DOES TELEMEDICINE DESERVE THE GREEN LIGHT?

The government is enthusiastically promoting telehealth as a way to cut NHS costs and improve care, but the evidence emerging from a large NHS trial seems much more equivocal. **Jonathan Gornall** reports

The Whole System Demonstrator programme, which spanned three and a half years and recruited more than 6000 patients and 230 general practices at a cost of £30m (€37m; $47m), is one of the most complex and ambitious trials ever conducted by the NHS and the biggest assessment of telehealth and telecare in the world.

Launched in May 2008, it was designed to answer one deceptively simple question for a health service hungry for innovative ways to manage the escalating costs of caring for an increasingly elderly population: does the use of technology as a remote intervention make a difference?

It was a good question. As Paul Burstow, the minister for care services, pointed out in March during his keynote speech at the King's Fund's international congress of telehealth and telecare, "Seven out of 10 inpatient beds are occupied by people with long term conditions; around 70p in every NHS pound is spent looking after them."[1]

If the number of these admissions could be reduced by adopting technology that allowed patients to manage their conditions at home, it could lead to substantial savings. But, despite the impression given by the government, the answer to that question remains uncertain.

Such is the scale of the programme that evaluation of its results has been divided into five themes, each analysed by a different institution. Only the first strand results have so far been published, appearing in the *BMJ* online on 21 June and on page 16 this week.[2] Yet the government, apparently determined to introduce telehealth throughout the NHS come what may, seems unwilling to wait for the full picture to emerge before committing itself to the full scale roll-out of the technology. This is despite criticism that the evidence base remains "essentially unchanged and uncertainties remain" and that the latest evidence "doesn't warrant full scale roll-out but more careful exploration."[3]

Jumping the gun

In December, like an excited child unable to wait until Christmas Day to open its presents, the Department of Health published "headline findings" from the trial, because "we want to share the telehealth headlines now, to help as many people as possible, as early as possible."

Even though all the results would not be available for analysis until January, in the government's view the programme had already "provided evidence of the benefits of telehealth and telecare," and the Department of Health announced it was now planning to collaborate with industry to introduce the technology on a wide scale.[4]

The headline findings, it said, showed that, "if used correctly," telehealth can deliver a "15% reduction in accident and emergency visits, a 20% reduction in emergency admissions, a 14% reduction in elective admissions, a 14% reduction in bed days, and an 8% reduction in tariff costs. More strikingly, they also demonstrate a 45% reduction in mortality rates."

Somehow, the department had also determined that "at least three million people with long term conditions or social care needs could benefit from using telehealth and telecare," and, on the back of this figure, announced its Three Million Lives campaign (www.3millionlives.co.uk), a collaboration between industry, the NHS, and social care.

The first manifestation of this was a concordat signed on 19 January between the government and the UK telehealth industry, to enable "millions of people to receive the significant benefits evidenced in the UK's Whole System Demonstrator trials."[5]

Further, and as yet unexplained, extrapolations followed. At the King's Fund congress in March, Burstow claimed telehealth "could save the NHS up to £1.2bn over five years."[6]

It remains unclear how Burstow arrived at the figure—the analysis of costs and cost effectiveness is still to be published. When the magazine *GP* asked the Department of Health to explain how Burstow had come up with the figure of £1.2bn, it declined to reveal the evidence behind the claim, saying that to do so would "undermine ministers' and officials' space for consideration and debate."[7]

That, says Richard Vautrey, a Leeds GP and deputy chair of the BMA's General Practitioners Committee, "just leaves people very suspicious.

Social care minister Paul Burstow claims telehealth could save the NHS up to £1.2bn over five years. But how did he arrive at this figure?

GABRIEL SZABO/GUZELAIN

Community telehealth nurse Dawn Watson visits patient Vera Swanson at home in North Yorkshire

The government prides itself on pursuing a policy of transparency with respect to outcomes in healthcare and we need to see that replicated within government itself. If there is convincing evidence—that needs to be published and should be available for peer review."

The very next day at the congress, in fact, another speaker threw a cat among the cost effectiveness pigeons. Catherine Henderson, a research officer at the London School of Economics, revealed data from the third theme of the study that showed it was "unlikely that telehealth is cost effective in terms of improving quality of life, in relation to a NICE [National Institute for Health and Clinical Excellence] threshold of £30 000." In fact, their analysis seems to have found a cost closer to £80 000.

"Knee-jerk reaction to the findings must be put on hold," commented Nick Goodwin, a sen-ior fellow for health policy at the King's Fund, in a blog comment on the congress, "until the full peer-reviewed studies are published in the *British Medical Journal* and the time is taken to fully digest and understand these cost implications."[8]

And yet the government seems in no mood to put anything on hold. After giving the keynote speech at the King's Fund congress, Burstow made clear that, in his view, the trial had already removed the evidence barrier to the widespread adoption of home monitoring technology and made no secret of his frustration at the pace of the peer review process.

"In the nicest of ways, I hope the *British Medical Journal* will get on with publishing the peer reviews," the minister was quoted as say-ing. "They're sitting with them at the moment. We want to get the information out there."[9]

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Caution on results

Yet when the first paper was published on 21 June, more than six months after the Department of Health leaked its headline findings, the tone was altogether more sober.

The main outcome measure of the research, which looked at 3230 patients across three sites with diabetes, chronic obstructive pulmonary disease, or heart failure, was the proportion of patients admitted to hospital over 12 months, and the principal finding was that "a smaller proportion of telehealth users than controls were admitted to hospital."

However, behind this lay a considered quali-fication, absent from the government's cel-ebration of the findings: "the magnitude of the group difference in admission proportion was relatively small . . . raising questions about the clinical relevance of the results."

For other measures of hospital use, including the number of visits to emergency departments, elective admissions, and outpatient attend-ances, "group differences were not significant." Likewise, "Crude differences in notional hospi-tal costs to commissioners of care were also not significant and were relatively small . . . espe-cially compared with the potentially high costs of these types of telehealth intervention."

Although, as the Nuffield Trust reported in a separate summary of its findings, the trial "found indications of an impact on emergency admissions"—a finding partly undermined by an unexplained increase in emergency depart-ment visits and emergency admissions among the control group at the start of the trial—it "did not conclude that there was a reduction in hos-pital costs due to telehealth."

This did not necessarily mean that telehealth did not have an effect on costs, but "the differ-ences observed in this trial"—which the Depart-ment of Health described as an "8% reduction in tariff costs"—could have been "the effect of chance."[10]

Although mortality was not a main outcome measure, the government has seized on what Burstow has called the "quite unexpected and truly extraordinary" finding that intervention patients "were significantly less likely to die within 12 months than controls"; 72 (4.6%) of the 1570 intervention patients died compared with 131 (8.3%) of the 1584 in the control group, a difference that represented 59 lives in a year.

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What isn't clear from the paper, however, is what part telehealth played in this difference. Josip Car, director of the Global eHealth Unit at Imperial College London, welcomed the finding but said that it "needs a plausible explanation of how it was achieved (and can be replicated)."[3]

As the paper's authors point out, their findings on mortality are at odds with those from the previous largest randomised controlled trial of telehealth. Although the Nuffield team had looked at 3154 patients, only 881 of them (456 in the control group, 425 in intervention) had heart failure—a similar number to the 826 heart patients enrolled in a randomised controlled trial reported last year in the *New England Journal of Medicine*. This examined the effects of telemonitoring on patients who had been recently admitted to hospital for heart failure and found no improvement in the number of readmissions or deaths.[11]

No simple fix

Jennifer Dixon, director of the Nuffield Trust and a coauthor of the telehealth paper, says it is important that, as further papers from the trial are awaited, those who are in a position to commission telehealth services remain "not uncritical" about the technology, which anyway is "just one strand of many that are needed to give us more quality and efficiency."

The danger, she says, is that "if people think there are dramatic savings to be made just by telehealth, that will deflect the attention that really needs to be given to these other things. What our findings partly indicate are that if you take telehealth and just plant it into what is usual NHS care, that's not enough. You have to make it unusual NHS care, you have to do something different to get the full benefit of telehealth."

Avoidable hospital admissions are the costliest part of the health service budget "and we've been looking far and wide over the past few years at Nuffield trying to evaluate the impact of complex out-of-hospital interventions and nothing seems to be making an appreciable dent on the upward trajectory of admissions . . . and that includes telehealth at the moment." This, she believes, is "because not enough about the care is changing; even though there may be some interventions doing this or that—whether it's telehealth, telephone coaching, a community nurse—there probably needs to be about 10 or 11 strands and, if only one or two of them happen, there's not much impact."

GABRIEL SZABO/GUZELAIN

GP David Hayward: a telehealth enthusiast

Practical experience

That seems to be the experience of one of the largest telehealth programmes in England. North Yorkshire and York Primary Care Trust (PCT) purchased 2000 telehealth units for £3.2 million in 2010 after a small scale pilot showed promising results. The decision was made without consulting clinicians, and, as a result, so far the programme has been adopted by only 20 of the 90 general practices in North Yorkshire, and extended to only 500 of the 50 000 patients in the region registered with heart disease, diabetes, and chronic obstructive pulmonary disease (COPD). Nevertheless, says Kerry Wheeler, assistant director of strategy for the trust, its deployment has shown several benefits for patients, potential savings for the trust, and lessons for any national roll-out of telehealth.

Chief among these, she says, is to "get your clinical buy-in right from the outset. General practice is fundamental to this . . . the NHS has to make savings and I'm not quite sure how we can do that unless we manage patients in a different way or enable them to self manage. Telehealth is the right direction of travel, but they will not do it unless they've got primary care lined up and signed up.

"We have started to see a change now in the mood of general practice," says Wheeler, "but we've been at this two and a half years now."

The clinicians who are using it "really like it and do not want it removing," she says, and the patients, mainly elderly but ranging in age from 38 to 91, "love it—a number have built up their self management skills and confidence as a result of having telehealth. And we've had carers telling us this has improved their quality of life massively, because they can go out, because they know somebody is keeping an eye on them."

For Vautrey, the government's enthusiastic rush to embrace telehealth "is primarily about saving money and about trying to avoid admissions, which in itself would be a good thing if patients felt their care was better as a result." Instead, the danger is that "it leads to greater anxiety among patients . . . and potentially increasing the workload for those who are looking at those results and having to respond to them."

Many GPs, he says, "will have had the experience of patients who are extremely good at monitoring their peak flows or other indicators—that's been happening for some years—and often what happens is those patients will be consulting and bringing in records more regularly or frequently, but actually it doesn't

reduce workload through fewer home visits and emergency attendances at the surgery. Much of the perception of telehealth among GPs, he says, is "apocryphal; you'll speak to one doctor and he'll say 'Oh I tried it and all my patients had alerts all the time,' but you have to think about how you select your patients and how you set your parameters."

With new telehealth patients, the Haxby practice operates what it calls "silent monitoring" for two weeks to calibrate the monitoring parameters. "If you've got patients with severe COPD and if you set for a lower limit of saturation of 97%, then you are going to run into problems because they'll be alerting all the time. If you set your parameters realistically based on the data that you're getting from that particular patient, then you're not going to get alerts which are inappropriate."

In the Haxby practice, alerts run at about 3-4% of patients a day and are fielded by a specially funded telehealth nurse. "I'm the telehealth lead in the practice and day to day I don't have an awful lot to do with patients with COPD or heart failure on the telehealth scheme," says Hayward.

Recruiting patients is proving easier as word spreads, he says, but he has no doubt about the kind of marketing gambit the government should consider to kickstart telehealth nationwide: "You have to get it into people's consciousness. If you had a story line in [a television soap opera like] Coronation Street or EastEnders about somebody who uses telehealth then that would be your marketing done for you."

The Haxby practice is currently evaluating the effect of telehealth: "We hope that it is going to reduce our acute admissions and unscheduled care," says Hayward. Nuffield Trust, meanwhile, will begin an evaluation of the telehealth programme across the whole of North Yorkshire PCT in October, but, says Wheeler, it is already clear that it has lacked the necessary pace of adoption to make significant savings.

This is another clear lesson for the government and its ambition to use telehealth in its drive to make efficiency savings of £15bn-£20bn by 2014.[12] "If we'd have got all of [our units] out in the first six months I think we would have seen savings in the millions. Unfortunately, with 500, even though we are seeing an impact, it's still not enough to take beds out of hospital or shut a ward and actually start to see real savings."

Whether telehealth can help to reduce NHS costs, chiefly by reducing admissions and freeing up beds for closure, remains a complex question.

Just how complex was illustrated by a 2010 paper from the Nuffield Trust that suggested the relentless annual increase in emergency admissions to hospitals might, counterintuitively, be a result of "greater efficiency breeding inefficiency."

Of all the possible supply side factors contributing to the increase, they concluded, "the most significant is that advances in medical care and management have reduced the length of stay that patients have in hospitals, which in turn has freed up more available beds and allows doctors to admit more patients."[13]

Simply throwing telehealth into the mix, says Dixon, might have unexpected consequences. "All of this indicates that there are wider forces at play beyond medicine and health, disease, and prevalence, that are related to structural organisation and financing and incentives in the system, that really need to be thought about much harder."

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really change their overall outcomes or the progression of their disease.

"I think it is this experience that has left many GPs cautious about the promises that telehealth might bring."

One of the practices in North Yorkshire that has adopted telehealth enthusiastically is Haxby Group Practice, with four surgeries, 16 doctors, and about 20 000 patients. The technology appealed, says partner David Hayward, because "Our demographic skews towards elderly patients," including about 1000 with diabetes, 250 with COPD, and 100 with heart failure.

Initially, they decided to start with COPD patients "because we had a decent number of them and our nurses were well trained in management of COPD" and now have 83 patients signed up across all three conditions. They worked to develop organisational protocols with Tunstall, the provider of the home units, which monitor data such as pulse, saturation, blood pressure, and weight and trigger alerts in response to irregularities.

The equipment, says Hayward, "is very easy to use" and "the patients that get on with it love it . . . they find it extremely reassuring."

Doctors, too, can benefit, he says. Many GPs are reluctant to take on telehealth because "they don't feel they have the capacity to take on any new work," but in fact telehealth can help to