

WEST OF SCOTLAND REGIONAL PLANNING GROUP**MODELLING THE IMPACT OF HOSPITAL
RECONFIGURATION ON CROSS-BOUNDARY PATIENT
FLOWS FOR EMERGENCY INPATIENT CARE BETWEEN
LANARKSHIRE, GLASGOW AND FORTH VALLEY****Introduction**

1. In May 2005, Professor David Kerr presented his report “Building a Health Service Fit for the Future” to Scottish Ministers. The Scottish Executive’s response, “Delivering for Health”, which was published in November 2005, developed the framework for the way services need to change and set out how Health Boards should implement the changes to deliver safe, quick and sustainable healthcare which responds to the changing needs of the population.
2. NHS Lanarkshire’s proposals, reflecting the findings of its own work as well as of the Kerr Report and “Delivering for Health” were published in January 2006 in a consultation document entitled “A Picture of Health”. This covers the whole health system, including proposals to strengthen health improvement, build up the capacity of local health services including GP services, services for older people, people with long term conditions and those with mental health problems, as well as modernising hospital services across Lanarkshire.
3. This paper deals with one aspect of the proposals to modernise the general hospital services i.e. the impact of potential changes in patient flows. It discusses a range of scenarios relating to the location and function of hospitals in the West of Scotland, as a result of the changes proposed by NHS Lanarkshire which are currently out to public consultation. This work will help to inform decisions in relation to NHS Lanarkshire’s proposals for hospital reconfiguration.
4. The key changes for the purposes of this paper, are the proposals that to improve care:-
 - one of Lanarkshire’s three general hospitals would concentrate its inpatient services on planned care; and
 - two of the three hospitals would provide emergency inpatient care and consultant led Accident and Emergency services for all of Lanarkshire
5. All of the hospitals mentioned in this paper will continue to provide expert care for the majority of people who currently attend their local Accident and Emergency Department. These are typically for the treatment of minor limb injuries, sprains, wounds requiring dressings or stitches, minor burns, particles in the eye and minor injuries to the ears or nose. In addition, certain of these hospitals (including Wishaw and either Hairmyres or Monklands) will provide facilities and expert staff to deal with people suffering from more major injuries or illnesses, including those requiring emergency inpatient admission to a hospital bed.
6. This paper was prepared for the Chief Executives on the Regional Planning Group, and will influence plans for hospital developments in Lanarkshire, Glasgow and Forth Valley. There is no significant impact from these changes on patient flows between Lanarkshire and Ayrshire.

7. The principal changes considered in this paper are:-
- Glasgow's plans already agreed by the Scottish Executive following consultation, to change services at Victoria Infirmary and Stobhill Hospital, with patients requiring emergency inpatient admission in the future going to either the new South Glasgow Hospital on the Southern General Hospital site (from Victoria) or an expanded Glasgow Royal Infirmary (from Victoria and Stobhill)
 - Lanarkshire's proposals, currently out to public consultation, for changes leading to patients requiring emergency inpatient admission in the future going to either Monklands or Hairmyres, along with Wishaw
 - Forth Valley's plan already agreed by the Scottish Executive following consultation, for a new hospital to be built at Larbert, replacing acute facilities at both Stirling and Falkirk. Larbert is closer for most people living in the Cumbernauld and Kilsyth areas of Lanarkshire than Wishaw, Hairmyres or Glasgow Royal Infirmary.

Current Assumptions

8. Whereas future sites offering emergency inpatient admissions will be fewer in number, hospitals offering the higher patient volume minor injury and illness services will be retained and within Lanarkshire increased in number. This means either no change, or increased local provision for outpatient, minor injury and illness, diagnostic testing, day procedures and 23-hour bed provision. This together represents over 80% of current patient activity at the hospitals where inpatient emergency provision is either planned to change or under consideration. Appendix 1 maps the current hospitals in this part of the Region.
9. So far each Board has broadly assumed that the impact of hospital reconfiguration will be contained i.e. any displacement of emergency inpatient admissions will be accommodated within the next nearest emergency inpatient hospital within its own (Health Board) boundary.
10. Current planning by each Health Board has so far assumed timescales for the hospital changes envisaged spanning the period 2009-2013. These are always going to be subject to change and further refinement as detailed planning and procurement progress and contingency planning will be undertaken once decisions are known, to take account of any differences in timing:-
- early 2009 - Ambulatory Care and Diagnostic Centre developments completed at Stobhill Hospital and Victoria Infirmary
 - late 2009 - Monklands or Hairmyres change to planned care
 - late 2009 - New Larbert Hospital begins phased commissioning
 - 2012 - New South Glasgow Hospital completed
 - 2013 - Redevelopment of Glasgow Royal Infirmary completed.

Challenging Current Assumptions

11. The Kerr Report, and the Scottish Executive's endorsement in 'Delivering for Health', are placing a duty on Health Boards to plan future hospital services on a regional basis, not in isolation. The advent of 'A Picture of Health' for Lanarkshire and more detailed analysis of current trends are potentially challenging some of the current planning assumptions. The growing importance of the need to plan services which are demonstrably patient focussed, and with greater public involvement, have heightened concerns over transport and geographical access.
12. Proposed changes to either Monklands or Hairmyres are significant, have the potential to impact on Glasgow and/or Forth Valley, and this work has allowed us to consider these changes in the context of the extant strategies of both Greater Glasgow and Forth Valley.

Hospital Catchment Populations

13. In emergency situations, patients tend to go to their most convenient Accident and Emergency department. This is most often the closest geographically (although not always), may be the hospital patients are familiar with and in the area most commonly referred to by their GP. They may be unfamiliar with alternatives when changes happen to their 'local' hospital, or be uncertain how to get to the nearest alternative if it means travelling on unfamiliar roads. This will need to be positively addressed by the NHS, to achieve a reasonable balance in hospital provision.
14. The concept of catchment areas when planning hospital provision is useful, and views need to be taken about the extent to which variables such as GP referral patterns and ambulance services are able to be directed and how much Health Board boundaries or travelling time will dictate catchment areas. However, developments in the Scottish Ambulance Service in recent years including paramedic assessment, stabilisation (and, in some cases, treatment) of acutely unwell patients by highly trained ambulance personnel has reduced the importance of distance to the nearest hospital. Increasing capacity of the "blue light" ambulance service, the emergence of a dedicated inter hospital ambulance service and increasing compliance with the 8 minute response time target, all of which are planned over the period in question, will further reduce patient risk and the clinical significance of distance between hospitals.
15. Directing some patients requiring emergency admission or assessment to alternative hospitals which may not be the closest geographically will be justified where
 - the extra distance in travelling time is clinically insignificant i.e. will have no adverse effect on the patient outcome
 - it enables balanced provision across neighbouring hospitals which makes best and most efficient use of all hospital resources i.e. the right services will be available when the patient arrives
16. This paper seeks to analyse the principal factors involved and to present options for redrawing the current catchment areas.

Distances/Sources of Emergency Admissions

17. West Central Scotland is well provided with emergency hospitals, compared with other parts of Scotland and with many parts of the UK as a whole (see Appendix 1). It has been calculated by NHS National Services Scotland that for Lanarkshire's population, average travelling time by private transport to an emergency inpatient hospital following the proposed changes at either Monklands or Hairmyres, will still be within 30 minutes for 92.9% of the population compared with the current 96.5% (see Appendices 2 and 3). Travelling times for Glasgow's population are even shorter.
18. Almost all emergency inpatient admissions reach hospital by car or ambulance, rather than by train or bus. A detailed analysis was therefore carried out to determine travel distances, average driving times and routes from locations at postcode level, to the various hospitals. This analysis covered the present catchment areas served by Monklands Hospital, Hairmyres Hospital and the Victoria Infirmary, using Microsoft/AA Auto route software. These are scheduled in Appendices 4, 5 and 6
19. Various journeys were also driven between townships and hospitals under controlled conditions and at different times of the day, as a means of sense checking the AA Auto route timings. This produced a slightly different outcome for certain journeys (see Appendix 7).
20. What this showed was that all existing and alternative hospitals could be reached within 30 minutes. It also showed that the driving time differences between more than one alternative hospital for certain populations could be quite small and clinically insignificant e.g. driving times from G72 8 – East Kilbride, to Monklands, Wishaw and Glasgow Royal Infirmary range from 18-26 minutes – they are all within 8 minutes of one another.
21. Although NHS National Services Scotland sought to develop software to map populations to hospitals, it was found to be more complex than originally intended. It was therefore agreed to map actual current source or origin of emergency admissions (see Appendices 8, 9 and 10 for admissions to Monklands, Hairmyres and Wishaw). These were further analysed in ways consistent with the Unscheduled Care Collaborative and separated into emergency inpatient admissions
 - brought by ambulance
 - referred by GP
 - referred by NHS 24/Out of Hours Services
 - self referred (i.e. the patient made their own way to hospital without contacting NHS first)
 - others
22. In determining new catchment areas, it is believed that the patients brought in by the first three routes (ambulance, GP and NHS 24/Out Of Hours Services) are more able to be directed to an alternative hospital than those who refer themselves without prior contact with the services. This latter group, which together with 'other' (non-defined) patients, total between one-third and half of all emergency admissions, represent a higher risk of turning up at a different alternative hospital.

The agreement and communications about any new catchment areas to the public is going to be an important issue and one which will also be influenced by actual or perceived availability of public transport (for ease of access for visitors etc). A separate, but related, exercise is underway looking at public transport links and the actions necessary to strengthen them in the light of the changes under consideration. This is part of the Transport Impact Assessment.

Sizing the Hospitals

23. Alternative scenarios involving the removal of each of the changing hospitals (Victoria Infirmary, Stobhill Hospital, Monklands and Hairmyres Hospitals) in turn from the analysis allowed us to determine the optimal alternative hospital. As a first stage, the emergency admissions were converted to bed numbers by using current models of care and length of stay (6-7 days total average stay) and an optimum bed occupancy level of 85%.
24. Each of the Health Boards has, or is in the process of modelling bed provision to take account of increased efficiency from patient pathway improvements such as more rapid diagnosis/assessment and better discharge arrangements. For Larbert, Forth Valley are explicitly aiming to reduce the length of emergency stays by community hospitals playing an active part in patient's rehabilitation. The assumption is made that any Lanarkshire residents who are admitted to Larbert would be repatriated to Lanarkshire for rehabilitation.
25. There are a number of current cross boundary patient flows which occur for various historical reasons which are not planned to change and have not been taken into account in this paper. The analysis below and in the attached data and maps, therefore, deals with the net change from the current or planned positions.
26. It has also been assumed for this paper that the emergency inpatient admissions are for secondary, not tertiary, treatment and are therefore moveable between the hospitals. Data relating to Lanarkshire admissions to Glasgow Royal Infirmary needs further analysis, but currently represents only a small number of beds.
27. The scenarios deal with emergency inpatient admissions and consequential bed requirements only. Other supporting diagnostic and treatment services will require to be sized accordingly. There is NO evidence that these changes will impact on referral patterns for planned care services, with the exception of medical investigations with symptoms for which emergency admissions in the future are very likely.
28. Planning for 3-7 years hence, on the basis of current numbers of emergency inpatient beds (as in Lanarkshire and Glasgow) assumes that any rise in demand for demographic or other reasons is offset by more efficient models of care. On the other hand, the combination of more systematic and focussed care and case management for older people with long term conditions, more rapid diagnosis and assessment, the advent of redesigned emergency medical complexes, further improvement in discharge planning and the targeted use of step down beds in local hospitals, all have the potential to reduce emergency bed requirements. In the absence of detailed modelling at this stage, however, current bed numbers have been used. More detailed planning will be carried out at the "business case" stage.

29. At present, Wishaw, Monklands and Hairmyres Hospitals have approximately 634, 529 and 490 beds respectively. Of these, some 1300 beds are required to be provided on the emergency hospital sites, the remainder for planned care. It is proposed to reconfigure these beds across two emergency inpatient hospitals and one planned care hospital. An earlier and less detailed assessment of potential catchment populations, taking into account travel times from main townships, suggested that one of the two emergency inpatient hospitals (proposed to be Wishaw) would accommodate 55% of the emergency beds, with the remaining 45% at either Monklands or Wishaw. Current assessments of the capital and revenue costs of each option are based on Lanarkshire's acute hospital beds being re-provided entirely within Lanarkshire. The following scenarios require that to be reviewed.

The Results

30. Two principle scenarios are covered in this paper, each with a number of sub-options according to planning assumptions explicitly identified:-

Scenario 1

Monklands becomes the planned care site, with Victoria and Stobhill changing predominantly to ambulatory care and diagnostics, and the impact of the new Larbert Hospital.

Scenario 2

Hairmyres becomes the planned care site, with Victoria and Stobhill changing predominantly to ambulatory care and diagnostics, and the impact of the new Larbert Hospital.

31. Using actual driving times from the Survey (supplemented by AA Auto route) as the principle determinant of the "optimum" alternative site, the following analyses are shown:-
- a) - the "optimum" alternative site is the next closest, or is no more than 5 minutes further than the nearest "out of Health Board area" hospital
 - b) - the "optimum" alternative site is the next closest, or is no more than 10 minutes further than the nearest "out of Health Board area" hospital

Using the sources of emergency admission listed in para 21 above, the following further analyses are shown for each of (a) and (b) above:-

- admissions and bed requirements only for those "self referred" and "others", with all remaining admissions (ambulance, GP, or NHS24/Out Of Hours) referred being directed to the nearest emergency inpatient hospital within the same Health Board area
- all emergency inpatient admissions

32. The data used is based on the most recent complete years available, 2004/5 for Lanarkshire and 2003/4 for Glasgow (see Appendices 11, 12 and 13).
33. Appendix 14 maps the NHS Lanarkshire resident admissions to Stobhill Hospital and Glasgow Royal Infirmary in 2004/5.

Scenario 1

34. The following table shows potential bed movement across current Health Board boundaries to reflect emergency inpatient flows as a consequence of the changes proposed at Monklands, Victoria and Stobhill. It does not detail the other bed changes planned within the same Health Board boundary.

Table 1

	(a) nearest ≤ 5 minutes longer than alternative HB provider		(b) nearest ≤ 10 minutes longer than alternative HB provider	
	self-referrals (beds)	all patients (beds)	self-referrals (beds)	all patients (beds)
<u>NHSL Residents</u>				
Monklands	-94	-173	-26	-55
Larbert (total)	+46	+75	+44	+73
- from Monklands	+27	+56	+25	+54
- from Glasgow	+19	+19	+19	+19
Glasgow Royal (total)	+50	+98	-18	-18
- from Monklands	+67	+117	+1	+1
- to Larbert	-19	-19	-19	-19
<u>NHSGG Residents</u>				
Victoria (new SGH)	-37	-37	-20	-20
Hairmyres - from Victoria	-37	+37	+20	+20

35. The range of impacts on Glasgow Royal Infirmary and Larbert under Scenario 1 are

GRI worst case +98 beds assuming all admissions flow in line with proximity and access analysis, with none being directed internally. This could be reduced to 61 by rearranging the flows from the Victoria catchment to Hairmyres

best case -18 beds assuming NHSL direct patients to Wishaw, Hairmyres and Larbert if their extended journey (further than GRI) is no longer than 10 minutes

Larbert worst case +75 beds assuming all admissions (mainly from Cumbernauld and Kilsyth) flow in line with proximity and access analysis, with none being directed internally

best case +25 beds assuming NHSL direct all patients except self referrals to Wishaw or Hairmyres or GRI

Scenario 2

36. The following table shows bed movement across current HB boundaries to reflect in patient flows as a consequence of the changes proposed at Hairmyres and Victoria Infirmary. It does not detail the other bed changes planned within the same Health Board boundary.

Table 2

	(a) nearest \leq 5 minutes longer than alternative HB provider		(b) nearest \leq 10 minutes longer than alternative HB provider	
	self-referrals (beds)	all patients (beds)	self-referrals (beds)	all patients (beds)
<u>NHSL Residents</u>				
Hairmyres	-37	-68	0	0
Glasgow Royal (total)	+18	+49	-19	-19
- from Hairmyres	+37	+68	0	0
- to Larbert	-19	-19	-19	-19
Larbert	+19	+19	+19	+19
<u>NHSGG Residents</u>				
Hairmyres	-6	-10	-6	-10
Glasgow Royal - from Hairmyres	+6	+10	+6	+10

37. Under Scenario 2, current flows to Monklands could remain undisturbed, while 19 beds may transfer from Stobhill and the Western Infirmary to Larbert, which is likely to be seen as more convenient than Glasgow Royal Infirmary when Stobhill changes and the Western Infirmary closes. There is also a risk that the impact of building a new hospital at Larbert could attract some patients from the Cumbernauld and Kilsyth areas, for which provision will still be provided at Monklands. It would be difficult to model this risk, which could be affected by such factors as the positive publicity around the opening of a new emergency hospital at a time when construction work may be disrupting operations at their existing hospital (Monklands).

Balancing Bed Provision

38. Amongst the other implications of redrawing catchment populations in this way, is the need to balance provision between the two inpatient emergency hospitals within Lanarkshire and the two within Glasgow. Catchment areas will be defined and agreed with GPs and the Scottish Ambulance Service, but each of the two Lanarkshire scenarios have quite different challenges.

39. With Hairmyres as the planned hospital, a reasonably balanced redistribution of emergency admissions to Wishaw and Monklands could be achieved (53%/47%). With Monklands as the planned site, a larger majority of displaced emergency inpatient admissions might naturally look to Wishaw in terms of proximity and access. This would not be sustainable, and could be ameliorated by slightly skewing catchment boundaries within Lanarkshire, providing for a higher proportion of complex elective admissions at Hairmyres. This might include renal medicine and communicable diseases. Further work on this is underway, but maps at Appendix 15 and 16 illustrate new catchment areas which would deliver the necessary balance. Such an adjustment could achieve a balance of about 60% of emergency beds at Wishaw and 40% at Hairmyres.

Risk Analysis

40. Under each Scenario in table 2, the range of risks affecting the various hospitals is estimated as follows, in terms of emergency inpatient beds. In other words, this table illustrates the range of possible changes in bed numbers at the various hospitals from earlier predictions, as a result of the NHS Lanarkshire options.

Table 3

	Monklands as planned site (Scenario 1)		Hairmyres as planned site (Scenario 2)	
	10 minutes (beds)	5 minutes (beds)	10 minutes (beds)	5 minutes (beds)
Glasgow Royal Infirmary	-18	+98	-13	+59
South Glasgow	-20	-37	nil	nil
Larbert	+44	+75	+19	+19
Wishaw/Hairmyres	-6	-136		
Wishaw/Monklands			-6	-78

41. It should be possible to minimise cross boundary flow appropriately and remain within tolerable travelling times for current NHS Lanarkshire patients by:-
- securing agreement of GPs, NHS24 and the Scottish Ambulance Service to the revised catchment areas proposed
 - providing good quality and accessible alternative hospital provision within 30 minutes driving time, and positive marketing of the new catchment areas/hospitals through extensive publicity campaigns.
 - repatriating longer stay admissions from Larbert (and Glasgow) to a Lanarkshire hospital, where this is convenient for patient and family.
42. For planning purposes, it is suggested that cross boundary patient flow is calculated on the basis of all of the actions at para 42 being taken, with the aim of achieving:-
- 95% of “directable” patients and 50% of self referrals/others within the affected areas admitted to the alternative hospital within the same Health Board, (except for Larbert under Scenario 1)

- 95% of all emergency patients from Cumbernauld and Kilsyth admitted to the new Larbert Hospital under Scenario 1
- repatriation of Lanarkshire residents admitted to Larbert under Scenario 1, for longer term rehabilitation where necessary

Applying these criteria would generate the following bed requirements to deal with the cross boundary flow as a consequence of the changes in this paper. The + means that more beds might be required at a particular hospital and the – means that fewer would be required.

Table 4

New Provision	Scenario 1	Scenario 2
	(beds)	(beds)
<u>Glasgow Royal Infirmary</u>		
- from Monklands		
5% x 50	+3	
50% x 67	+34	
- to Larbert		
95% x 19	<u>-18</u>	-18
	<u>+19</u>	
- from Hairmyres		
5% x 31		+2
50% x 37		+19
95% x 10		<u>+9</u>
		<u>+12</u>
<u>South Glasgow Hospital</u>		
- to Hairmyres		
50% x 37	<u>-19</u>	
<u>Larbert</u>		
- from Glasgow Royal		
95% x 19	+18	<u>+18</u>
- from Monklands		
95% x 56	<u>+53</u>	
	<u>+71</u>	
<u>Wishaw/ Hairmyres</u>		
- Monklands to Glasgow Royal	-37	
- Hairmyres from South Glasgow	+19	
- Monklands to Larbert	<u>-53</u>	
	<u>-71</u>	
<u>Wishaw/Monklands</u>		
- Hairmyres to Glasgow Royal		<u>-30</u>

Conclusion

- 43 This is a complex set of circumstances and the ambition of the Regional Planning Group to give weight to proximity and patient access regardless of current Health Board boundaries is sensible. While proximity and access alone cannot be the sole determinant of future hospital catchments, (given the historical legacy of current locations and the need for balanced provision), it is remarkable how much balance can be achieved with relatively little deviation from the shortest driving times.
44. There is also the question of relative distance. We are not dealing here with the kinds of travel times and distances that are found in rural areas such as the Highlands or the Borders. All of the revised catchment areas suggested in this paper involve total private transport journeys of less than 30 minutes, in most cases considerably less. This fact, together with the paramedic developments and capabilities of a modern ambulance service and the lack of evidence of higher risk to patients supports the feasibility of the new catchment areas.
45. In essence, this analysis shows that the risk of increasing cross boundary flow is less than at first anticipated, and is most significant not on Glasgow, but on Larbert, should Monklands be designated the planned hospital. This is because of its relative proximity to Cumbernauld and Kilsyth. Even then, the flow is small and marginal representing less than 7% of Forth Valley overall acute beds, 6% of Lanarkshire's and 3% of Glasgow's.
46. Further detailed planning will not be put in hand until NHS Lanarkshire has finally determined its way forward. We can, however, test the understanding and support of the public (in the case of Lanarkshire), GPs and the Scottish Ambulance Service for the analysis and implications set out in this paper.

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