

A review of telehealth in Scotland



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Auditor General for Scotland

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Contents

Summary

Page 2

Background

Page 3

About our audit

Summary of key messages

Page 4

Summary of key recommendations

Page 5

Part 1. Planning for telehealth

Page 6

Key messages

The Scottish Government is now providing clearer strategic direction for developing telehealth

Page 7

The integration of SCT with NHS 24 has been positive, providing more focus for the development of telehealth

Overall, developing telehealth has not been a priority for NHS boards

Page 8

An estimated £4.7 million has been allocated to telehealth initiatives since 2006

Page 9

Telehealth should be considered as an option when NHS boards are introducing or redesigning services

Page 10

Recommendations

Page 11

Part 2. Delivery of telehealth

Page 12

Key messages

All NHS boards are making use of telehealth but initiatives are small-scale and almost half are pilots

Telehealth is most well used in the north of Scotland

Page 13

Telehealth offers many potential benefits for patient care

Patient experience of telehealth is broadly positive

Page 15

NHS staff require more opportunities, support and training to use telehealth

Page 17

IT infrastructure and technical support are important in developing telehealth and need to be planned for appropriately

Page 18

NHS 24/SCT needs to strengthen its arrangements for sharing good practice

Other countries are increasingly using telehealth but many of the initiatives are also on a small scale

Recommendations

Page 19

Part 3. Opportunities for improving value for money

Page 20

Key messages

Better-quality evaluations of telehealth initiatives are needed

Recent large-scale projects will improve the availability of evidence on telehealth

Page 21

Telehealth offers the potential to provide NHS services more efficiently

Page 22

Using telehealth to monitor patients with COPD at home offers potential opportunities for efficiencies

Page 23

NHS boards should consider whether telehealth could help deliver services more efficiently

Recommendations

Page 24

Appendix 1. Defining telehealth and use of terminology

Page 26

Appendix 2. Audit methodology

Page 27

Appendix 3. Membership of the advisory group and COPD modelling panel

Page 28

Appendix 4. Questions to help NHS boards assess potential opportunities for using telehealth

Page 30

Summary



Telehealth provides an opportunity to treat patients in new ways and help manage rising costs and demand.



Background

1. The use of technology in the NHS has the potential to improve the quality, delivery and efficiency of healthcare services. Telehealth is the provision of healthcare to patients at a distance using a range of technologies, such as mobile phones, internet services, digital televisions, video-conferencing and self-monitoring equipment ([Exhibit 1](#)). Telehealth can offer a number of potential benefits to patients and NHS boards, such as reducing the need to travel to outpatient clinics, providing a quicker diagnosis, and avoiding referrals to hospital for diagnosis or treatment.¹ It also has the potential to help NHS boards deliver clinical services more efficiently. This report includes exhibits and case studies that highlight examples of the benefits delivered by telehealth initiatives.

2. In 2006, the Scottish Executive established the Scottish Centre for Telehealth (SCT) to support NHS boards in developing telehealth.² In April 2010, SCT was integrated with NHS 24 which is the provider of national telehealth services in Scotland.³ Scotland is the only country in Europe that has both a national organisation with a specific remit for telehealth and a national strategy for telehealth.⁴

3. This audit focused on telehealth initiatives in NHS boards that deliver care to patients. While technology is used routinely for meetings, education and training (for example, NHS staff using video-conferencing to discuss patient cases or offer professional advice and training to colleagues in other locations), we did not examine these initiatives in detail. The audit did not look at telecare (services mainly provided by local authorities using technology such

Exhibit 1

Examples of telehealth services

Telehealth can involve a range of technologies and can be used in a number of clinical areas.

- Mr X, who lives on an island in the north of Scotland, is referred by his GP to his local hospital to have an endoscopy (an internal examination using a small video camera on the end of a tube). A trained doctor at the hospital carries out an endoscopy, and the images are viewed live by a consultant in Aberdeen using video-conferencing equipment. Mr X can see the consultant on the video screen, and speak to him about the results.
- Mrs Y has noticed that a mole on her arm has changed shape and size. Her GP refers her to the local hospital, where a medical photographer takes high-quality digital images of the mole. The images, along with the GP's referral letter, are sent to a consultant dermatologist who assesses the mole and decides what action needs to be taken.
- Mr Z has chronic heart failure, which can result in admission to hospital if his condition worsens. He was recently given a piece of equipment to monitor his condition at home. Every day, Mr Z checks his weight, blood pressure and pulse using the equipment provided. He then enters these details into the monitoring equipment, and answers a few simple questions on his health (eg, level of tiredness and breathlessness). This information is sent via broadband to specialist nurses who monitor the results. If the results indicate that Mr Z's condition is deteriorating, a nurse contacts him to provide advice or take appropriate action.

Source: Audit Scotland

as sensors and alarms to support people to live more independently in their own home) or national eHealth projects (involving IT infrastructure and electronic information and records management). [Appendix 1](#) provides the definitions of telehealth, telecare and eHealth that we used for the purpose of this audit.

4. In December 2009, the Scottish Parliament's Health and Sport Committee took evidence on the development of telehealth in Scotland. The subsequent report noted that there are many positive examples of telehealth pilot initiatives within Scotland and that telehealth has the

potential to play a significant role in helping to care for people closer to home. However, the Committee highlighted NHS boards' lack of progress in rolling out these pilot projects more widely as part of their routine services.⁵

Demand and cost pressures within the NHS are increasing

5. As the proportion of older people in Scotland rises, the NHS faces growing demand for its services. The population aged 65 and over is projected to increase by 62 per cent between 2006 and 2031.⁶ In the same timescale, the population aged 85 and over is projected to

1 *Review of the Scottish Centre for Telehealth: November 2008 to January 2009*, Scottish Government, October 2009.

2 Prior to September 2007, the Scottish Administration was referred to as the Scottish Executive. It is now called the Scottish Government. When dealing with the earlier period this report refers to the Scottish Executive but in all other instances it refers to the Scottish Government.

3 NHS 24 is a Scotland-wide telephone-based service which provides health advice and information and offers clinical assessments by qualified health professionals over the telephone.

4 *Scottish Centre for Telehealth Strategic Framework 2010-12*, NHS 24, April 2010. NHS 24 is due to develop a new strategy in 2012.

5 *Clinical portal and telehealth development in NHS Scotland*, Scottish Parliament Health and Sport Committee report, March 2010.

6 *Financial overview of the NHS in Scotland 2009/10*, Audit Scotland, December 2010.

increase by 144 per cent. A growing older population is likely to lead to greater prevalence of long-term conditions such as diabetes and chronic obstructive pulmonary disease (COPD), which will require ongoing care.⁷ Projections for the hospital sector estimate that the rise in the over 65 population will lead to a 24 per cent rise in beds occupied by older people admitted as emergencies by 2016.⁸ By 2031, this equates to 6,000 more hospital beds.

6. Unlike some other parts of the Scottish public sector, NHS funding levels have remained steady.⁹ However, NHS budgets are coming under pressure as costs associated with pay, energy and prescribing rise at a faster rate than funding increases. For example, the Scottish Medicines Consortium estimates that the cost of drugs could rise by around ten per cent per year.¹⁰

7. These pressures leave NHS boards with a major challenge to find significant savings so they can continue to provide the same level and quality of services within their available budgets. Targeted appropriately, telehealth offers the potential to help NHS boards deliver a range of clinical services more efficiently and effectively, and manage increasing demands on services. However, evaluations of telehealth initiatives in Scotland are limited and do not provide reliable evidence on the overall effectiveness of telehealth compared to traditional patient care. The evidence base will be strengthened by three large-scale telehealth projects currently under way in the UK.

About our audit

8. This audit looked at the use of telehealth in the 14 territorial NHS boards in Scotland. It reviewed the structural, organisational and funding arrangements in place to support the development and delivery of telehealth. We assessed the benefits telehealth can deliver, and the barriers to NHS boards using it more widely. We also examined the potential of telehealth to deliver better value for money than more conventional models of patient care.

9. During the audit we interviewed staff in NHS boards and national bodies (ie, the Scottish Government and NHS 24), reviewed information on telehealth initiatives from the 14 territorial NHS boards, reviewed relevant documents, and carried out economic modelling. [Appendix 2](#) provides further information on our methodology.

10. An advisory group provided independent advice and feedback at key stages of the audit, and a panel of people with relevant experience provided input to our economic modelling work. See [Appendix 3](#) for membership of both groups.

11. Our report is in three parts:

- Planning for telehealth ([Part 1](#)).
- Delivery of telehealth ([Part 2](#)).
- Opportunities for improving value for money ([Part 3](#)).

12. We have identified questions that NHS boards may wish to consider when introducing or redesigning a service, to help assess potential opportunities for using telehealth ([Appendix 4](#)).

Summary of key messages

- The NHS in Scotland is facing growing demand for its services, due to an ageing population and the increasing prevalence of long-term conditions. NHS boards need to consider new models of care such as telehealth to help manage current and future demand. Targeted appropriately, telehealth offers the potential to help NHS boards deliver a range of clinical services more efficiently and effectively. To achieve this, NHS boards should consider the use of telehealth when introducing or redesigning clinical services.
- The SCT was established in 2006 to support NHS boards in developing telehealth. There was a lack of clarity over SCT's role and purpose in its first three years. The combination of the integration of SCT with NHS 24 and a new eHealth strategy provides a much stronger focus to drive the development of telehealth nationally. Although NHS boards are making use of telehealth, development and investment in this area has not been a priority.
- Telehealth offers a range of potential benefits for patients such as reducing travel, receiving a quicker diagnosis and avoiding hospital admissions. Patient experience is broadly positive and there are high levels of satisfaction. The experience of NHS staff involved in telehealth initiatives is also positive. However, opportunities for them to gain

⁷ COPD is a serious lung disease which can make it hard to breathe, and includes conditions such as emphysema and chronic bronchitis.

⁸ *Imperatives for change: shaping the future of care*, Scottish Government presentation, 2009.

⁹ Scottish Government funding of the NHS reduced by 0.3 per cent overall (in real terms) between 2010/11 and 2011/12, with territorial NHS boards receiving an average real-terms increase of 1.3 per cent and special health boards receiving an average real-terms reduction of three per cent between these two years. *Scotland's public finances: addressing the challenges*, Audit Scotland, August 2011.

¹⁰ *Getting into shape: a discussion paper to inform the debate about how the NHS in Scotland should respond to the challenges presented by the UK Government's Comprehensive Spending Review*, Institute of Healthcare Management Scotland, February 2011.

experience remain limited and more training and education are needed.

- Better-quality evaluations are required to provide reliable evidence on the overall effectiveness of telehealth and whether it offers better value for money than traditional patient care. Three large-scale telehealth projects in the UK will improve the availability of evidence. Our economic modelling work suggests that using telehealth to monitor patients with COPD at home has the potential to help NHS boards avoid costs of around £1,000 per patient per year.

NHS boards should:

- ensure that telehealth initiatives are supported by business cases that consider the long-term clinical, organisational and cost benefits resulting from the use of telehealth
- use [Appendix 4](#) of this report to assess potential opportunities for using telehealth when services are either introduced or redesigned.

Summary of key recommendations

NHS 24/SCT should:

- ensure that its new strategic framework, to be developed in 2012, contains specific and measurable objectives for developing telehealth, and is supported by a delivery plan which sets out a clear timetable for implementation
- continue to work with the Scottish Government and NHS boards to identify how the implementation of national telehealth programmes will be funded
- promote good practice in NHS boards in evaluating telehealth initiatives, including cost-effectiveness, and routinely analyse and share completed evaluations among NHS boards.

Part 1. Planning for telehealth



The integration of the Scottish Centre for Telehealth with NHS 24 is providing more focus for developing telehealth services across the country.



Key messages

- The combination of the integration of SCT with NHS 24 and a new eHealth strategy provides a much stronger focus to drive the development of telehealth nationally. However, at a strategic level within NHS boards there is still a lack of awareness about the role of NHS 24/SCT and the support it can provide.
- Overall, developing and investing in telehealth has not been a priority for NHS boards. Initiatives are often developed in isolation and not clearly linked to NHS boards' wider strategic priorities or any long-term financial planning. Telehealth is not routinely considered when introducing and redesigning services.

The Scottish Government is now providing clearer strategic direction for developing telehealth

13. In 2005, *Delivering for Health* included the Scottish Executive's commitment to establish SCT which would support NHS boards in developing telehealth.¹¹ Prior to this, there was limited use of telehealth in Scotland. Activity was focused around using video-conferencing as a tool to overcome large distances in rural and remote parts of Scotland, and there was very little evidence about the effectiveness and benefits of telehealth.¹²

14. SCT was established in 2006 and became fully operational in 2007/08 once staff recruitment was complete. It was hosted by NHS Grampian, which provided office accommodation, managed its payroll

and administered its budget. SCT was tasked with identifying telehealth initiatives that could be introduced nationally and promoting their development in NHS boards. Its main functions were to:

- provide a centre of expertise on telehealth, and define and share best practice with NHS boards
- support NHS boards to develop and implement telehealth projects, and support the process of awarding funding to projects
- coordinate the evaluation of telehealth projects that could be developed nationally
- evaluate the impact of telehealth on service redesign.¹³

15. In 2007, *Better Health, Better Care* set out the Scottish Government's aim to make Scotland a recognised global leader in telehealth.¹⁴ It highlighted four priority areas for SCT's work: long-term conditions (particularly COPD); paediatrics; unscheduled care; and care in remote and rural areas. However, it did not include any specific objectives or timescales for delivery. There was no clear direction for SCT in the first three years of its existence and no coordinated approach to its activity. Instead, it was largely reactive, providing support for existing initiatives and local pilots in a small number of NHS boards.

16. At the end of 2008, the Scottish Government reviewed SCT's performance.¹⁵ The review highlighted that SCT had successfully implemented telehealth projects in some clinical areas (eg, stroke and paediatrics), and that there was support from NHS boards for

a national centre for telehealth. However, it also found that a lack of clear strategic direction and confusion over the role and purpose of SCT were damaging its influence and success. The review also noted that the decision to physically locate SCT within NHS Grampian had limited its ability to be seen as a resource that all NHS boards could use, as it reinforced the perception that telehealth is more relevant in rural and remote areas. The report recommended that SCT join NHS 24, to help position itself as a national resource.

17. Within the Scottish Government, responsibility for telehealth lies within the wider remit of eHealth. This covers the use of IT systems and information and records management tools in the NHS for clinical, educational and administrative purposes. The Scottish Government's budget for eHealth increased from £72.2 million in 2008/09 to £90 million in 2011/12 (in cash terms).^{16, 17} The majority of this money goes to NHS National Services Scotland to fund national eHealth projects aimed at improving patient records systems and the way information on patients is stored. Information is not available to determine how much of this money is spent in individual NHS boards, or if any of it is used for telehealth projects.

18. A governance structure is in place to coordinate delivery of the Scottish Government's eHealth programme, which includes strategic boards and working groups with a clinical and technical remit. These groups are focused on implementing nearly 100 national eHealth projects. Telehealth does not feature significantly in the work of these groups, or in the Scottish Government's *eHealth Strategy 2008–11*.¹⁸ However, a new

11 *Delivering for Health*, Scottish Executive, November 2005.

12 'Telemedicine in Scotland', D Godden & N Barry, *Scottish Affairs*, no. 53, pp48-65, Autumn 2005.

13 *Delivering for Health*, Scottish Executive, November 2005.

14 *Better Health, Better Care: Action Plan*, Scottish Government, December 2007.

15 *Review of the Scottish Centre for Telehealth: November 2008 to January 2009*, Scottish Government, October 2009.

16 *Scottish Budget: Draft Budget 2009/10*, Scottish Government, September 2008.

17 *Scotland's Spending Plans and Draft Budget 2011/12*, Scottish Government, November 2010.

18 *eHealth Strategy 2008–11*, Scottish Government, June 2008.

eHealth strategy was published in September 2011.¹⁹ This provides a clearer direction for the development of telehealth by:

- identifying the potential role that telehealth can play in supporting people with a range of long-term conditions such as COPD
- outlining the Scottish Government's ongoing support for telehealth through continued funding for SCT (within NHS 24)
- highlighting the importance of the Delivering Assisted Living Lifestyles at Scale (DALLAS) project. This aims to demonstrate how technology can be used to help improve the quality of life of older people and those living with long-term conditions (see paragraph 67).

The integration of SCT with NHS 24 has been positive, providing more focus for the development of telehealth

19. The integration of SCT with NHS 24 took place in April 2010, and provided more direction and focus for SCT's activity. It is now part of an organisation which is the provider of national telehealth services. To correspond with its move into NHS 24, SCT published its first strategic framework, setting out its aim to develop and deliver telehealth across Scotland through four areas of work: stroke, paediatrics, COPD and mental health.²⁰ The Scottish Government has adopted this framework as the national strategy for telehealth.

20. Since April 2010, NHS 24/SCT has focused on delivering programmes in each of its four priority areas on a national scale. For example, it has worked with NHS boards to develop a strategic framework for mental health service delivery, outlining opportunities to develop telehealth initiatives in this area.²¹ It is involved in developing the first national paediatric service, where rural general hospitals will be linked via video-conferencing to the main paediatric centres in Scotland, providing round-the-clock access to paediatricians and paediatric nurses. NHS 24/SCT is also working with NHS boards across Scotland to extend and develop telehealth services in stroke and COPD, building on the services that are already in place.

21. The remit of NHS 24 in relation to telehealth continues to expand, which should help increase the profile of telehealth in NHS boards. NHS 24 is leading the implementation of a UK-wide telehealth initiative in Scotland (see paragraph 67), and is involved in telehealth projects at a European level (see paragraph 60). In addition, responsibility and resources for the national telecare programme moved from the Joint Improvement Team in the Scottish Government to NHS 24 in April 2011.²² A new NHS 24 strategy, due to be developed in 2012, will reflect future priorities for both telehealth and telecare, and set out how they will be delivered nationally.

Overall, developing telehealth has not been a priority for NHS boards

22. There is limited coverage of telehealth in NHS boards' Local Delivery Plans (LDPs) – only half refer to telehealth specifically. LDPs are the 'performance contract'

between the Scottish Government and NHS boards, and set out how NHS boards plan to meet national performance targets.²³ Only half of NHS boards have a dedicated clinical lead specifically for telehealth. Responsibility for telehealth tends to lie within the wider remit of eHealth. Managerial responsibility for telehealth sits with the Head of eHealth or Head of IT in over half of NHS boards. Eleven NHS boards have a strategic group that considers issues relating to telehealth, although they all have a wider remit covering eHealth or IT.

23. Where telehealth initiatives have been introduced in NHS boards, they have generally been led by enthusiastic clinicians who identified potential roles for telehealth in their clinical areas. This is important as it ensures that there is clinical support and buy-in for telehealth at the outset of any initiative. However, these initiatives are often small scale, developed in isolation and not clearly linked to NHS boards' wider strategic priorities or any long-term financial planning. Greater engagement between senior managers and clinicians is required before telehealth initiatives are introduced, to ensure that the appropriate infrastructure and resources are available to successfully deliver a telehealth service. The role of senior managers is particularly important in the current financial climate, as NHS boards need to examine all investment decisions closely and assess any opportunities to deliver services more efficiently.

24. There is still a lack of awareness among some NHS boards about the role of SCT. More than a third of the 14 medical directors interviewed did not know if SCT was performing its core functions well. Half of medical

19 *eHealth Strategy 2011–17*, Scottish Government, September 2011.

20 *Scottish Centre for Telehealth Strategic Framework 2010-12*, NHS 24, April 2010.

21 *Mental Health Strategic Framework*, NHS 24, March 2011.

22 Telecare is the use of technology to support people with health and/or social care needs to live safely and more independently in their own home (see Appendix 1). The Joint Improvement Team is co-sponsored by the Scottish Government, the Convention of Scottish Local Authorities (COSLA) and NHS Scotland, and provides practical support and additional capacity to local health and social care partnerships across Scotland (www.jitscotland.org.uk).

23 The NHS in Scotland reports its progress against national HEAT targets. These are set by the Scottish Government and cover Health improvement, Efficiency and governance, Access to services, and Treatment appropriate to individuals.

directors felt that the integration of SCT and NHS 24 had no impact on the delivery of telehealth within their board. To help improve awareness of the role of SCT at a strategic level within NHS boards, the Chief Executive and Medical Director of NHS 24 have been attending executive team meetings in every territorial NHS board to discuss issues including the development of telehealth.

25. NHS 24/SCT is also working to raise the profile of telehealth more widely in NHS boards, particularly with key decision-makers in middle and senior management, eHealth leads, and others responsible for approving business cases for new and redesigned services. NHS 24/SCT is making use of existing partnerships, such as regional planning groups, to develop telehealth projects. This approach has been successful in developing a regional stroke programme through the South East and Tayside Regional Planning Group ([Case study 1](#)).

An estimated £4.7 million has been allocated to telehealth initiatives since 2006

26. It is not possible to identify exactly how much NHS boards have spent on developing telehealth in Scotland as there is limited availability of cost information on individual telehealth projects. However, we estimate that around £4.7 million has been allocated to telehealth initiatives since 2006, based on the information available for 49 initiatives. This funding is from four main sources:

- the Scottish Government (68 per cent of funding)

Case study 1

Telestroke in the south and east of Scotland

Best practice guidance is that thrombolysis (clot busting) treatment for stroke should be given within 4.5 hours of a patient displaying symptoms of stroke.¹ Before this treatment can be offered, a consultant must view the patient's brain scan and carry out a face-to-face consultation. The national telestroke programme, led by NHS 24/SCT, aims to increase the number of stroke patients receiving thrombolysis. It uses video-conferencing to ensure patients have access to a stroke specialist, allowing them to receive thrombolysis within 4.5 hours. The programme is driven by the need to offer a service which is not currently available to all patients.

Through engagement with the South East and Tayside Regional Planning Group (SEAT), NHS 24/SCT has successfully implemented the telestroke programme in five NHS boards in the south and east of Scotland. Previously, only NHS Lothian was able to provide a round-the-clock stroke thrombolysis service. Three other NHS boards in the region (Forth Valley, Fife and Dumfries and Galloway) could only offer a thrombolysis service from 9am to 5pm on a weekday, and NHS Borders could only offer an ad hoc service.

The South Telestroke Network went live in March 2011. The network links an on-call stroke specialist in NHS Lothian with the four other NHS boards. The stroke specialist can use video-conferencing facilities at NHS Lothian sites, or in their home, to carry out consultations with stroke patients within NHS Lothian and in the four other NHS boards during out-of-hours periods. NHS 24 is providing nearly £60,000 in 2011/12 to buy, install and maintain video-conferencing units for the network. Evaluations of this programme will be presented to SEAT after the first six months and after one year.

Note: 1. *Better heart disease and stroke care action plan*, Scottish Government, June 2009.
Source: Audit Scotland

- NHS boards and special health boards (21 per cent of funding)²⁴
- charities (8 per cent of funding)
- NHS 24/SCT (3 per cent of funding).

27. Almost £3 million of this funding has been spent on two telehealth projects. The Telescot project in NHS Lothian has received funding of around £1.9 million from a range of

sources ([Case study 4, page 22](#)). The Scottish Government Health and Social Care Directorate provided £1 million over three years (2008/09 to 2010/11) to support the development of a national paediatric telehealth service.²⁵ Other Scottish Government funding includes £347,000 from the Joint Improvement Team for COPD home-monitoring initiatives, and £243,000 from the Improvement and Support Team of the Health Delivery Directorate for initiatives in

²⁴ In addition to the 14 territorial NHS boards, there are eight special health boards which are responsible for improving patient care across Scotland (eg, Scottish Ambulance Service, NHS Education for Scotland). Although NHS 24 is a special health board, we have identified its funding for telehealth initiatives separately.

²⁵ *National Delivery Plan for Children and Young People's Specialist Services in Scotland*, Scottish Government, January 2009.

dermatology, neurology and surgery. **Exhibit 2** provides examples of how funding has been used to support a range of telehealth initiatives in Scotland.

28. Since 2006/07, the Scottish Government has provided SCT with around £1 million a year to cover its running costs (eg, salaries and

accommodation). In the last three years, a small amount of this money (£180,000 in 2010/11) has been used to support telehealth projects in NHS boards.

29. Over a fifth of initiatives were developed using existing resources in NHS boards (eg, equipment and staff) and did not receive any specific funding. A lack of funding is cited

as a barrier to telehealth initiatives being implemented or developed further than the piloting stage. Around half of medical directors highlighted funding as one of the main barriers to developing telehealth in the future. As NHS 24/SCT develops its strategy to deliver national telehealth programmes, it will need to engage with NHS boards and the Scottish Government to consider how implementation of these initiatives in NHS boards will be funded.

Exhibit 2

Funding of telehealth initiatives

Funding for telehealth initiatives comes from a wide range of sources.

Telehealth initiative	Funding
<p>Pulmonary rehabilitation (NHS Borders, Dumfries and Galloway, Lothian, Tayside and Western Isles)</p> <p>Aim: to deliver rehabilitation programmes to patients with respiratory disease remotely across five NHS boards, improving patients' access to rehabilitation classes so they do not have to travel long distances.</p>	<p>£75,000</p> <ul style="list-style-type: none"> £50,000 from the Long-Term Conditions Alliance Scotland £25,000 from NHS 24/SCT
<p>COPD home-monitoring (Aberdeen City Community Health Partnership)</p> <p>Aim: to use telehealth monitoring in patients' homes to help those with unstable COPD better manage their condition.</p>	<p>£30,000 from the Scottish Government's eHealth Development and Demonstrator funding</p>
<p>Hypertension (NHS Lothian – part of the Telescot programme)</p> <p>Aim: to use telehealth blood pressure monitoring in patients' homes to help those with hypertension better manage their condition.</p>	<p>£275,000</p> <ul style="list-style-type: none"> £230,000 from the BUPA Foundation charity £25,000 from NHS Lothian £20,000 from the High Blood Pressure Foundation charity
<p>Sepsis (blood poisoning) (NHS Fife and the Scottish Ambulance Service)</p> <p>Aim: to clinically assess a patient with blood poisoning in an ambulance and send the results electronically to the emergency department of the hospital, allowing them to plan the care required for the patient prior to their arrival.</p>	<p>£10,000 from the Scottish Ambulance Service</p>

Source: Audit Scotland

Telehealth should be considered as an option when NHS boards are introducing or redesigning services

30. Telehealth is not generally considered as an option when NHS boards are planning or redesigning the way a service is delivered. Initiatives are often developed around the availability of a particular piece of new technology or equipment and in isolation from the NHS board's wider strategic priorities. As outlined earlier, responsibility for telehealth tends to sit within the wider remit of eHealth or IT. However, this places telehealth within a technology-led setting rather than positioning it as a tool to enable the redesign of clinical services.

31. For telehealth to be sustainable, NHS boards need to start considering how technology can be used as a tool to support new and more efficient ways of delivering services, rather than an additional way of delivering them. A list of questions to help NHS boards assess potential opportunities for using telehealth is set out in [Appendix 4](#).

32. The Scottish Government's Efficiency and Productivity Framework for the NHS recognises the potential role of telehealth in supporting service redesign and highlights telehealth as one of the tools that can be used to support the redesign of cancer and orthopaedic services.²⁶ Telehealth may not always be an appropriate way

of delivering healthcare, and it may not be suitable for all patients and all specialties. However, NHS boards should consider the use of telehealth when planning or redesigning services, and assess whether it has the potential to provide a more efficient or better-quality service, or to help manage increasing demand (Case study 2).

Recommendations

NHS 24/SCT should:

- ensure that its new strategic framework, to be developed in 2012, contains specific and measurable objectives for developing telehealth, and is supported by a delivery plan which sets out a clear timetable for implementation
- continue to build on relationships with regional planning groups to further develop telehealth in NHS boards
- continue to work with the Scottish Government and NHS boards to identify how the implementation of national telehealth programmes will be funded.

NHS boards should:

- consider having a dedicated clinical lead for telehealth to help coordinate activity and drive forward development in this area
- use [Appendix 4](#) of this report to assess potential opportunities for using telehealth when services are either introduced or redesigned.

Case study 2

Redesigning dermatology services in NHS Lanarkshire

Referrals to the dermatology service in NHS Lanarkshire are rising by about ten per cent each year, placing increasing demands on consultants' time and lengthening waiting times for patients. In 2005, NHS Lanarkshire reviewed activity in its dermatology service, and found that for every 100 cases of suspected melanoma referred, only one or two were confirmed as being cancerous. Therefore the NHS board decided to redesign its dermatology service for skin cancer.

A telehealth approach was considered, and in 2006 NHS Lanarkshire introduced a pilot virtual skin cancer clinic with funding from the Scottish Government's Centre for Change and Innovation (£120,000).¹ Any patients suspected of having skin cancer are referred from their GP directly to the Medical Illustration Department to have their skin lesion photographed. These images, along with an electronic referral from the GP, are then assessed by a dermatology consultant who determines if the patient needs to be seen urgently or if the skin lesion is not worrying.

The pilot was successful in reducing the time patients waited to be seen and treated within Scottish Government cancer targets. The dermatology service for skin cancer in NHS Lanarkshire has been redesigned around this approach. All patients with suspected skin cancer are referred through the virtual clinic – around 200 patients a month. Telehealth has helped NHS Lanarkshire manage demand for its skin cancer service, as consultants can prioritise those patients who need to be seen more urgently.

Note: 1. The Scottish Government set up the Centre for Change and Innovation to support continuous improvement in the NHS. The Centre's work is now being taken forward by the Scottish Government's Quality and Efficiency Support Team.
Source: Audit Scotland

Part 2. Delivery of telehealth



Patient experience of telehealth is generally positive.



Key messages

- All NHS boards in Scotland are making use of telehealth across a range of clinical specialties, and it is most well used in the north of Scotland. However, the telehealth initiatives in place tend to be small-scale and involve small numbers of patients. Almost half of the initiatives are pilots or trials, and are not part of a routine service delivered by the NHS board.
- Where telehealth initiatives are in place, patient satisfaction is generally high. Patients are open to receiving a service that involves some form of telehealth.
- The experience of NHS staff involved in telehealth initiatives is generally positive. However, opportunities for staff to gain experience of telehealth remain limited, as is training and education. IT infrastructure and technical support are important in developing telehealth but need to be planned for appropriately.
- NHS boards have largely been developing telehealth initiatives in isolation from each other and there is no central source of good practice examples. NHS 24/SCT needs to strengthen arrangements to share good practice and routinely share completed evaluations among NHS boards.

All NHS boards are making use of telehealth but initiatives are small-scale and almost half are pilots

33. Across Scotland, NHS boards are making use of telehealth in a range of clinical specialties, including stroke, dermatology, respiratory medicine and paediatrics ([Exhibit 3, overleaf](#)). However, the extent and way in which NHS boards are using telehealth vary across Scotland.

34. Since 2006, we estimate that around 70 telehealth initiatives have been introduced in NHS boards.²⁷ Most of these initiatives are on a small scale, involving on average 34 patients. Small-scale pilots have been the easiest way for NHS boards to implement telehealth initiatives as they often do not require the full redesign of services, only a small number of staff need to be trained, and upfront costs are reduced. However, the smaller scope can limit the reliability of any findings on the effectiveness or benefits of the initiative. These issues are explored in more detail in [Part 3](#).

35. Of the 70 telehealth initiatives we identified, around 40 per cent are currently being piloted (ie, trialled for a set period of time). A further 40 per cent are part of an NHS board's routine service delivery, although the telehealth service tends to be provided in addition to the original service. It is unusual for a telehealth service to replace the original service; this usually requires service redesign and has only happened in a small number of cases ([Case study 2, page 11](#)). The remaining 20 per cent of initiatives

are either delivered on an ad hoc basis, are being evaluated following a pilot, or have been discontinued. For example, NHS Fife piloted the use of video-conferencing to diagnose and manage patients with uveitis (an eye condition). However, this was discontinued as the quality of the digital image of the eye was not good enough for the consultant to assess.

36. There is a wide range of reasons why NHS boards have made limited use of telehealth, including:

- the lack of appropriate and reliable IT infrastructure and equipment
- limited funding being available, normally at piloting stage
- resistance or uncertainty among clinical staff to providing services in a different way
- the lack of reliable, transparent evidence that demonstrates the effectiveness of telehealth.

Telehealth is most well used in the north of Scotland

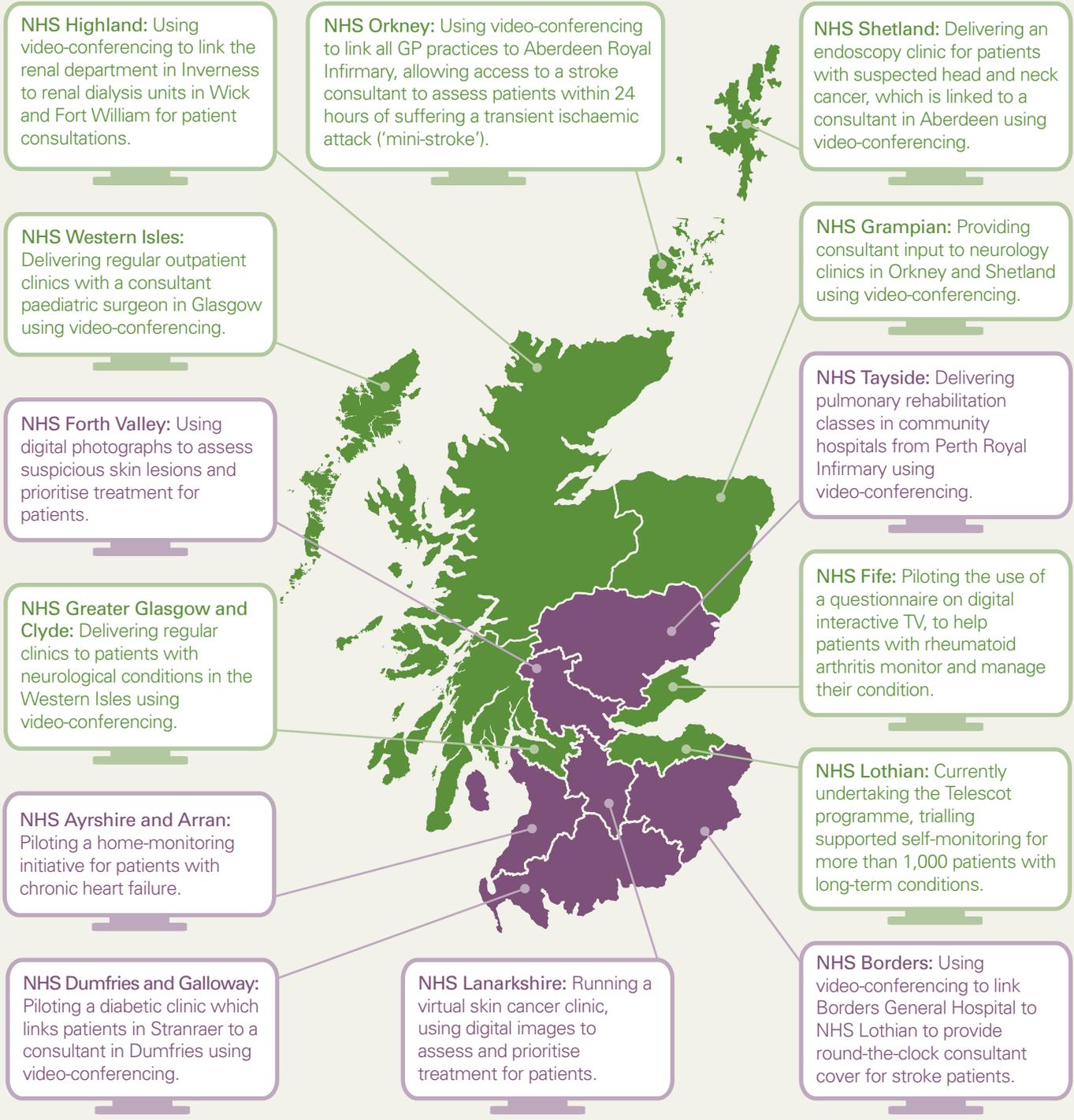
37. NHS Grampian and NHS Highland are responsible for nearly half of the telehealth initiatives that have been introduced in Scotland. They are using telehealth in the widest range of clinical areas and both have a number of joint initiatives in place with the island boards (NHS Shetland, Orkney and Western Isles). Many of these initiatives involve the use of video-conferencing, to provide access to healthcare for patients in more remote areas.

²⁷ This is based on information we collected from the 14 territorial NHS boards and NHS 24/SCT up to August 2011. It does not include the routine use of technology, such as video-conferencing facilities, to conduct meetings to discuss patient treatments and conditions.

Exhibit 3

How telehealth is used in NHS boards

The map shows an example of a telehealth initiative in each NHS board.



Wide range of telehealth initiatives



Smaller range of telehealth initiatives

Note: The range of telehealth initiatives in each NHS board reflects the number of initiatives introduced in the board since 2006, based on information we collected from the 14 territorial NHS boards and NHS 24/SCT up to August 2011.
Source: Audit Scotland

38. Traditionally, telehealth has been seen as a tool for providing healthcare to rural and remote locations, and the initial location of SCT in NHS Grampian may have supported this perception.²⁸ However, the range of technologies available to NHS boards is increasing, and telehealth offers a range of potential solutions which may be equally appropriate in an urban setting. For example, using telehealth to reduce the need for people to travel to hospital from areas of a city where there may be limited access to reliable or affordable transport. While the transfer of SCT into NHS 24 is helping to develop the profile of telehealth across Scotland, further engagement between NHS 24/SCT and NHS boards and a stronger evidence base for telehealth are still necessary.

Telehealth offers many potential benefits for patient care

39. Where telehealth is being used, it offers a number of advantages to patients, staff and NHS boards (Exhibit 4, overleaf). It has the potential to provide patients with a quicker diagnosis and can help avoid the need for an outpatient appointment or hospital admission. Telehealth can also reduce the length of stay in hospital by supporting early discharge. It can reduce the need for patients to travel as far, saving them time, money and (in some cases) discomfort. For some patients, telehealth provides a service which may not otherwise have been available.²⁹ Home-monitoring for patients with long-term conditions can help them understand and manage their condition better and feel more independent.³⁰

Patient experience of telehealth is broadly positive

40. Evaluations of telehealth pilots and trials in Scotland provide good coverage of the patient experience, which is generally positive (Exhibit 5, page 17). Patients are open to receiving a service using some form of telehealth, and medical directors agreed that patients are not a barrier to telehealth being implemented more widely within NHS boards.

41. To get an indication of patient satisfaction with telehealth, we reviewed nine evaluations covering a broad range of telehealth initiatives and found that reported patient satisfaction is consistently high. These included evaluations of initiatives for home-monitoring of long-term conditions, pulmonary rehabilitation, paediatrics and patient consultations being carried out by video-conferencing. Patients identified avoiding travel and receiving care closer to home as some of the biggest benefits of telehealth.

42. Where patients are responsible for using some form of technology themselves (such as home-monitoring equipment for long-term conditions), the evaluations reported that it helped them to better manage their own condition and subsequently address health or social care concerns such as depression. Other patients felt that it improved their understanding and awareness of their health, which helped motivate lifestyle changes such as increased exercise or better dietary awareness.

43. Although patient experience of telehealth was broadly positive, the evaluations did identify some concerns. The main area of concern related to training and support around the use of new technology, although such fears did diminish as patients became more familiar with the technology. Where video-conferencing was used, some patients were concerned that the absence of face-to-face contact would make the consultation feel impersonal and that the appointment time would be shorter. However, these concerns were allayed during the actual consultation process.

44. Evaluations of telehealth initiatives in England also suggest that patient satisfaction with telehealth is broadly positive. NHS North Yorkshire and York has rolled out one of the largest telehealth initiatives in the UK, which provides patients with home-monitoring equipment to manage their long-term condition. A recently completed survey of 200 patients involved in this initiative found that:

- 96 per cent would recommend the telehealth technology to others
- 98 per cent were satisfied or highly satisfied with how telehealth is helping them manage their condition.³¹

45. Telehealth studies in Canada and the USA also report high levels of patient satisfaction.^{32, 33}

²⁸ *Review of the Scottish Centre for Telehealth: November 2008 to January 2009*, Scottish Government, October 2009.

²⁹ *Ibid.*

³⁰ *Telehealth: a review of the evidence*, NHS North Yorkshire and York, Tunstall, and Ernst & Young, 2010.

³¹ *Managing long-term conditions with telehealth: patient survey results*, NHS North Yorkshire and York, April 2011.

³² *Telehealth benefits and adoption: connecting people and providers across Canada*, Canada Health Infoway, May 2011.

³³ *Care coordination/home telehealth: the systematic implementation of health informatics, home telehealth and disease management to support the care of veteran patients with chronic conditions*, A Darkins et al, Telemedicine and eHealth, December 2008.

Exhibit 4

Potential benefits of telehealth for patients, staff and NHS boards in NHS 24/SCT's four priority areas

There are several potential benefits from using telehealth.

Before telehealth	Using telehealth	Potential benefits of telehealth
In NHS Borders, Fife, Forth Valley and Dumfries and Galloway, patients who suffered a stroke were only offered thrombolysis (clot-busting treatment) if they could reach a hospital with the appropriate scanning equipment, be seen by a stroke consultant on-site, and receive thrombolysis within 4.5 hours, in line with best practice guidance.	Patients suffering a stroke are taken to the nearest hospital with scanning equipment. An on-call stroke consultant based in NHS Lothian assesses the brain scan image electronically from their office or home, consults with the patient via video-conferencing, and then decides whether thrombolysis should be offered. Thrombolysis is then given to the patient by staff locally within 4.5 hours.	<ul style="list-style-type: none"> • Thrombolysis may reduce a patient's length of stay in hospital and reduce the need for stroke rehabilitation services, improving the outcome for the patient and potentially reducing costs for the NHS board. • Patients receive a treatment they may not have previously been offered.
Children in the Western Isles requiring a paediatric surgical consultation were transferred from their local hospital to one of the four children's hospitals in Scotland. This could involve a long journey and delay diagnosis of the child's condition.	Staff at the local hospital use video-conferencing equipment to speak to a consultant paediatric surgeon at the Royal Hospital for Sick Children (Yorkhill) in Glasgow. The consultant assesses the child's condition, looks at X-rays, and discusses the case with staff at the local hospital and the child's parents. The consultant makes a diagnosis and advises on the best course of treatment.	<ul style="list-style-type: none"> • Patients do not need to travel as far to access the services of a specialist consultant. • Patients receive a quicker diagnosis, reducing any delay in treatment. • Local NHS staff can get a second opinion from a specialist consultant which can contribute to staff development. • Lower greenhouse gas emissions through reduced travel.
In NHS Tayside, patients with COPD living in Pitlochry had to travel to Perth Royal Infirmary (a 50 mile round trip) twice a week for eight weeks to attend a pulmonary rehabilitation programme.	Patients with COPD living in Pitlochry attend a pulmonary rehabilitation programme at the local community hospital. Using video-conferencing, patients participate in a programme led by a respiratory physiotherapist and nurse at Perth Royal Infirmary, and are supported by a physiotherapy assistant at the community hospital.	<ul style="list-style-type: none"> • Patients do not need to travel as far, so those who cannot cope with a long journey can participate in the programme. • Provides a development opportunity for NHS staff in the community hospital. • Lower greenhouse gas emissions through reduced travel.
Patients suffering from low mood, mild to moderate depression or symptoms of anxiety may lack the confidence to seek help. They may also experience difficulty accessing appropriate mental health services because of where they live or due to a lack of specialist services in their NHS board area.	Patients living in Borders, Highland, Lothian, Shetland, Western Isles and West Dunbartonshire phone a helpline, hosted by NHS 24. They speak directly with a self-help coach and/or qualified therapist on a regular basis for four to 12 weeks, talking through the materials in a 'workbook' which is available online or in paper copy.	<ul style="list-style-type: none"> • Patients receive support in the privacy of their home, increasing the likelihood of them seeking help. • Patients have improved and quicker access to appropriate specialist psychological therapies. • Offering guided self-help to patients may help reduce the prescribing of anti-depressant medication, which may reduce costs for the NHS board.

Exhibit 5

Patient experiences of telehealth

Patients are positive about their personal experience of telehealth.

COPD home-monitoring initiative

"I've never had such care [until commencing telehealth monitoring]. I feel like someone is really interested in keeping me out of hospital"

Cardiology outpatient service (using video-conferencing)

"Local appointment was more relaxed, rather than long travel to busy distant hospital. Less time off work"

"Brilliant, made to feel more at ease as two doctors discussed case. Reassured as had second opinion from a specialist doctor in Yorkhill"

Scottish paediatric project

"The progress dad has made in the space of a few days is incredible and we know that has a lot to do with the clot-busting drugs you were able to prescribe"

Telestroke programme

Source: Audit Scotland, review of telehealth evaluations

48. However, where staff have used telehealth, their experience is generally positive. The RCN survey found that 90 per cent of respondents in Scotland who had used telehealth rated their experience as positive.³⁵ Clinical staff whom we interviewed were all positive about their personal experience of telehealth and the benefits it delivered for both them and their patients, such as reduced travel, shorter waiting times and quicker access to treatment.³⁶

Staff education and training are important to increasing acceptance and use of telehealth

49. There is a need to equip the current workforce with the skills to manage new and more sophisticated technologies, and to support changes to roles and working practices.³⁷ Telehealth initiatives can offer learning and development opportunities for NHS staff, by changing working practices. For example, a recent COPD initiative in NHS Lanarkshire offered opportunities to test the potential for telehealth to enhance the role of community nurses through home-monitoring of patients. In NHS Tayside, the introduction of video-conferencing to provide a pulmonary rehabilitation programme at Pitlochry Community Hospital offered an opportunity for physiotherapy staff at that location to take on more responsibility and oversee patients' care (Exhibit 4). There is scope for such opportunities to be made available to other staff more widely.

50. Our review of telehealth evaluations identified staff concerns about their level of knowledge and skills at the start of their involvement in a telehealth initiative. These concerns diminished over time, through experience and as their confidence increased. However, the findings in the evaluations do underline the importance of training and development for staff in using telehealth.

NHS staff require more opportunities, support and training to use telehealth

46. As the use of telehealth in NHS boards in Scotland remains small-scale and involves small numbers of patients, the opportunities for clinical staff to gain practical experience of telehealth are limited. For example, a survey of nurses by the Royal College of Nursing (RCN) in 2010 identified that 76 per cent of respondents in Scotland had no experience of using telehealth and only 37 per cent felt ready for its introduction.³⁴

47. A third of the 14 medical directors reported staff resistance or lack of commitment as one of the main

barriers to developing telehealth within NHS boards. Interviews with other NHS staff and GPs also identified that there is still some resistance to using telehealth as a means of delivering care. One of the main reasons for this is the lack of reliable evidence on the costs and effectiveness of telehealth on a large scale. GPs were also unsure how appropriate telehealth was to the service they provide, as they often see patients for more than one condition. They felt that telehealth is better suited to delivering care for a specific clinical condition (eg, diabetes or rheumatism), which better reflects the model of care provided in a hospital.

34 *eHealth survey 2010: report*, Royal College of Nursing, June 2011.

35 *Ibid.*

36 Our three fieldwork sites were NHS Fife, Grampian and Lanarkshire (see Appendix 2).

37 *Healthcare without walls: a framework for delivering telehealth at scale*, 2020health.org, November 2010.

51. NHS 24/SCT has started to make progress in this area and has developed an education and training programme. The programme includes a number of different workstreams, such as developing teaching materials on using telehealth equipment. The programme is underpinned by a two-year strategy which has been developed jointly by SCT and the Joint Improvement Team.³⁸ NHS 24/SCT is also engaging with universities to promote the inclusion of telehealth in medical undergraduate curriculum. The RCN has introduced an online learning resource for its members explaining what telehealth is; how it can be used; the potential benefits and barriers to using telehealth; and how to evaluate telehealth initiatives.³⁹ Also, an eHealth competency framework was published in June 2011, outlining the knowledge, skills and behaviour that medical staff involved in telehealth initiatives should be able to demonstrate.⁴⁰

IT infrastructure and technical support are important in developing telehealth and need to be planned for appropriately

52. Ongoing technical support is essential to make the best use of the technology used to support telehealth and to make telehealth initiatives sustainable. However, SCT was established with no formal technical support function. In addition, resources in NHS boards' IT departments are directed towards the day-to-day maintenance of software and equipment and introducing and supporting national eHealth projects.

53. However, some progress is being made in this area. In 2010, NHS 24/SCT recruited three people to provide additional technical support to NHS boards, to help them implement telehealth initiatives. The posts are

based in NHS Grampian, Lothian and Greater Glasgow and Clyde. They are temporary posts and will be reviewed in March 2012.

54. Interviews suggest that the lack of an appropriate and reliable IT infrastructure is a barrier to developing telehealth in some boards. NHS 24/SCT is working with NHS

National Services Scotland and the North of Scotland Regional Planning Group to improve the IT infrastructure for video-conferencing ([Case study 3](#)). When introducing telehealth services, NHS boards need to ensure they have the appropriate IT infrastructure and necessary ongoing technical support to deliver them effectively.

Case study 3

National video-conferencing project

NHS boards use video-conferencing for a number of reasons:

- To improve access to clinical expertise in rural areas.
- To generate efficiency savings by reducing travel.
- To deliver education and training.

However, the quality of video-conferencing services across NHS boards is variable, due to the different types of equipment used and the reliability of the existing IT network to support it.

In October 2009, a national video-conferencing project began, funded by the eHealth directorate of the Scottish Government (£120,000) and NHS 24 (£80,000). The project aims to develop a good-quality, reliable and sustainable network of video-conferencing services across all NHS boards in Scotland. The project involves linking up all video-conferencing devices in NHS boards, to improve the ease and reliability with which people can communicate both within and between NHS boards. The new video-conferencing infrastructure will:

- improve the quality of video calls, by routing them through broadband instead of phone lines
- reduce network costs for NHS boards, as broadband is less expensive than phone line rental and call charges
- support a single directory of video-conferencing devices, making it easier to book and set up video calls within and between NHS boards
- introduce a central system to identify and manage faults.

The new video-conferencing infrastructure is now up and running in the six boards in the north of Scotland (NHS Grampian, Highland, Orkney, Shetland, Tayside and Western Isles). The roll-out to all other NHS boards is due to be completed by March 2012, and the project team will then decide how to develop the project further (eg, identifying ongoing technical support for the video-conferencing infrastructure).

Source: Audit Scotland

38 *A strategy for education and training 2010-2012*, Joint Improvement Team and Scottish Centre for Telehealth, March 2010.

39 *Telehealth explained*, RCN Learning Zone, Royal College of Nursing website, www.rcn.org.uk

40 *eHealth competency framework: defining the role of the expert clinician*, Academy of Medical Royal Colleges and the Scottish Government, June 2011.

NHS 24/SCT needs to strengthen its arrangements for sharing good practice

55. NHS boards have largely been developing and evaluating telehealth initiatives in isolation from each other. While NHS 24/SCT has provided support and advice to some NHS boards, it needs to be more proactive in disseminating good practice and routinely sharing both the experiences and evidence from telehealth pilots in Scotland. Medical directors identified this as one of the key areas where NHS boards require more support and guidance.

56. Of the telehealth initiatives introduced to date, only around 40 per cent have been evaluated. The overall quality of these evaluations is generally poor (see Part 3). To assist NHS boards in carrying out evaluations, NHS 24/SCT has included a range of reference material on its website.⁴¹ However, there is no central coordination of the evaluations that do exist, and no central point where NHS boards can access completed evaluations to learn from them and consider whether they could adopt a similar initiative within their own board.

57. In recognition of the need to share good practice among NHS boards, NHS 24/SCT established a telehealth champions' network in 2010. This brings together resources from a range of organisations, including NHS boards and academic institutions, to share best practice. The group meets quarterly and examines a range of telehealth issues including home-monitoring of COPD and the use of telehealth in the voluntary sector and in remote and rural areas. Feedback that NHS 24/SCT has gathered from recent meetings indicates that it is a helpful forum for practitioners to start to share

their own experiences of telehealth. However, it is too early to tell what impact the network is having on the implementation of telehealth in NHS boards.

Other countries are increasingly using telehealth but many of the initiatives are also on a small scale

58. An analysis of telehealth activity in other European countries identified many telehealth initiatives although, as in Scotland, many of these are on a small scale.⁴² Telehealth is predominately being used for home-monitoring of patients with long-term conditions, access to care from a distance in remote areas, and coordinating services between health and social care providers.

59. A small number of countries, including Canada and the USA, have developed a more strategic approach to telehealth, using it to redesign services. This has led to significantly greater adoption of telehealth in some cases. This large-scale use of telehealth offers better opportunities to assess whether it is more effective and offers better value for money than traditional patient care. For example, the Veterans Health Administration in the USA delivers a telehealth home-monitoring service to over 30,000 patients with long-term conditions. This has resulted in a 20 per cent reduction in the number of hospital admissions, and 86 per cent of patients are satisfied with the service. It costs \$1,600 per patient each year to deliver the telehealth service, compared to \$13,121 for a conventional home-based care service.⁴³ In Canada, using telehealth helped the health system avoid estimated costs of around \$55 million in 2010, by reducing the need for patient travel (\$34 million), hospital stays (\$20 million) and emergency department visits (\$1 million).⁴⁴

60. NHS 24 represents Scotland in Europe-wide telehealth projects, such as the Regional Telemedicine Forum Project. This is a collaboration of nine European regions which provides a forum for different countries to share experiences of telehealth, with a view to identifying and promoting best practice. NHS 24 is involved in a European project developing a Telemedicine Readiness Assessment Tool (TREAT). The tool can be used to assess the current ability of a region to implement a large-scale telehealth service, by examining the policies, infrastructure, processes and systems in place (or proposed) to support the service. The tool is being piloted in Moray Community Health Partnership in 2011. NHS 24 has also contributed to the development of a Model for Assessment of Telemedicine (MAST), which aims to provide a structured framework for European countries to assess the effectiveness of telehealth initiatives.

Recommendations

NHS 24/SCT should:

- continue to work with NHS boards to ensure appropriate technical support is available for any nationally supported telehealth projects
- promote good practice in evaluating telehealth initiatives in NHS boards and routinely analyse and share completed evaluations among NHS boards.

NHS boards should:

- ensure that when introducing a telehealth service they have the appropriate IT infrastructure and necessary ongoing technical support to deliver it effectively.

41 The Scottish Centre for Telehealth and Telecare website, www.sctt.nhs.uk, provides a number of online resources for NHS boards.

42 *European countries on their journey towards national eHealth infrastructures: final European progress report*, European Commission, January 2011.

43 *Care coordination/home telehealth: the systematic implementation of health informatics, home telehealth and disease management to support the care of veteran patients with chronic conditions*, A Darkins et al, Telemedicine and eHealth, December 2008.

44 *Telehealth benefits and adoption: connecting people and providers across Canada*, Canada Health Infoway, May 2011.

Part 3. Opportunities for improving value for money



Telehealth offers the potential to provide NHS services more efficiently.



Key messages

- Better-quality evaluations are required to provide reliable evidence on the overall effectiveness of telehealth and whether it offers better value for money than traditional patient care. Evaluations should more systematically cover the benefits and costs of the specific initiative and compare them with current practice.
- Recent large-scale projects in the UK, involving at least 37,000 patients, will improve the availability of evidence on telehealth.
- Our economic modelling work suggests that using telehealth to monitor patients with COPD at home has the potential to offer better value for money than conventional care.

Better-quality evaluations of telehealth initiatives are needed

61. In the context of telehealth, evaluation involves assessing the extent to which an initiative has been successfully implemented and its effect on aspects of service quality, cost or patient experience. Most telehealth initiatives in Scotland have been introduced as pilots or trials. Evaluations should form an important part of this process as they can provide an evidence base to inform decisions about if, and how, the initiative should be taken forward.

62. However, of the telehealth initiatives that have been introduced in Scotland, only around 40 per cent have been evaluated. Our review of existing evaluations found that the work has not been as useful as it should have been. The evaluations have:

- been based on small numbers of participants, limiting the overall reliability of the results
- not used a control group of patients to compare outcomes, introducing the possibility that some of the benefits may not be due to telehealth. A randomised controlled trial is the best method of determining whether a cause and effect relationship exists between telehealth and the outcomes under examination, but it requires a large sample of patients and can be expensive, so must be designed and implemented proportionately⁴⁵
- generally not been carried out independently of the clinical staff who are actually running the telehealth initiative and therefore have the potential to introduce bias
- contained incomplete cost information, preventing any analysis of cost-effectiveness or comparisons between similar telehealth initiatives.

63. Overall, there is little consistency in the approach taken to evaluation. Cost information is often presented differently, for example variation in the costs adopted for a standard overnight bed stay or a specific grade of staff. This can make it very difficult to compare similar initiatives across different NHS boards and identify any common themes in terms of value for money or measures of effectiveness.

64. It is essential that evaluation is considered at the outset of any telehealth pilot or trial, and sufficient time needs to be built in for planning and designing this. Evaluations should assess patient and staff satisfaction, and identify the benefits experienced by both patients and the NHS board through using telehealth. It is also important that evaluations systematically assess the

costs and outcomes (eg, reduced hospital admissions) of the specific initiative and compare them with current practice, to identify potential efficiencies or service improvements. One of the core objectives of NHS 24/SCT is to support NHS boards in evaluating telehealth initiatives, but it needs to be more proactive in promoting and supporting good practice in this area.

Recent large-scale projects will improve the availability of evidence on telehealth

65. Some of the results presented in individual evaluations suggest that telehealth offers benefits to patients and NHS boards. However, there is still a lack of reliable evidence demonstrating whether telehealth is both more efficient and cost-effective when compared to traditional patient care. The evidence base will be strengthened by three large-scale projects currently under way or being developed. The Telescot project based in NHS Lothian is a large-scale telehealth initiative that is based on randomised controlled trials and has a robust system in place for evaluation (*Case study 4, overleaf*).

66. In England, the Department of Health has made £31 million available for the Whole Systems Demonstrator (WSD) programme, which it is managing. The programme aims to assess the benefits of telehealth, by evaluating how technology can help people manage their own health while living independently. The programme, which began in 2008, covers more than 6,000 people in three areas in England, and is the largest randomised controlled trial of telecare and telehealth in the world to date. The results of the project are due to be published in late 2011 and will contribute towards the evidence base that is important for any decisions about future long-term, large-scale implementation of telehealth.

⁴⁵ A randomised controlled trial is where a group of people are randomly allocated to receive either the standard treatment for their condition or an alternative treatment which is being assessed (eg, home-monitoring equipment). In all other ways, the people involved in the trial are treated in the same way. This allows comparisons to be made between the standard and alternative treatments, and can help identify the impact of the alternative treatment on patients.

67. Findings from the WSD programme will help inform a UK-wide project (Delivering Assisted Living Lifestyles at Scale), which aims to demonstrate how technology can be used to help improve the quality of life of older people and people living with long-term conditions. This project aims to deliver telehealth services to at least 10,000 patients in three to five areas of the UK, including Scotland. The five initial sites for this project in Scotland will be in NHS Forth Valley, Grampian, Highland, Lothian and Western Isles. Funding of £10 million over three years (2012–15) will be provided by the Technology Strategy Board (£5 million), the Scottish Government (£3.9 million), Highlands and Islands Enterprise (£0.8 million) and Scottish Enterprise (£0.3 million).⁴⁶ NHS 24 is responsible for delivering this programme in Scotland, beginning in April 2012.

Telehealth offers the potential to provide NHS services more efficiently

68. Systematic reviews suggest that telehealth may result in cost savings and can be effective in improving healthcare and the quality of life of patients.^{47, 48} Although there are a number of weaknesses with existing evaluations in Scotland, some of them do identify potential opportunities for efficiencies in a number of areas (Exhibit 6).

69. While the results of these evaluations suggest that there are opportunities for improved efficiencies through the introduction of telehealth, these have tended to be resource savings (ie, freeing up capacity for other patients such as NHS staff time, appointments or hospital beds) rather than cash-releasing savings. Cash-releasing savings could only be achieved if, for example, the COPD initiative in Inverclyde resulted in hospital capacity being reduced to match lower demand.

Case study 4

Telescot project in NHS Lothian

Telescot is a Lothian-based telehealth programme, organised by NHS Lothian, the University of Edinburgh and Napier University. It is primarily an academic research project, and is run in collaboration with a number of public, private and voluntary sector organisations. Funding of around £1.9 million to date has been provided from the Scottish Government, NHS Lothian, the BUPA Foundation, the High Blood Pressure Foundation, SCT and City of Edinburgh Council.

The project involves a series of trials, aimed at supporting people with COPD, diabetes, congestive heart failure and hypertension, by using a range of different technologies in their homes to monitor their condition. It will involve more than 1,000 patients within Lothian. Information about changes in symptoms is fed back to healthcare professionals through the technology, supporting and prompting self-management and enabling early intervention when necessary.

The project aims to assess the potential role that technology makes in early intervention, and will look at clinical outcomes, cost efficiency and user experience. The findings are due to be published in late 2012.

Source: Audit Scotland

Exhibit 6

Potential efficiencies through telehealth

Individual evaluations of telehealth initiatives identify the potential for a range of efficiencies.

NHS Forth Valley – Dermatology initiative

The evaluation stated that using photo-triage to assess patients with suspected skin cancer led to initial hospital appointments with a consultant being avoided in 72 per cent of cases. This freed up appointments, so more urgent cases could be seen by the consultant more quickly.

NHS Greater Glasgow and Clyde and NHS Highland – Tele-cardiology project

The evaluation stated that using video-conferencing to link a cardiology clinic in Mid Argyll Hospital with a consultant cardiologist in Glasgow Royal Infirmary reduced the distance patients in Argyll needed to travel by an average of 165 miles.

Inverclyde Community Health Partnership – COPD home-monitoring

Fifteen patients with COPD were given home-monitoring equipment to help manage their own condition and reduce emergency admissions to hospital. The evaluation stated that over the course of a year, hospital admissions for these patients reduced by 78 per cent.

Source: Audit Scotland

46 The Technology Strategy Board is a UK-wide agency which aims to accelerate economic growth by stimulating and supporting business-led innovation.

47 'Home telehealth for chronic disease management: a systematic review and an analysis of economic evaluations', J Polisen, D Coyle, K Coyle, S McGill, *International Journal of Technology Assessment in Health Care (Volume 25, Issue 3)*, 2009.

48 'A systematic review of the benefits of home telecare for frail elderly people with long-term conditions', JG Barlow, D Singh, S Bayer, R Curry, *Journal of Telemedicine and Telecare*, 2007.

70. Telehealth offers an opportunity to help NHS boards manage increasing demand by freeing up hospital capacity. This is particularly important given growing demand for NHS services and increasing pressure on NHS budgets. Telehealth should be considered as an option for delivering services, particularly those in high demand such as respiratory disease and dermatology.

Using telehealth to monitor patients with COPD at home offers potential opportunities for efficiencies

71. As part of our audit, we carried out economic modelling to compare telehealth intervention with conventional care. The aim of this work was to assess whether telehealth has the potential to achieve savings or free up NHS capacity to help NHS boards manage increasing demand for their services. This is particularly timely given the increasing demand and cost pressures currently facing the NHS. A separate report providing more detailed information on the modelling work is available on our website.⁴⁹

72. We selected COPD as the condition to model (Case study 5). It was suitable for a number of reasons:

- There are more than 100,000 people living in Scotland with this condition.
- It is one of the most common reasons for hospital admission in Scotland and it has the highest rate of hospital admission and bed day usage of any long-term condition.

Case study 5 COPD home-monitoring

The COPD home-monitoring initiatives carried out in Scotland mainly use 'pods' or 'hubs', which are pieces of equipment placed in a patient's home allowing them to measure things such as their breathing and pulse rate.

The data measured using this technology are transmitted from the patient's home to a health professional, such as a GP or respiratory nurse specialist, via broadband or a mobile phone, so they can review it and take any necessary action.

Home-monitoring technology is designed to enable a patient to remain at home and be confident that they will receive prompt attention from a healthcare professional when needed. It can help patients to look after their health more effectively and take more control over their own treatment. Other potential benefits of the telehealth approach include reductions in emergency hospital admissions and earlier discharge from hospital for patients.

Source: Audit Scotland

- The direct cost of COPD to the NHS in Scotland in 2004/05 was around £100 million per year, and it is predicted that the number of people with the condition will increase by a third between 2007 and 2027.⁵⁰
- A number of COPD telehealth initiatives have already been implemented across Scotland in the last three years and each of the completed evaluations contains some cost and outcome data.

73. To support our modelling work, we drew on existing information from recent evaluations of telehealth pilots. However, this presented a number of challenges and uncertainties. The COPD telehealth evaluations covered small numbers of patients, and each had different approaches tailored to local circumstances. It was not

feasible to pool the data from all the evaluations, and instead we modelled the costs of two individual initiatives where comprehensive cost information was available.⁵¹ This approach limits the reliability of the results.

74. The data on the costs of conventional management of COPD for GP and hospital-based care were also limited. Data had to be obtained from a wide range of sources, including information on respiratory disease in general and the use of some data for England where information for Scotland was not available (eg, data on GP consultation time).

75. The modelling work is based on patients recruited to the COPD telehealth pilots, who were a group likely to benefit most from home-monitoring. The modelling

49 *Modelling telehealth: chronic obstructive pulmonary disease*, Audit Scotland, October 2011.

50 *Managing long-term conditions*, Audit Scotland, August 2007.

51 The two COPD telehealth initiatives that the costs are modelled on were in NHS Lanarkshire (evaluation data for 38 patients) and Inverclyde Community Health Partnership (data for 15 patients). The cost information contained in other evaluations was either too incomplete or too unreliable to be used as part of the modelling process.

results need to be considered in this context. The patient symptoms were towards the more severe end of the spectrum of COPD in terms of:

- poor lung function
- high rate of breathlessness
- continually worsening respiratory symptoms
- recent admission to hospital.⁵²

Monitoring patients with COPD at home may help NHS boards avoid costs of around £1,000 per patient per year

76. The modelling work was based on defining a patient pathway for conventional and telehealth management of COPD, and estimating the probability of a patient moving to different stages of the pathway (eg, the probability of a patient needing a GP home visit or of being admitted to hospital under each pathway). The modelling work assigned estimated costs to the stages within the two pathways, for example the cost of a GP consultation or the cost of NHS professionals monitoring the health data sent by patients using telehealth. It then estimated the total average cost per patient per year under each pathway. The overall costs of telehealth management include the upfront capital costs of telehealth equipment. We used sensitivity analysis to test the robustness of our findings on the total costs. This is a technique for changing certain factors in the model (eg, rates of hospital admission) to determine their effect on the costs.⁵³

77. The results of our modelling work suggest that, compared to conventional patient management, telehealth offers the potential to help NHS boards avoid costs. This is through reduced demand on GP-based health services and, in particular, fewer hospital admissions. While there are a number of significant uncertainties, we estimate that telehealth management of COPD patients at home might avoid costs of around £1,000 per patient per year ([Exhibit 7](#)). Even after changing the assumptions in the sensitivity analysis to more negative assumptions, the findings still support the conclusion that using telehealth for home-monitoring of COPD has the potential to help NHS boards reduce hospital admissions for those patients and reduce costs.⁵⁴

78. The costs avoided by using telehealth, for example from lower hospital admission rates, may not necessarily be cash-releasing savings, unless hospital capacity is reduced to match the lower demand. In view of the uncertainties in the data as outlined in paragraphs 73 and 74, it is not possible to say at what point the roll-out of COPD telehealth initiatives would be enough to start to reduce hospital capacity or to accurately scale up pilot results to a national level. However, the modelling work does suggest that home-monitoring can avoid costs by freeing up capacity.

NHS boards should consider whether telehealth could help deliver services more efficiently

79. NHS boards are facing financial pressures and NHS funding is likely to remain steady or reduce slightly in the short and medium term. Making the most of the resources available (money and people) is therefore very

important. Our modelling work on COPD demonstrates that telehealth offers a potential opportunity to deliver services more efficiently. Evaluations also show that there are high levels of patient satisfaction with telehealth. Any avoidance of costs or increased capacity (eg, staff time or hospital beds) would be available to help manage increasing demand and/or shorten waiting times. A list of questions to help NHS boards assess potential opportunities for using telehealth is set out in [Appendix 4](#).

80. The current financial pressures within the NHS also emphasise the need to identify opportunities to achieve the most benefit from telehealth. Business cases for telehealth initiatives need to be able to demonstrate the potential long-term clinical, organisational and cost benefits to a NHS board, based on reliable evidence of both quality and cost. They also need to reflect the potential of telehealth to enable service redesign.

Recommendations

NHS 24/SCT should:

- advise NHS boards on a consistent approach to evaluating the cost-effectiveness of telehealth initiatives, and collate and share the findings.

NHS boards should:

- ensure that telehealth initiatives are supported by business cases that consider the long-term clinical, organisational and cost benefits resulting from the use of telehealth.

⁵² The criteria for selecting patients for home-monitoring are described in more detail in *Modelling telehealth: chronic obstructive pulmonary disease*, Audit Scotland, October 2011.

⁵³ The sensitivity analysis is described in more detail in *Modelling telehealth: chronic obstructive pulmonary disease*, Audit Scotland, October 2011.

⁵⁴ These more negative assumptions include, for example, assuming that the rate of hospital admissions could increase by as much as 20 per cent.

Exhibit 7**Results from our modelling work**

Telehealth management of COPD has the potential to help NHS boards avoid costs.

Average estimated cost per patient per year ¹	
Conventional GP-based COPD management	
Estimated non-admissions cost of conventional GP-based care	£500
Estimated costs of hospital admissions	£3,700
Estimated total cost of conventional COPD management	£4,200
Range of total costs after applying sensitivity analysis for number of hospital admissions and cost per admission ²	£2,900–£14,000
Telehealth COPD management	
Estimated costs of telehealth equipment	£400
Estimated NHS staff costs for monitoring data and GP-based medical intervention when necessary	£1,800
Estimated costs of hospital admissions	£1,100
Estimated total cost of telehealth COPD management	£3,300
Range of total costs after applying sensitivity analysis for number of hospital admissions and cost per admission ²	£2,900–£6,100
Estimated savings (by using telehealth compared to conventional management)	£1,000³

Notes:

1. All figures are to the nearest £100. The modelling work assumes all other costs in each pathway are equal.

2. The lowest end of the range of costs assumes that hospital admissions are ten per cent lower and applies the cost of a hospital stay for a less severe case mix; the highest end assumes admissions are 20 per cent higher and applies the cost for a severe case mix.

3. Difference shown is based on unrounded total costs for telehealth and conventional COPD management.

Source: Audit Scotland

Appendix 1.

Defining telehealth and use of terminology

There is no single accepted definition of telehealth, and terminology in this area can be confusing. Telehealth is often associated with other terms, such as telecare and eHealth. For the purposes of our audit, we used the following definitions:

- Telehealth – NHS boards providing healthcare to a patient at a distance using technology, such as mobile phones, internet services, digital televisions, video-conferencing and self-monitoring equipment.
- Telecare – using technology (eg, falls monitors, motion sensors, alarms) to support individuals with a range of health and/or social care needs to live more independently and remain at home safely. These services are mainly provided by local authorities.
- eHealth – NHS boards using IT systems, electronic communication and information and records management tools to transmit, store and/or retrieve data electronically for clinical, educational and administrative purposes. Examples of eHealth include the Picture Archiving and Communication System, which enables X-rays and scans to be stored electronically and viewed on screen, and the Emergency Care Summary which electronically stores basic information on patients' health in a single system that can be accessed by staff in hospitals and primary care.

Appendix 2.

Audit methodology

Our audit had six main components:

- Desk research – we researched existing information to examine areas such as the costs and benefits of telehealth and patient satisfaction. We assessed evaluations of completed telehealth initiatives in Scotland, and looked for examples of telehealth in other countries.
- Information request – we reviewed high-level information from all 14 territorial NHS boards on the telehealth initiatives introduced in their board since 2006. We also reviewed information on national telehealth initiatives from NHS 24/SCT.
- Interviews with national bodies – we interviewed people in a range of national bodies, including the Scottish Government, NHS 24 and the Scottish Centre for Telehealth, to assess the national direction, support and leadership that have been provided for telehealth over the last five years.
- Interviews with medical directors – we appointed a consultant to conduct telephone interviews with the medical directors of all 14 territorial NHS boards. The telephone interviews aimed to assess how telehealth has been implemented in individual boards and gather medical directors' views on the role of the SCT.
- Interviews in three NHS boards – we interviewed key staff in NHS Fife, Grampian and Lanarkshire to explore the types of telehealth initiatives that are being adopted, the benefits that are being realised, and the barriers to using telehealth more widely. We also spoke to a group of GPs from a range of NHS boards.
- Economic modelling – we commissioned an economist to work with us on economic modelling to assess whether telehealth has the potential to achieve savings or free up NHS capacity to help NHS boards manage increasing demand for their services. The modelling was based on existing information from evaluations of telehealth initiatives for people with COPD, and was supported by advice from a panel of people with experience in this area (see Appendix 3). A separate report on this work is available on our website (www.audit-scotland.gov.uk).

Appendix 3.

Membership of the advisory group and COPD modelling panel

Audit Scotland would like to thank members of the advisory group and COPD modelling panel for their input and advice throughout the audit. We are also grateful to James Robertson, who carried out the economic modelling work; and Hilary Robertson, who conducted telephone interviews with the medical directors of all 14 territorial NHS boards.

Membership of advisory group

Member	Organisation
Dr Suzanne Brannan	Consultant Ophthalmologist, NHS Fife
Richard Brewster	Performance Analyst, Scottish Health Council
Dr George Crooks	Medical Director, NHS 24
Martin Egan	eHealth Director, NHS Lothian
Dr Claudia Pagliari	Convener of eHealth Interdisciplinary Research Group, University of Edinburgh
Paul Rhodes	eHealth Programme Director, Scottish Government
Justine Westwood	Head of Planning and Performance, NHS 24
Liz Wilson	Nursing, Midwifery and Allied Health Professions Clinical Lead for eHealth, Scottish Government
Robin Wright	General Manager – Information Management and Technology, NHS Lanarkshire

Membership of COPD modelling panel

Member	Organisation
Michael Bews	Patient Delivery Specialist, British Lung Foundation
Lynn Garrett	Project Manager, Argyll and Bute Community Health Partnership
Professor David Godden	Co-Director, Centre for Rural Health, University of Aberdeen
Dr John Haughney	General Practitioner and Research Fellow, University of Aberdeen
Colin Marchment	Respiratory and Tuberculosis Clinical Nurse Specialist, Inverclyde Community Health and Care Partnership
Christine McClusky	Service Development Manager, Scottish Centre for Telehealth, NHS 24
Gillian McCready	Service Manager - Older People, Inverclyde Community Health and Care Partnership
Professor Brian McKinstry	General Practitioner and Research Fellow, University of Edinburgh

Note: Members of these groups sat in an advisory capacity only. The content and conclusions of this report are the sole responsibility of Audit Scotland.

Appendix 4.

Questions to help NHS boards assess potential opportunities for using telehealth

The table below sets out questions that NHS boards may wish to consider when either introducing or redesigning a service, to help identify opportunities for using telehealth and assess whether the use of telehealth is feasible.

What are the potential benefits of using telehealth to deliver this service?
<p>Improved access</p> <ul style="list-style-type: none"> • Are any patients unable to access the current service (eg, because of geography, lack of specialist skills locally)? • Are any patients unable to access the current service due to the nature of their condition (eg, if the patient is housebound or seriously ill)? • Do clinical staff have to travel more than a four-hour round-trip to deliver the current service? • Does a patient have to travel more than a four-hour round-trip to access the current service? • Could telehealth provide the opportunity for patients to be seen more quickly by specialists?
<p>Increased capacity</p> <ul style="list-style-type: none"> • Is demand for the current service increasing? • Could using telehealth help with meeting HEAT targets? • Could using telehealth shorten stays in hospital and/or support early discharge?
<p>Cost avoidance</p> <ul style="list-style-type: none"> • Could using telehealth potentially avoid hospital admissions? • Could using telehealth shorten inpatient stays and/or support early discharge? • Could using telehealth lead to a reduction in outpatient appointments? • Could using telehealth reduce patient transport costs for the NHS board? • Could telehealth replace the current method of service delivery, or would it have to be provided as an additional service?
<p>Health benefits</p> <ul style="list-style-type: none"> • Could using telehealth lead to quicker diagnosis and treatment for patients? • Could using telehealth potentially improve health outcomes for patients? • Could using telehealth potentially reduce patient anxiety and stress (eg, by providing a service closer to home)? • Could using telehealth help patients better manage their own condition?

Does the NHS board have the appropriate resources to deliver this service using telehealth?

Technology and IT infrastructure

- Could technology be used to support delivery of the particular clinical service?
- Is appropriate technology already available in the NHS board to support telehealth (eg, video-conferencing)?
- Is the IT infrastructure suitable to support telehealth (eg, broadband services)?
- How much would any new equipment or improvements to the IT infrastructure cost (capital and revenue) and is funding accessible?
- Is appropriate technical support available to support the use of telehealth?

Clinical staff

- Do clinical staff have the relevant skills and experience to use telehealth?
- Are there opportunities for staff to receive training and support in using telehealth?
- Are clinical staff supportive of the service being provided through telehealth?

A review of telehealth in Scotland

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