SUSTAINABLE FUNDING REVIEW FOR AMBULANCE SERVICES

PRE-PRESS DRAFT

OCTOBER 2004
Foreword

Minister’s foreword to be inserted.
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STATEMENT FROM THE PROJECT STEERING GROUP

Steering Group is currently formulating a covering statement for the report. The following is a summary of the main issues as discussed at the last meeting of the Group.

Goal 1 – understanding of revenue

The group considers this goal to have been met.

Issues of leveraging assets and the status of area committees could be further investigated.

Goal 2 – understanding of scope of service

The group considers this goal to have been conditionally met with the following caveats:

- Work with the sector on service levels classifications is needed.
- Understanding how the various services interact was not possible as some data was provided at an aggregate level.

Goal 3 – understanding of costs

The group considers this goal to have been conditionally met with the following caveats:

- There are issues with data consistency.
- Drivers of cost are better understood than before, but not fully.
- The relationships between variables were not strong enough to give an ‘average price’ for the sector.
- We do not fully understand why some providers or stations appear to be much more efficient than others. More work needs to be done in this area.

Goal 4 – a model describing the relationship between cost, revenue and quality of service

The group considers this goal to have been conditionally met with the following caveats:

- We could not find a unified quantifiable output for use in a predictive model.
- This did not allow full development of an input-output model.

Goal 5 – robust financial model reflecting sustainable funding

The group considers this goal to have been conditionally met with the following caveats:

- The review is a snapshot in time [2002/03].
Funders must not use the review as a ‘blunt instrument’ to set funding. The Crown and the sector need to agree on the relative contributions of State and NGO funding for EAS.

The group noted that there was little appreciation when the scope was written how difficult a task goal 5 was. In hindsight, the project was ambitious and not all objectives could be achieved due to limits on the availability of data. This is a reflection of current management information systems, not lack of commitment from the sector. Outputs from ACP and work on the Standards will improve understanding of the sector.
EXECUTIVE SUMMARY

The Ministry and stakeholders have broadened their knowledge of the ambulance sector through the process of this review. The review does much to quantify the drivers of cost and compiles a lot of information that will be useful for the providers, service funders and other stakeholders in agreeing future developments.

In terms of sustainability at current levels of service, the review has not identified a need for a material correction in funding levels for ambulance services.

The main findings of the review reinforce a number of intuitively obvious drivers relating to the provision of ambulance services. Findings related to cost drivers are:

- Population and volume demand are closely matched at all levels of analysis and that this is particularly true of emergency volume demand
- There is a strong match between resourcing of stations and demand with very few stations appearing as outliers
- The cost of service provision is closely matched with volume demand
- There are clear economies of scale in station costs
- Cost per unit of volume decreases with increasing utilisation of ambulances
- Cost per unit of volume varies according to the nature of the volume and significantly varies between emergency and non-emergency volumes
- There are significant differences in station cost structures between providers that can only be partially explained by the information provided for this review.

With respect to wider cost pressures on the service, the review notes the following.

- The total reported revenue of the NGO road ambulance providers (inclusive of other activities) for 2002/03 was $124 million with expenses of $117 million. With respect to the road ambulance activity alone, the revenue for the same period was $83.5 million against expenses of $86.3 million. These figures are inclusive of activities funded by ACC and the Ministry such as PRIME, air ambulance services and disaster preparedness. Against these reported figures, it should be noted that the combined St John annual report has a deficit for ambulance activities of $0.249 million and that these figures largely exclude the semi-independent trusts that support ambulance and other activities; e.g. the St John Area Committees. The total and ambulance related revenue and costs for the air ambulance sector have not been made known to this review.

- A push to fully crew all ambulances has come from the initiation of a Standards document in the ambulance service. Lack of clarity of the aims of full crewing and incomplete or contradictory data provided to the review, however, limit the ability to estimate the cost of such a provision. Rough estimates of the cost of implementing full crewing range from $17.5 million to...
$4.8 million or less. The appropriate place for costing a move to universal full crew levels will be with the assessment of the Standards.

- The Standards document also describes the appropriate qualification mix for different classes of ambulance. This review did not collect information on the numbers of ambulances in these classes, but a view has been obtained of the relative qualification mix of ambulance stations. The degree of overlap between service levels has meant that no clear benchmarks are available on this criteria and no overall cost estimate can be made of moving to those benchmarks.

- Response time performance appears to be better than that regularly reported to funders. A complete picture of response time performance is not available from the data provided, but a representative sample indicates that overall performance may be around 2% below target (i.e. 78% of emergencies are getting an ambulance officer on scene within a time for which the target is 80% and 93% of emergencies are getting a response within the 95% target).
1 INTRODUCTION

The ambulance service sustainable funding review arose as a response by various parties to a perceived need for a better understanding of the funding requirements of the ambulance service. It was considered highly preferable that this understanding be shared by those on both sides of the negotiating table, both funders and providers, without the process of achieving this understanding being itself a negotiation. The main parties involved in initiating this review were the Ministry of Health, ACC and Ambulance NZ as signatories of a Memorandum of Understanding that establishes a forum for high level discussion of common ambulance issues. The spokesgroup for DHBs, DHB NZ, was also invited to be involved in light of the interest DHBs have in these services both as funders of inter-hospital transfers and as the main delivery point for emergency transports.

Funders and providers have come to this review with slightly different imperatives. The Ministry faced claims of substantial deficits from at least one provider, had a long-standing intention to better understand ambulance service cost drivers and, therefore, undertook to provide the bulk of the analytical input to the review. Ambulance NZ, as the representative of providers, had also been consistently advocating that the Crown needed to sort out the mix of funding arrangements it had with the sector and that such a review was a means to achieve this.

Rather than devolving the emergency ambulance contracts it inherited from the Health Funding Authority (HFA) to District Health Boards (DHBs) the Ministry opted to firstly review what would be required to achieve a sustainable service of appropriate quality. The Ambulance Services Sustainable Funding Review (SFR) project was brought into being to achieve these aims. The review required a collaborative environment with input from a wide range of providers to be successful. Both funders and providers were represented at a working and governance level through the establishment of the Project Working Group and Project Steering Group. Membership of these groups is set out in Appendix A.

The Ministry also widened the scope of the exercise to include both air and road ambulance services, as it believed at the time that an understanding of the interface between these modes of transport would be informative. As the air ambulance sector was not the main driver for this review and did not have the same reliance on Crown funding as the road ambulance sector, its incentives to be party to this review were quite different. Data collection from this sector was treated quite differently, both from the point of view of their background in the review and with respect to the greater competition between air ambulance providers. The separate technical reports appended to this document originate from this decision.

While the report is the product of the Ministry, it has only been possible with the goodwill and effort of ambulance providers. The Ministry acknowledges that shortfalls in the ability to address certain questions posed of the review relate more to ambulance service information systems being designed for other purposes than to a lack of willingness to participate in the project.
2 PROJECT SCOPE

The sustainable funding review was tasked to conduct a bottom-up analysis of ambulance costs, volumes, distribution, and income to develop a model to assist in determination of appropriate funding levels for the provision of ambulance services in New Zealand.

The project’s objectives were to:

- establish a shared understanding of the existing levels of revenue (Crown funding and other) available for the provision of ambulance services in New Zealand
- establish a shared understanding of the scope of the service delivered by ambulance services in New Zealand (including service inputs such as infrastructure and crewing and service outputs such as volumes and response times) and how the various services interact
- establish a shared understanding of the costs (fixed and variable components) and the cost pressures relating to the provision of ambulance services in New Zealand
- build on the agreed understanding of costs, revenue and coverage to develop a model describing the relationship between ambulance service revenue and ambulance service costs and quality of service
- produce a robust financial model reflecting the sustainable funding of ambulance services acceptable to both the funders and the sector, to be used as the basis for determining funding approaches in future engagement practices.

3 PRINCIPLES

The steering group set the overarching principles of the sustainable funding review. These are in the form of general assumptions within which the review was to operate:

- That the ambulance sector will continue to be supported by volunteers and receive revenue from a variety of sources including Crown funding
- The review is a technical project to develop a shared understanding of the scope of the current service coverage costs and revenue of New Zealand ambulance services (it is not a negotiating process)
- The project will evaluate the complete scope of ambulance services in New Zealand and identify appropriate performance and efficiency benchmarks for those services
- Sufficient information should be obtained on the non-core ambulance services provided by ambulance operators (including income) to fully comprehend the revenue and costs of the ambulance service.
4 MAIN FINDINGS

This section links the project goals with the outcomes of the analysis. There were five project goals, the last two of which were the most dependent on consistency of data between providers. The goals of the review are presented overleaf in section two of this report.

Existing Levels of Revenue

The ambulance service in New Zealand is in relatively good financial shape to provide the current level of services required of it.

With respect to road ambulance services, revenue has been growing faster than costs and ongoing surpluses are being achieved after expenditure from direct Crown and patient funding and charitable input for these services. Most of the charitable revenue and revenue from other activities is being directed to charitable or commercial activities. Overall, the contribution from volunteers is a critical NGO input.

Air ambulance services differ markedly in that direct Crown funding is a minority source of revenue. Direct Crown funding for operators of helicopter only ambulance services amounts to about 15% of their total revenue, most in the form of ACC fee-for-service payments. The equivalent figure for other operators (either fixed-wing or a combination of fixed-wing and rotary) is 35%. The responses to the survey did not provide a complete representation of the revenues to the air ambulance providers. Any optimization of the air sector would have to take its reliance on non-Crown funding into account.

Scope of Service

The project scope asked for the development of a “…shared understanding of the scope of the service delivered by ambulance services in New Zealand (including service inputs such as infrastructure and crewing and service outputs such as volumes and response times) and how the various services interact”. This report, together with the appended technical reports on road and air ambulance services, provides a wide range of information on the scope of ambulance services. Key points can be found in the Executive Summary and the Conclusions sections as well as in the Summary section of Part A of this report. Discussion on quality issues can be found in sections on full crewing, response times and volunteers.

Costs and Funding

This report describes, for road ambulances, the clear relationships discovered between population and demand and demand and costs, plus the cost drivers identified in utilisation, mix of activities, and input from volunteers. Cost weights based on the available data are specific to existing providers of road ambulance services. A relationship between cost and quality could not be accurately determined from the information provided. Further information would be required to identify the costs for different utilisation rates for each class of fixed wing aircraft.
It is unlikely that any savings would be gained by greater use of air ambulances in rural areas. Savings would only arise if the capacity of the remote road ambulance services could be reduced. These services are already operating at well below optimal utilisation and are only possible as a result of the local community input.

**Relationship with Quality**

The preceding goals of the review assisted the understanding of how the NGO status of providers and their use of volunteer’s influences the Crown and provider’s decisions around the location of services. In doing so, part of the fourth goal, the relationship between revenue and costs, has largely been achieved.

The pre-review expectation that there would be sufficient consistency of data to permit the setting of benchmarks relating cost and quality for road ambulance services has not been fulfilled. The implications of having at least two ambulance officers in each ambulance (“full crewing”) cannot be reliably calculated from the data currently collected by providers. Without plentiful stations shown by the data as operating at the required response time performance levels, the review cannot estimate the cost implications of these targets. The implications of meeting qualification expectations can be assessed with respect to existing staffing, but is of limited value given that the staff implications of full crewing and response times are unknowns.

Resolution of the relationship between cost and quality in the road ambulance service will, to a large extent, be a natural outcome of the processes relating to understanding the implications of the Ambulance Sector Standards. In moving to adopt those Standards, the sector will need to assess the staffing and access implications and present to their funders options for what can be achieved in a cost effective manner. Currently the necessary information rests with the ambulance providers and, while this information will be nationally consistent following the implementation of the Ambulance Communications Project, work could commence at an earlier date based on regionally consistent information. To some extent, however, the performance of the ambulance service needs to be considered in the context of the wider health sector, particularly primary care, in terms of drivers of medical emergency demand and it is in that area that the Ministry will need to focus.

**Financial Model**

An outcome of this review is a much better understanding of the funding constraints within which the sector operates. That understanding is based on study of a single year. There is no reason to suspect that year was unusual and sufficient reason to conclude that ambulance funding has kept pace with the cost of demand growth. Funders can now be confident that any additional money put in to road ambulance services would result directly in improved services.

Outstanding work on funding includes:
- gaining an understanding of the premium required for a fee-for-service style of contracting over a bulk contract approach (“capacity funding”)
- determining appropriate comparative volumes between accident and medical emergencies (“cost relativities”)
- determining and agreeing on an appropriate division of funding responsibility between ACC, Vote:Health and the charitable fundraising of the providers.
These matters were not necessarily the intent of the review but will continue to be topics for further work between ACC and the Ministry, and between those parties jointly and service providers.

5 SUSTAINABILITY

In the main findings section of this review it was concluded that, at the current level of service and revenue, the ambulance service is sustainable. The proviso relating to the current level of service is quite deliberate. In this section, the report considers the concept of sustainability for the ambulance sector for the longer term.

**Working Definition of Sustainability**

For the purposes of this review, a service is considered sustainable if, with effective management, optimised resource distribution and appropriate triaging of demand, it can continue over time to at least break-even financially and perform to the standard expected of it within the resources available to it.

**Current State**

There are two main factors that contribute to the statement that, at the current level of service and revenue, the ambulance service is sustainable. The first is that the assessment of the financial state of providers shows that they continue to at least break-even financially. The second is the imprecision in the specification of performance.

The imprecision in the specification of performance arises from joint service specifications that reference the Standards document but require only that providers make “reasonable endeavours” to meet the expectations of that document. The service specifications take that position as the Standards, while they are a huge step forward in compiling expert opinion on the direction of the service, are not yet at a stage where costs and benefits can be assessed. Until that assessment occurs, the Standards cannot be reviewed with rigour, gaps in its coverage will be difficult to find and fill, and an informed position cannot be presented to the Minister of Health to be mandated. [Note that the Health and Disability Services (Safety) Act 2001, s18, requires, amongst other things, that the Minister of Health be satisfied that requiring providers to comply with the Standards would be in the public interest, having regard to the extent to which compliance would ensure the safe provision of services and the likely costs of compliance.]

The lack of clarity around the specification of service quality leads to the uncomfortable position that the ambulance service is considered sustainable in its current configuration as long as it meets the condition of prudent financial management.

**Performance against Quality Measures**

A mixture of analysis and anecdote indicates that ambulance providers are not meeting the quality measures compiled in the Standards document. As stated above,
the quality measures in the Standards document will need to be shown to be in the public interest before they will be included in an approved compliance document but are taken as valid for the purposes of this review.

Direct staff costs at the time of the review for all ambulance services were about $45.5 million. The cost estimates for meeting the full crew requirement for EAS vehicles only range from $16.4 million to $4.8 million or lower. In terms of increase over current staffing levels, these equate to an increase of anything up to 36%. As such, questions relating to full crewing will be central to future debates on implementation of the Standards. It will only be once there has been a full assessment of the benefits of full crewing (including crew retention, avoidance of harm to crew, added patient observation and care in transit, and improvements in time for the vehicle to come available following patient delivery) that decisions will be made on the level of full crewing that will be considered part of the sustainability equation.

Shorter response times are seen as key to improvements in recovery or survival in serious medical emergencies or severe trauma. Ambulance providers devote significant effort to reducing response times through maximising the availability of spare ambulances at times of expected high demand, and reducing activation times through having crew being on duty in their vehicles and improving call management. These variables are within the control of ambulance management and their importance will be specific to a given locality. Through the thorough understanding of these local dynamics, information should arise on the extent to which gaps in response time performance could be met by improved management and the cost of meeting any remaining performance gap.

The benefit of the shorter response time declines with declining severity of the cases. For this reason the response time targets are only set on ‘priority one’ callouts; i.e. those occasions when the ambulance is responding with maximum urgency. Decisions on the appropriate priority of the callout, however, are made on limited information and any evidence of declining acuity of callouts will call into question the appropriateness of the targets.

The achievement of response time targets are, therefore, an issue that requires in-depth knowledge of the local callout process, crew scheduling, vehicle positioning, and the local relationship between spare capacity and response times, before decisions should be made on investment in additional resources to make the achievement of those targets sustainable.

This review does not have sufficiently robust information to assess the sustainability of an improved response time performance measured against an agreed Standard. The information it does have available gives only an indication of performance on response times at the provider level. While this indication is that the road ambulance service is slightly under-performing against existing contracted response time targets, there is no indication of the degree to which that under-performance relates to controllable factors or under-resourcing of the service.

Management of Assets

An organisation may be meeting its financial obligations for some short to medium period without being sustainable in the longer term by reducing its asset base in terms
of quantity or quality. A sustainable organisation takes a long-term view of service provision and, therefore, maintains its assets. To do this, depreciation must be recognised as a cost against the organisation and assets replaced once they have reached the end of their useful life.

Depreciation in the road ambulance sector almost matches capital expenditure ($9.969 million cf $10.088 million). This indicates that this sector has the financial capability to maintain business capacity on an ongoing basis; i.e. that its capital stock is being maintained at a constant level (assuming that the scope of activity remains largely unchanged). There are, however, indications that the quality of vehicle stock is variable between providers; i.e. that some vehicles are older than the depreciation term. The depreciation term to which road ambulance service operates is not standard but varies between eight and ten years for vehicles. While it is not clear that all vehicles older than the depreciation term are at the end of their useful lives, the cost of replacing all vehicles within the depreciation term would increase overall costs by between $0.8 million to $1.7 million depending on the depreciation term used. Compared with the overall cost of the service, the age of the fleet would not appear to be a significant issue.

**Effective Management**

Management effects sustainability both in terms of its impact on efficient use of resources and in terms of the overhead implications. To the extent that sustainability is viewed from the framework of maximum efficiency, both are relevant to this discussion.

It is clear from *Figure 5.8* that there are differences in costs between providers although it is not clear whether the factors influencing this are to do with management or some other factor. The discussion on response times above indicates some of the management focus in the ambulance sector on effective management.

The costs of production are only partially under the control of providers as there are areas where services are being provided for reasons relating to access and at high unit cost that non-essential services would regard as uneconomic. In other words, providers may have a limited ability to optimise service provision to manage within a national average funding rate. In such situations, the fixed costs do not change and the marginal costs (or saving) relate only to about 15% of costs that may be considered variable.

Production costs are also influenced by inflation. Inflation is considered to be largely outside the control of providers as long as they are taking decisions to keep costs under control as much as possible (e.g. becoming more fuel efficient). There is no accepted measure of inflation that relates specifically to the ambulance service. Providers and funders need to develop an understanding of variable costs and how prices should be influenced by inflation to ensure this risk is well managed.

With respect to overheads, efficiencies may be obtained through the amalgamation of administrative functions. The Order of St John responds to about 85% of incidents and has progressively evolved into more centralised administrative structures. The effective control of the organisation has moved from districts to regions and, more recently, to a national administrative structure, even though the community aspect has
have largely been retained through area committees. In further strengthening the national administrative structure there will be opportunities for efficiencies in removing duplication of various functions. Such efficiencies would lower the administrative overheads and reduce the overall cost per incident. An example of moves towards amalgamation of functions is the Ambulance Communications Project (ACP) that rationalises and standardises the number and quality of control centres. This project should create a communication and control mechanism that will not alter with provider structure changes, but will allow better understanding of demand, acuity of calls and help with management of low acuity demand.

**Management of Demand**

The most vexed question in relation to sustainability is that of volume growth. The ambulance service is one that is generally seen as demand-driven, at least with respect to emergencies. Emergencies may be divided into accidents and medical events. Accidents have a body of legislation to define what they are and various programmes to reduce their occurrence (e.g. road accident campaigns). Accident emergencies, as defined by law and interpreted ACC staff, have been reported as decreasing, both in absolute terms and on a per capita basis. Any growth in medical emergencies should relate to changes in the size of the population and increasing health needs (generally related to the effects of aging). The current net effect of these drivers, assuming the level of acuity accepted for dispatch of an ambulance is constant, is a per annum increase of around 1.3% (the benchmark calculated from hospital discharge information for assessment of DHB hospital demand growth assumptions).

Providers, however, are reporting increases in medical emergencies that are more significant. This would imply a reduction in the level of acuity of medical emergencies. As funders have not altered the service specification in a way that would decrease acuity (and the service specifications are common to both ACC and the Ministry), these additional volumes beyond the effects of population change appear to be, at least partially, within the control of the ambulance providers. Certainly, they do not appear to be increasing costs.

A growth in medical emergencies beyond that implied by population and the consequential reduction in acuity may be linked to the growth of other ambulance sector activities like alarms and caring callers. These activities alter the balance of responsibility for the activation of an ambulance from the public to the ambulance provider.

The difference in acuity between differing categories of emergencies will impact on sustainability. Areas with higher proportions of serious emergencies will need to maintain larger fleets and assume lower utilisation to ensure there is spare capacity when needed. Areas of lower acuity will be able to more fully utilise their fleets and are sustainable at lower levels of input per incident. As discussed elsewhere in this report, cost-weighting of volumes will need to occur to standardise for differences in acuity.
6 PRECONCEPTIONS

The sustainable funding review of ambulance services set out to test certain preconceptions that have persisted for a number of years. These preconceptions were that:

1. The road ambulance sector was under significant financial pressure
2. The quality of service was variable and, generally, below that required to meet service standards
3. Full crewing is an essential goal for ambulance providers
4. Air ambulances should replace road ambulances in certain situations
5. ACC subsidises other ambulance service funders.

Evidence of Significant Financial Pressure

The review considered and received independent advice on annual reports from the non-governmental organisations that provide the bulk of the road ambulance services in this country. The view of the Ministry is that this is a financially healthy sector with an overall surplus of $6.7 million (excluding GST) in 2002/03. To a large extent, this surplus is a result of non-ambulance activities developed around either the goodwill the public have towards the ambulance service (e.g. gaming activities and subscription schemes) or the infrastructure that supports the ambulance service (e.g. alarm monitoring).

The road ambulance activity itself is, effectively, fully funded for the services it provides, recognising that much of this service is only affordable with the input from volunteers. There is, however, a limited dependence on charitable funding. In the year reviewed, 2002/03, donations credited to this activity made up 0.3% of revenue for the activity. The other 99.7% was made up of direct funding for emergency services, patient transports or event attendance from ACC, the Ministry of Health, or their clients in the form of either a fully commercial transaction or as a part-charge for medical emergencies. The net revenue from part-charges accounts for 7% of activity revenue.

Fixed costs in the road ambulance service do not appear to be a significant cost driver. While there is evidence that the quality of the road ambulance stock is variable across the country, estimates of the additional fixed costs that would arise from updating the fleet are of the order of $0.8 million to $1.7 million. These estimates are sensitive to assumptions of the value of an ambulance and the term for depreciation.

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1 Three DHBs provide services independent of the NGOs, but account for less than 5% of incidents attended. Their accountability documents have a different focus from those of the NGO providers and their performance is managed through Crown Funding Agreements.
Consistent Service Quality

The review considered information provided on several aspects of either input or output quality with the aim of linking quality with resource use to create robust benchmarks for good practice. The data did not support this aim as no relationships could be found between quality and cost, but information gained is of use in guiding improvements in data collection for future benchmark and target development.

One quality measure suggested by the working group was the proportion of incidents to which an advanced paramedic responded. With respect to this quality measure, the data was incomplete and the targets undefined. Standard application of station coverage area definitions will need to be implemented before significant improvements in response time information will arise. Clarity will be necessary around the definition or scope of full crewing and significant improvements will be required in data collection before full crew status will be routinely available and this review was limited by time and scope to routine information.

Full Crew Levels

There is a perception that there ought to be at least two ambulance officers attending each emergency so that patient care can be maintained by one officer while the other drives. As an aim, this could be achieved in two main ways:

1. Full crewing every vehicle, and/or
2. Use of multiple single-crewed vehicles (e.g. a first response unit plus an emergency ambulance), in some instances using other emergency service vehicles (e.g. fire engines) as the first responders

Road ambulance operators make every effort to get appropriate resources to each incident efficiently and risk being publicly chastised for those occasions when resources do not permit this. It is difficult, however, to get an objective view of the benefits that arise from having full crews in all vehicles.

The lack of clarity over what full crewing might mean to the public, the service funder and the service provider is in contrast to the expert opinion expressed in the Standards document (‘Standard: DZ 8156; Ambulance Sector Service Standard’ compiled by Ambulance New Zealand in 2002) which targets for full crew in every emergency ambulance, every first response unit, and every patient transport vehicle. Ministry and ACC contractual specifications do not require full crewing of first response units, and DHBs are free to decide on how patient care is provided in the patient transport vehicles they use.

This review has attempted to form a view on the cost of meeting certain quality standards, with full crewing being part of that task. The data available to the review was insufficiently accurate to robustly estimate the current state of crewing within ambulances, let alone the frequency that two crewmembers attend appropriate incidents. The estimated cost of full crewing varies widely from over $17 million per year to almost $5 million per year, where even that lower estimate may be excessive.
This review proposes that the debate over the benefits and costs of full crewing should more properly occur within the evolution of the Standards document towards an officially ratified Standard.

**Air Ambulances as Replacement for Road Ambulances**

Planes and helicopters can potentially respond more quickly under certain circumstances than road ambulances, but have certain disadvantages. A fixed wing aircraft can only land at designated airports, limiting their role to inter-hospital transfer (IHT) with the assistance of road ambulances at either end of the journey. Aircraft take significantly longer to activate than land vehicles although this is partially due to volumes not warranting 24 hour on-duty staffing. Aircraft are more limited in their ability to operate in adverse weather and at night and usually require assistance to secure the safety of a landing site; e.g. a helicopter would not land directly on a highway until traffic has been stopped. Aircraft are also much more expensive to operate than road ambulances, especially if they are to be of sufficient size to allow patient care to be maintained.

The high fixed cost of helicopters and the training, skill maintenance requirements of pilots, and the maintenance cost of the craft themselves limits the number in use. This is particularly true of those helicopters that are of sufficient size to permit patient care to occur in transit. The number of helicopters, together with the additional time to activate one, leads to consideration of their use being predominantly limited to areas that are well away from roads or well away from main centers of population. These are largely the same areas where limited demand means establishment of paid officer road ambulance stations is not currently an option from both a funding and a skill management perspective. Such stations are likely to be operating at levels of utilisation well below the optimum for cost-effective stations with all paid staff and would not support maintenance of full-time officer skills. Additional use of helicopters in remote areas will not reduce the need for a road resource to be in place to serve less urgent local cases and to support or replace the use of air ambulances in adverse conditions. The conclusion, therefore, is that greater use of helicopters should be judged on the grounds of benefit to the patient rather than potential cost savings.

**Funding Sources**

In costing road ambulance services, it has been found that the relative share between emergency and non-emergency ambulance services places an inappropriate reliance on emergency services. The share of costs between road inter-hospital transfers (IHTs), emergency ambulances and private hire is in the order of 1:2:1. Relating revenue directly with costs indicates that revenue should also be split along these lines (i.e. half of ambulance provider revenue should come from IHTs and privates hires and half from emergency contracts). However, the current revenue distribution places significantly more reliance on emergency ambulance revenue.

Within emergency road ambulance services, several factors indicate a prima facie case for a higher price per unit to be incurred by ACC. These include:

- ACC not directly paying for patients cared for at the scene and not transported;
- the process of meeting ACC’s information requirements and claim vetting procedures may be a disincentive to the full capture of trauma-related activity;
• low acuity medical cases may be attributed as medical emergencies as a result of the Ministry’s bulk funding method, and
• the higher risk that a provider faces in ACC’s fee-for-service environment than in the Ministry’s bulk funding environment.

The scale of the price differential cannot be determined directly from the data collected for this review. Such a determination would require a separate study with this as a specific aim.

7 SERVICE DESCRIPTION

7.1 NATURE OF SERVICE

The nature of the ambulance service is often described as one of a ‘capacity’ service. This comes from the view that the service needs sufficient capacity to respond with appropriate promptness to demand. This view is consistent with the observation that the service is one where marginal costs form a limited proportion of total costs.

The primary focus of this review is on road ambulance services as these perform the bulk of activity. Air ambulances are included as they perform a vital function, represent a significant resource investment, and there is general support for their greater use where there is clear benefit to patient outcomes and the service is cost effective. Water ambulances are a rarity in New Zealand. There are understood to have been two operating in Auckland at the time of the America’s Cup, but elsewhere, marine ambulance work tends to rely on relationships between the ambulance service and Coastguard or harbour board vessels. For reasons of the small and varied nature of the marine ambulance situation these were excluded from the review.

In theory, population distribution determines the spacing of services, with the result that those stations covering relatively low populations have highly variable demand and difficulty in establishing an appropriate capacity. Those sparse, low population, low demand, stations tend to fit with the model of community managed services; linked in to the emergency communications network, but staffed entirely by volunteers.

Still developing in the more remote areas is the Primary Response in Medical Emergency scheme (PRIME). This scheme is a medical and advanced paramedic support to more remote communities through the training of GPs and nurse practitioners in paramedic skills. PRIME adds to the quality of service through a multi-disciplinary approach.

Further along the spectrum we find the more common type of station in terms of workload. Core working day service is provided by one or more on-duty paid staff, who often remain on-call to support volunteer staff at night and weekends.

At the most productive end of the road ambulance spectrum we find stations staffed largely by paid staff with relatively predictable workloads and more directly under the control of professional management.
The ambulance service falls into the category of ‘worthy causes’ to which people donate time and resources with some confidence that they are helping their community. However, there is some debate that resource contributions are available for the provider to venture into non-ambulance charitable or commercial activities and a view within the service that ambulance activities should be fully Crown or ACC funded. The extent to which ambulance service providers should act as NGOs versus commercial providers of ambulance services is yet to be clarified.

Air ambulance services have a more recent history as a mode of emergency response, are not reliant on volunteers and are much less reliant on Crown funding than their road counterparts. Corporate sponsors seem highly appreciative of any association they can form with emergency air ambulances.

The provision of corporate and other sponsorship has meant that there is a larger number of air ambulance providers operating at a lower level of activity than would otherwise be viable. It also means that there is a wide range of quality of service in this area with limited ability for the Crown or ACC to push for improvements. The most important levers for the Crown and ACC are Ministry/ACC contracts with providers and the ambulance control centres, owned and operated by the road ambulance services.

Most air ambulance providers are also involved with other activities, but there are a handful of dedicated air ambulance providers. These generally operate craft that facilitate the continuous care of the patient throughout the flight. To improve overall consistency of quality of service delivery, contractual requirements could favour dedicated air ambulance providers over those for which the service is only part of their business model.

The nature of the patients served by air ambulance providers is of interest to funders. It appears that emergency medical patients (those whose condition does not relate to a trauma) fewer patients benefit from an air response than trauma cases. Most cardiovascular emergencies, for example, are resolved in less time than it takes to get an ambulance airborne. This ‘golden hour’ philosophy developed mainly around serious trauma cases with the understanding that outcomes may be improved if the patient can be taken to definitive care within an hour of the injury being sustained and that severe trauma may be associated with internal bleeding for which surgery is most often indicated. Consistent with this view, emergency air ambulance services (largely by rotary wing aircraft) are mostly utilised by ACC claimants.

Medical emergency cases are more likely to be taken by road to the nearest Emergency Department, stabilised, assessed and, if necessary, transported to the appropriate point of definitive care. When this point of definitive care is a greater distance away than could reasonably be expected to be covered by road or the condition of the patient requires it, the simplest appropriate form of air transport is used. Cases that can be transferred with a nurse assisting would be likely to use a charter fixed wing aircraft with limited additional medical services available and with the nurse supplied by the transferring hospital. Cases requiring services such as available in an Intensive Care Unit (ICU) would be more likely to be retrieved by a team of specialists from the receiving hospital in a fixed wing aircraft equipped effectively as a ‘flying ICU’. The ‘flying ICU’ must be dedicated to ambulance work.
and so would not be able to spread its costs over other activities. The cost to the user of these services is, therefore, quite different.

The differing imperatives on the road and air ambulance providers lead to a tension where air ambulance providers monitor and publicly question the appropriateness of control centre decisions. There are appropriate channels for such debates to occur productively and, with road ambulance providers controlling both the mode of response and the supply of trained paramedics, it seems unlikely that this tension would degenerate into roadside disputes over who is best placed to transport a patient.

Control centres are currently maintained by each of the nine road ambulance providers with the exception of that operating in most of Marlborough as part of the local DHB (i.e. eight control centres in the country). Calls relevant to Marlborough are dispatched from Christchurch. Any 111 phone-call asking for an ambulance response will go to one of two Telecom call centres and will be directed to one of these eight ambulance control centres.

Key decisions affecting the speed of the response, the responding ambulance in terms of appropriate skill level and whether to respond by road or by air are largely taken by ambulance control centres. As these decisions have a direct influence on the income of competing ambulance providers, the objectivity and neutrality of those decisions is critical to the sustainability of the air ambulance sector.

7.2 Service Standard

In reviewing the service being provided, attention must be given to the standard of service expected of providers. With respect to road ambulance services there are two different sets of expectations by which the service may be judged. At the instigation of Ambulance New Zealand and under the auspices of Standards New Zealand the document ‘Standard: DZ 8156; Ambulance Sector Service Standard’ was compiled in 2002. This will be referred to in this review as the ‘Standards document’ or the ‘Standards’. The other measure of service standards is the set of service specifications compiled jointly by the Ministry and ACC. Neither set of expectations is the ideal start point for judging service quality.

The Standards document is maturing but it will be some time before it has the cost and benefit information that will allow it to be considered for ratification by the Minister of Health and become mandatory. In the normal course of events such standards can be expected to develop from where it currently stands, an expert committee opinion, through the development of assessment or audit tools, the appointment of expert independent auditors, the process of a cost/benefit analysis and redrafting of the document before being ratified as an official Standard. Many such documents do not progress fully through this process. The Standards are taking the initial steps to progress past the first stage of this process, that of an expert committee opinion, by developing and promoting a voluntary self-assessment workbook for the purposes of completing a stock take of existing services.

2 Note that Search and Rescue co-ordinators may also initiate air responses, sometimes with vehicles that may not be ideal for ambulance work, but that these may result in a claim to ACC for an ambulance transport.

3 A separate project aims to improve the quality and objectivity of triaging and dispatch from control centres, with an overall increase in staffing but a reduction in number of centres to three.
The service specifications jointly prepared by the Ministry and ACC confine themselves to the area of emergency ambulance services that these organisations purchase. They do not, for example, make any requirement with respect to full crews being available on patient transport service ambulances purchased mainly by DHBs. These specifications were drafted in the knowledge of the Standards document and linked to that document in a number of areas. Such links were made with an awareness that the Standards would have to go through several steps before they finally matured and that the contracts in which they were used did not require an absolute adherence to the specifications. In the Ministry contracts, for example, they are referred to as something the providers were to make ‘reasonable endeavours’ to achieve. In respect of full crewing, the specifications took a deliberate step away from the Standards by stating there would be no full crew requirement for level one stations.

In the absence of a definitive statement on service standards, this review has opted to measure quality of emergency ambulance service against the service specifications with the removal of the ‘reasonable endeavours’ clause. No quality standard has been used for the non-emergency ambulance services.

7.3 SERVICE LEVELS

Service levels describe the mix of service capability found in any ambulance station. This description of services was developed in one region of the ambulance service and was adopted for wider use by the funders. They relate mostly to the crew qualifications of the active vehicles. Appendix B sets out these requirements in detail with TABLE B1 showing the crewing and other requirements while TABLE B2 shows more of the relationship between various modes of transport. Both tables come from the service specification used by both the Ministry and ACC in their respective contracts and differ from the crewing expectations of the Standards document in that full crewing is not an expectation on the most remote stations.

The data showed less consistency of unit costs by service level nationally than anticipated. Discussions with ambulance service representatives indicated a degree of subjectivity in assigning service levels. Whatever the cause, this inconsistency has meant that service levels are less useful for benchmarking purposes than anticipated. Any future repetition or extension of this review will need, at an early stage in the project, to design and test a categorisation of ambulance stations that reflects resource inputs.

A group of stations that are clearly similar in terms of costs are those with no paid staff. These display a high degree of predictability between unit costs and volumes. Volunteer-only stations occur in the three least complex service levels and the result reinforces that the chief variable in establishing station costs is staffing.

With respect to the air ambulance service, a two-way classification was reviewed; both by type of aircraft and by the number of ambulance-related flying hours. The flying hour aspect was dropped through issues relating to sample size. These vehicles were, therefore, simply classified in to fixed wing, single-engined rotary and twin-engined rotary with some distinction within fixed wing between pressurised and other aircraft.
7.4 FULL-CREW

‘Full-crew’ levels are a particular issue for the road ambulance service. In general terms, having a full crew in an ambulance means having two ambulance officers on each rostered vehicle although that definition may not be absolute in respect of first response units and patient transport vehicles. It is not clear that having full crew on either first response units or patient transport vehicles assists either officer security or patient care. It is also unclear what the impact is on either of these concerns of having two single crew vehicles attend incidents, where this is considered warranted, with one vehicle being left for later retrieval if any doubts on patient care.

From the perspective of the service funders, there is some ambiguity in the definition of ‘full-crew’. The Standards document, which will need to go through a cost-benefit assessment before it could be considered for ratification, implies that the full crew requirement applies equally to patient transport vehicles, first response units and emergency ambulances. The joint Ministry/ACC service specification relates only to emergency vehicles and applies discretion with respect to level one services. DHB requirements with respect to patient transport vehicles vary but, from a limited sample, tend to expect the ambulance service to provide only vehicle and driver.

Any future review of the full crew requirement in the Standards should compare the advantages of having two officers in each emergency ambulance with those of having additional ambulances. The addition of extra ambulances with a single ambulance officer would reduce response times, but would require greater reliance on the secondary vehicles in those serious emergencies that would benefit more from application of ambulance officers skills at the scene or in transit than from arrival at an emergency department in shorter time. The benefit to the patient of full crewing the existing number of ambulances is mostly that they can be better monitored in transit. Other benefits accrue to ambulance officers in full crewing in the lifting of patients and backup in cases where there are threats of violence and no other emergency service personnel. Such benefits could be assessed in terms of variance in recruitment or retention of staff.

There has been a call in the Standards document for full crews on all ambulances, not only the emergency vehicles. This would mean additional officers on first response units and patient transport vehicles that also come under the general definition of ‘ambulance’.

A second officer on a first response unit is not a requirement of the current joint Ministry/ACC service specifications. The second officer would be largely superfluous, as these vehicles are not expected to transport patients.

Similarly, a second officer would be superfluous on a patient transport vehicle except when specifically required by the DHB. Patient transport vehicles operate between hospitals and the continuity of patient care would be provided either by hospital staff or an ambulance officer if so requested. This is a decision for the DHB concerned.

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4 Level one services are entirely staffed by volunteers.
Data available to the review provides conflicting information on the gaps in full crew levels. It is not clear:

- Whether the number of rostered vehicle hours were consistently reported (e.g., whether a vehicle is considered to be ‘rostered’ on when the staff are on-call)
- The extent to which CAD systems are able to advise accurately on the crewing levels of individual responses (this appears to be particularly the case in stations where the workforce is largely a volunteer one)
- The extent to which incidents have two officers attend (even if on separate vehicles)
- If single crewed vehicles tend to be used mainly to provide support to less qualified full crews

The data available on existing full crew levels is insufficient to use as the basis of a quality measure for the following reasons:

- Calculating the level of single crewing based on vehicle rostered hours and staff available does not appear to give a reliable result based on the reported single crew rates of the small sample of stations with all paid officers
- The sample of stations with all paid officers is too small to be used as the base of any extrapolation for an index of quality
- For the large number of stations that are totally reliant on volunteers, an assumption may be made that these only respond when full crews are available, rendering either the rostered hours or the staff hours incorrect and making a quality index irrelevant
- Almost half the number of stations operate on a mix of paid and volunteer staff for which any data on which an index would be based is unreliable.

With the definition of full crew being unclear and the current status against the range of possible definitions being unclear, it is not surprising that the range of cost estimates to meet a full crew target are going to be quite wide. Starting with the assumptions that the target cannot be met by attracting further volunteers and that these additional staff will be all on-duty (it may be that many gaps could be met by lower cost on-call arrangements), the review came up with a range of cost estimates from $17.5 million to put two officers on each rostered vehicle to $4.8 million to do the same but take into account the preferential dispatch of full crew vehicles. Even this lower estimate may be excessive.

The Table 7.1 presents the results of calculations of full crew requirements based on a range of assumptions. Even the lowest of these costings may exceed the true cost as it accounts for preferential dispatching of full crews only in a minority of stations.
### Table 7.1: Full Crew Cost Options

<table>
<thead>
<tr>
<th>Full Crew %</th>
<th>Full Crew Definition (number of crew)</th>
<th>Additional Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculated from vehicle rostered hours and actual staff hours</td>
<td>2 2 2</td>
<td>$17.5 million</td>
</tr>
<tr>
<td></td>
<td>2 1 2</td>
<td>$16.4 million</td>
</tr>
<tr>
<td></td>
<td>2 1 1</td>
<td>$16.4 million</td>
</tr>
<tr>
<td>As above except assume no additional staff needed for volunteer only stations</td>
<td>2 2 2</td>
<td>$16.7 million</td>
</tr>
<tr>
<td></td>
<td>2 1 2</td>
<td>$15.2 million</td>
</tr>
<tr>
<td></td>
<td>2 1 1</td>
<td>$14.1 million</td>
</tr>
<tr>
<td>As above except assume no additional staff needed stations with 50% or more volunteer staff hours</td>
<td>2 2 2</td>
<td>$14.1 million</td>
</tr>
<tr>
<td></td>
<td>2 1 2</td>
<td>$12.7 million</td>
</tr>
<tr>
<td></td>
<td>2 1 1</td>
<td>$11.6 million</td>
</tr>
<tr>
<td>Take in to account claimed full crew rates where these represent higher full crew levels as improvements over calculated levels may show management effectiveness [full crew definition makes no difference in this costing]</td>
<td></td>
<td>$4.8 million</td>
</tr>
</tbody>
</table>

The Standards document requires the development of audit tools and a cost/benefit assessment before it progresses. It is recommended that consideration of the future direction of full crewing would be more properly kept as part of that process.

#### 7.5 Volunteers

Volunteers are used in most levels of road ambulance service provision. In particular, however, they are the mainstay of stations that have low utilisation. It is assumed that these stations exist because the community values improved access to health services in an emergency, but where the demand is low due to sparse population.

The review has been told that volunteers are becoming increasingly difficult to attract and retain. This is a common concern of NGOs and has been linked with social changes. The sustainability of the volunteer input to the ambulance service is uncertain but the cost of replacing volunteers with paid staff can be estimated to give a view on the magnitude of the risk should this input wane. In such an event, however, serious consideration would need to be given to alternative modes of providing emergency response in rural or remote areas as it is difficult to imagine how full-time crews could maintain the higher qualifications they hold given the low levels of utilisation.

Two sets of assumptions were used to estimate the cost of replacing volunteers with paid staff. These are:

1. Directly costing the volunteer hours based on the total cost of providing paid staff hours at each qualification level with a proxy cost for volunteer hours on the lowest qualification level (say 75% of National Certificate rates);
2. That volunteers on the lowest qualification level would be retrained to National Certificate level and that there would be additional training cost at this level on an ongoing basis.
On the first set of assumptions, the cost of replacing volunteers is about $21.8 million while the second set of assumptions gives a larger first year cost because of the training input ($86.0 million) and an ongoing annual cost of $32.6 million. In reality, of course, any move to modify the workforce would not be possible over a short timeframe as finding and training the staff would be a more significant task.

The Figure 7.1 indicates the effect on unit costs for the 80 stations with all volunteer input when their staff hours are re-costed in the manner described for the first option above. Unit costs per incident increase at least three-fold in this calculation even when all hours for these stations are at the lower on-call rate. Note that the ACC contract rates per flying hour for helicopters in 2002/03 were $2245 for single-engine craft and $3002 for a twin-engine craft. Only 11 stations cost more that the ACC single-engine helicopter rate of which six also cost more than the twin-engine rate. These 11 stations account for 367 incidents in total.

**Figure 7.1 Impact of Replacing Volunteers with Paid Staff**

7.6 **Response Times**

Response times are measured from the time when sufficient information is received from the caller to activate an ambulance to the time an ambulance officer arrives at the incident location; i.e. the time excludes initial call processing. Not all situations require an urgent response so contracts specify that only those cases in the more urgent category, ‘priority one’, need to be measured against the relevant targets. The targets are set with international norms in mind and recognise the reality that sparse populations cannot support the service expected in more densely populated areas.
The current targets for priority one calls are indicated in the **TABLE 7.2** where the times are the targets within which the relevant percentage of incidents are to have a response. The Standards follow a similar structure but the targets relate to different percentile levels as indicated below.

**TABLE 7.2: Response Time Targets**

<table>
<thead>
<tr>
<th>Source Document</th>
<th>Percentile</th>
<th>Urban</th>
<th>Rural</th>
<th>Remote Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract</td>
<td>80%</td>
<td>10 minutes</td>
<td>16 minutes</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Contract</td>
<td>95%</td>
<td>20 minutes</td>
<td>30 minutes</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Standards</td>
<td>50%</td>
<td>8 minutes</td>
<td>12 minutes</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Standards</td>
<td>95%</td>
<td>20 minutes</td>
<td>30 minutes</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

A major issue in the study of response times is that of the geographic categories used. These need to be unequivocal. Looseness in definitions makes comparison of performance across providers on these categories fraught with difficulty.

Reporting against these targets to the Ministry is inconsistent both in terms of gaps in individual providers’ records and in comparison with each other. Information collected for this review is equally inconsistent with some quite rural areas reporting against urban, rural and remote targets. The data collected for the review seems to indicate providers tend to overstate the urban nature of the station coverage areas. This will give a false impression of poor performance, as they will be measured against a target they are not required to meet. Providers have indicated a willingness to work with funders to rationalise the information they collect and report on response times.

A review of all 210 stations reveals that 47 have coverage areas that correlate to all three of the geographic response time targets against which they are reporting. Including these 47 stations, there are 116 stations overall for which response time performance is provided for the main category of the coverage area (urban, rural or remote) AND where that category matches with an external assessment of the nature of that coverage area.

The available data for response times has been converted to an index for each station. This index uses the ratio between the difference in the actual and target performance and the target, all weighted for the proportion of the station’s coverage area population to which that target would apply.

Across the 47 stations with a consistent match between population and performance reporting, the index shows an overall performance 2.1% below target. The additional 69 stations in the sample show an overall performance of 7.7% below target. This implies we can use the larger sample of stations (116) but should scale the indices for the stations with the less precise geographic match to account for the mis-representation of performance.

Based on a response time index value of 1000 (meaning that the average for the 80% and 95% performance values equals the target performance), the performance for stations of varying categories can be anticipated (scaling as described in the previous
paragraph applies) as shown in TABLE 7.3. The four cities with multiple ambulance stations are presented with their reported performance combined to compensate for the impact of dynamic deployment.

**TABLE 7.3: Estimated Response Time Performance**

<table>
<thead>
<tr>
<th></th>
<th>Weighted Mean</th>
<th>Expected Performance on 80% target</th>
<th>Expected Performance on 95% target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>979</td>
<td>78%</td>
<td>93%</td>
</tr>
<tr>
<td>Urban</td>
<td>988</td>
<td>79%</td>
<td>94%</td>
</tr>
<tr>
<td>Rural</td>
<td>889</td>
<td>71%</td>
<td>84%</td>
</tr>
<tr>
<td>Remote</td>
<td>949</td>
<td>76%</td>
<td>90%</td>
</tr>
<tr>
<td>Auckland</td>
<td>983</td>
<td>79%</td>
<td>93%</td>
</tr>
<tr>
<td>Wellington</td>
<td>1074</td>
<td>86%</td>
<td>102%</td>
</tr>
<tr>
<td>Christchurch</td>
<td>930</td>
<td>74%</td>
<td>88%</td>
</tr>
<tr>
<td>Dunedin</td>
<td>1001</td>
<td>80%</td>
<td>95%</td>
</tr>
</tbody>
</table>

### 7.7 Qualification Levels

Qualification levels effectively determine the capability of the ambulance. Emergency ambulances crew are defined as Basic Life Support (BLS), Intermediate Life Support (ILS) or Advanced Life Support (ALS). BLS and ILS crews need backup from ALS. BLS crews are generally qualified at the entry level to ambulance officer status while ALS tend to be at the more experienced end of the spectrum with at least one officer generally being qualified to National Diploma in Ambulance Paramedic standard. The Standards document does not provide an easily quantifiable ideal for the mix of ALS, ILS and BLS ambulances and the review did not collect information on that basis.

A measure of the service quality relating to the qualification mix of ambulance officers may be obtained at a station level by reviewing the weighted staff cost per hour compared with the national average. **TABLE 7.4** shows the output from this process where the national average is set at 1000.

**TABLE 7.4: Qualification Mix**

<table>
<thead>
<tr>
<th>Service Level</th>
<th>Minimum</th>
<th>1st Quartile</th>
<th>Median</th>
<th>3rd Quartile</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>567</td>
<td>567</td>
<td>567</td>
<td>567</td>
<td>765</td>
</tr>
<tr>
<td>2</td>
<td>567</td>
<td>567</td>
<td>616</td>
<td>702</td>
<td>1574</td>
</tr>
<tr>
<td>3</td>
<td>567</td>
<td>785</td>
<td>894</td>
<td>962</td>
<td>1574</td>
</tr>
<tr>
<td>4</td>
<td>813</td>
<td>1007</td>
<td>1147</td>
<td>1553</td>
<td>2311</td>
</tr>
<tr>
<td>5</td>
<td>858</td>
<td>1112</td>
<td>1329</td>
<td>1417</td>
<td>1608</td>
</tr>
<tr>
<td>6</td>
<td>983</td>
<td>1324</td>
<td>1436</td>
<td>1657</td>
<td>2311</td>
</tr>
</tbody>
</table>
The degree of overlap between index values by service level and the apparent inconsistency between values for service levels 4 and 5 do not support the use of this method to inform quality.

7.8 CURRENT FUNDING / CONTRACTING MODELS

Ambulance funding arrangements are regionally inconsistent with respect to medical cases and inter-hospital transfers and, for emergency ambulance services, divided according to the cause of the emergency.

Inter-hospital transfers are (mostly) the responsibility of health agencies (primarily DHBs, but the Ministry of Health contracts for transfers by road in the former Central RHA region). Differing funding approaches, with respect to these road transfers, between the Ministry and DHBs is not a major issue for providers as they occur in differing geographic areas, each covered by a separate provider.

Three DHBs, Taranaki, Wairarapa, and Nelson Marlborough (with respect to Marlborough only), are both funders and providers of both emergency and transfer services and their funding with respect to medical emergencies and inter-hospital transfers is included in their Crown Funding Agreement.

All ambulance providers, however, face two contractual frameworks with respect to emergency ambulance services. ACC contracts directly with each road and air ambulance provider for a set fee for each claimant transported that meet the set criteria. The Ministry contracts with each road ambulance service provider for a set amount nominally representing the non-accident case share of the capacity required to respond to emergencies inclusive of necessary air ambulance responses. In the case of the Ministry’s contracts, the relationship with the air ambulance providers is through the road ambulance contract.

Road and air ambulance providers argue that contractual arrangements that are entirely fee-for-service place undue risk on them with respect to their need to maintain a capacity to respond without the certainty of revenue.
8 Financial Viability

8.1 Non-DHB Road Ambulance Operators

Road ambulance providers are in a relatively good financial situation. Collectively and over all of their activities, the non-DHB providers, had:

- Revenue growth across all activities of 10% between 2001/02 and 2002/03 to $118 million

- ‘Other income’ (interest and donations) of $5.4 million, $1.5 million more than the previous year

- Cost increases of 8% to $116 million

- A surplus of $6.7 million (cf $3.3 million in 2001/02)

- Depreciation almost matching capital expenditure ($9.969 million cf $10.088 million) indicating financial capability to maintain business capacity

- Cash flow surpluses for those for which data was provided (i.e. all except St John Southern Region) of $16.0 million and, after capital expenditure, of $6.4 million again indicating financial strength

- Equity of $78.2 million excluding assets held outside their financial statements (eg. St John Northern indicates assets of $15.1 million in area committees and the Wellington Free Ambulance Trust indicates assets of $4.9 million)

- While two providers, St John Northern and Wellington Free are better capitalised than others, the 2002/03 accounts do not show any providers having signs of financial stress

- Cash and investment reserves greater than three months of cash expenditure

While it is difficult to establish a clear separation between ambulance and non-ambulance activities, the St John national consolidation of its financial performance indicates a net deficit from its ambulance activity after its direct ambulance service funding of $0.249 million in 2002/03 (0.3% of ambulance-related expenses) compared with an overall surplus of $6.3 million. These figures exclude St John’s 142 area committees. The above assessment is therefore considered conservative.

All road ambulance providers have a wider range of activities with which they are engaged than ambulance services alone. For the three DHB providers, ambulance services are on top of the range of health activities expected of DHBs. Other road ambulance providers have a range of charitable and commercial activities which feature significantly in their operations. These non-DHB road ambulance providers may also have assets available to them that are recorded against other entities making a thorough financial assessment difficult. An example of this is where St John area...
committees purchase assets for ambulance use for which a rental of some description and amount might be charged to the regional organisation.

Most road ambulance providers are expanding their non-ambulance businesses and in all likelihood producing ongoing surpluses. As indicated elsewhere in this report, these activities are not considered essential to the financial sustainability of the ambulance service. It is impossible to accurately separate out the impact of these activities from the annual accounts or the extent these might occur without having an ambulance core function to their organisations. These activities include:

- Alarm monitoring
- Servicing events
- First aid supplies
- Training (internally and externally)
- Subscription schemes and
- Gaming

In assessing road ambulance costs, costs associated with the PRIME scheme have been excluded. Because of the slow uptake of PRIME localities, the actual rate of revenue has exceeded costs by $854,000. In assessing financial viability, the total revenue and costs of the service were taken into consideration. In essence, this approach puts the surplus from PRIME into the ambulance activity. PRIME itself will be the subject of a separate review, but in the meantime contracts should be adjusted to reflect the costs incurred by these different contract lines.

Lastly, the point has been made that, while depreciation matches capital expenditure and the ambulance service appears to be in a ‘steady-state’ with respect to capital, it appears that the “quality” of the vehicle stock is variable. In other words, the service seems to be operating with a number of vehicles older than the depreciation term; i.e. ‘written off’. Evidence from the vehicle fixed costs supports this assertion. Ignoring the DHB providers who are bound by different financial rules, it would seem that particular challenges exist with St John’s Northern Region (Sth Is) and Central regions. Both regions have numerous stations with low utilisation. Should all available vehicles be included in the sustainable cost regime, overall costs would rise by $0.8 million to $1.7 million\(^5\). Whether or not it is appropriate to keep the entire ambulance fleet on a consistent replacement cycle may depend on the actual level of use of the vehicles in the more remote areas.

### 9 Conclusions

#### 9.1 Population Drives Volume

Analysis has shown that population domiciled in the areas covered by each station is the single most important determinant of volume for road ambulances. This is particularly true of emergency volumes. In the case of city stations, there is significant overlap between their nominal coverage areas and it is therefore more sensible to combine those areas for comparison between volumes and populations.

\(^5\) Assumes a vehicle capital cost of $125,000 each and depreciation over either 8 or 10 years.
The Figure 9.1 illustrates the strong relationship that exists between volumes and populations with stations in the four main cities combined. City stations’ volume and population have been combined and stations that specialise in patient transports but have no set coverage area have been excluded.

**Figure 9.1 Station Population vs Incidents**

To demonstrate the relationship more clearly, Figure 9.2 shows only those stations that are not in one of the four main cities or Hamilton.
A fuller discussion of this point is provided in the appended technical report.

These graphs indicate that, on average, any population will generate road ambulance incidents of almost 7% of the number of people, but that this could vary from about 4% to about 12% of the number of people. For a funding formula based on the station domicile populations to be useful, it would need to include explanatory variables that account for this range.

It should be noted that any consideration of population-based funding of ambulances should only follow full assessment of the impact of low utilisation in rural and remote areas.

9.2 Volume Drives Cost

The relationship between population and incidents still leaves unexplained significant variation when comparing stations serving similar sized domicile populations. A more direct relationship may be expected between volumes and cost.

The Figure 9.3 shows something of this relationship with stations beyond the 95% confidence interval lines named.
While the overall correlation between volume and cost is clearly important, the variation in cost between stations with similar total volumes needs further explanation. It is interesting to note that removal of the four mostly PTS stations in the northern region improves the $R^2$ to 0.91 and increases the slope of the ‘best fit’ line to 191. Clearly volume mix is a factor to be considered.

It is also not essential that the relationship between station coverage population and costs is sufficiently strong to drive a funding formula. Relationships between cost, utilisation, emergency demand and volunteer input are insufficiently strong to generate such a funding formula.

### 9.3 Economies of Scale

As station volumes increase, the variation in unit costs decrease and the absolute unit cost decreases, i.e. the fixed costs get spread more thinly with increasing volumes. Much of the variation seems to be explained by service level analysis although the degree of fit of similar service level graphs is not as good as anticipated, perhaps due to subjectivity around classification of stations into service levels. Figure 9.4 shows how unit costs decrease with increasing volume.
9.4 UTILISATION AND COST

The next most important cost driver to population found is utilisation of ambulances. As may be expected, the more work done by each unit of resource, the lower the average cost of service. FIGURES 9.5 and 9.6 show this, firstly, in relation to all stations and, secondly, in relation to stations entirely operated by volunteers (this avoids issues of service level classification).

FIGURE 9.5 Unit Cost vs Utilisation
9.5 **VOLUME MIX AND COST**

Emergency ambulance activity requires significantly more resource than non-emergency activity, as the former needs to have capacity in place for immediate response. Non-emergency activity can be scheduled or delayed when emergencies occur. An impact on station cost from the mix of activities that make up its overall volume was, therefore, anticipated.

Statistical tests of station costs and volumes defined into emergency incidents, inter-hospital transfers, and other incidents produces relative cost weights for these groups of 1:0.52:0.30 or, in dollar terms, $247 for an emergency incident, $127 for an inter-hospital transfer and $75 for ‘other’ activity. ‘Other’ activity includes private hire, stand-by at public events and stand-by at other emergencies such as armed offender alerts and fires. As the mix of each activity differs according to station, much of the remaining variation in station cost is explained by this cost differential.

9.6 **SERVICE COVERAGE CASE STUDIES**

**Figure 9.7** shows total station costs and total numbers of incidents for stations of service level 5 or 6. Together with the **Table 9.1**, it is intended as an illustration of importance of some of the factors discussed above.

These stations form a tight pattern ($R^2$ of 80%) about a line with a slope of 164.11 and an intercept of 301,978. Lines indicating one standard deviation either side of that ‘best fit’ line are also indicated and stations that fall outside of the range, the ‘outliers’ are named. In **Table 9.1**, the peculiar features associated with this outlier status are postulated as an illustration of the mix of factors associated with cost.
FIGURE 9.7 Examples of Outlier Stations

\[ y = 164.11x + 301978 \]
\[ R^2 = 0.7963 \]

TABLE 9.1: Outlier Stations Explained

<table>
<thead>
<tr>
<th>Station Name</th>
<th>High or Low Outlier</th>
<th>Utilisation (incidents per vehicle)</th>
<th>Volume Mix (emergency incidents as % of total)</th>
<th>Volunteer Input (total volunteer hours as % of total hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamilton</td>
<td>Low</td>
<td>2829</td>
<td>74%</td>
<td>21%</td>
</tr>
<tr>
<td>Lower Hutt</td>
<td>Low</td>
<td>3725</td>
<td>57%</td>
<td>18%</td>
</tr>
<tr>
<td>Newtown</td>
<td>Low</td>
<td>1945</td>
<td>36%</td>
<td>25%</td>
</tr>
<tr>
<td>Palmerston North</td>
<td>Low</td>
<td>3854</td>
<td>63%</td>
<td>19%</td>
</tr>
<tr>
<td>St Albans</td>
<td>Low</td>
<td>6841</td>
<td>89%</td>
<td>0%</td>
</tr>
<tr>
<td>Paraparaumu</td>
<td>Low</td>
<td>5699</td>
<td>50%</td>
<td>42%</td>
</tr>
<tr>
<td>Wigram</td>
<td>Low</td>
<td>2137</td>
<td>89%</td>
<td>50%</td>
</tr>
<tr>
<td>Christchurch Central</td>
<td>High</td>
<td>1403</td>
<td>64%</td>
<td>32%</td>
</tr>
<tr>
<td>Dunedin</td>
<td>High</td>
<td>1481</td>
<td>61%</td>
<td>13%</td>
</tr>
<tr>
<td>West Auckland</td>
<td>High</td>
<td>3865</td>
<td>95%</td>
<td>0%</td>
</tr>
<tr>
<td>Invercargill</td>
<td>High</td>
<td>795</td>
<td>62%</td>
<td>11%</td>
</tr>
<tr>
<td>Silverdale</td>
<td>High</td>
<td>1790</td>
<td>94%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Shown in bold numerals are the factors that have the greatest influence on each station being classed as an outlier while those factors which would influence the station positively but are insufficient to result in their being within the bounds are shown in italics.

### 9.7 Provider Cost Function

After all other factors have been considered, there appears to be something in the cost function of providers that remains unexplained. **Figure 9.8** illustrates this by plotting station cost against total incidents for the main road ambulance service providers. While the trendlines on the provider information have a similar slope for four providers (185.33 to 203.41), two are quite divergent. The $R^2$ on each of the provider’s trendlines are each individually quite significant with Order of St John’s Northern region (OSJN) having the least significant trend as a result of having dedicated patient transport services.

This situation implies that there is an element (perhaps full crew levels) in the providers’ cost structure that has yet to be explained. It also arises from utilisation being such a significant driver of costs that differs between providers in ways that the available data cannot explain. Such variances may be best explained from with the benefit of analysis and experience by providers themselves.

**Figure 9.8 Cost Differences by Provider**

The information on emergency volume cost weights ($247 per incident) can be brought to the provider level and extrapolated to match total reported provider costs.

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6 The selection process was whether or not the station was in the top 50% of stations for that factor.
This does not change the total costs as reported by each provider but does produce different cost-weights for emergency activity for each provider. Table 9.2 indicates the scaling factors and the resulting cost-weights for emergency and non-emergency incidents for each provider.

**Table 9.2: Provider Cost-Weights**

<table>
<thead>
<tr>
<th>Provider</th>
<th>Scaling Factor</th>
<th>Average Emergency Costs per Incident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nelson Marlborough DHB</td>
<td>1.14</td>
<td>$282</td>
</tr>
<tr>
<td>St John Central</td>
<td>1.08</td>
<td>$268</td>
</tr>
<tr>
<td>St John Midland</td>
<td>1.02</td>
<td>$252</td>
</tr>
<tr>
<td>St John Northern</td>
<td>1.12</td>
<td>$276</td>
</tr>
<tr>
<td>St John Northern (SI)</td>
<td>1.14</td>
<td>$281</td>
</tr>
<tr>
<td>St John Southern</td>
<td>1.51</td>
<td>$373</td>
</tr>
<tr>
<td>Taranaki DHB</td>
<td>1.23</td>
<td>$305</td>
</tr>
<tr>
<td>Wairarapa DHB</td>
<td>1.17</td>
<td>$290</td>
</tr>
<tr>
<td>Wellington Free</td>
<td>0.82</td>
<td>$203</td>
</tr>
</tbody>
</table>

9.8 **Air Ambulance Services**

Information collected from air ambulance operators is considered to be representative of the sector while not be complete in all respects. There are at least 32 aircraft providing over 9500 flying hours for over 7000 missions of ambulance activity.

Air ambulance operators differ significantly from their road counterparts in that the direct funding from providing these services is a relatively small portion of their revenue. Direct funding (from ACC, the Ministry (via road ambulance operators) or DHBs) accounts for about 15% of revenue for operators with helicopters only (no fixed wing aircraft) and about 35% for other operators.

Analysis shows reasonable cost curves can be generated for helicopters (fixed costs about $500k and variable costs of $1500/hour for single engine craft and about $2200/hour for twin engine craft). It is noted that even the busiest helicopters are not breaking even on the ACC hourly charge rates let alone the average DHB rates as they are not well utilised. A similar cost curve is not available for pressurised fixed wing although average cost per mission seems to be about $2400. The cost curve for non-pressurised fixed wing is based on $42k fixed costs (which appears low) and variable costs of $754/hour.

The maximum number of flying hours for pressurised fixed wing craft is over 800 hours in the year and 600 hours for non-pressurised fixed wing craft, the averages are 300 and 150 respectively. Based on the above, aircraft utilisation appears to be an issue.

Charge rates vary according to type of mission but these variations are as expected given the different services such as paramedic crew that are included in different contracts.
There is variation in the mix of missions flown by different types of craft. Inter-hospital transfer missions are the mainstay of fixed wing air ambulances but a significant number of missions are flown by twin engine rotary wing craft. Missions flown by helicopters include a mix of all types of activity. Trauma related missions are mainly served by single engine rotary but the twin engine helicopters tend to do longer missions. Search and rescue operations are a significant activity, in terms of flying hours, for single engine helicopters even though these are only 1% of missions.
PART B: AIR AMBULANCE SERVICES; TECHNICAL REPORT
PART C: APPENDICES
## Appendix A: Project Membership

### Steering Group

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stuart Powell</td>
<td>MoH Project Sponsor</td>
<td>• Delegated responsibility on behalf of MoH.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Chair of Project Steering Group</td>
</tr>
<tr>
<td>Chris Crane</td>
<td>DHB Representative</td>
<td>• To represent interests of DHBs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strategic advice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Member of Project Steering Group</td>
</tr>
<tr>
<td>John Ayling</td>
<td>Sector Representative</td>
<td>• To represent interests and coordinate input from AS sector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strategic advice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Member of Project Steering Group</td>
</tr>
<tr>
<td>Anne O’Connell</td>
<td>ACC Project Sponsor</td>
<td>• Delegated responsibility on behalf of ACC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Member of Project Steering Group</td>
</tr>
</tbody>
</table>
## WORKING GROUP

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Responsibility</th>
</tr>
</thead>
</table>
| Carl Weller [previously Brian O’Sullivan (August 2002 to April 2003)] | Project Manager             | To organise process to ensure delivery of project objectives and effective communication.  
|                                           |                             | Chair of Project Working Group.                                               |
| Paul Howard                               | Technical Support           | Delegated responsibility on behalf of MoH.  
|                                           |                             | Member of Project Working Group.                                              |
| Weiguo Ding                               | Technical Support           | Delegated responsibility on behalf of MoH.  
|                                           |                             | Member of Project Working Group.                                              |
| Sandy Dawson                              | Clinical Advisor            | Clinical advice and support  
|                                           |                             | Member of Project Working Group.                                              |
| Simon Bidwell                             | Policy Analyst              | MoH link to policy work programme.                                            
|                                           |                             | Member of Project Working Group.                                              |
| Peter Wood Programme Manager              | Technical Advisor           | Delegated responsibility on behalf of ACC.  
|                                           |                             | Member of Project Working Group.                                              |
| Stuart Francis Consultant                 | Funder representative       | Delegated responsibility on behalf of ACC.  
|                                           |                             | ACC link to policy work programme.                                            
|                                           |                             | Member of Project Working Group.                                              |
| Tony Blaber CEO, St John, Northern Region (SI) | Road ambulance representative | Member of Project Working Group.                                              |
| Keven Tate CEO, St John, Northern Region (represented by Noel Winsloe) | Road ambulance representative | Member of Project Working Group.                                              |
| Steve Nickson CEO, Wellington Free Ambulance (represented by Graham Presland / Peter Goldup / Marty Smyth) | Road ambulance representative | Member of Project Working Group.                                              |
| Julie Rodgers GM, Planning, Nelson Marlborough DHB | Road ambulance representative | Member of Project Working Group.                                              |
| David Wickham Partner, Stretton and Co. | Air ambulance representative | Member of Project Working Group.                                              |
| Pauline Hanna Programme Manager, Provider Arm, Planning and Funding, Counties Manukau DHB | DHB representative | Member of Project Working Group.                                              |
| Liz Prior Manager, Emergency Planning, Waikato DHB | DHB representative | Member of Project Working Group.                                              |
### TABLE B1: ROAD AMBULANCE SERVICE LEVELS

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Crew Qualification</th>
<th>Vehicle Type</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: First Response</td>
<td>Capable of providing on-scene BLS, preferably operating 24-hour/7-day</td>
<td>Preferably 2 crew per ambulance; 1 crew member Certificate in Ambulance (Primary Care) level</td>
<td>Class 3 ambulance</td>
<td>Nearest level 2 and/or PRIME provider within 60 minutes by road, 30 minutes by air</td>
</tr>
<tr>
<td>2: Rural</td>
<td>Capable of providing on-scene BLS, operating 24-hour/7-day</td>
<td>Preferably 2 crew per ambulance (crew usually on call); 1 crew member National Certificate (Patient Care and Transport) level with 2\textsuperscript{nd} crew member Certificate in Ambulance (Primary Care)</td>
<td>Class 2 ambulances</td>
<td>Nearest level 6 and/or PRIME provider within 30 minutes by road or air</td>
</tr>
<tr>
<td>3: Provincial</td>
<td>Capable of providing mix of ILS and BLS, operating 24-hour/7-day</td>
<td>2 crew per ambulance (crewed by a mix of on duty and on call staff), 1 crew member National Diploma (IV/Cardiac) level, with 2\textsuperscript{nd} crew member National Certificate in Ambulance (Patient Care &amp; Transport)</td>
<td>Class 1 or Class 2 ambulances</td>
<td>Nearest level 6 and/or PRIME provider within 30 minutes by road or air</td>
</tr>
<tr>
<td>4: Town</td>
<td>Capable of providing at least ILS, operating 24-hour/7-day</td>
<td>2 crew per ambulance (crewed by a mix of on duty and on call staff), 1 crew member National Diploma (IV/Cardiac) level, with 2\textsuperscript{nd} crew member National Certificate in Ambulance (Patient Care &amp; Transport)</td>
<td>Class 1 ambulances</td>
<td>Nearest support from neighbouring road or air providers</td>
</tr>
<tr>
<td>5: Urban</td>
<td>Capable of providing ALS 24-hour/7-day supported by a mix of ILS and BLS as appropriate</td>
<td>2 crew per ambulance (crewed by on duty staff) except for BLS ambulances; 1 paramedic, 1 National Diploma (IV/Cardiac) for ALS vehicle(s); 1 National Diploma (IV/Cardiac), 1 National Certificate in Ambulance (Patient Care &amp; Transport) for ILS ambulances and for BLS vehicles, preferably 2 crew per ambulance with a mix of National Certificate (Patient Care and Transport) level and Certificate in Ambulance (Primary Care)</td>
<td>Class 1 ambulances</td>
<td>Nearest support from neighbouring road or air providers</td>
</tr>
<tr>
<td>6: Metropolitan</td>
<td>Capable of providing advanced life support 24-hour/7-day as primary response with a mix of ALS, ILS and BLS rostered to meet anticipated workload</td>
<td>2 crew per ambulance (crewed by on duty staff) except for BLS ambulances; 1 paramedic, 1 National Diploma (IV/Cardiac) for ALS vehicle(s); 1 National Diploma (IV/Cardiac), 1 National Certificate in Ambulance (Patient Care &amp; Transport) for ILS ambulances and BLS vehicles, preferably 2 crew per ambulance with a mix of National Certificate (Patient Care and Transport) level and Certificate in Ambulance (Primary Care)</td>
<td>Class 1 ambulances</td>
<td>Nearest support from neighbouring road or air providers</td>
</tr>
<tr>
<td>Service Level</td>
<td>Road</td>
<td>Water</td>
<td>Air</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>------</td>
<td>-------</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>All emergency Basic Life Support capable ambulances must be crewed with at least one crew member who is qualified to at least Ambulance New Zealand recognised Certificate in Ambulance (Primary Care) or its equivalent.</td>
<td></td>
<td>All emergency Basic Life Support capable air ambulances must be crewed with: A medical doctor; and/or An ambulance officer who holds at least the Certificate in Ambulance (Primary Care) or its equivalent.</td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>All emergency Intermediate Life Support capable ambulances must be crewed with two crew who hold a recognised ambulance qualification. One crewmember must be qualified to at least Ambulance New Zealand recognised National Certificate in Ambulance (Patient Care and Transport) or its equivalent, and one must be qualified to at least the National Diploma IV/Cardiac or its equivalent as recognised by Ambulance New Zealand.</td>
<td></td>
<td>All emergency Intermediate Life Support capable air ambulances must be crewed with two crew, including: A medical doctor or ambulance officer who holds at least the National Diploma in Ambulance Paramedic or its equivalent; and An Intermediate Care Officer skilled in trauma management and intubation.</td>
<td></td>
</tr>
<tr>
<td>Advanced</td>
<td>All emergency Advanced Life Support capable ambulances must be crewed with two crew who hold recognised ambulance qualifications. One crewmember must be qualified to at least the National Diploma IV/Cardiac or its equivalent as recognised by Ambulance New Zealand, and the other crewmember must hold at least the National Diploma in Ambulance Paramedic or its equivalent as recognised by Ambulance New Zealand.</td>
<td></td>
<td>All emergency Advanced Life Support capable air ambulances must be crewed with two crew, including: An ambulance officer who holds at least the National Diploma in Ambulance Paramedic or its equivalent; and A medical Consultant or Registrar, skilled in anaesthetics, intensive care, emergency medicine or paediatrics.</td>
<td></td>
</tr>
</tbody>
</table>