56 In audit opinion, while the operations of the Service's clinic car division have in the past existed to provide a service to a specific group of patients, it is questionable as to whether there is an ongoing need for the Service to utilise its specialised resources in non-core operations, particularly as this role can be performed by private sector operators, including taxi companies.

INDUSTRY REGULATION AND QUALITY CONTROL

7.57 While the Service's non-emergency stretcher patient transport contractors and in-house vehicle operators (transporters of ambulatory patients) are subject to compliance with service delivery, quality assurance and clinical standards established by the Service, no such standards or regulatory framework exist for the private sector firms who undertake non-emergency patient transport. The onus of responsibility to ensure an acceptable level of patient care is provided by private sector patient transport operators rests with the hospital or medical practitioners in their selection of a service provider.

Government review of industry standards, regulatory framework and competition policy principles

7.58 A Ministerial Review Taskforce established by the Government in March 1997, commenced a review of the following aspects of non-emergency patient transport services in Victoria:

- current service delivery standards and associated quality assurance arrangements;
- the extent to which the regulatory framework, under which private patient transport operators currently function, requires strengthening; and
- provision of non-emergency patient transport services in accordance with National Competition Policy and Competitive Neutrality principles.

7.59 The findings of the Taskforce, although due in June 1997, have yet to be finalised.

Implications of the Federal Government's Competitive Neutrality Policy

7.60 The Service has, in a recent review, examined the effect of the Federal Government's Policy Statement on Competitive Neutrality which was issued in June 1996 (policy became operative from 1 July 1997) upon the pricing of its non-emergency transport operations and is currently recalculating its pricing structure.

7.61 Concerns have been expressed by private sector transport operators to the Competitive Neutrality Complaints Unit within the Department of Treasury and Finance regarding the Government's decision to contract with and reimburse the Service as a single provider in the free transportation of pensioners and health care card holders. In November 1996, the Unit advised the Department of Human Services of the results of its assessment of the concerns conveyed to it, as follows:

- *"appearances suggest that the Government reimburses ASV* [ambulance services] *as a matter of historical legacy rather than as a result of a conscious decision or tender process from which ASV emerged as the most efficient provider of pensioner transport;*
- *"there would appear to be no practical reason for Government to reserve pensioner transport to only one provider. While ... given there are competitors in the non-urgent market who would also be able to transport pensioners and to bill the government for the service; and*
- *"the limit on the private operators from accessing pensioner transports may be inhibiting effective competition between private providers and ASV for non-urgent patient transport ..."*.

7.62 The Unit also advised the Department that the abovementioned matters regarding the appropriateness of the decision to limit the pensioner transport market together with the future direction of non-emergency patient transport, would be addressed by the then forthcoming Federal Government's competition policy review.

7.63 If the Service is to actively compete with the private sector and to operate at a profit, a number of issues as outlined below will need to be addressed as a matter of urgency:

- There will need to be recognition of the real cost to the Service of the free transportation of pensioners and health card holders, which has increased in volume by around 80 per cent over the past 3 years. While Government funding seeks to recognise the cost to the Service of providing free non-emergency transport, such grants are not linked to the actual volume of "free transport" provided; and
- While government funding allocated to non-emergency operations during 1996-97 in relation to the free transportation of pensioners and health care card holders was around $5.5 million, audit was advised by the Service that the total costs associated with the free transportation of these patients was $9.4 million, representing a shortfall of $3.9 million, to be borne by the Service in that year. The Department maintains that the shortfall will be compensated for in the 1997-98 budget negotiations.

7.64 The review of non-emergency patient transport services by the Ministerial Review Taskforce is both timely and necessary. The common view which exists within the industry is that there is a need to urgently address the way in which non-emergency transport services are provided. There is presently a 2-tiered system in operation of which only part is subject to regulation. There is a need for service delivery to be standardised, minimum skill and service levels to be developed and, the establishment of a regulatory body to monitor compliance by all providers of non-emergency patient transport. In audit opinion, this would be to the advantage of all stakeholders within the patient transport industry.

Part 8

Financial and strategic management

OVERVIEW

8.1 Throughout most of the 1990s, concerns have existed over the ongoing financial viability of the Metropolitan Ambulance Service with adverse financial results incurred in all years until 1996-97. The improved result in 1996-97 was largely attributable to a substantial increase in government funding. This increase in funding has assisted management of the Service in addressing past financial viability concerns, meeting increased case loads and implementing quality improvement initiatives.

8.2 Despite the current improvement in operating results, the Service continues to face a range of financial pressures including a relatively precarious liquidity position, additional costs associated with an increasing demand for ambulance services, and declining revenue from sources such as patient transport and subscription fees.

8.3 If the current improvement in its financial position is to be sustained, it will be necessary for the Service, in conjunction with the Department of Human Services, to address these emerging pressures particularly through resolution of matters related to future levels of government funding. These matters principally involve the lack of a direct link between government funding and the cost of providing ambulance services at no charge to pensioners and other health care card holders.

8.4 On a strategic basis, the Department needs to ensure that the funding arrangements for the Service are consistent with the Government's stated expectations from the Service.

8.5 Current management of the Service have developed an overall plan, together with more detailed plans and guidelines related to specific operational areas, as a means of guiding the direction of the Service until the year 2000. These plans and guidelines enhance the financial and strategic management frameworks of the Service and provide a sound basis for continuous improvements in the delivery of ambulance services to the metropolitan community.

TRENDS IN THE FINANCIAL POSITION OF THE SERVICE

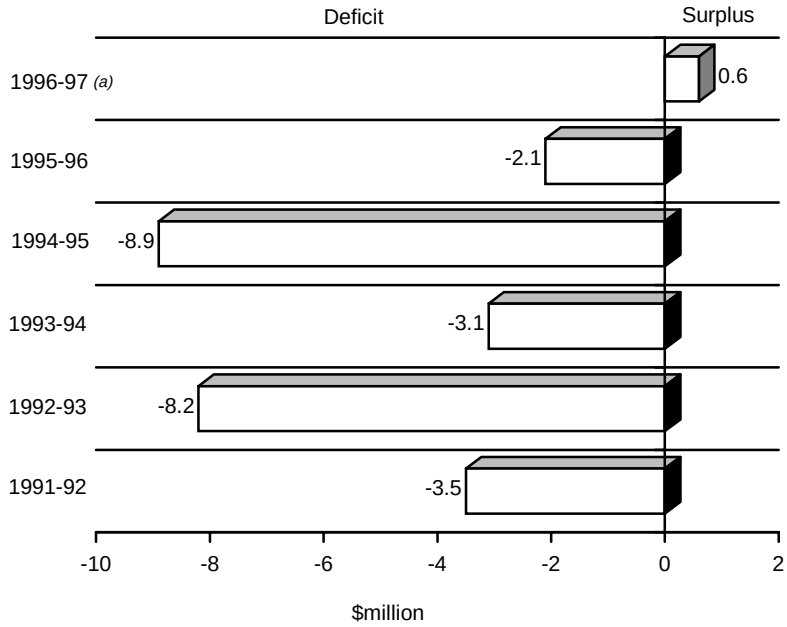
8.7 As with all health service agencies, the Metropolitan Ambulance Service operates in an environment where it faces the competing pressures of meeting the demands and expectations of the community for its services while managing the inevitable resource constraints affecting its service delivery.

8.8 A key factor in addressing this challenge is ensuring the ongoing financial viability of the Service by both minimising costs and maximising, to the extent possible, funds available to meet these costs.

8.9 It is clear that the Department of Human Services also has a major role in assisting the Service to meet this challenge by ensuring that government funds made available are sufficient to provide the required level and quality of service to the community and maintain the financial viability of the Service.

8.10 Throughout most of the 1990s, concerns have existed over the ongoing financial viability of the Service with adverse financial results incurred in all years until 1996-97. Chart 8A illustrates the operating results of the Service since 1991-92.

CHART 8A
OPERATING RESULTS, 1991-92 TO 1996-97
($million)



(a) The surplus in 1996-97 excludes the effects of a $13.5 million abnormal adjustment related to a change in accounting treatment for the recognition of prepaid subscription revenue. The 1996-97 operating deficit after accounting for this one-off abnormal adjustment was $12.9 million.

Source: Annual Reports of the Metropolitan Ambulance Service.

8.11 The improved financial result in 1996-97, excluding the abnormal adjustment of $13.5 million referred to above, can be attributed mainly to additional government funding of $8 million to the Service. Departmental approval of these funding increases has followed the preparation by current Service management and submission to the Department of detailed financial plans which have addressed issues concerned with both improving the quality of service delivery and progressively resolving pre-existing financial problems.

8.12 Although operating results have shown improvement over the last 2 years, the Service continues to face a range of financial pressures. Of particular relevance is the continuation of a relatively precarious liquidity position as evidenced by current liabilities of $12 million exceeding current assets of $10.7 million by 12 per cent. The major reasons for this adverse position relate to the high level of employee entitlements currently owed by the Service and difficulties in meeting payments to creditors as they fall due.

8.13 Overall, to ensure that the current improvement in its financial position is sustained, it will be important for the Service, in conjunction with the Department, to continue to address a range of emerging financial issues including:

- the additional costs incurred in meeting an increasing demand for ambulance services;
- the level of government funding needed to meet these increasing costs; and
- maintaining funding from other sources, such as subscriptions and patient transport fees, in the face of increased competition from the private sector and other pressures affecting the level of revenue raised from these sources.

8.14 On a strategic basis, the Government will need to decide what expectations it has of the Service and to ensure that it is funded in line with those expectations. Put simply, if ambulance response times are to be improved, further funding of the Service for the necessary infrastructure and resources is essential.

8.15 To its credit, for the first time in many years, instead of the Service concentrating on addressing the many problems that have arisen from the actions of past administrations and increasing workloads, the management has been able to adopt a forward approach in identifying where it wants to be by the year 2000 and the resources required. Failure to recognise many of these resource demands would mean provision of a level of service, which, in view of increasing public demands and expectations in conjunction with the workload, may eventually fall below community expectations.

INCREASING COSTS OF MEETING THE DEMAND FOR AMBULANCE SERVICES

8.16 From around 1992, the Service has faced the challenge of improving its financial performance in line with a general government direction to reduce the costs of public sector service provision through achievement of productivity improvements.

8.17 In an attempt to meet this challenge, former management of the Service adopted an approach of outsourcing of activities not considered to be part of the core operations of the Service. Specific outsourcing arrangements entered into by the Service's former management were referred to in my April 1997 Special Report No. 49 - *Metropolitan Ambulance Service: Contractual and outsourcing practices,* and included:

- awarding of the contract to Intergraph for the operation of a new computerised communications system;

- the operation of new financial and management information systems and the Service's subscription scheme by Emergency Services Pty Ltd; and
- the management and maintenance of ambulances and other vehicles by JMJ Fleet Management Pty Ltd.

8.18 Former management of the Service estimated that the implementation of these outsourced arrangements would result in significant cost savings to the Service, up to $20 million over a 4 year period, with resultant improvement in financial viability and a lower reliance on government funding to meet expenditure incurred in providing ambulance services.

8.19 As pointed out in my April 1997 Report, despite the aims of former management, it is clear that envisaged savings from these outsourcing arrangements have not eventuated. In fact, total operating costs of Service have increased significantly since 1990-91 indicating limited, if any, efficiency improvements resulting from the outsourcing direction.

8.20 The increase in operating costs over recent years has corresponded with a similar increase in the number of patients transported by the Service. Accordingly, the average cost for each patient transported has remained relatively stable over the period since 1994-95.

8.21 Table 8B outlines the relationship between operating costs and numbers of patients transported since 1994-95.

TABLE 8B
THE RELATIONSHIP BETWEEN
OPERATING EXPENDITURE AND CASE NUMBERS

Item	*1994-95*	*1995-96*	*1996-97*
Operating expenditure ($million)	81.8	82.7	92.6
Case numbers	188 766	192 379	213 790
Average cost per patient transported ($)	433	430	433

8.22 As indicated in the preceding table, operating costs increased in 1996-97 by approximately $9.9 million, or 12 per cent. A major contributing factor to this increase was an escalation in salary and wage costs by 13 per cent to $43 million in 1996-97.

8.23 Considerable reductions in staff numbers were implemented by former management following the outsourcing arrangements referred to above in an attempt to reduce the costs of the Service. It would be fair to say that, in many respects, decisions to reduce staff had little regard for the resultant impact on the quality of administration of the Service's activities or on the standard of service provided to the community.

8.24 To address these existing administrative and service delivery issues, current management has taken a range of initiatives, which have involved the employment of additional staff and related expenditure, with the aim of:

- meeting the increased patient transport workload;
- improving the timeliness and quality of response by ambulance officers to requests for assistance; and
- ensuring the necessary expertise is in place to effectively administer outsourcing contracts and other areas requiring specialist management expertise.

FINANCING THE INCREASING COSTS OF THE SERVICE

8.25 Revenue of the Service, amounting to approximately $93 million in 1996-97, was generated from 3 major sources:

- government funding ($48 million, 52 per cent of total revenue);
- income from ambulance service subscriptions ($28 million, 30 per cent); and
- patient transport fees ($15 million, 16 per cent).

8.26 Throughout the 1990s, there have been significant pressures on Service management in its attempts to maintain the level of revenue from sources other than government funding. These pressures have included competition from the private sector in relation to membership of ambulance schemes and a marked increase in the number of cases involving pensioners and other eligible recipients of free ambulance services. As a consequence, revenue from these sources has decreased from approximately $47 million in 1993-94 to $32 million in 1996-97.

8.27 Given these reductions, it is clear that the increasing cost of service provision must be largely met by a related increase in the level of government funding.

Issues related to government funding of the Service

8.28 The level of funding to the Service has increased substantially over recent years as highlighted in Table 8C.

TABLE 8C
LEVEL OF GOVERNMENT FUNDING
($million)

	1992-93	*1993-94*	*1994-95*	*1995-96*	*1996-97*
Government contributions	12.2	15.6	24.8	39.2	47.2

8.29 The substantial increase in government funding has assisted management of the Service in addressing past financial viability concerns, meeting increased case loads and implementing its quality improvement initiatives.

8.30 However, despite the substantial increases, a wide range of issues relating to the provision of government funding to the Service remain unresolved. Major issues include:

- The underlying basis for the level of annual funding provided to the Service continues to be largely based on the funding of shortfalls between the total operating costs of the Service and the combined revenue earned from other sources. Accordingly, there is little, if any, direct relationship between the funding provided and the case load of the Service;
- Given the emphasis on government funding of shortfalls in other revenue, there is little direct incentive for the Service to maximise the level of income from these sources. (Although, as described in later paragraphs of this Report, despite this lack of incentive, the Service, to its credit, has initiated a range of initiatives to generate additional revenue such as the implementation of a marketing program to attract additional subscribers to the Service);
- There has been no direct link established by government between the cost of providing ambulance services to pensioners and other health care card holders at no charge, a government policy implemented in late 1990, and the level of reimbursement provided by government for these services. (Service management has estimated that current government funding is substantially lower than the actual cost of providing these services); and
- Delays in the annual approval of funding allocations, as evidenced by formal confirmation of 1996-97 government contributions not occurring until March 1997, and uncertainty about levels of contributions in future years significantly impede the ability of Service management to develop short-term and long-term financial plans.

8.31 Given these unresolved issues, it is vital that the current basis for funding of the Service should be subject to detailed review by the Department. The purpose of this review should be to ascertain the feasibility of implementing more equitable and appropriate funding mechanisms including the introduction of an output-based funding approach.

8.32 As a result of the large and increasing proportion of cases related to patients eligible for services at no charge, the review of government funding for ambulance services should also incorporate consideration of the current methods of providing funding for non-chargeable cases. In audit opinion, the most appropriate funding mechanism would be reimbursement by the government for non-chargeable cases specifically related to the volume and cost of these services provided by the Service.

8.33 Finally, it is imperative that annual funding allocations by the government are agreed with the Service prior to the commencement of each financial year to ensure that the Service is in a position to adequately plan its financial operations.

Action by the Service to identify the potential for additional revenue from patient transport fees

8.34 In July 1996, the Service initiated action to review the basis currently used for the charging of fees to users of ambulance services. As part of this process, external consultants were engaged for the purpose of developing an appropriate model for the pricing of emergency services provided to the community.

8.35 In a report of January 1997, the overall conclusion of the consultants was that *"... without a new approach to funding and a new pricing structure, the Service will require further increases to the Government grants to meet its service obligations"*. In drawing this conclusion, the consultants outlined a number of issues related to the charging of emergency service transport fees, including:

- fees currently charged recoup only 47 per cent of the average cost of providing emergency transport;
- there is no fee charged when patients are attended to but ambulance transport is not subsequently required or provided;
- there is no fee differentiation between the level and type of assistance required by patients attended by ambulance officers;
- the Service's budget is not linked to service outputs.

8.36 After consideration of the consultant's findings, the Service made the following recommendations to the Department in January 1997:

- introduction of a flat fee for emergency transport that approximates full recovery of the cost of providing these services;
- implementation of a fee-for-cases where treatment not requiring ambulance transport is required; and
- in the case of services provided at no charge to eligible recipients, government funding be directly related to the cost of providing these services.

8.37 Despite over 9 months elapsing since the submission of these recommendations for consideration and ongoing discussions, audit was advised that the Service was still awaiting a formal response from the Department.

8.38 Urgent action should be taken by the Department to address the issues raised by the Service in relation to emergency transport fees. In this respect, audit considers that specific attention should be given to determining and implementing a fee structure that is more closely related to the cost of providing emergency services.

Management of revenue from the ambulance subscription scheme

8.39 The ambulance subscription scheme is essentially an insurance scheme whereby subscribers upon paying an annual fee can indemnify themselves or their families against the cost of emergency ambulance transport and non-emergency ambulance transport, where authorised by a medical practitioner.

8.40 Operation of the subscription scheme to date has been profitable for the Service. In 1995-96, the Service calculated that the scheme resulted in a net profit of around $11.5 million after allowing for operational costs, such as marketing, and after off-setting the full cost of emergency ambulance services provided to subscribers.

8.41 In essence, the surplus generated from the scheme helps defray the loss incurred by the Service on its emergency transport operations incurred largely as a result of the lack of full cost recovery from patient transport fees and other issues related to the level of government funding, as referred to in preceding paragraphs of this Part of the Report.

8.42 Overall responsibility for the administration and marketing of the scheme rests with the Service. However, the Department has responsibility for the setting of subscription rates charged under the scheme.

8.43 Administration of the call centre and provision of software and hardware for the management of the scheme was outsourced by the Service in 1993 to Emergency Services Pty Ltd, a company established by the chartered accounting firm Arthur Andersen, under a contract which also provided for the firm to develop and implement the financial and other management information systems of the Service. Total payments to the firm in respect of the subscription scheme totalled $7.5 million between 1993-94 and 1996-97. Under the arrangement with the company, the subscriptions scheme is administered on a Statewide basis for both the metropolitan and rural ambulance services.

Financial status of the scheme

8.44 The subscriptions scheme makes an important contribution to the revenue of the Service. It also serves to enhance the image of the Service by providing members with the feeling that they are contributing to a very important public safety organisation.

8.45 The ongoing success of the scheme is currently under threat due to a range of factors such as:

- declining membership numbers and associated revenue due to:
  - competition from private health funds; and
  - an increasing proportion of services provided at no charge to pensioners and other eligible recipients;
- high administrative costs incurred under the current outsourcing arrangements; and
- delays in implementing marketing campaigns to specifically address the continuing decline in membership that became evident as early as 1990-91.

8.46 Given these factors, the proportion of subscription revenue to total revenue has declined from 48.6 per cent in 1991-92 to only 30 per cent in 1996-97. In nominal terms, gross subscription revenue declined from $31.2 million in 1991-92 to $28 million in 1996-97, despite an increase in subscription rates during this period. Subscriber numbers across Victoria declined from 922 000 at 30 June 1992 to 750 000 at 30 June 1997, a decrease of 19 per cent.

8.47 The declining revenue from subscriptions is placing pressure on the ability of management to improve its current financial position and maintain the current standards of service provided to the community. It is therefore likely that any shortfall in revenue from this source will need to be offset by increased government funding.

8.48 As previously mentioned, the Service raised a number of funding related issues with the Department in January 1997. The decline in revenue from subscriptions further emphasises the need for the Department to take action to resolve these issues, particularly in relation to the setting of transport fees.

Impact of competition on subscriptions

8.49 Inappropriate pricing of the services provided by the Metropolitan Ambulance Service and more recently incentives provided by the Federal Government to health funds have increased the competitive pressure on the subscription scheme from these funds. They are able to competitively price their product, albeit for a much narrower cover as compared to that provided by the ambulance services, because the funds do not have to pay for the range of services that the Service provides to the public. For example, the Service does not charge for call out and treatment but charges only if transport is provided.

8.50 The net profit of the ambulance subscription scheme is established through offsetting against revenue the real cost to the Service of emergency ambulance transport for its subscribers. On average, the cost of emergency transport per event in the metropolitan area was calculated by the Service in early 1997 to be $576 per trip.

8.51 In contrast, non-subscribers are not charged the full cost of emergency transport. These patient transport fees are based on distances travelled in an ambulance at rates established by the Department. On this basis, average fees charged are currently $272 per trip, or 47 per cent of the average cost ($576) of providing this transport.

8.52 In view of the above pricing policy, the Service faces a severe competitive disadvantage with the private health funds in that while it incurs the full cost of providing emergency transport to its subscribers, the private health funds are only charged the average rate in respect of claims by their members. This anomalous situation represents an effective government subsidy of claims lodged with the private insurers of around $304 per ambulance trip.

8.53 The Government's guidelines on the setting of fees and charges by departments and Budget-sector agencies specifically require that *"... all user-pay type fees and charges should be set to recover from users the full cost of the service provided unless there are explicit policy or public good reasons otherwise"*. Documentation outlining why the full cost-recovery policy has not been applied by the Department to ambulance transport fees was not available to audit.

8.54 Action should be taken by the Department to ensure that transport fees charged to non-subscribers to the Service's subscription scheme, including members of private health funds, reflect the full costs of providing ambulance transport services.

Marketing of the scheme

8.55 By 1994-95, it became very apparent to the Service that as membership numbers had declined by around 31 per cent since 1990, urgent action was needed to arrest this decline. Although the decline was primarily due to the increased levels of free emergency ambulance transport provided to pensioners and health care card holders, other factors included competition from private health funds and the absence of a marketing strategy.

8.56 In response to the above factors, during 1995 the Service established a marketing department to assume responsibility for marketing the subscription scheme. Since then, this department has been very active in promoting the scheme through initiatives such as:

- specific marketing campaigns e.g. the "..*it Happens*" campaign in 1996-97;
- direct mailing to subscribers whose membership had lapsed;
- Ambulance Week; and
- introduction of alternative methods of paying subscriptions, such as payment through Australia Post.

Aggressive marketing of the subscriptions scheme by the Service is required in order to maintain subscriber numbers.

8.57 The establishment of the marketing department has been successful, as evidenced during 1996-97 when 76 800 new members were recruited to the scheme. However, during the same period, 49 500 members exited due to resignations, lapsed membership or becoming eligible for free ambulance transport. As a result of the above movements, there was a net increase in revenue from the scheme for the year of only $830 900, before taking into account marketing costs of around $700 000 providing a 19 per cent return.

8.58 The above situation illustrates the negligible impact that even a highly successful and relatively inexpensive marketing campaign can have on ultimately increasing revenue from this source.

8.59 It also serves to emphasise the need for alternative funding strategies for the Service as well as action to urgently address the barriers, such as transport fees, which prevent the scheme from competing fairly with private health fund schemes offering ambulance insurance at reduced rates. The Service has estimated that around 30 per cent of members who fail to renew their subscriptions become members of these cheaper schemes.

8.60 The very poor net return to the Service even after aggressive marketing campaigns is further diminished in that any additional revenue earned from such campaigns is effectively taken into account when determining the level of annual government funding. Audit considers that in order to provide an incentive for the Service to actively increase net membership of the subscription scheme, it should be permitted to retain additional revenue earned from this source beyond an agreed level without a negative impact on the level of government funding.

Impact of outsourcing arrangements

8.61 One of the major factors impacting on the profitability of the subscription scheme is the level of administrative costs in managing the call centre and providing the technology. In 1995-96, the scheme incurred costs of around $4 million, of which payments to Emergency Services Pty Ltd amounted to approximately $2.5 million with the remainder largely attributable to bank processing charges associated with subscription payments and promotional activities of the Service.

8.62 As referred to in the Auditor-General's Special Report No. 49 - *Metropolitan Ambulance Service: Contractual and outsourcing practices*, April 1997, significant weaknesses exist in the arrangements entered into with the company. Foremost of these weaknesses are:

- The failure to achieve predicted cost savings of $3.8 million as anticipated cost reductions from reduced staffing levels were effectively negated by higher than expected costs under the outsourcing arrangement; and
- Contractual payments to the company based upon a minimum membership of 1 million subscribers across Victoria despite only 868 000 actual subscribers at the time of entering into the contract. Payments have continued to be based on 1 million members notwithstanding the ongoing decline in subscriber numbers since that time.

8.63 In addition, the Service has incurred additional costs associated with the subscription scheme as the initial expectation, although not specified in the contract, that the company would, through innovative ideas, improve system efficiency and increase subscriber numbers through providing information for membership promotion, has not eventuated.

8.64 In audit opinion, the outsourcing of the membership scheme has been a contributing factor, particularly in earlier years, to the decline in membership due to a lack of availability, under the arrangement, of management information critical for marketing purposes and a relatively poor level of service provided to members and individual ambulance services, especially those in rural areas.

8.65 Audit was advised that the quality of service and co-operation received by the Service from the company has substantially improved during 1997. However, it was unclear to what extent this enhanced level of co-operation could be attributed to improved contract monitoring by the Service or the reaction by the company to the term of the contract expiring in November 1997.

8.66 The Service, at the date of the audit examination, was exploring a range of options for the future administration of the scheme. Options include re-tendering of the contract, short-term renewal of the contract pending government direction on the future of the scheme, or a return to the use of internal resources to administer subscriptions.

8.67 Over the last 2 years, the Service has made substantial advances in contract management, including the establishment of a contracts management department, recruitment of experienced contract administrators and the inclusion of performance criteria in all contracts. The challenge for the Service is to utilise its recently acquired expertise to determine the most favourable outcome required for its subscriptions scheme. In this regard, audit considers that, in the event of the calling of tenders at the expiration of the existing outsourcing arrangement, an exercise be undertaken to determine the estimated cost and benefits of administering this critical revenue source in-house, including allowing for competitive neutrality. Such an exercise should provide a benchmark against which external bids could be judged in terms of cost, quality of service and innovative approach.

ACTION TAKEN TO CLARIFY ONGOING FINANCIAL AND LEGAL COMMITMENTS ARISING FROM STRATEGIES OF PREVIOUS MANAGEMENT

8.68 A new committee of management for the Service was appointed in January 1997 to assume the high-level oversight role which had been undertaken over the previous 4 years by a government-appointed administrator.

8.69 Following its appointment, and the tabling in April 1997 of the Auditor-General's Special Report No. 49 - *Metropolitan Ambulance Service: Contractual and outsourcing practices*, the new committee expressed concern regarding any financial and legal obligations that may face the Service as a result of actions taken by previous management.

8.70 As a consequence, the committee commissioned a firm of chartered accountants and consultants to undertake a due diligence review of the Service as at the date of appointment of the committee.

8.71 In their report provided to the committee in August 1997, the consultants stated that the Service was now well managed but faced a wide variety of risks. Specific findings by the consultants included:

- the absence of sustainable pricing policies precluding development of accurate revenue and financial forecasts by the Service;
- continuing difficulties in the contract with Intergraph with regard to the implementation of mobile data terminals;
- the failure of the arrangement for outsourcing of management of financial systems and the subscription scheme to make provision for the Service to acquire related computer technology, should the arrangement be terminated;
- the major variation to the fleet management contract required due to variations in the volume of vehicle repairs;
- present tendering procedures substantially address the irregularities and deficiencies which existed under previous management;
- recent employment contracts entered into with management were on terms more favourable to the Service than those entered into during the previous management regime; and
- there was no major financial exposure from leasing arrangements or forward commitments of the Service.

8.72 The consultants concluded that current management had identified and addressed many of the shortcomings associated with the operations of the Service and that this should limit the risk of recurrence of previous difficulties.

Improvements in strategic planning by Service management

8.73 Following the appointment of the current Chief Executive Officer of the Service in April 1995, much of the attention of Service management was directed towards resolving pre-existing administrative and operational problems, including the financial issues identified in preceding paragraphs.

8.74 With substantial progress made in resolving these problems, current management has been in a position over the last 12 months to direct greater attention to strategic planning of the future operations of the Service.

8.75 A key element of this increased emphasis on strategic planning was the preparation of a draft 3 year business plan (known as the "Service Plan") in May 1997. Key features of this plan are:

- a "vision statement" outlining the aim for the Service to be recognised as a world leader in the provision of ambulance-based medical care;
- a "mission statement" for the Service to provide access to efficient and skilled care which aims for the best possible patient outcome at a cost acceptable to the community;

- identification of the environment and challenges in which the Service operates; and
- detailed objectives and strategies for each key area of operations, such as emergency services, communications and financial accountability, and for each critical relationship including patients, the community, employees, contractors and the Government.

8.76 The first draft of the plan was prepared in April 1996 and forwarded to the Department for comment. Finalisation of the plan by the Service was delayed until the appointment of the new committee of management for the Service, which subsequently approved the final draft of the plan in May 1997.

8.77 The final draft plan was subsequently forwarded to the Department for comment and approval by June 1997. A formal response from the Department has only recently been forwarded to the Service and discussions are continuing. Given the importance of the plan to the future operations of the Service, finalisation and approval of the plan should occur as a matter of urgency.

8.78 In addition to the business plan, management has completed, or is in the process of completing, a wide range of detailed plans and guidelines for various aspects of the Service's operations. Specific examples of these planning initiatives include:

- Finalisation in July 1997 of the draft *Emergency Operations Operational Plan 1997-2000* which sets out detailed strategies to achieve emergency operations objectives set out in the Service Plan, including response time targets and improved delivery of MICA paramedic services. Strategies outlined in the operational plan include:
    - management strategies dealing with all phases of the response process which aim to maximise the performance of existing resources and place a particular focus on more effective monitoring of benchmarks at each stage of response; and
    - resource strategies, which identify future resource requirements, their location and the appropriate mix of different resource types. These strategies are based on a detailed analysis of caseload by location and time of day and modelling of the resource levels needed to achieve target performance given the expected growth in workload;
- Development of human resources and vehicle plans which are consistent with the operational plan and are aimed at optimising the availability of these resources while minimising, to the extent possible, their cost to the Service;
- Formation of a benchmarking partnership with 9 ambulance and emergency medical services (5 in the United Kingdom, 2 in the United States and one each in New Zealand and Canada). This partnership is directed towards the monitoring of performance indicators aimed at measuring key processes and outputs which will subsequently enable the setting and monitoring of world best practice levels of performance;
- Development of an information technology strategy to guide the identification, development and implementation of systems suitable for the Service's future management information needs;

- Preparation of forward financial strategies in support of the Service's operational plans; and
- Implementation of detailed guidelines governing the tendering and ongoing management of outsourcing and other contractual arrangements.

8.79 The development of an overall Service plan and of additional plans and guidelines in other specific areas, where only limited, if any, documentation has existed in the past, represents a very positive approach by management to enhancing the Service's strategic management framework and provides a sound basis for implementing improvements to the delivery of ambulance services in the future.

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