Rapid review of the front-loaded model (FLM) and proposed application within the Scottish Ambulance Service (SAS)

A report presented to the Chief Medical Officer on 29 August 2008
## CONTENTS

1 Executive Summary .................................................................3
2 Context of the review of the FLM ...........................................5
3 Origins of the FLM within the Department of Health ..............5
4 Definitions/interpretations of the FLM within UK ambulance services........6
5 Evidence base to support implementation of the FLM ..............8
6 SAS approach to preparing for implementation of the FLM ......11
7 SAS project – New Ways of Clinical Working .........................14
8 Discussion and Conclusions ....................................................14
9 References .............................................................................18
10 Glossary ................................................................................20
11 People/organisations interviewed/contributing to report ..........22
12 Appendices ............................................................................23
   Appendix 1 Front Loaded Model Terms of Reference ..................23
   Appendix 2 Membership of the Reference Group ....................24
   Appendix 3 Search Strategy ....................................................26
   Appendix 4 Timeline of key decision points ............................27
1 Executive Summary

This report is a rapid review of the front loaded model (FLM) within the ambulance service and was produced at the request of the Chief Medical Officer for Scotland.

The FLM describes a change in approach to increase the number of single-crewed fast response vehicles (FRVs), whilst reducing the number of traditional double-crewed ambulances. This model may be suitable for responding to appropriate emergency calls in certain geographical areas. The model has been used across UK ambulance services over recent years, but implementation has varied from area to area.

Whilst there is a paucity of evidence relating to the FLM, there is evidence of the effectiveness of a relationship between response time and survival in cases of cardiac arrest. There is also evidence of patient satisfaction with new models of ambulance response, including paramedic treatment and referral of appropriate cases to services other than emergency departments.

In late 2007/early 2008 the Scottish Ambulance Service (SAS), in response to increasing demand on the service and the need to improve performance against Scottish Government targets, undertook a number of pieces of work to support the implementation of the FLM. These included a modelling exercise of the staffing and numbers of FRVs required, a review of clinical codes to determine the most appropriate for FLM deployment and a review of the current vehicle mix. Subsequently, certain elements were adopted however the FLM was not fully implemented.

A review of the proposed implementation of the FLM by SAS in June 2008 identified a number of risks that are now being addressed by a project on New Ways of Clinical Working.

NHS Quality Improvement Scotland (NHS QIS) identified a number of aspects relating to the delivery of the New Ways of Clinical Working which should be addressed.

In conclusion, NHS QIS recommends that:

1. as the use of FRVs to respond to appropriate emergency calls more quickly is valid, SAS should continue to develop the use of FRVs as part of its service to meet the clinical needs of patients
2. the use of the term FLM is avoided within the service because, although the principles are sound, there has been no clear definition of term within SAS and its use leads to confusion. A more productive approach to the implementation of the principles will be to ensure that the New Ways of
Clinical Working project aims are widely articulated across the service and beyond
3. in advance of further service development, strategies are established for effective engagement and communication with staff, healthcare professionals in primary care, out of hours services, emergency departments, the public and other relevant organisations, such as the police
4. staff receive the necessary training, ongoing development opportunities, managerial and clinical support to ensure their competence and confidence to adapt to these new ways of working
5. operational aspects of delivering New Ways of Clinical Working, including addressing perceived personal safety concerns and governance of clinical decision making, should be developed in partnership with staff
6. work should be initiated on the public needs and expectations of the ambulance service to ensure the provision of clinically effective patient-centred care.
2 Context of the review of the FLM

In June 2008 the Chief Medical Officer for Scotland requested that NHS Quality Improvement Scotland (NHS QIS) undertake a rapid review of the front-loaded model (FLM) within the ambulance service. This was in response to the Cabinet Secretary's statement in the Scottish Parliament on 4 June 2008 that an independent evaluation of the FLM was to be commissioned to build public confidence in this aspect of ambulance service redesign.

NHS QIS has produced this report with input from a Reference Group set up to oversee the work, members of the ambulance services in Scotland and England, and other staff from NHSScotland. The Terms of Reference for the Reference Group are provided in Appendix 1 and the membership in Appendix 2. The Reference Group met on two occasions.

NHS QIS was set up by the Scottish Parliament in 2003 to take the lead in improving the quality of care and treatment delivered by NHSScotland. NHS QIS does this by setting standards and monitoring performance, and by providing NHSScotland with advice, guidance and support on effective practice and service improvements.

3 Origins of the FLM within the Department of Health

Ambulance service performance has been measured by response time targets for many years. The current target in Scotland is that 75% of Category A (life-threatening emergencies) calls should be responded to within 8 minutes. That emergency service response time is kept low is thought to be a key component of public confidence in the service.

Single-crewed vehicles have been in use within ambulance services since the 1970s. More recently single-crewed cars and motorbikes have been introduced to provide a faster response to 999 calls for assistance in urban areas where traffic restricts the ability of traditional ambulances to reach incidents quickly.

Increasing demand on ambulance services in the UK, together with the performance targets, has led to the introduction of more single-crewed vehicles, variously named fast response vehicles (FRVs), rapid response units (RRUs) and, more recently, paramedic response units (PRUs). The system on introduction involved dispatch of a FRV backed up with deployment of an ambulance at the same time, or as soon as possible thereafter, to facilitate the subsequent transport of the patient to hospital.

The Department of Health in England (DH) described the use of the FLM in 'Improving Ambulance Response Times: High Impact Changes'. The implication within this document was that use of single-crewed vehicles would obviate the
need for traditional ambulance dispatch. This document also describes the need for a range of measures to be in place for successful implementation of the FLM. These include:

- development of the workforce to facilitate service redesign
- reassurance and support for staff from operational managers when required
- identification of appropriate Advanced Medical Priority Dispatch System (AMPDS) codes for FRV deployment
- effective engagement with unions and staff side.

The Ambulance Service Network (part of the NHS Confederation) published a document in 2008 outlining its vision of the role of ambulance services in England. In this document the challenges of an ageing population, the increasing number of people living with chronic diseases and rising patient expectations are described. The vision promoted encompasses:

- a single access point linked to an appropriate service response
- a world-class service for patients with life-threatening conditions
- integrated primary and secondary care services 24 hours a day, including those patients who require urgent care.

Furthermore, this document also advocates that appropriately trained ambulance staff work across a variety of healthcare settings to provide care for patients as well as transporting patients to hospital, and that patient outcomes and experiences should be adopted as measures of success. Although this document does not refer to the FLM or the use of FRVs, it does describe the need to respond to calls in the most clinically and cost-effective way. The vision of a modern ambulance service resonates with the vision of the Scottish Government for the whole of NHSScotland presented in Better Health, Better Care.

4 Definitions/interpretations of the FLM within UK ambulance services

The DH definition of the FLM is “a reduction in the proportion of traditional ambulances in a fleet and an increase in the proportion of fast response vehicles”. The description of how this fleet mix should be used is the dispatch of single-crewed vehicles to appropriate Category A calls without automatic back-up with a double-crewed ambulance. It is made clear that this is not appropriate across all areas. In those areas where demand for the 8 minute response is low, i.e. in rural areas, community/co-responder schemes may be more appropriate, but in this instance an ambulance must always be dispatched concurrently.

Within the UK a range of emergency vehicle response models would appear to be in use currently as services undergo the process of service redesign. These include variations in the interpretation and implementation of the FLM combining automatic ambulance back-up for different groups of call codes and/or
geographical areas. The London Ambulance Service (LAS) and the South East Coast Ambulance Service (SECAmb) were contacted on the recommendation of members of the Reference Group. Within the LAS currently all Category A calls attended by a PRU are backed up with an ambulance whereas there is no automatic back-up of Category B calls attended by a single-crewed vehicle. The picture is currently mixed within SECAmb as some primary care trusts (PCTs) have invested funding to extend the training of paramedics. This allows all calls falling under certain codes to be responded to by a FRV, whereas in other areas traditional ambulances are still dispatched at the same time as a FRV.

A recent survey of FRV use conducted by SAS found that ambulance services in Leeds, Sheffield and Bradford have approximately half as many FRVs as double-crewed ambulances, however Birmingham has only a third as many FRVs and Bristol has considerably more (almost three times as many) than traditional ambulances. Most of the services who responded indicated that they intended to increase the proportion of FRVs within the next two years. The fleet mix within SAS as at 31 March 2008 is given in Table 1. As will be noted, the proportion of FRVs to traditional ambulances is low in comparison to other services. Since the end of March 2008, the total number of FRVs within the service has increased to 70 (15.2% of all vehicles) with the number of traditional ambulances reducing to 391.

<table>
<thead>
<tr>
<th>Division</th>
<th>FRV n (%)</th>
<th>AEU n (%)</th>
<th>Total n</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Central</td>
<td>19 (18.4)</td>
<td>84 (81.6)</td>
<td>103</td>
</tr>
<tr>
<td>South East</td>
<td>5 (8.2)</td>
<td>56 (91.8)</td>
<td>61</td>
</tr>
<tr>
<td>South West</td>
<td>10 (9.3)</td>
<td>97 (90.7)</td>
<td>107</td>
</tr>
<tr>
<td>East Central</td>
<td>13 (16.9)</td>
<td>64 (83.1)</td>
<td>77</td>
</tr>
<tr>
<td>North East</td>
<td>6 (12.5)</td>
<td>42 (87.5)</td>
<td>48</td>
</tr>
<tr>
<td>North West</td>
<td>1 (1.8)</td>
<td>54 (98.2)</td>
<td>55</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>54 (12.0)</td>
<td>397 (88.0)</td>
<td>451</td>
</tr>
</tbody>
</table>

There are clear differences in the type of model which is appropriate for the ambulance service operating in urban areas, where the difficulties are high demand and responding to emergency calls quickly through dense road traffic, and rural areas, where demand is lower but distances to be travelled much greater and road traffic usually less of an issue. In Scotland the ambulance service is required to operate in both types of geographical area and it would be inappropriate to adopt a Scotland-wide model of ambulance response. This is reflected in the variation across the country in the current fleet mix with proportionally greater numbers of FRVs in the central belt where the main urban areas are situated. A variation in fleet mix will, correctly, continue to remain in different parts of Scotland.
In NHS Highland FRVs have been used to respond to appropriate Category B and C calls for a number of years and this has more recently been supported with a paramedic based in the Emergency Medical Dispatch Centres (EMDC). Referral pathways and links with primary care, out-of-hours care and other local services, in addition to emergency departments, have been established to allow the patient to receive the best care and outcomes given their individual situation. A dual-crewed ambulance was dispatched at the same time or as soon as possible after deployment of the FRV; however in 55% of incidents there was non-conveyance of the patient to hospital.

5 Evidence base to support implementation of the FLM

A search of published and ‘grey’ literature was carried out during July 2008 using terms generated from documents submitted to NHS QIS to identify papers on the FLM. The search strategy used is given in Appendix 3.

Web searching was directed towards the following sources:

- UK ambulance trusts
- UK organisations, eg Audit Commission, Healthcare Commission
- university research departments specialising in emergency care
- selected international health departments.

The following databases were also searched, with no limits applied:

- MEDLINE
- CINAHL
- HMIC.

Other reference material was identified from citations included in the articles and reports identified by these searches.

Very little literature relating directly to the FLM was identified, however a number of publications where the use of FRVs was discussed were found and the most relevant of these are described below.

A range of alternative models of emergency response to 999 calls is described in the literature identified in these searches. These include: the development of emergency care practitioners, use of see and treat guidelines, paramedics employing alternative referral pathways to the traditional transport to emergency departments, telephone triage and referral for non-serious 999 calls, and the development of a first responder system where members of the public or other emergency services with basic life support training would be dispatched to certain categories of call. The drivers for such initiatives have similarly varied, with some being directed towards reducing the pressure on ambulance services.
created by increasing demand, whereas others are initiatives introduced to reduce emergency department workload and subsequent hospital admissions.

The impact of ambulance performance targets on patient outcomes was explored by researchers at the University of Sheffield\textsuperscript{11}. This study involved a review of 999 calls for potentially life-threatening conditions in four ambulance services over a five year period from 1997–2001. The response time performance and patient outcomes were analysed. Four conditions were hypothesised to benefit from faster response times; asphyxia, cardiac arrest, serious haemorrhage and trauma. On analysis of the data there was no significant effect observed for asphyxia, haemorrhage or trauma. However, for out of hospital cardiac arrest it was found that a one minute reduction in response time was estimated to increase the odds of survival to discharge by 19%. Cardiac arrest patients accounted for around 7.7\% of calls included in the study. Data from SAS has estimated that around 2\% of 999 calls are for cardiac arrest. No work was identified in the University of Sheffield review which suggests changing the 8 minute cut-off as the critical time for response to Category A calls.

The report found that although the services studied had made operational changes, such as improving communication systems and increasing the number of FRVs, only small improvements in response times were noted. As the study considered only Category A calls, the impact of other influences on overall response times were not considered, ie increasing service demand. The study also examined only survival as an outcome and the authors acknowledge that reductions in anxiety, distress and pain are likely to be additional benefits of a fast response.

The authors concluded that only a small proportion, estimated at 10\%, of Category A calls were for what can really be described as life-threatening, ie when the patient was reported as unconscious or not breathing or with acute chest pain. Therefore, there is considerable risk avoidance within the call-handling system. It was also reported that just over 50\% of the Category A calls reviewed in this study required no or minimal hospital treatment. The report questions the validity of response time as an appropriate measure of the quality of ambulance services. However, anecdotally, speed of response is a key aspect of patient expectation. Little or no empirical work was identified that determined exactly what the public expects overall from an ambulance service.

A cluster randomised trial of a paramedic practitioner response scheme for older people experiencing minor acute conditions such as falls, limb or head injury has been tested in South Yorkshire\textsuperscript{12,13}. This is essentially the FLM model directed at a particular client group. Paramedics undertook additional training in community-based clinical assessment for patients over 60 years with minor injuries. In total 4,175 patients who met the inclusion criteria were identified over a 56 week period. The results indicated that patients in the intervention group were significantly less likely than those in the control group to attend an emergency
department at the time of the incident or during the 28 days following (62.6% versus 87.5%, P<0.001), and less likely to require hospital admission during the same time period (40.4% versus 46.5%, P<0.001). The intervention group patients were also more likely to be very satisfied with their treatment than the control group (85.5% versus 73.8% P<0.001).

This study identified that the AMPDS system required additional flexibility to allow the operation of such alternative approaches to ambulance dispatch, particularly when there is pressure to meet performance targets. Ambulance crews and control room workers were interviewed regarding the project. Paramedic staff not directly involved with the project voiced some concerns that key personnel would be moved away from work on traditional ambulance units and the effects this would have on the service overall. Most of the respondents considered that the additional training offered as part of the project should be made available to all paramedics.

Other authors have reported similar levels of satisfaction amongst patients when new systems of working within the ambulance service have been introduced.

A number of models of care are currently in use in SAS and these have undergone an initial evaluation. In Forth Valley a community paramedic scheme allows referrals to a local minor injuries unit and some specialisms in addition to transfer of patients to emergency departments. In addition, the community paramedic is able to administer a range of medications under patient group directives and emergency department staff can refer patients to the community paramedic where appropriate.

In Fife an emergency care team includes a state registered paramedic who respond to appropriate Category B and C 999 calls and out of hours service GP home visits. The team will treat, refer and discharge a wide range of illnesses and injuries and administer a range of medications under patient group directives. They also refer patients directly to a number of specialisms.

In Highland region state registered paramedics in FRVs will attend all categories of 999 calls and can directly refer patients to a number of specialisms, the diabetes clinic and to the intermediate care team. They will also undertake specialised interventions such as male catheterisation in the community.

All three models have been shown to reduce the rate of hospital attendance and where patient response to the service has been determined in the Forth Valley model, very high levels of satisfaction were reported.

In 2006 LAS commissioned MORI to establish the single most important role of the ambulance service and 32% of respondents answered responding quickly (P Bradley, LAS, personal communication). The other top answers were responding to a major emergency (18%), getting to emergency patients (14%) transporting
6 SAS approach to preparing for implementation of the FLM

A timeline of key decision points for the introduction of the FLM in SAS is given in Appendix 4.

Prior to the introduction of priority based despatch, between 2002–2004, Operational Research CONsultancy (ORCON) standards were used to measure the performance of SAS. ORCON standards were applied, based on local authority areas to reflect the local geography, and response times varied with the population density. In all mainland areas AMPDS is used and response time standards vary with the category of call. The target set at the time of introduction of the AMPDS was that by March 2008 75% of Category A calls, by mainland NHS board in Scotland, would be responded to within 8 minutes. This target did not apply to the island boards; NHS Western Isles, NHS Orkney and NHS Shetland.

To understand the evolution of the FLM concept within SAS it is important to recognise the environment in 2007. Senior executives within the service were focusing maximum effort into improving Category A performance. This focus was supported by the Scottish Government Improvement Support Team and was transmitted down to the senior management structure within the organisation. While clinicians supported the concept and developed proposals for a focused application of single-crewed vehicles, the approach within SAS resulted in a climate of confusion across the service.

In June 2007, SAS reported a 12% increase in demand year-on-year and this contributed to a missed performance target of 64% of Category A calls responded to within 8 minutes, with its performance being 55.7%15. It was recognised that meeting this target would require considerable effort and changes in working practices and as such a number of measures were initiated. In July 2007, the Scottish Government introduced a programme to assist SAS deliver on its performance targets16. The HEAT performance target set in 2008 is for 75% of Category A calls to be responded to within 8 minutes from April 2009 onwards for Scotland as a whole.

SAS undertook a number of pieces of work to review the use of FRVs and to determine if changes to current practice in respect of FRVs would contribute to improvements in response time performance.
6.1 Operational Research in Health (ORH) Limited report

SAS has used RRUs since 2003/4 and currently has around 70 vehicles in use. These vehicles have been used to respond to Category A calls capable of being reached within the 8 minute target, with a traditional ambulance dispatched at the same time or as soon as possible thereafter. The following traditional ambulance can be stood down at any point by either the EMDC on receipt of additional information, or the paramedic attending in the RRU.

ORH were commissioned to review options for the introduction of the FLM across Scotland\(^17\). The model used was similar to the SAS resource planning model, but allowed ambulances and FRVs to be deployed and FLM scenarios (ie no automatic ambulance dispatch) to be included. The model was run to allow resources to be estimated assuming response within 8 minutes for 75% of Category A calls within all NHS boards except Greater Glasgow & Clyde, Lanarkshire and Lothian, where an 85% target was modelled. Three levels of non-conveyance (40%, 50% and 60%) were modelled as were three different times on scene for the FRV; 20, 30 and 40 minutes. Under the existing system, the average time on scene is 20 minutes and the non-conveyance average 27%. Dependent on projected demand, population density and current ambulance provision, different NHS board areas would require more or fewer staff than the traditional model to reach the required performance.

The results indicated that to achieve the target within the traditional model of ambulance provision 173 additional staff would be needed. By implementing the FLM only in those areas where it would provide the greatest advantage, ie Greater Glasgow & Clyde, Forth Valley and Lanarkshire, the additional staff required reduces to 105. The number of FRVs and traditional ambulance units for deployment in these areas would require to change correspondingly. The report also concluded that additional FRVs would be required whether a traditional model or the FLM were to be implemented and that increasing the number of FRVs in Lothian, Greater Glasgow & Clyde, Fife and Tayside would be a first step to improving response time performance.

The basis of the results obtained by this modelling exercise were assumptions relating to the time at scene, the non-conveyance response, and the use of optimal deployment locations, however clinical aspects of individual calls and the overall case mix that might be appropriate for one model or another were not included. It was highlighted in the report that implementation of the FLM would require ‘substantial change in operational practice’. This would include the operational culture, the skill mix of staff to deliver the model, and the fleet mix.

In November 2007, the SAS Board agreed, in principle, the implementation of the FLM.
6.2 AMPDS code review

The AMPDS codes were reviewed by a clinical team, led by the SAS medical director, to determine those codes which would be most suitable for a FLM\textsuperscript{18}. This set of codes was validated, and subsequently revised, however during the piloting of the deployment of FRVs there has not been systematic implementation of the codes and ambulance units have continued to be dispatched to back-up the FRV by many of the EMDC staff. This practice would appear to vary with the control room team on shift and level of demand on the service, with back-up being automatically dispatched where the code does not require it when pressure on the system is low.

6.3 Fleet mix

Within the January 2008 SAS Board papers it is reported that to deliver the FLM would require, ultimately, a fleet mix of 50% FRVs and 50% double-crewed ambulances in urban areas\textsuperscript{19}. This proportional mix was broadly similar to an initial study undertaken by ORH prior to their main work on the FLM. Following the production of the ORH report, the SAS Board agreed to commence implementation of the changes to support the FLM.

A number of risks were identified in the SAS review of the FLM\textsuperscript{18}. In summary these were:

1. FRVs should be targeted to appropriate AMPDS codes
2. referral pathways need to be in place to ensure patients get the most clinically appropriate subsequent care
3. FRV paramedics require the necessary training and experience to be both competent and confident to treat and discharge at the scene or refer to the appropriate subsequent care pathway
4. communication between the EMDC and FRV staff needs to be optimised to ensure paramedic safety when working alone
5. ongoing review of operating procedures is required to ensure quality improvement
6. deployment of paramedics to full-time FRV duties may de-skill staff and prevent opportunities for ongoing learning and development
7. the FLM may result in patients having to wait longer for subsequent transport to hospital.

Overall, the conclusion of this NHS QIS report is that only certain elements of the FLM were adopted by SAS prior to June 2008 and in that sense the FLM was not implemented.
7 SAS project – New Ways of Clinical Working

In June 2008, a project was initiated within SAS entitled New Ways of Clinical Working. The aim of the project is stated as follows:

“to review and support the implementation of new ways of clinical working to get to patients quicker; providing the most appropriate patient care; accessing the most appropriate referral/care pathway; ensuring our people have the right skills and equipment and are fully supported during a period of major clinical development”.

This project is in the early stages of development and will include representation from across SAS and the public and both clinical and operational aspects will be considered. Appropriate project management methodologies will be employed to ensure a robust process.

8 Discussion and Conclusions

Further issues relating to the deployment of FRVs have been identified during the NHS QIS review and these should be considered in the development of the New Ways of Clinical Working project. These are:

- the vision and need for this major change in operating practices has not been successfully articulated across the service
- there is a need for effective engagement and communication with staff, healthcare professionals, such as emergency department staff, GPs and community nurses, and other organisations, eg the police and the public
- there are perceptions that personal safety issues have not been fully addressed by current policy and procedures and cannot be assured by communication between the EMDC and FRVs alone
- the speed with which the FLM was scheduled to be implemented did not allow sufficient time for the required preparatory work
- although all ambulance staff are appropriately trained for the work they undertake, there is variation in the current FRV operators experience and additional training leading to variation across the country in both competence and confidence and subsequent level of service that patients will experience
- the procedures to provide clinical governance of cases where patients are not conveyed to hospital have not been established, in particular, those instances where paramedics are expected to be the point of discharge.

The Terms of Reference for the Reference Group were to:

1. assess the evidence of the clinical effectiveness and safety of the FLM, including its risks and benefits
2. describe and understand the FLM as described in the DH guidance
3. describe and understand the FLM as implemented by SAS as at beginning of June 2008, including the clinical and corporate governance processes within SAS relevant to the implementation of the FLM
4. scope, as far as possible within the timescale, the changes and adaptations, including those planned by SAS, that might be made to the FLM to increase its effectiveness, safety and sustainability.

Each of these is dealt with below.

First, in common with many aspects of health service change, a dearth of published literature on the clinical and cost effectiveness of the FLM was identified. Consequently this report has relied on ‘grey’ literature, policy documents and the findings from discussions with a range of individuals and groups to inform the conclusions. The conclusion with regard to the central element of the FLM, ie use of a FRV to respond to more appropriate emergency calls more quickly, is valid. In addition, the use of ‘see and treat’ guidelines is already well established within the ambulance service. However, audit and evaluation of alternative models of emergency service response within SAS must be undertaken to allow effectiveness to be measured.

Second, this report outlines the FLM as described in the DH guidance including the elements required for successful implementation.

Third, the report describes the FLM as implemented by SAS. In conclusion, the evidence is that the FLM was not implemented by SAS as only certain elements of it were piloted. In particular, the implementation of the FLM did not address all the risks noted in the SAS review of the FLM. The term ‘FLM’ now appears to be imprecise; it has been used to describe different service models and as such its use should be avoided when describing future models of service. SAS has agreed that this term will no longer be employed.

Fourth, although there is widespread acceptance across staff groups for effective use of FRVs, the FLM was and is still seen as an ‘ORCON buster’, ie a short-term measure to improve performance against the 8 minute target. SAS staff are not opposed to change, and indeed have in the past readily taken on new working practices. However, when seen only in the context of achieving government targets without cognisance of the complexity of delivering a clinically effective emergency response service, there was understandable resistance from some staff to adopt the FLM as it was presented. Therefore, consideration could be given to reviewing the terminology used and to ensure that use of FRVs is aligned to a wider vision of a modern ambulance service as described in the SAS mission, values and objectives. New Ways of Clinical Working is an important initial step in that journey but it needs to be developed and implemented appropriately.
Key elements of this implementation will include ensuring that staff are appropriately trained, equipped and supported, both clinically and managerially to adapt to this new way of working. NHS Education for Scotland could continue to provide advice and support on how to achieve the necessary workforce development to support service redesign.

Effective engagement and communication with all stakeholders (including primary care, out of hours services, emergency units, the police and patients and the public) in the current service is essential to ensure that referral pathways are established and understood in advance of implementation of any new operational model. This will take time and skilled communicators, but there are champions amongst the paramedics and managers within SAS who would be invaluable in such efforts.

SAS should continue to develop and ensure implementation of policies and procedures for many of the operational aspects outlined in New Ways of Clinical Working. This should include addressing, in partnership, issues of staff personal safety and providing transparency of clinical decision making.

Although speed of response is very important to the public, little is known on what the public and patients expect from an ambulance service overall. SAS should therefore consider the effect of proposed and actual changes to the ambulance service from a patient and public perspective.

In conclusion, NHS QIS recommends that:

1. as the use of FRVs to respond to appropriate emergency calls more quickly is valid, SAS should continue to develop the use of FRVs as part of its service redesign to meet the clinical needs of patients
2. the use of the term FLM is avoided within the service because, although the principles are sound, there has been no clear definition of term within SAS and its use leads to confusion. A more productive approach to the implementation of the principles will be to ensure that the New Ways of Clinical Working project aims are widely articulated across the service and beyond
3. in advance of further service development, strategies are established for effective engagement and communication with staff, healthcare professionals in primary care, out of hours services, emergency departments, the public and other relevant organisations, such as the police
4. staff receive the necessary training, ongoing development opportunities, managerial and clinical support to ensure their competence and confidence to adapt to these new ways of working
5. operational aspects of delivering New Ways of Clinical Working, including addressing perceived personal safety concerns and governance of clinical decision making, should be developed in partnership with staff
6. work should be initiated on the public needs and expectations of the ambulance service to ensure the provision of clinically effective patient-centred care.
9 References


<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A&amp;E</td>
<td>Accident &amp; Emergency.</td>
</tr>
<tr>
<td>AEU</td>
<td>Accident &amp; Emergency Unit. A traditional double-crewed ambulance.</td>
</tr>
<tr>
<td>AMPDS</td>
<td>Advanced Medical Priority Dispatch System.</td>
</tr>
<tr>
<td>Category A</td>
<td>Immediate life threatening emergency calls/incidents.</td>
</tr>
<tr>
<td>Category B</td>
<td>Urgent but not immediately life threatening emergency calls/incidents.</td>
</tr>
<tr>
<td>Category C</td>
<td>Routine calls/incidents.</td>
</tr>
<tr>
<td>DH</td>
<td>Department of Health in England.</td>
</tr>
<tr>
<td>EMDC</td>
<td>Emergency Medical Dispatch Centres.</td>
</tr>
<tr>
<td>FLM</td>
<td>Front loaded model: An operational model characterised by measures such as the use of fast response vehicles to respond to more Category A calls more quickly.</td>
</tr>
<tr>
<td>Front loaded model</td>
<td>See FLM.</td>
</tr>
<tr>
<td>FRV</td>
<td>Fast response vehicle. A car or motorbike crewed by a single member of the ambulance service usually a paramedic.</td>
</tr>
<tr>
<td>‘grey’ literature</td>
<td>Research reports and other literature in print and electronic formats that is not found in traditional peer-reviewed publications or otherwise controlled by commercial publishers. Examples are government agency monographs, symposium proceedings, and industry reports.</td>
</tr>
<tr>
<td>HEAT targets</td>
<td>The performance management framework for the Scottish Government Health Directorates. The Scottish Government HEAT Category A target for SAS is to achieve an 8 minute response to 75% of Category A calls.</td>
</tr>
<tr>
<td>LAS</td>
<td>London Ambulance Service.</td>
</tr>
<tr>
<td>ORCON</td>
<td>Operational Research CONsultancy (ORCON) standards were developed for monitoring ambulance service performance for the Department of Health.</td>
</tr>
<tr>
<td>PCT</td>
<td>Primary care trust.</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>PRU</td>
<td>Paramedic response vehicle – see FRV.</td>
</tr>
<tr>
<td>RRU</td>
<td>Rapid response vehicle – see FRV.</td>
</tr>
<tr>
<td>SECAmb</td>
<td>South East Coast Ambulance Service.</td>
</tr>
</tbody>
</table>
11 People/organisations interviewed/contributing to report

NHS QIS would like to thank the following individuals and organisations for their input to this report:

Members of staff of the Scottish Ambulance Service; in particular, George Crooks, Bill Mason, Rod Moore, Stephanie Philips, Drew Wymess, the FRV paramedics at Kirkcaldy and Stirling ambulance stations and the South East EMDC staff.

Chris Howden, South East Coast Ambulance Service.

Peter Bradley, London Ambulance Service.

George McLean, NHS Grampian.
Appendix 1 Front Loaded Model Terms of Reference

1. To assess the evidence of the clinical effectiveness and safety of the FLM, including its risks and benefits.
2. To describe and understand the FLM as described in the DoH guidance.
3. To describe and understand the FLM as implemented by SAS as at beginning of June 2008, including the clinical and corporate governance processes within SAS relevant to the implementation of the FLM*.
4. To scope, as far as possible within the timescale, the changes and adaptations, including those planned by SAS, that might be made to the FLM to increase its effectiveness, safety and sustainability.

* This will take account of the on-going CG developments.

Reference Group - to meet twice (w/s 21 July and w/s 18 August) and to include SGHD, SAS, clinicians (inc paramedics), public partner(s), patient group; to provide advice on gaps in the evidence, relevant contacts, review draft report etc.

Status of Report - NHS QIS report to CMO.

Timescale - report completed by Friday 29 August; may identify need for further work.

26 June 2008
### Appendix 2 Membership of the Reference Group

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Harpreet Kohli</td>
<td>Medical Advisor (Chair)</td>
<td>NHS Quality Improvement Scotland</td>
</tr>
<tr>
<td>Dr Karen Ritchie</td>
<td>Lead Health Services Researcher</td>
<td>NHS Quality Improvement Scotland</td>
</tr>
<tr>
<td>Ms Doreen Pedlar</td>
<td>Reference Group Secretariat</td>
<td>NHS Quality Improvement Scotland</td>
</tr>
<tr>
<td>Mr Alan Bickerstaff</td>
<td>Employee Director</td>
<td>Scottish Ambulance Service</td>
</tr>
<tr>
<td>Ms Margo Biggs</td>
<td>Public Partner</td>
<td>NHS Quality Improvement Scotland</td>
</tr>
<tr>
<td>Mr David Clark</td>
<td>Chief Executive</td>
<td>Chest Heart &amp; Stroke Scotland</td>
</tr>
<tr>
<td>Dr George Crooks</td>
<td>Interim Medical Director</td>
<td>Scottish Ambulance Service</td>
</tr>
<tr>
<td>Mr John Gallacher</td>
<td>UNITE representative</td>
<td>Scottish Ambulance Service</td>
</tr>
<tr>
<td>Mrs Pauline Howie</td>
<td>Chief Executive</td>
<td>Scottish Ambulance Service</td>
</tr>
<tr>
<td>Mr Robin Lawrenson</td>
<td>Clinical Performance Manager</td>
<td>Scottish Ambulance Service</td>
</tr>
<tr>
<td>Mr Karen McLachlan</td>
<td>UNISON representative</td>
<td>Scottish Ambulance Service</td>
</tr>
<tr>
<td>Mr George McLean</td>
<td>General Manager, G-MED Out of Hours Service</td>
<td>NHS Grampian</td>
</tr>
<tr>
<td>Mr Bill Mason</td>
<td>National Continuous Improvement Manager</td>
<td>Scottish Ambulance Service</td>
</tr>
<tr>
<td>Mr Neil Nichol</td>
<td>Consultant in Emergency Medicine</td>
<td>NHS Tayside</td>
</tr>
<tr>
<td>Mr Pat O’Meara</td>
<td>General Manager</td>
<td>Scottish Ambulance Service</td>
</tr>
<tr>
<td>Ms Shirley Rogers</td>
<td>Director of HR and Clinical Development</td>
<td>Scottish Ambulance Service</td>
</tr>
<tr>
<td>Dr Alexandra Watson</td>
<td>Senior Medical Officer</td>
<td>Scottish Government Health Directorates</td>
</tr>
<tr>
<td>Mr Ian Williamson</td>
<td>Performance Manager for SAS and NHS 24</td>
<td>Scottish Government Health Directorates</td>
</tr>
</tbody>
</table>
Appendix 3 Search Strategy

Search strategy used for MEDLINE
1. Ambulances/
2. Triage/
3. Ambulance$.ab.
4. triage.tw.
5. or/1-4
6. ((rapid or fast) adj1 response).tw.
7. (front adj1 load$).tw.
8. (single adj1 (operator$ or responder$ or manned)).tw.
10. AMPDS.tw.
11. FLM.tw.
12. "front end model".tw.
13. RRV.tw.
14. or/6-13
15. 5 and 14
### Appendix 4 Timeline of key decision points

#### Introduction of the front loaded model in SAS

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>Commencement of prioritisation implementation. 32 RRUs introduced to busy urban areas across Scotland</td>
</tr>
<tr>
<td>2004</td>
<td>Implementation of prioritisation complete</td>
</tr>
<tr>
<td>August 2006</td>
<td>Operational performance improvement plan developed</td>
</tr>
<tr>
<td>April 2007</td>
<td>DH issued ‘Improving Ambulance Response Times – 10 High Impact Changes’ which recommended introducing the FLM</td>
</tr>
<tr>
<td>August 2007</td>
<td>SGHD IST diagnostic visit recommended ‘SAS should increase the number of RRUs available as soon as possible, even within existing resourcing’</td>
</tr>
<tr>
<td>November 2007</td>
<td>SAS Board approved proposal to allow RRUs to attend all types of appropriate emergency calls, backed up by a double crewed unit at the request of the attending RRU practitioner</td>
</tr>
<tr>
<td>January 2008</td>
<td>SAS model of FLM commenced implementation</td>
</tr>
<tr>
<td>February 2008</td>
<td>Internal review of SAS model of FLM after 4 weeks – recommendations made</td>
</tr>
<tr>
<td>February 2008</td>
<td>ORH FLM resource modelling report completed</td>
</tr>
</tbody>
</table>