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WHICH DOCTORS TAKE UP PROMISING IDEAS?

NEW INSIGHTS FROM OPEN DATA

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About Nesta

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SUMMARY

What comes to mind when you think about innovation in public services? New ideas, products and services? Design, research and development? So often, our immediate reaction is to focus on creating and experimenting with new solutions. While important, innovations don't have impact by simply existing. They must be adopted, used and spread.

Adoption is an inherently complex process involving a variety of people, organisations, resources, and information at every stage. Implementing innovation can be disruptive for those involved and will affect the delivery of existing services and care. However, these challenges can be worthwhile if they ultimately lead to better outcomes in care, as well as efficiency and cost savings.

From education, to social care, to policing, adopting new approaches or products occurs across virtually all public services like schools and the NHS. Many of our contemporary public services were once considered innovations in themselves. Yet for every successful instance where an innovation with demonstrable benefit is scaled, many others are not taken up.

Inevitably, we all expect some variation within and across the mass of institutions and systems that make up our public services. But by failing to take up innovations, we may be overlooking some of the greatest opportunities to improve or even radically transform our public services for the better. At a time when we face increasingly complex challenges, such as a growth in long-term conditions and an ageing population, we need these innovative solutions more than ever.

How do we encourage the faster and wider take-up of innovations across public services?

Early adopters are the crucial bridge between proven, yet unexploited innovations and their adoption by the majority. However, relatively little is known about these underrated innovators.

With massive open datasets, it is now significantly easier to look under the bonnet of a public service and see who is adopting what, where and when. Already, the UK government's open data hub, data.gov.uk, holds over 10,300 data files from central government and public authorities.¹ As these datasets continue to grow and multiply, so too does the opportunity to make good use of them.

If we can find ways to use this data to understand innovation, public service providers and the public can be better informed. By becoming more informed, providers and practitioners can take measures to improve or transform their services – and become better equipped to tackle the problems they face.

A first focus on primary care

Nesta is keen to explore opportunities for using open data to understand how adoption occurs across public services. We believe that open data can play an important role by informing us of trends and pointing to gaps and opportunities. To begin our research in this area, we have worked with Mastodon C and CASMI to focus on early adoption of innovations in primary care.

How can the NHS keep pace with the changing care needs of an ageing population and rising number of patients with chronic health conditions? In the face of increasingly restricted budgets and resources, innovative tools, processes and practices have an invaluable role to play in enabling efficiency, better outcomes and cost-effectiveness in the NHS. For the NHS to be truly innovative, new products, services and procedures need to be implemented by GP practices.

Despite many health innovations emanating from the UK, the NHS is consistently recognised as a slow adopter. But this can change. Recent government reforms have focused on GP practices, providing them with increased freedom. However, in the midst of wider institutional shifts, there is a risk of GP practices deprioritising innovation, or forgetting it altogether. Before we can overcome these challenges to early adoption, we must first understand what is happening within primary care.

Using recently released datasets from the Health and Social Care Information Centre (HSCIC), we have explored the adoption rates of different kinds of innovations – including drugs, technology infrastructures, and Quality and Outcomes Frameworks (QOFs).

Looking across these different innovations, we have examined how GP practices find out about innovations, who are early adopters in primary care and what is the underlying process for adopting innovations. Although we did not identify one group of serial early adopters, subgroups of early adopters did occur: IT tools and infrastructure have a distinct group of serial early adopters. In contrast, the majority of practices had already adopted the Quality and Outcomes Frameworks (QOFs) measures by the time they were officially issued. Interestingly, high patient satisfaction did not align with early adoption. Equally, while larger practices are more likely to be early adopters and neighbouring practices have similar adoption patterns, our research highlighted that all GP practices have the potential to become early adopters.

The process of adopting an innovation is extremely variable. GP practices rely on a broad range of sources to identify innovations, including informal local networks and more centralised guidance and information systems. From patients to practice managers, many people are involved along the way, and can be driving forces for innovation in a GP practice. Equally, the wider context and existing infrastructure – from patient demographics to IT systems – are incredibly important in determining what a practice is functionally able to adopt. Still, many barriers can arise – be they structural, administrative, technical or informational – which need to be overcome.

This report paints a complex and mixed picture of early adoption across primary care in England. But we are at a moment of great possibility. Recent reforms and new priorities within the NHS could improve adoption, whilst new intermediary structures, like AHSNs and CCGs, have the power to convene, encourage and support early adopters. Likewise, we can all support and encourage the adoption of innovations. Patient demand for innovation has transformed treatment for certain conditions. Anyone wanting to take up innovation in primary care can and should be empowered to do so – be they GPs, other health practitioners, patients, NHS England, CCGs, AHSNs or academics. To drive forward these opportunities and achieve lasting change and improvement, we must begin to both celebrate and support early adopters within primary care – and across our public services in general.

“As successful as medicine is, it remains replete with uncertainties and failure. That is what makes it human, at times painful, and also so worthwhile. The choices a doctor makes are necessarily imperfect but they alter people’s lives. Because of that reality, it often seems safest to do what everyone else is doing – just to be another white-coated cog in the machine. But a doctor must not let that happen – nor should anyone who takes on risk and responsibility in society. So find something new to try, something to change. Count how often you succeed and how often you fail. Write about it. Ask people what they think. See if you can keep the conversation going.²”

Atul Gawande, *Better: A surgeon’s notes on performance*.

INTRODUCTION

Early adopters – the underrated innovators

From education to social care to policing, public services have been built upon innovations. While many of our contemporary public services were once considered innovations in themselves, virtually all have had to continue innovating to remain relevant and effective. So often we assume that innovation is simply a matter of creating something new. However, adoption is crucial: an innovation won't have impact unless it is taken up, spread and used.

Adopting innovations is hard, but it is also worthwhile. An often complex and uncertain process, adoption involves a variety of people, organisations, resources, and information. It can be disruptive and affect the delivery of existing services. However, these challenges can be worthwhile. By failing to take up proven innovations, we may be overlooking some of the greatest opportunities to improve and even transform our public services for the better. As public services face increasing pressure to simultaneously improve outcomes and efficiency and to generate cost-savings, innovative solutions become even more valuable and necessary.

If we want to encourage faster and wider take-up of innovations across our public services, we must first understand the pioneers and trendsetters who link proven, but unexploited innovations to the majority. These are the early adopters. While research into early adoption has evolved considerably in the last century, relatively little is known about these underrated innovators in public services.

Using open data, we can better understand how early adoption occurs across public services. As government begins to open its massive open datasets, it is becoming significantly easier to analyse and track early adoption on a national scale. Already, the UK government's open data hub, data.gov.uk, holds over 10,300 datasets from central government and public authorities.³ As these datasets continue to grow and multiply in the coming years, so too will the opportunity for the public to make good use of them.

What we mean by innovation

For the purposes of this report, we consider an innovation to be a new way of working, service, technology, procedure or product. It can range from something small and incremental, to a radical and disruptive force. The important thing is that it delivers a positive impact – such as improving outcomes or increasing productivity and effectiveness.⁴

We must also note that **new does not necessarily mean better**. Over the past century, the drive for research and development has ensured that most sectors are continuously awash with new products, tools or services. However, not all innovations respond effectively to their users' needs or surpass the quality of existing services or processes.

In this report, we have focused our research on new tools, services, or approaches which have already passed the first hurdle of demonstrating their impact, but have yet to be adopted more widely.

As the UK's innovation foundation, Nesta is dedicated to understanding and supporting innovation in public services. Through our research and practice, we seek to provide actionable insight into innovation within public services – including procurement, decommissioning, and co-production/co-design.⁵ We view early adoption as a crucial yet undervalued stage within the innovation process, which deserves greater consideration.

Nesta is also committed to promoting the better use of evidence within public service decision making, as demonstrated through our Standards of Evidence for Impact Investing⁶ and the Alliance for Useful Evidence.⁷ At present, connecting knowledge with practice remains

inconsistent in many sectors, and still requires encouragement at all stages. This includes the production of quality evidence and the dissemination of clear and actionable guidance to decision makers. Compared to some other public services, healthcare has a strong record of recognising and employing evidence within its systems. The challenge is to promote faster uptake and spread of innovations that have proven benefit.

Understanding what is taking place puts us in a significantly better position to make informed decisions. By analysing massive open datasets, it is easier than ever to develop informative and detailed snapshots of our public services. We are keen to use open data to understand large, complex processes like early adoption – so that services can begin to analyse this information more readily and consistently, and use it to inform their development.

A first focus on primary care

As a starting point for our research into early adoption, we have worked with Mastodon C and the Centre for the Advancement of Sustainable Medical Innovation (CASMI) to focus on primary care. This decision was based on three considerations:

- **Availability of open data:** Open datasets are an invaluable resource that can help uncover trends and increase our understanding of current practices. Yet few open datasets are analysed and translated into useful information for the wider public. Primary care was an obvious first choice for research, given the recent release of a selection of open datasets from the Health and Social Care Information Centre (HSCIC).
- **Urgency of need for innovations in primary health:** Current financial constraints mean the NHS is under a great deal of pressure to improve efficiency and cost-effectiveness. Meanwhile, increased prevalence of chronic and complex conditions require new methods of care and prevention. Understanding the spread and adoption of innovations is a crucial step as the NHS attempts to overcome these challenges.
- **Opportunities within current reforms:** Recent NHS reforms have introduced new structures and organisations along with devolved decision-making powers. As outlined in the new NHS Mandate, GP practices are at the heart of the Government's plans to improve health and wellbeing outcomes. While these reforms are conducive to more localised and independent pathways for adoption, innovation risks getting lost in the upheaval as GP practices adjust to the wider institutional shift.

While many NHS clinical scientists are recognised as world leaders in developing innovations, the NHS is too slow in diffusing them across the health system.⁸ As one study on health technology pointed out, by failing to manage adoption processes appropriately, *“the NHS is missing opportunities to achieve major improvements in service quality and productivity.”*⁹

For the NHS to be truly innovative, new products, services and procedures need to safely reach the frontline. In primary care, promoting and spreading the adoption of innovations is not straightforward. Patients rely on GPs and practices to make informed decisions about their treatment. Such decisions do not occur in isolation, but are embedded within a wider context of guidance, evidence, protocols and regulation within which GPs operate. Such boundaries are crucial for ensuring safety within primary care; however, they can impede innovative decision-making. How do GPs navigate the seemingly infinite range of innovations and information sources and effectively identify the best innovations for their patients and practices?

This report builds on the significant body of literature exploring early adoption in healthcare, offering its own analysis of a carefully selected set of innovations – including drugs, technology infrastructures, Quality and Outcomes Frameworks (QOFs), and patient satisfaction of services. Making use of open datasets, our research aimed to uncover trends and patterns surrounding how GPs find out about innovations, who the early adopters are, and the underlying process of innovation adoption.

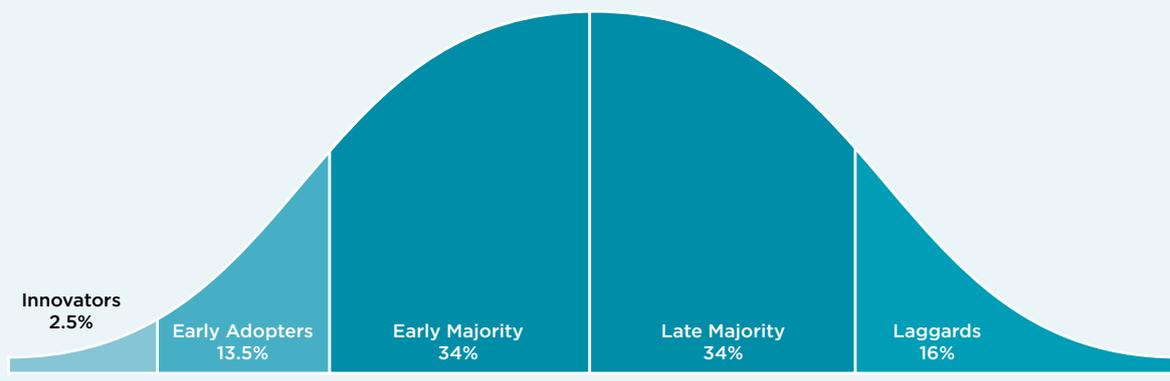
Research into adoption and diffusion of innovations – a brief overview

If we want to encourage public services to adopt innovations more readily and frequently, a good first step is to understand what is already taking place. In particular, searching for trends among serial early adopters can shed light on the characteristics and contexts which are more likely to encourage and support early adoption. This can promote and accelerate early adoption within the wider community.

Research into the diffusion of innovations has been conducted for nearly a century, with the last 50 years seeing a particular surge of activity. Along the way, numerous generalisations and proposals about the adoption process have been made.¹⁰

Existing studies of adoption in the private sector have created a clear language and set of frameworks for understanding how innovations are adopted. Early models tended to depict a linear process of adoption, focusing almost exclusively on the innovation and channels for disseminating information. Some critics have dubbed these frameworks as stereotypical, lacking empirical support or a clear understanding of the complex nature of adoption.¹¹ Consequently, recent research has expanded to account for the ‘push and pull’ influence of innovators and service users, along with the various systemic, organisational and contextual factors affecting adoption.¹²

While many have produced typographies and frameworks, Everett Rogers’ adoption curve¹³ (pictured below) is one of the most referenced models for understanding the diffusion of innovation.



Source: Rogers, E.M. (1963) 'Diffusion of Innovators.' Third ed., p247. New York: Free Press.

Here, Rogers identifies five groups of adopters of innovation: innovators, early adopters, early majority, late majority and laggards.¹⁴ While useful in a general sense, such market-driven frameworks struggle when applied to adoption in public services, where pathways are not simply driven by consumer markets or competition. For one, adoption and uptake within commercial models rely upon demand – a new product or process will not scale if consumers find it disappointing or ineffective. To adopt an innovation in a public service context one must not only gain the support of practitioners and patients. Regulatory and procurement frameworks, evidence standards and professional biases must also be navigated.

Although adoption research has come a long way, limits still exist. For instance, much research still focuses on innovations without adequately considering the characteristics of the innovation or the adoption context more generally. This included failing to distinguished between processes and products. Equally, research has tended to privilege certain types of innovation – in particular technological products and services.¹⁵ Research continues to evolve as increased attention is given to understanding adoption within various commercial and public service contexts – particularly as new data and analysis methods help improve our collective understanding of adoption.

METHODS

Understanding how innovations are adopted in UK public services is a broad and complex task that can be undertaken in a variety of ways. Our report takes a deliberately narrow view, looking at a limited selection of innovations within primary care. This approach was selected in part to ensure a grounded analysis of early adoption, but also due to the limited availability of open datasets.

Research for this report was undertaken by the Centre for the Advancement of Sustainable Medical Innovation (CASMI), a partnership between University College London (UCL) and the University of Oxford, and Mastodon C, an agency specialising in big data analysis. Our methods consisted of open dataset analysis to identify early adopters and quantitative and qualitative research to identify and understand trends across early adopter practices and adoption processes. This report is the culmination of two phases of research.

Phase one: Drug adoption in primary care

The first phase of our research used GP prescribing data to explore the early adoption of drugs in primary care. A relatively new open dataset administered by the Health and Social Care Information Centre (HSCIC) was used. This contained GP prescribing data, which lists all items prescribed by GP practices in England along with their British National Formulary code numbers. GP prescription data is available from September 2010 with regular updates published, resulting in over four million rows of data released each month as of January 2014.

Of the 26,360 items prescribed by English GP practices between 2010 and 2012, we identified two groups that could be characterised as new and potentially innovative. The first group contained 108 drugs which had doubled to at least 1,000 prescriptions per month. A second, smaller group of innovations were also identified for this period: five medicines that received a positive Technology Appraisal from the National Institute for Health and Care Excellence (NICE) that would be prescribed by GPs (as opposed to being used in secondary health for instance).¹⁶ Guidance from NICE is generally considered the most important healthcare guidance for NHS professionals. Our research analysed datasets for both groups but focused primarily on the second, as they were considered to be both new and beneficial:

- **Liraglutide 1.2 mg** for diabetes (NICE guidance issued October 2010)
- **Prucalopride** for chronic constipation in women (NICE guidance issued December 2010)
- **Prolonged-release Exenatide** (marketed as Bydureon) for diabetes (NICE guidance February 2012)
- **Rivaroxaban 15mg** for prevention of stroke in patients with atrial fibrillation (AF)- alternative to warfarin (NICE guidance issued May 2012)
- **Rivaroxaban 20mg** for deep vein thrombosis (NICE guidance issued July 2012)

It should be noted that several drugs were variants of the same medicine: Rivaroxaban (15mg) and (20mg), as well as Exenatide and Bydureon (which is a brand name of Exenatide). We included both sets of drugs as they appear separately within prescription data. This distinction also enabled us to see how their prescription patterns differed.

Analysing the open GP prescribing data for these drugs enabled us to establish their adoption among GP practices in England. We then used data from the Quality and Outcomes Framework (QOF) and NHS indicators – including number of doctors, length of service, and index of deprivation in the local area – to learn more about the identified early adopter practices. This enabled us to gather some initial insights into the characteristics associated with particular prescribing behaviours for our selected drugs.

While this research was a helpful trial in using open data to understand early adoption, it also uncovered many constraints to analysing the adoption of drugs and other treatments. These are outlined in Chapter Two. Recognising the limitations of using dataset analysis as the sole method for understanding early adoption, we adapted the second phase of our research to incorporate greater feedback from GPs and practices alongside the analysis of other open datasets.

Findings from the first stage of research were discussed at a roundtable in March 2013 with representatives from the Department of Health, the Department for Business, Innovation and Skills, the NHS, NHS Confederation, Nottingham University, Healthbox, the Young Foundation, the European Open Pharmaceuticals Data Project, and Nurse First. Feedback from this session also helped to inform our scope and approach in the second phase of research.

Phase two: Other innovations in primary care

Analysis of open datasets

Our second phase of research sought to explore adoption across a wider range of innovations within primary care. In order to find early adopters, we first had to identify an applicable selection of innovations. Taking a comprehensive view of the types of innovation taken up by GP practices, we began by creating a long list of potential innovations with available datasets dating at least two years. A long list of the innovations considered for inclusion can be found in Appendix I.

The innovation list was refined through discussions with key stakeholder groups and patient organisations, including the National Association of Primary Care (NAPC) and GP partners. Following consultation, we selected 19 innovations for analysis across three different information sources, which are listed below. Individual measures can be found in Chapter Two and Appendix II.

- **The Quality and Outcomes Framework (QOF):** an annual programme which measures and incentivises good practice among GP surgeries across England through the use of financial rewards. As of 2011/12, QOFs scored GP practices on over 142 indicators ranging across clinical care, organisational approaches, patient experience and additional services. QOF indicators change from year-to-year so some indicators were unavailable for all years. Apart from drug prescription data, this was the only source which could provide data over a significant period of time.
- **IT tools and infrastructures:** the NHS tracks multiple measures centrally, including the adoption of new IT tools and infrastructures in GP surgeries. These datasets enabled us to look at the adoption of technologies (IT tools and IT infrastructure) in primary care, which fell into two distinct sub-groups: IT innovations in which the functions used by patients are linked to the GP practice's own IT systems (referred to as 'internal' systems) and IT innovations which are linked directly to NHS-supplied services (referred to as 'external' systems).
- **The GP patient survey:** a survey which measures patients' experiences and satisfaction levels with the services of NHS England. The survey has been run for over seven years, and reaches an average sample of over 1.36 million people.

Selecting innovations with sufficient open datasets was not without its challenges. Of the freely available data, all but one source represented a fixed point in time. This made it impossible to evaluate any changes in adoption over time. Equally, in some cases the Health and Social Care Information Centre (HSCIC) had not collected data long enough to offer a sufficient continuity or depth. However, as these (and other) datasets are developed over time, the opportunity to undertake similar analysis will grow.

The limited availability of data also placed restrictions on the scope of this report. For example, the NHS England's new observational data and interventional research service Clinical Practice Research Datalink (CPRD) was available, but with considerable restrictions due to patient confidentiality. Private sector data sources were also largely unwilling to share data due to commercial confidentiality. Such constraints need to be considered and addressed if the NHS is to realise the potential of using data to track adoption, and innovation more broadly.

Analysis of these datasets by Mastodon C led us to create a list of early adopters for each selected innovation. Demographic data was also sourced for each practice, including number and ages of GPs, level of local deprivation, and patient list size. Early adopter lists were first created for each individual innovation and compared to identify serial early adopter practices and clusters within and across different types of innovations. The full scoring system protocol can be found in Appendix III.

GP survey and interviews with practice managers

To complement the analysis of open datasets, a survey was conducted to help build a profile of early adopter practices. The survey aimed to:

- Understand attitudes, behaviours and motivations surrounding innovation in general practice.
- Provide data and insight into trends among early adopter subgroups.
- Find out how GPs hear about innovations and how and why they decide to adopt them.
- Understand practitioners' key barriers and enabling factors to adoption.
- Begin to uncover the process of implementing innovations, with focus on the innovations chosen for this study.

A survey questionnaire (Appendix IV) was distributed online via the NAPC network (~1600 members) and a professional market research company¹⁷ to a randomly selected group of GP practices (3,500 out of a total panel of 14,000). The survey received responses from 174 GPs across England – 24 from the NAPC network and 150 from the professional market research company. The overall response rate was therefore 3.4 per cent. Responses have been interpreted to provide insight of a self-selecting sample and should not be taken as representative of all GPs in England. Survey sample characteristics can be found in Appendix V.

Following the survey, interviews were conducted to gather more personalised accounts of early adopter practices. Using prompts from the survey questionnaire, researchers conducted 10 to 20 minute semi-structured telephone interviews with 18 early adopter practices identified within the following early adopter groups:

- Earliest adopters of technologies.
- Earliest adopters of QOFs, technologies and high patient experience scorers.
- Earliest adopters of QOFs and technologies, excluding patient experience scores.

Additional information about these groups can be found in Chapter Three. Interviews were not conducted with early QOF adopters as a distinct subgroup was not identified. Equally, interviews were not conducted with the group of high patient experience scorers, because this measure was not shown to be linked to early adoption. The interview structure outline can be found in Appendix VI.

Interviews were conducted in July and August 2013, and focused on gathering greater insight into practices' motivations for and experiences of adopting different innovations. Through these interviews we were able to supplement and verify our survey findings, thereby developing a more detailed understanding of GP practices choices, habits and perceptions of adopting innovations.

Through this research, we have probed the various stages and factors affecting early adoption in primary care, including: the dissemination of information and the identification of innovations (Chapter One), the qualities and characteristics related to early adoption among GP practices (Chapter Two), along with the challenges and enabling factors of the adoption process itself (Chapter Three). These findings have led us to identify several lessons for encouraging early adoption within primary care and across public services more generally, which can be found in the Conclusion.

CHAPTER ONE: WHERE DO GPs FIND OUT ABOUT INNOVATIONS?

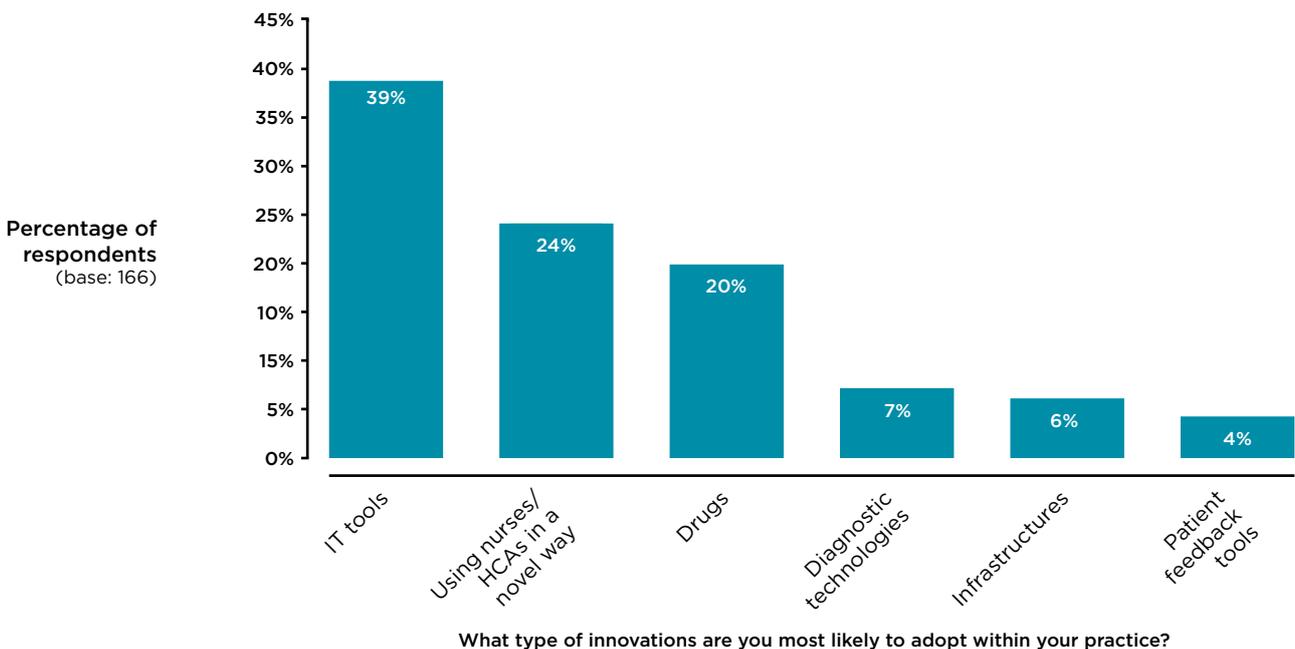
What innovations are practices adopting?

We consider innovations in primary care to be the best new treatments, practices and approaches available. While diverse, they all share the aim of contributing positively to a practice’s efficiency or quality of care. A new treatment for managing diabetes may radically transform a patient’s wellbeing. Extended hours or an online prescription service can make primary care accessible to a wider range of people. Whilst it’s impossible to create an exhaustive list of every innovation a GP practice might encounter, there are several prevailing types:¹⁸

- Medicines and drugs
- IT tools
- Diagnostic tools
- Using nurses and healthcare assistants (HCAs) in novel ways
- Infrastructures
- Patient feedback tools
- Service changes
- Models of care

Through our survey we asked GPs which type of innovations they would be most likely to adopt within their practices. According to our respondents, **IT innovations were the most likely to be adopted in a practice**. Figure 1 below shows that 39 per cent of GPs who responded to this question adopt IT tools most commonly amongst innovations.

Figure 1 GP responses to the survey question: ‘What type of innovations are you most likely to adopt within your practice?’



Looking at Figure 1, IT tools, using nurses and HCA staff in innovative ways, and drugs were each considered priority innovations by 20 per cent or more of the GPs in our sample. Meanwhile, diagnostic tools, infrastructures and patient feedback tools were significantly less likely to be considered for adoption among our respondents. What could influence GP practices' likelihood of prioritising certain innovations over others?

External forces, such as NHS policy priorities and incentives, inevitably factor into GPs' decisions around adoption. For example, the popularity of IT tools among survey respondents may be partly due to NHS England's efforts to increase the uptake of IT tools in primary care, as well as the recent introduction of IT-related monetary incentives.¹⁹

Alternatively, studies exploring the diffusion of health innovations have argued that an **innovation's content and attributes** as well as the **ease of the adoption process** play an important role in determining its likelihood of being adopted.²⁰ In other words, if an innovation is perceived to be more trouble than it's worth, GPs are unlikely to proceed down the path of adoption. A practical, and possibly cultural, preference may also explain the high rates of adoption among incremental or peripheral innovations. While this may weed out unnecessarily complicated or ineffective innovations from consideration, certain types of valuable innovations may also get dismissed too readily. For example, adopting patient feedback tools will require the collaboration and buy-in of many more stakeholders than prescribing a new drug. Additional consideration is given to the challenges involved in adopting different types of innovations in Chapter Three.

Finally, **access to information** must be taken into account. GPs and practice staff may actively seek out an innovation in response to a specific challenge or problem. However, they will receive unanticipated or unsolicited information about innovations. As the availability of health-related innovations continues to grow, navigating this information and advice becomes ever more important.

As more innovations are created and available, understanding where GP practices are currently receiving and disseminating information is crucial to ensuring more innovations can be found by GPs and considered for adoption.

Where are practices learning about innovations?

Innovations are identified and shared through a variety of informal and formal channels. An information source can influence how quickly or widely an innovation is adopted. Equally, the quality and type of information available is important to consider – are practices willing to adopt an innovation once they learn it exists or do they wait for more detailed guidance?

In this digital age, information travels faster and is accessible to more people than ever before. In healthcare, this phenomenon has facilitated the creation of open-source medical research and global expert networks.²¹ If we have more information than ever about what works in health, how do GPs sift through it all and find the innovations they need?

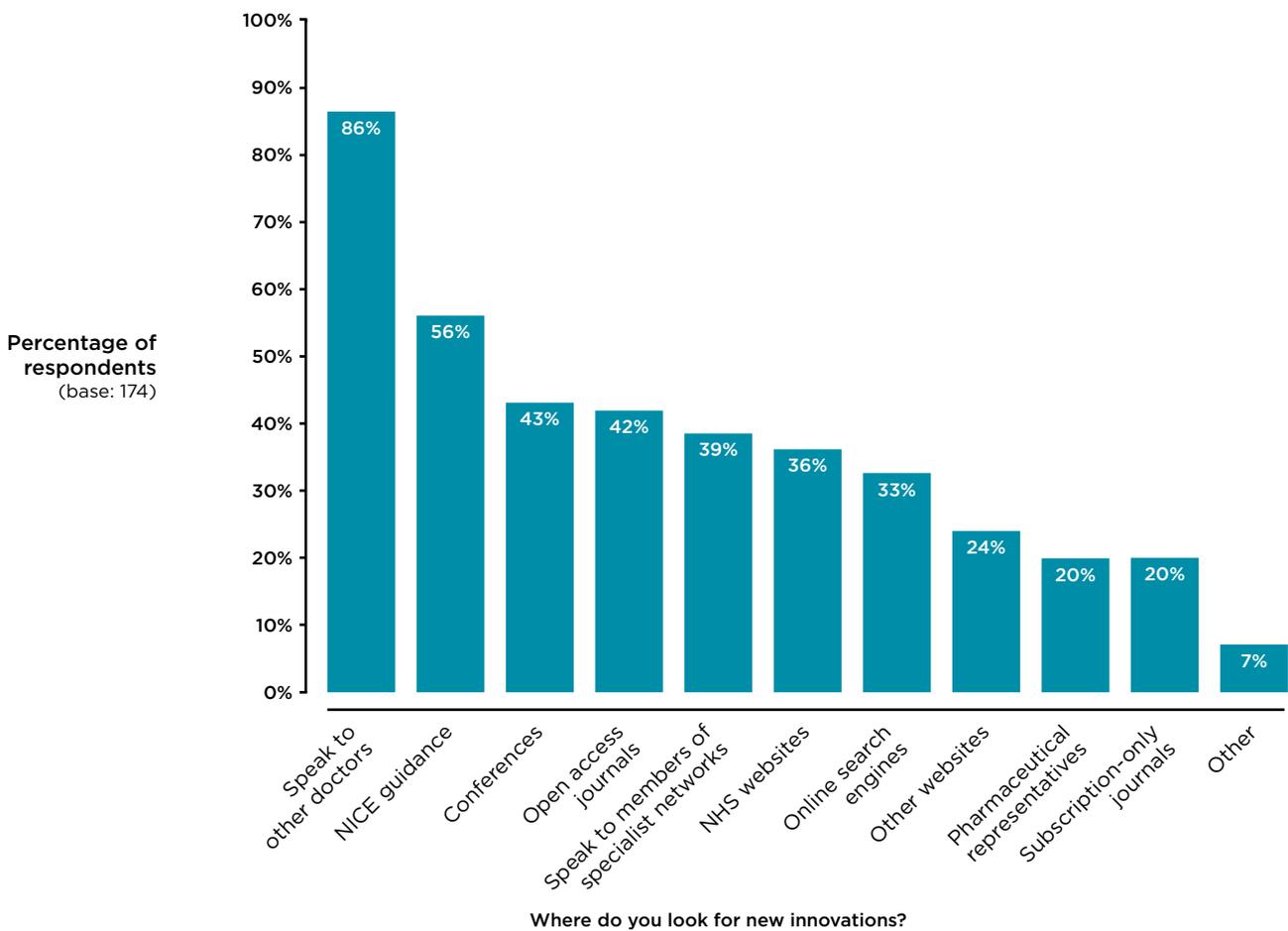
Through our interviews and surveys, a particularly diverse range of information sources emerged. These included, in no specific order:

- **Colleagues and other doctors.**
- **Practice manager meetings.**
- **Primary Care Trusts (PCTs) and Clinical Commissioning Groups (CCGs).**
- **Clinical Guidance, e.g. NICE and the Medicines and Healthcare Products Regulatory Agency (MHRA).**
- **NHS websites and emails from various NHS organisations.**
- **Conferences, e.g. local and national user groups and conferences for clinical systems.**

- Formal and specialist networks, e.g. Academic Health Science Networks (AHSNs).
- Subscription-only journals, e.g. Medical Protection Society (MPS) publications.
- Open access journals, e.g. British Medical Journal (BMJ).
- Pharmaceutical representatives.
- Emails, newsletters or telephone contact or visits from software providers.
- Status messages and prompting in clinical support systems.
- Online search engines.
- Other websites.

All sources contribute to the information system surrounding innovations in primary care, but their influence, focus, and effectiveness range considerably. With such a long list, GPs will inevitably gravitate towards certain sources over others. Through our survey, reflected in Figure 2, we asked GPs where they sourced information on innovations.

Figure 2 GP responses to the survey question: ‘Where do you look for new innovations?’



The majority of our responding GPs were primarily influenced by other doctors and NICE guidance, followed by academic and professional networks and online information courses. This suggests that identifying innovations is a multifaceted process involving everything from formal information channels and active personal research to chance tip offs.

Understandably, the information sources that GPs choose to access will greatly influence the choices they make around which innovations to adopt. Next we consider three particularly influential types of information, made up of the different information sources listed above.

Top-down information and guidance

Given the varying levels of risk associated with identifying and adopting innovations, GPs will generally seek clinical evidence before adoption. The validation of a reputable body or guidance system can play an important role in influencing practices to consider, if not adopt, an innovation.²² Accessible, evidence-based guidance provided by the NHS, NICE and other institutional bodies can help to satisfy this need and ensure a consistent standard of practice at a national level.

For example, any novel drug seeking access to the market will need to be approved by the MHRA which relies on rigorous scientific evidence to make its judgement.²³ Once a drug has been approved for use it will generally need to be appraised by NICE, which provides *“summaries of the best available evidence for selected new medicines...to help commissioners, budget holders and groups such as Area Prescribing Committees to make informed decisions and aid local planning on the introduction of key new medicines”*.²⁴

This national level information is invaluable for GPs because it enables them to confidently minimise risks to their patients. A qualitative research study on prescribing decisions suggested that GPs are also *“increasingly relying on PCOs (Primary Care Organisations)... to help them prescribe ‘appropriately’”*.²⁵ However, such top down information is not taken without a critical regard – GPs will ignore guidelines which they consider to be too restrictive or inappropriate.²⁶

Informal local networks

While formal guidance is a crucial source for introducing GPs to innovations, informal networks and personal contacts continue to hold immense sway. Doctors rely on one another to share knowledge and advice so that high standards are maintained across the profession.

Our findings reinforce this: of the 174 GPs who responded to the survey, the majority indicated that they rely on other doctors as a source of information and method of promoting innovation adoption. In addition to informal and formal meetings between GPs, interviews also found that practices were heavily influenced by word-of-mouth via GP and practice manager meetings.

Unfortunately, referrals through informal networks are difficult to track, measure, and isolate within our methods of data analysis. Adoption may be measurable through an outcomes framework, but we are unable to establish whether the practices involved initially heard about the innovations through official guidance or less formal sources. Methods such as social network analysis could help explore this further in future research.

Intermediaries

Research into adoption in health continues to note the importance of intermediaries. Conferences, journals, websites, and pharmaceutical representatives can act as intermediary sources of information to local practices, but few can guarantee that their information is available and accessible to every GP practice in England.

As recent NHS England reforms have restructured local and mid-level bodies,²⁷ new entities like CCGs and AHSNs have the opportunity to act as aggregators, evaluators and promoters of information about innovations in primary care (see the text box). Localising this responsibility can free GPs and health managers to focus their efforts on identifying and adopting innovations that are relevant and useful to their local context. However, focusing on local intermediaries could also intensify pre-existing challenges to encouraging adoption at a national scale.

What are Clinical Commissioning Groups (CCGs) and Academic Health Science Networks?

GP practices have received increased independence through reforms, but they are still affiliated directly and indirectly to several key intermediary entities. All practices in England now belong to a clinical commissioning group (CCG).

As of 1 April 2013, CCGs replaced Primary Care Trusts (PCTs), which previously controlled the majority (80 per cent) of the NHS budget and were responsible for commissioning most services. Taking on many of responsibilities previously held by PCTs and some by the Department of Health, CCGs now commission most local hospital and community health services. While CCGs have taken on more responsibility than their predecessors, NHS England is still responsible for commissioning some primary care services, including dental services, GP practices and specialised services.

CCGs can access support and information from Academic Health Science Networks (AHSNs), which aim to improve quality of care and productivity within healthcare. AHSNs aim to achieve this by facilitating collaboration between the NHS, academia and industry to *"identify, adopt and spread of innovation and best practice."*²⁸ By April 2013, 15 AHSNs had been appointed across England. Still in their early stages, each AHSN is creating a strategy to improve the diffusion of innovation and best practice within primary care in their region.²⁹ However, the activities, approaches and organisational structure of many AHSNs are still in development – leaving unanswered questions about how they will accomplish their aims.

With this in mind, intermediary bodies – like CCGs and AHSNs – could bridge gaps between formal top-down evidence and informal local networks. However, we should also ask whether these bodies can successfully connect with the existing lateral or informal approaches to sharing evidence of innovations which occur in their jurisdiction. This consideration will be developed further in the coming chapters.

CHAPTER TWO: WHO IS ADOPTING NEW INNOVATIONS?

There is always room to improve a public service, but it takes effort to try new things. Simply hearing about an innovation does not guarantee GP practices will take the plunge and bring it on board. An innovation may not respond to the needs of a practice. Alternatively, existing approaches or infrastructure may already be providing satisfactory results. Even if the innovation is appropriate and needed, taking up and embedding a new practice, drug or tool will inevitably require time and effort on the part of a GP practice. This must be carefully managed to avoid lowering the quality of care available to patients whilst the adoption process takes place – particularly when dealing with the more ‘disruptive’ innovations.

Below we explore trends in early adoption across a selection of innovations including IT tools and infrastructure, drugs, QOFs, and the patient satisfaction survey.

IT tools and infrastructure

As the world becomes increasingly connected by and reliant upon digital technologies, primary care is no exception: technology’s allure has attracted a specific, but considerable community of GP practices. ‘Technophiles’ – serial early adopters of innovative IT tools and infrastructures – were the most clearly defined group of early adopters in our research.

Technology measures analysed

- Patient-facing functionality linked to the GP practice’s own systems (referred to as internal IT Innovations):
 - Functionality for patients to book or cancel appointments online;
 - Functionality for patients to view or order repeat prescriptions;
 - Functionality for patients to view test results;
 - Functionality for patients to access full medical record.
- NHS-supplied services (referred to as external IT Innovations):
 - GP Practices live with Summary Care Records;
 - GP Practices live with Electronic Prescription Service (EPS) according to release 1 and release 2.

Practice size matters

One common characteristic prevailed across technophile practices – **their size**. For example, practices that had implemented online prescription ordering had an average of 4.2 doctors – over double the average number of doctors in practices which had not implemented the innovation, despite being able to (2.0 doctors). There is an average of 4.4 GPs per practice in England; however, variation between practices ranges widely (from one to 30 GPs per practice).³⁰

This trend may be connected to two phenomena. First, IT tools and infrastructure are often intended to automate or ease everyday administrative or organisational tasks for practices. Larger practices are more likely to see the benefits of tools that automate and streamline practice management. Equally they are also more likely to have practice managers and a wider range of infrastructure and skillsets among their employees, making it easier to take up IT innovations.

Adopting innovations into existing systems

IT tools and infrastructures rely and build on existing infrastructures. Depending on the innovation, existing infrastructure can dictate whether a practice can adopt an IT innovation. **Functionality is key** – if a practice does not have the right internal or external IT system, it may not be able to implement a new innovation.

This quandary echoes some of the wider challenges surrounding the design and spread of information technologies in any sector. As Jaron Lanier argues in *You are Not a Gadget*, information technologies have the ability to ‘lock-in’ future development, which can be problematic:

“*The fateful, unnerving aspect of information technology is that a particular design will occasionally happen to fill a niche and, once implemented, turn out to be inalterable. It becomes a permanent fixture from then on, even though better design might just as well have taken its place before the moment of entrenchment.*”³¹

Indeed, in primary care, we found that IT systems immediately predetermine the range of internal IT innovations a practice can adopt or operate.³² A GP practice can only adopt an innovation if its IT system can accommodate it; if not, they must either change to a new IT system or wait for the innovation to become available for their current system. This is particularly evident if we consider internal IT innovations, where patient-facing functionality is operated by the GP practice’s own systems.

Yet not all IT systems offer access to innovations. Table 1 below shows which manufacturers offer access to our selected innovations on their IT systems. EMIS is the only manufacturer that offers the opportunity to implement all of our selected IT innovations. It is also the most widely used IT manufacturer across the NHS, with 51.5 per cent of practices using their IT systems. However, it is important to note that, some manufacturers – including TPP and EMIS – offer multiple IT systems, which may not include full access to the innovations listed below.

Table 1 Table showing proportion of GP practices that have enabled or have functionality for internal IT innovations

GP Practice Internal IT System Manufacturer	% Surgeries using	Book appointments	Order prescriptions	View test results	View records
Egton Medical Information Systems (EMIS)	51.5%	Y	Y	Y	Y
The Phoenix Partnership (TPP)	23.1%	Y	Y	N	Y
In Practice Systems (INPS)	16.4%	Y	Y	N	N
Informatica	3.3%	Y	Y	N	N
No system	2.2%	N	N	N	N
Microtest	1.7%	Y	Y	N	N
iSoft	0.8%	N	N	N	N

Functionality is necessary, but not sufficient

If EMIS offers full functionality for these innovations to over half of GP practices in England, it would not be unreasonable to expect at least half of GP practices to have already enabled them. However, one of the most striking findings of our research was the disparity between functionality and enabled innovations within practices. Table 2 below highlights this disjuncture for our four internal IT innovations.

Table 2 Table showing proportion of GP practices that have enabled or have functionality for internal IT innovations

Internal IT Innovation	Practices that have enabled innovation	Practices with functionality, that have not enabled innovation
System to book or cancel appointments online	36%	60%
System to view or order repeat prescriptions	39%	57%
System to view test results	0.7%	52%
System to access full medical record	0.8%	76%

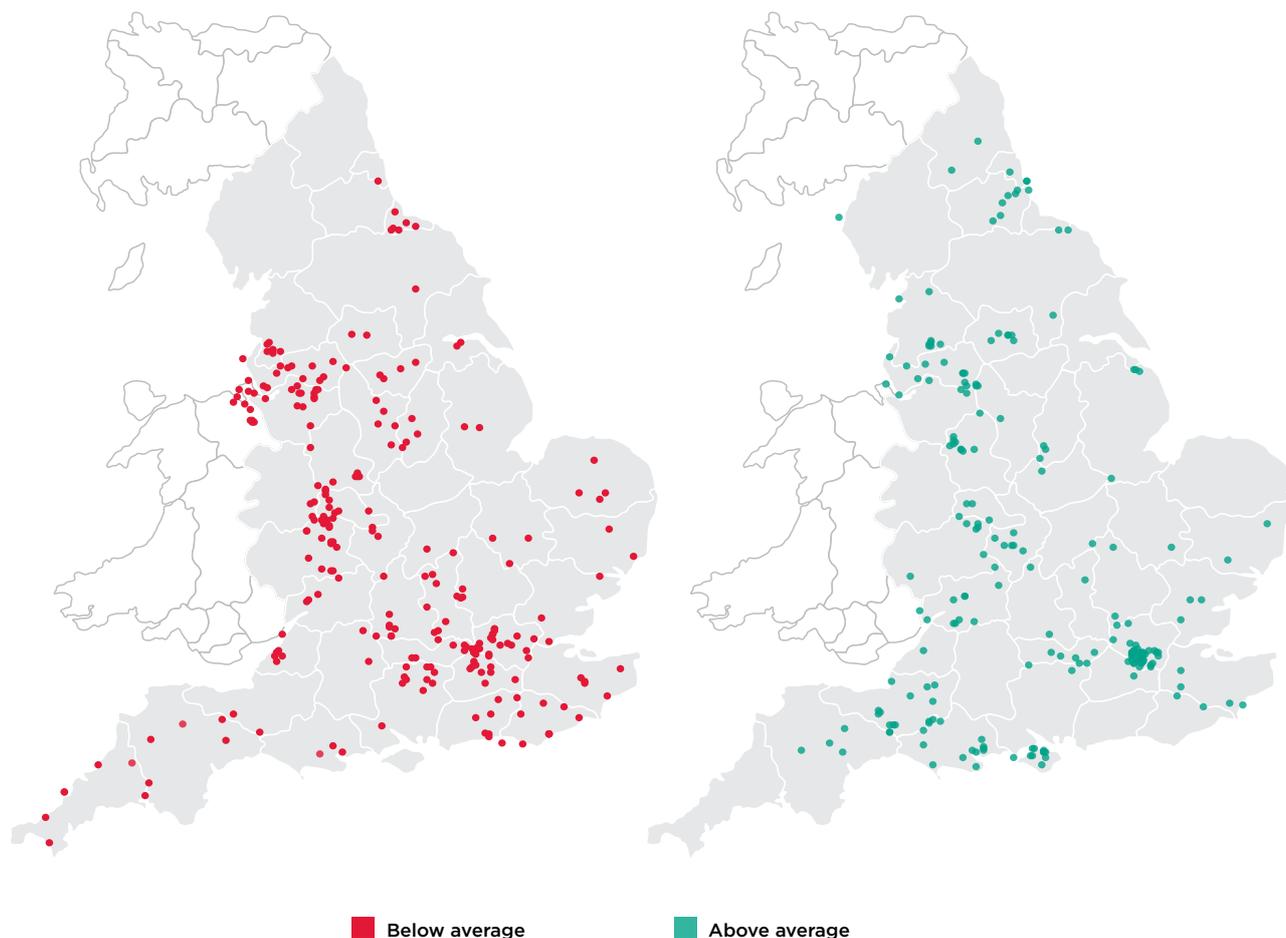
However, even with the right IT system in place, practices are refraining from taking up innovations. The fact that some practices have not adopted all internal IT innovations can partly be explained by the fact that their clinical system does not offer that functionality.

The majority of GP practices have IT systems that can offer access to different IT innovations. However, many of these practices do not take up the innovations available to them. For example, over 96 per cent of practices have the IT functionality in place to book or cancel appointments online, yet only 36 per cent have actually enabled such a system. While this decision will be unique to each practice, it is likely due to a combination of the barriers to adoption outlined in Chapter Three.

External IT innovations

A similar phenomenon is present among certain external IT systems, which are used by GP practices but supplied and run by the NHS. For example, as of 2012, only 17 per cent of GP practices in England were using electronic summary care records.³³ Meanwhile, GP practices across England had enabled the Electronic Prescription Service (EPS) – (89 per cent of practices are live with release 1, 0.4 per cent are live with release 2). The gap between EPS 1 and 2 is particularly interesting given this is simply an updated version of existing technology.³⁴ We will revisit this question in Chapter Three.

Figure 3 IT innovation adoption rates by GP practice



Drugs

Drugs analysed

- Liraglutide 1.2mg for diabetes (NICE guidance issued October 2010).
- Prucalopride for chronic constipation in women (NICE guidance issued December 2010).
- Prolonged-release Exenatide (marketed as Bydureon) for diabetes (NICE guidance issued February 2012).
- Rivaroxaban 15mg for prevention of stroke in patients with AF as an alternative to warfarin (NICE guidance issued May 2012).
- Rivaroxaban 20mg for deep vein thrombosis (NICE guidance issued July 2012).

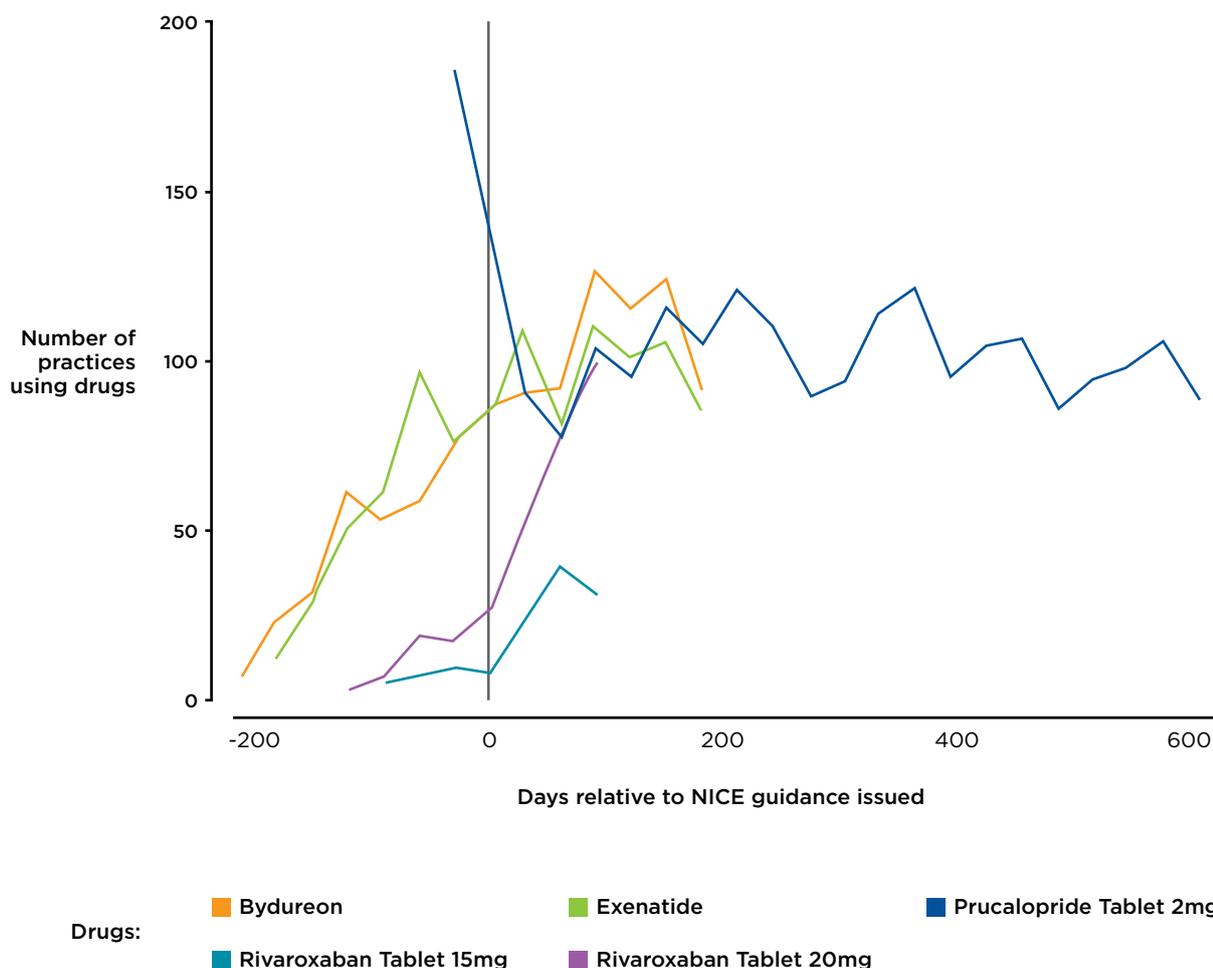
Looking for early adopters of the above selection of drugs, we identified practices that had prescribed a selection of drugs within a month of NICE guidance being issued, as we defined this as early adoption. Interestingly, the majority of 8,563 GP practices in England did not prescribe these innovative drugs once between 2010 and 2012 – the period during which data was available.

Drugs are unique and context-dependent. Before considering any trends found through our analysis of GP prescription data, we must acknowledge some of the many factors that can influence their take-up:

- Inevitably, GP practices serve diverse populations that differ in age, gender, ethnicity and socio-economic status. All of these factors will contribute to differences in the conditions GPs encounter and the appropriateness of the treatments they select.
- Prevalence of a condition will inevitably affect GPs' likelihood of adopting certain drugs. In this initial research, we only examined prevalence versus uptake of *selected* drugs related to diabetes.
- When considering any single drug, alternative treatments are likely to be available and, in some cases, already recommended under NICE guidance. New drugs may become available, but the benefits they offer may be comparable to existing treatments. Our research has not captured the variety of treatment options available for certain conditions.
- When a drug is already providing effective treatment to a patient – particularly those with long-term conditions – GPs will have little reason to change their prescription.
- Cost estimates are also an important consideration for GPs, who may not adopt a new drug if a similarly effective option is available at a lower cost. Along with other tools, NICE offers a costing template to help practices consider and implement new drugs.
- Some drugs (such as Pruclopride) are not recommended as a first line of treatment and are only used following unsuccessful courses of treatment with other medicines.

Taking care to consider the implications of these factors, our analysis did identify some trends among early adopter practices of our selected drugs sample. For instance, drug data highlighted the fact that a number of practices were adopting certain drugs *before* the issuing of NICE guidance. In the case of the diabetes treatments Exenatide and Bydureon (a brand of Exenatide), some GPs had prescribed these medicines for over half a year prior to NICE guidance (Figure 4). This may be related to preliminary recommendations for Exenatide (and Bydureon) which appeared in October 2011, before NICE guidance was issued.³⁵

Figure 4 Adoption rates of selected drugs relative to issuing of NICE guidance³⁶



As seen with Prucalopride in Figure 4, adoption spikes arose in certain cases. Other drugs faced a more gradual rate of uptake. This can be explained to some degree by the drug’s function and how commonly such a prescription would be needed; however, other factors can contribute to whether or not a practice is likely to adopt a drug sooner rather than later (if at all).

Looking across the five drugs we analysed, local clusters appeared to have the strongest influence on take-up. When a neighbouring practice or nearby GP had adopted a drug, surrounding GPs were more likely to do so as well. For example, our research showed that a practice has a 32 per cent greater chance of being an early adopter of a drug if four of their ten nearest neighbours were as well. If none of their neighbouring practices were early adopters, the practice only has a 6 per cent chance. Of course, some of this can be explained by other factors – such as drug suppliers (or other information sources) using effective marketing in certain areas.

Local priorities may also influence practices to become early adopters of certain drugs. For example, GP practices with higher rates of diabetes tended to adopt new drugs sooner. To a lesser extent, local deprivation levels were correlated to the adoption of certain drugs. Practices serving populations with a lower level of deprivation were more likely to be early adopters of Liraglutide (for diabetes) and Rivaroxaban 20 mg (for deep vein thrombosis).

Larger practices – those with greater patient list sizes and more GPs – also tended to adopt our selected drugs earlier. Once again, the additional infrastructure, staff and resources needed to operate a larger practice may help to distribute the additional effort that goes into embedding an innovation. Likewise, larger practices will inevitably have more GPs identifying new drugs through various information sources, who can then share that information with colleagues. This was corroborated with the negative likelihood of single-GP practices being early adopters for all

the drugs we evaluated. As this was an initial study to explore early adoption, we did not control for correlation between variables. Some factors, such as GP list size and number of GPs in a practice, will be correlated.

Finally, GPs themselves had some influence over their practice's likelihood of adoption. For example, the number of years a GP had worked at a practice was found to have a slight influence on their likelihood of being an early adopter – practices with longer serving doctors and GPs of an above average age were slightly less likely to take up drugs quickly.

Quality and Outcomes Frameworks (QOFs)

Quality and Outcomes Frameworks (QOFs) are a unique metric for promoting adoption because they use monetary incentives to encourage uptake of new treatments, tools and services in primary care. In fact, several experts actively discouraged their inclusion within this research for this very reason. Nevertheless, the data surrounding their uptake provides an interesting point of comparison to innovations which are not promoted using financial incentives. We examined the uptake of several QOFs which were introduced to UK practices between 2005 and 2007.

QOFs measures analysed

- **Education 6:** the practice conducts an annual review of patient complaints and suggestions to ascertain general learning points which are shared with the team.
- **PC (Palliative Care) 2:** the practice has regular (at least three-monthly) multidisciplinary case review meetings where all patients on the palliative care register are discussed.
- **Records 18:** the practice has up-to-date clinical summaries in at least 80 per cent of patient records.
- **Management 9:** the practice has a protocol for the identification of carers and a mechanism for the referral of carers for social services assessment.

Unlike other innovations we examined, our analysis found that QOFs had generally high adoption rates at the moment a QOF was issued. Education 6 and Management 9 were found to have over 95 per cent compliance by the time the QOF was issued. The lack of variability means that data for these QOFs were unsuitable for identifying early adopters. However, the palliative care and clinical summaries (Records 18) were not so universally adopted and therefore slightly more useful for distinguishing early adopter practices.

The high adoption rates represented within QOF data should not be taken to mean that the majority of practices were early adopters. Since data collection commences with the issuing of a QOF, other data sources would be required to track adoption of the innovation prior to QOF status.

Are QOFs an effective measure of early adoption?

With the vast majority of practices achieving at least 95 per cent of the maximum QOF score, we must question whether QOFs can be seen as a measure of early adoption.

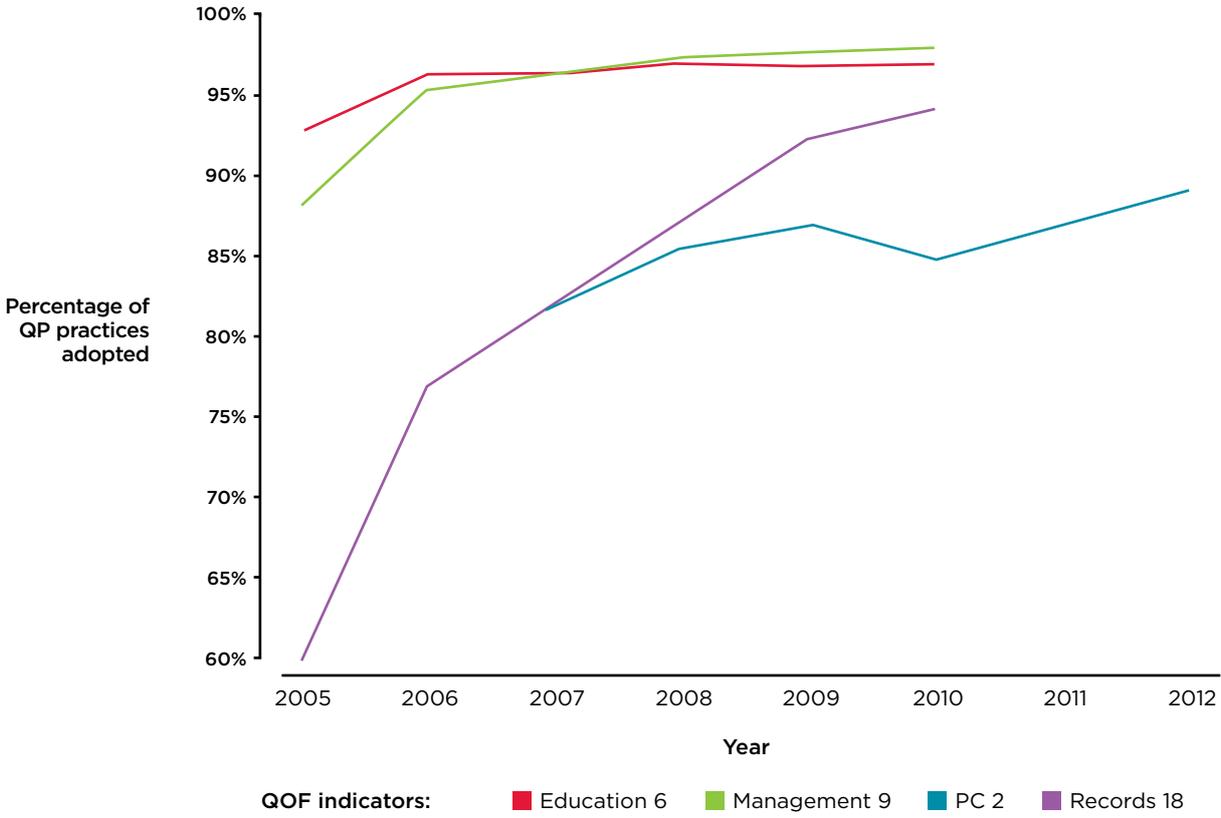
The short answer is no. High levels of compliance indicate that many practices have already taken up an innovation by the time a QOF is issued. According to the Department of Health, QOF is *“an incentive payment scheme, not a performance management tool.”*³⁷ We would argue that QOFs' function more as a tool for compliance rather than driving early adoption. However, there are several reasons for looking to QOFs as a measure of adoption.

First, QOFs can be used to understand the later stages of adoption for different processes, products and approaches. This also helps us to consider the impact incentives have on scaling innovations across primary care. Secondly, identifying practices with persistently low QOF scores enables us to consider the limitations of adoption incentives and identify any characteristics which may hinder adoption.

While these are two useful functions for using QOF data to understand adoption, we must not forget the greater question surrounding incentives and data. We consider the role of incentives further below.

Records 18 (of the measures we analysed) had the lowest take up when the QOF was issued: of 60 per cent of GP practices in England. All other QOF measures were adopted by over 80 per cent of GP practices at the time the QOF was issued. However, our innovations did see further take up from the time QOFs were issued. Compliance increased to at least 87 per cent of GP practices for all selected QOFs, including over 96 per cent for Education 6 and Management 9. Figure 5 tracks this increase.

Figure 5 Adoption rates of selected QOFs indicators (2005–2012)



Most GP surgeries have good QOF scores. Instead, our analysis identified two subgroups based on noncompliance with QOFs, leaving us with three core subgroups represented across the QOF data:

- **Normal, good scorers** - the majority (82.0 per cent).
- **Generally poor** - rarely have their records up to date, and also often score poorly on other key QOF measures (7.6 per cent).
- **Poor on palliative review (PC 2)** - a distinct group who fail to review their palliative care cases regularly, but are not unusually bad on any other QOF measure (10.4 per cent).

Next we will consider the common traits of the latter two groups.

Poor QOF adopters

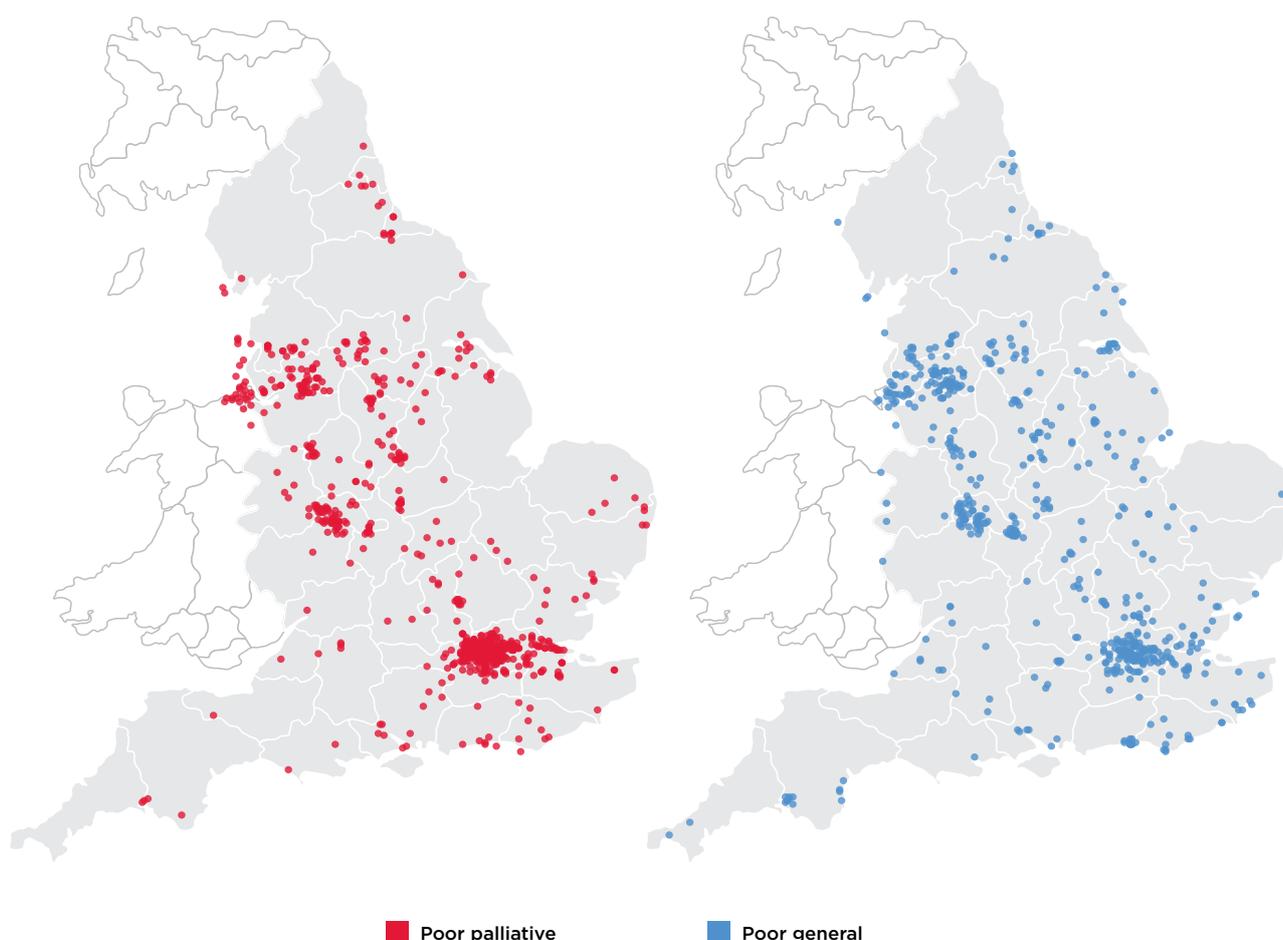
Late adopters represent an interesting group – not only are they a particularly small contingent of GP practices; they are also forgoing financial benefit offered for taking up relatively straightforward innovations. So what links these outliers?

Low-scoring practices had two distinct characteristics: first, these surgeries had higher general levels of deprivation than overall good QOF scorers (26.7 compared to 23.1). Secondly, generally poor scorers had fewer doctors per practice than average (2.5 versus the average 4.4), indicating a difference in practice size between early and late adopters.

Our third subgroup – PC2: practices that have a generally good score apart from a poor palliative review score – challenges this trend. Despite having higher overall QOF scores than the ‘generally poor’ scorers, our PC2 group had the smallest average practice size. Regular palliative care review meetings require a certain level of organisational infrastructure and administrative support which can be challenging for small practices. This may explain why smaller practices in more deprived³⁸ areas are less likely to adopt this QOF measure.

Some characteristics appeared to have little or no impact on QOF scoring, such as GPs’ years of service and geography. Low-scoring practices were broadly distributed across the country despite some clusters being found in urban areas. The map below (Figure 6) provides a snapshot of general low scoring and low PC2 scoring QOF groups.

Figure 6 Map showing geographical distribution of generally low scoring and poor on palliative review (PC2) QOF groups



While not a perfect measure for understanding adoption of all innovations, the low scoring QOF groups highlight some characteristics which may deter the adoption of innovations – even when financial incentives are attached.

Considering the impact of financial incentives

Media and anecdote often say that GPs will only adopt an innovation where they see financial advantage. But this is too simple. Behavioural research literature³⁹ has shown that financial incentives are most effective for encouraging straightforward, mechanical steps. For actions requiring significant engagement, people are more likely to respond positively if the change is connected to a visionary goal.

Looking at the NHS, financial incentives have been favoured tools for encouraging changes in behaviour and practices among GP practices.⁴⁰ Unlike mechanisms that take away funding for non-compliance in secondary care, the self-employed status of most GPs has resulted in more positive incentivisation schemes for primary care. At the time of research, no established incentives were in place for early adoption. However, this is now beginning to change.

In March 2013, the NHS Commissioning Board introduced the **Enhanced Service for Online Access System**. This new service attempts to improve practice and patient engagement with online access tools and help people to manage their own care. Its introduction underlies the *“Government’s commitment for implementing secure online communication and viewing medical records and to further incentivise expansion of the services adopted in 2013/14.”*⁴¹

While similar to QOFs, participation in the scheme is optional for GP practices. The payment structure consists of three components:

Component 1: A single payment of £0.14 per registered patient, which represents a payment of £985 for an average-sized GP practice (registered population 6,911) based on satisfactory evidence of enabling and utilisation of online booking.

Component 2: A further single payment of £0.14 per registered patient, which represents a payment of £985 for an average-sized GP practice (registered population 6,911) based on satisfactory evidence of enabling and utilisation of online repeat prescribing.

Component 3: A flat rate payment of £985 to each GP practice based on satisfactory evidence of a proportion of registered patients being issued with passwords for accessing services online.

The success of this scheme remains to be seen, but it will be an important case to evaluate as discussion around incentivising early adoption evolves. If higher than average adoption takes place, this model could itself be adapted to encourage early adoption of similar types of innovations.

Still, financial incentives should not be seen as a catchall solution, but part of a wider range of tools to support and encourage early adoption. As one of the overall high scoring early adopter practices noted in our interviews, *“We shouldn’t need payment incentives to achieve what’s best for patients! It’s insulting to doctors. We should be looking at outcomes; those who aren’t achieving them should be looked at.”*

An anomaly: patient satisfaction and innovation adoption

As part of our initial analysis, we included several measures of patient satisfaction (see box). Analysis of practices’ patient experience scores from the GP Patient Survey revealed a distinct cluster of high-scoring practices. Around 17 per cent of GP practices received consistently high scores across the patient satisfaction measures. However, comparing this group to our data on early adoption of IT and QOF innovations provided surprising results.

GP patient satisfaction measures analysed

- Whether patients are satisfied with the level of access to their GP via telephone.
- Whether patients are satisfied with their experience of telephone consultations.
- Whether patients are satisfied with the time frame for booking appointments.
- Whether patients are satisfied with the practice opening hours.
- Whether patients feel involved in the self-management of their illness.

High-scoring patient satisfaction groups were associated with small list sizes and small GP practices – particularly smaller practices from rural areas. These practices *did not* tend to belong to early adopter groups of IT or QOFs innovations. Which leads to the question, is high patient satisfaction (as determined by the GP Patient Survey⁴²) at odds with early adoption?

Is it possible for practices to excel at the softer measures of care while also improving efficiency and patient outcomes? If we recall that early adopters are more likely to be large practices, it would be worthwhile to explore why large practices score lower on patient satisfaction.

Common characteristics and trends

Looking across this diverse selection of innovations, what can we learn about early adopters? Data analysis did not reveal any significant connection between early adopters of IT tools and infrastructure, QOFs or patient satisfaction. However, we identified several recurrent factors in adoption trends and clusters.

Of all the characteristics we evaluated, **practice size** appeared most consistently related to early adoption. Bigger practices have more hands on deck and tend to be better positioned to explore and implement new innovations. This was specifically the case with IT innovations, drugs and QOFs. Existing research into adoption in the UK has also noted that innovations tend to be assimilated more easily within larger and more mature organisations. However, research also indicates that larger organisations are more likely to have differentiated and specialised professional knowledge, decentralised decision making and additional resources – all useful conditions for adoption.⁴³ Inversely, smaller practices may find the demands and challenges associated with change more difficult. Unlike the other measures, patient satisfaction tended to be higher among smaller GP practices. This begs the question; how can these different strengths be brought together?

GP practices in near **geographical proximity** (approximately within a ten-mile radius) were likely to have similar patient experience and technology scores. Our analysis showed a positive, albeit small, correlation between the patient experience score of a GP practice and that of its neighbours, with similar findings for technology scores. This is likely influenced by local activities like local practice manager meetings, meetings between doctors as well as PCT/CCG policy, support, and training. However, this correlation is likely to be influenced by factors such as demographics, prevailing illnesses and deprivation levels.

Finally, GPs are important players in the process of adoption. Apart from our research on drugs, no personal characteristics – including age, gender and years of service – appeared to increase a GP's likelihood of becoming an early adopter. **All GPs have the capacity to be early adopters.** This point is particularly important, as the process of identifying and adopting innovations into primary care is, by and large, a social process. Previous research has also highlighted shortfalls of viewing adoption as contingent on an individual person – or organisation.⁴⁴ Therefore, we should not target specific types of GPs and practices, but rather consider the contexts and resources needed to encourage more early adoption in general. We will explore this point more fully in the following section.

CHAPTER THREE: HOW ARE NEW INNOVATIONS ADOPTED?

Taking an innovation and weaving it into existing infrastructures and ways of working in primary care is not a straightforward process; many people are involved and unexpected challenges can arise. Few practices will face a completely linear route to adoption when embarking upon this often messy and unpredictable process.⁴⁵ For one, all innovations are on some level difficult since they require a break from the status quo. Time, energy and resources must be invested to facilitate the transition from old to new.

Barriers to adoption are well known to GP practices, but reactions are far from uniform. Some practices simply avoid early adoption, or are too stretched to even consider such opportunities. Others may tentatively take on the role of early adopter, if a specific innovation is considered sufficiently useful and low risk. Finally, some may enthusiastically and repeatedly embrace early adoption, picking up hints and tricks which make the process easier each time. This section will consider the path to adoption, who is involved, challenges that arise, and factors that can facilitate adoption.

Understanding the path to adoption

Adopting innovations is multifaceted and without a single route. Context must be taken into account. A variety of factors affect the path to adoption – including institutional culture, infrastructure, stakeholder knowledge, policy, industry standards and competition.⁴⁶ Still, we can unpick a general understanding of the process. Through our research and in reviewing surrounding literature, adoption processes tend to include several phases:

- **Phase one – Identification/introduction:** GP practice identifies an innovation and has initial contact with the supplier or information source.
- **Phase two – Demonstration:** the innovation is demonstrated to the practice.
- **Phase three – Internal agreement:** practice team agree to adopt the innovation.
- **Phase four – Staff training:** training is provided by the supplier or PCT/CCG.
- **Phase five – Pilot:** early adopter pilots the new innovation, with varying degrees of support from suppliers and/or other NHS bodies.
- **Phase six – Promotion to patients:** Once the pilot is complete and the innovation is embedded, GP practice encourages patient engagement (e.g. through the use of leaflets or posters in waiting rooms).

This process may not capture the nuances and variety of adoption processes in primary care, but it does help us to consider when GP practices may encounter challenges.

Who is involved in the adoption process?

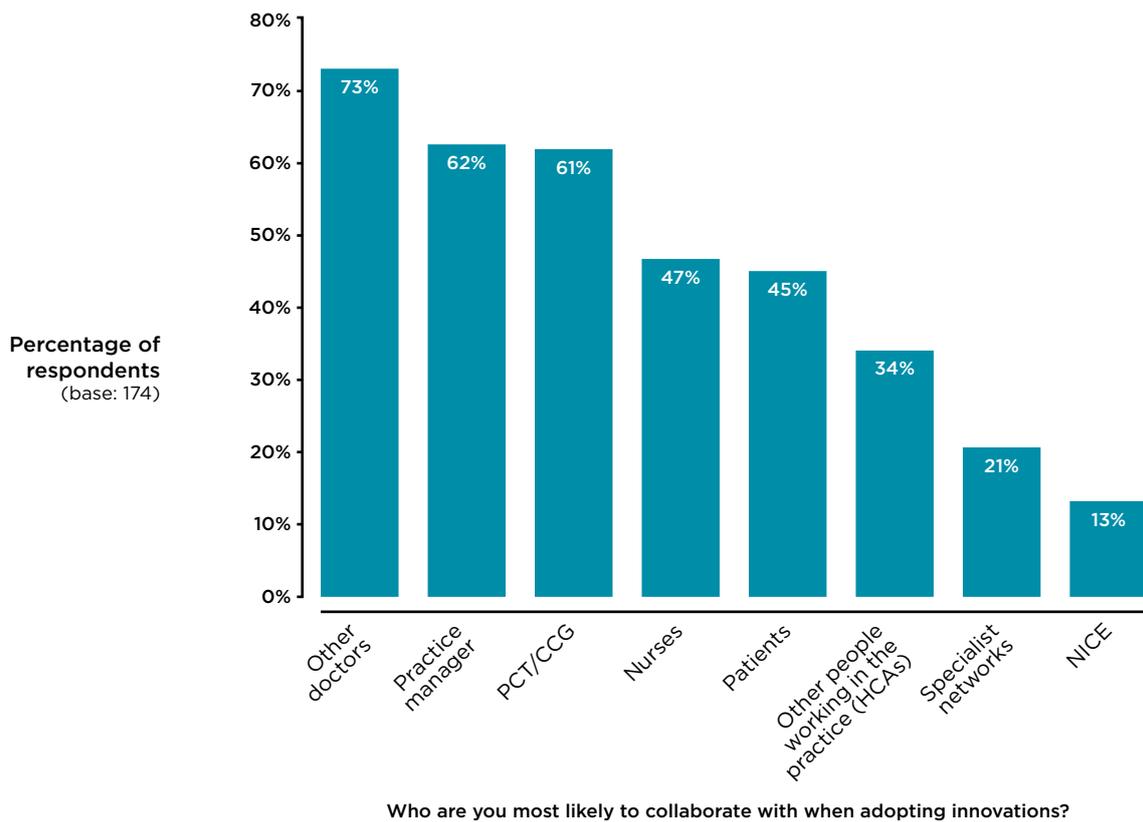
Few innovations can be implemented independently by a single individual. Adoption is a collective process involving many people's support, commitment and patience. So who is involved and when? The exact community drawn into the adoption process depends on the innovation at hand. For example, establishing an electronic prescription service will inevitably require close collaboration with a pharmacy, while a GP has to take particular care in how they engage patients while piloting a new drug.

Depending on the innovation, the parties that a GP involves in the adoption process may include:

- Other doctors
- Practice managers
- PCT/CCG
- Nurses
- Patients
- Other people working within the practice (HCAs)
- Specialists networks
- NICE

Our survey asked respondents ‘who’ they were most likely to collaborate with, both in their practice and the wider community, during this process. The bar chart below (Figure 7) provides a breakdown of ‘who’ respondents say they are most likely to collaborate or engage with when adopting an innovation for the practice.

Figure 7 GP responses to the survey question: ‘Who are you most likely to collaborate with when adopting innovations?’



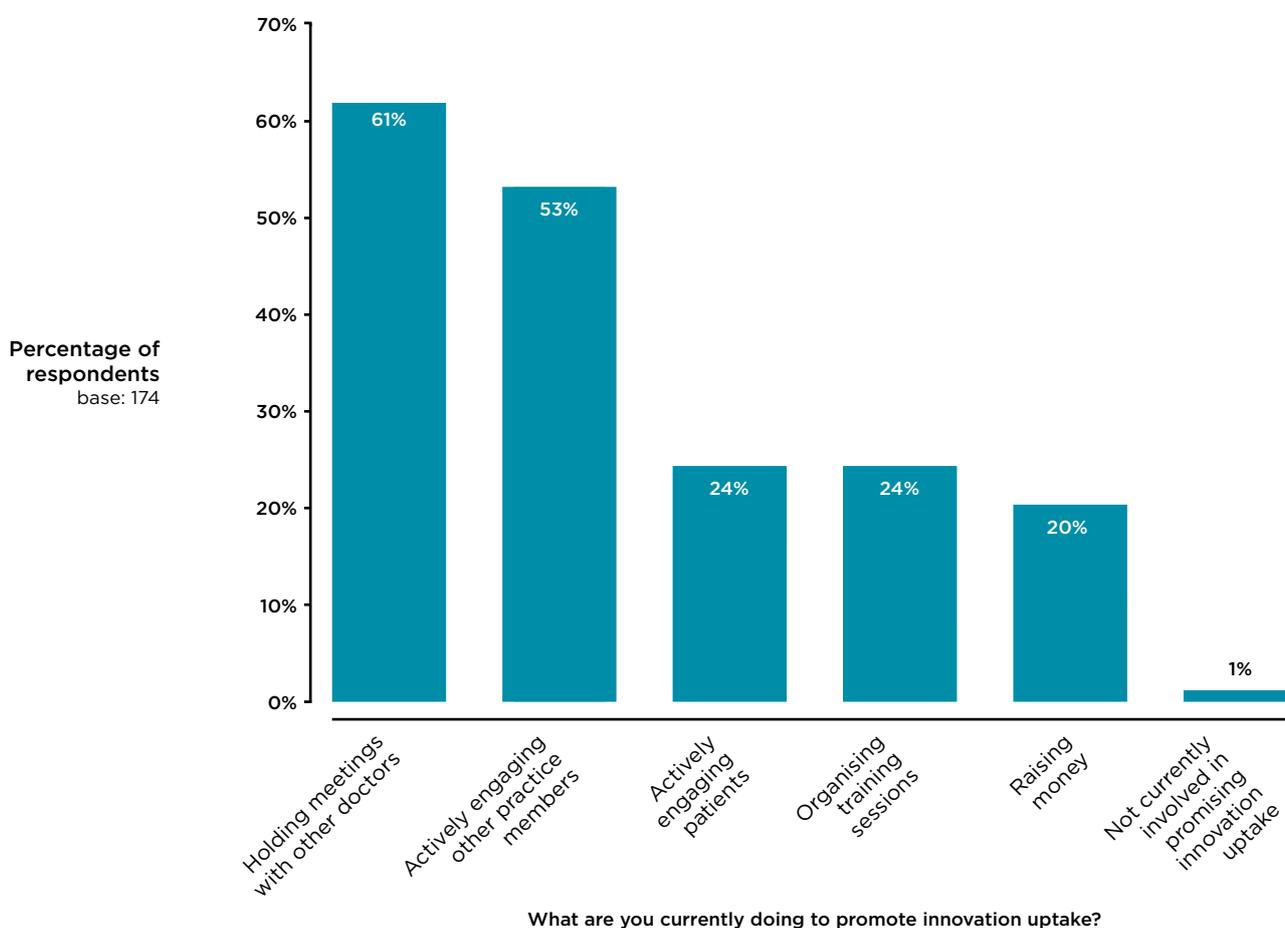
As we can see, other doctors, CCGs and practice managers consistently played key roles in the adoption process for our respondents. Below we outline some of the opportunities and concerns for each group.

GPs

While GPs speak to a range of groups when considering adopting an innovation, our survey shows that they are most likely to consult and collaborate with their colleagues. Other doctors play a crucial role in supporting the adoption of new innovations. Based on our survey and wider adoption literature, fellow GPs are crucial collaborators within the innovation process.

Not only a key source of information for one another, GPs also promote innovations more widely among themselves. Within our survey, GPs said they were most active in promoting innovations to other doctors and to other members of their practices, through meetings and other less formal means. Figure 8 reflects the approaches GPs take to promote innovation uptake more widely.

Figure 8 GP responses to the survey question: 'What are you currently doing to promote innovation uptake?'



Practice managers and practice staff

The majority of respondents in our survey nominated a practice management team as responsible for innovation. As the 'skippers of primary care,' practice managers ensure the smooth functioning of GP practices and are in a prime position to help coordinate and manage the adoption process of innovations - bringing together all staff within the process as well as gauging and recruiting external support and information as needed. However, practice managers are not present across all GP surgeries. Smaller practices in particular are less likely to have someone occupying this strategic role, leaving these duties to either be divided among other practice staff, or to be taken on by an individual GP in addition to their existing responsibilities.

Along with practice managers, practice staff are fundamental to successfully navigating adoption. However, as the people working directly between patients and doctors, staff need to be informed, trained, and confident about the innovation. If they are supported and supportive, the innovation is more likely to be adopted.

Given their importance, should the practice staff and management teams be given a more formalised role in adoption? Could an incentive scheme help prioritise and convene non-medical practice staff around the adoption of innovations? For instance, the NHS or local intermediaries could reward practice managers for introducing schemes that accelerate the adoption of important innovations within their practice. If successful, these individuals could share their lessons more widely within the local community. This would also mean that each practice would have a definitive person responsible for innovation.

PCTs/CCGs

As we have discussed in Chapters One and Two, local intermediaries play an important role in providing support to GP practices. They are also responsible for commissioning services and coordinating early-stage pilots of different types of innovations. While PCTs acted as the main local coordinating body in previous years, CCGs have taken on a slightly modified role. As a core element of the recent NHS reforms, CCGs continue to carry out much of this work – albeit with slightly more variable jurisdictions and less management resource than their predecessors.⁴⁷ Alongside NHS England area teams, CCGs lead on much of the commissioning for primary care and are responsible for approximately two-thirds of the NHS budget.

Given that GPs become members of CCGs and work very closely with them on a variety of matters, their presence and influence cannot be underestimated within the process of adoption. A recent study by the King's Fund found that the greatest perceived strength of CCGs over PCTs was their ability to support more dialogue among practitioners.⁴⁸ Yet CCGs must balance influencing GP practices without managing them. While these new entities are still open to some speculation, it is likely CCGs will be involved in the adoption process at some point – whether disseminating information, setting priorities, organising support for adoption, or managing commissioning procedures.

Patients and carers

Patients and carers are crucial players within the adoption process in two regards. Firstly, GPs are committed to providing high quality care to their patients. GPs will immediately be discouraged from adopting an innovation if they fail to see its value, or believe it will be challenging or problematic to their patients. In this regard, patients are an important force that can encourage as well as deter their practices from considering adoption.

GPs are equally incredibly responsive to patient needs and demand. Nearly half of doctors in our survey stated that they would collaborate with patients when adopting an innovation. This is a positive reflection of the increasing influence and consideration of patient feedback and participation. As patients, are we encouraging and challenging our practices to bring on new innovations? Equally, are we supportive and understanding of our practices when they are in the midst of embedding a new innovation – such as online bookings or a new drug?

Patients can be a driving force for innovation by identifying and advocating for innovative treatments and services. As information about innovations and health treatments becomes increasingly available, patients are increasingly becoming researchers in their own right. Patients have driven forward the adoption and spread of innovative medicines and practices, which has contributed to significant improvements in the treatment of conditions like HIV and breast cancer. We have also seen the creation of health companies like Patients Know Best – the first patient-managed medical records system⁴⁹ – and NHS initiatives like the Expert Patients

Programme, which seeks to support patients to confidently manage their condition and treatment through training.⁵⁰ Equally, free-to-use online platform Patients Like Me⁵¹ has provided a space where hundreds of thousands of patients with similar conditions can connect, share, and learn from one another's experiences. Such patient-centred innovations reflect a shift towards people-powered health, a phenomenon explored in work undertaken by Nesta and partners.⁵²

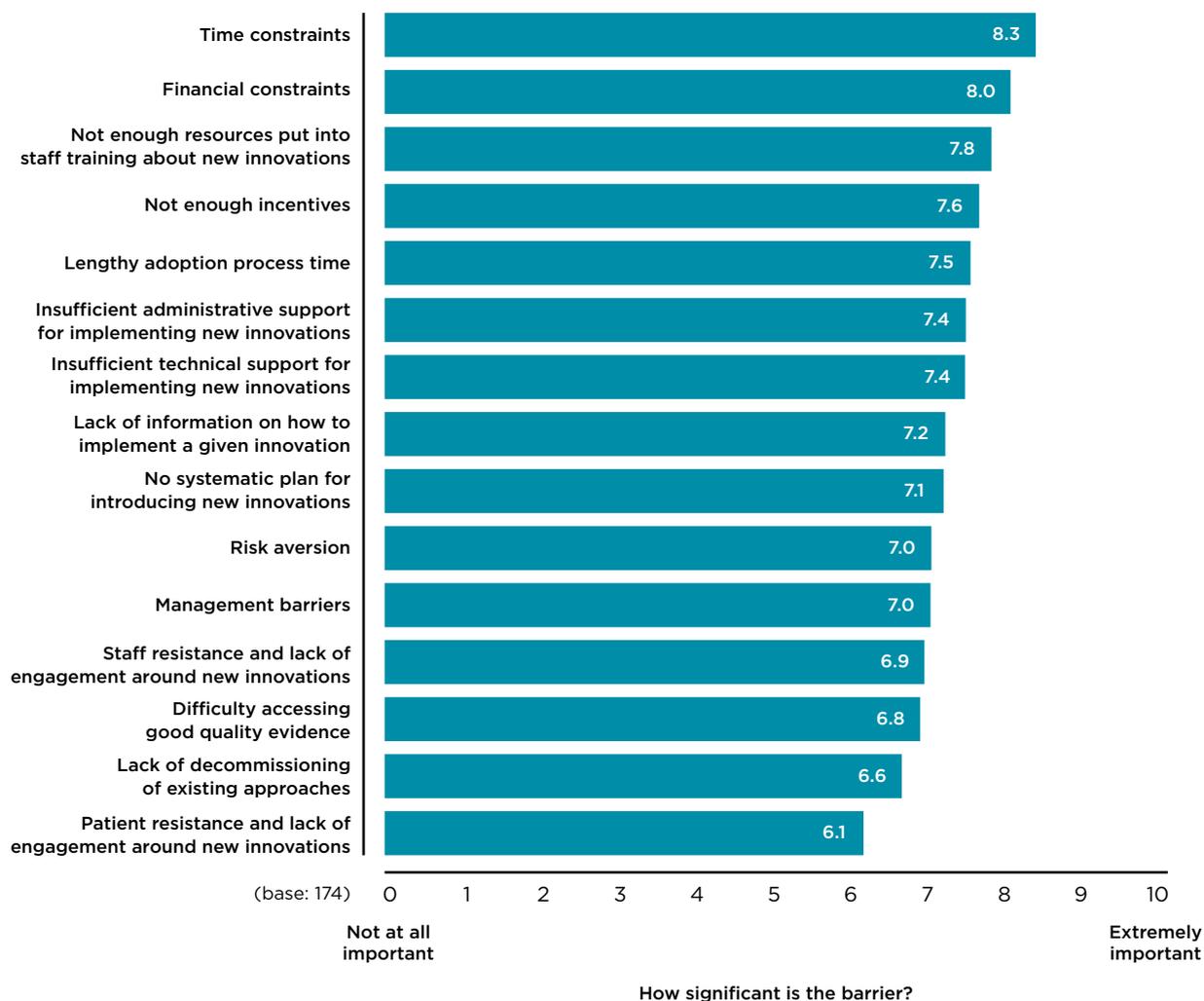
This increasing recognition of patients as drivers of innovation reflects a wider shift in healthcare over recent decades. However, the most vocal or informed patients may not be entirely representative. While some patients are leading the way for innovations within their practices, others may not feel confident suggesting treatment or service changes to their GPs. Patients will differ both as a community and in their individual interactions with the health system. Nonetheless, it is important to appreciate their influence and power in driving adoption in primary care.

Barriers to innovation

With so many people involved, the path to implementation will inevitably have some bumps. Considering the multitude of challenges that can arise while adopting an innovation, it's hardly surprising that risk aversion is a significant barrier. As Rogers and others have pointed out, an innovation's perceived characteristics – such as relative advantage, compatibility, complexity, trialability, and observability⁵³ – will play an important role in determining how and whether it is adopted. However, if we can begin to anticipate the different stages of an innovation process and the people who will be involved, it is possible to manage and minimise potential challenges.

The list of potential barriers is long. New challenges and unforeseen limitations can arise at any moment. Equally, negative past experiences can lead to unwillingness or apprehension within practices when new opportunities arise. Our survey asked GPs to rate 14 potential barriers to the adoption of innovations within their practice on a ten-point scale from 'not at all important' to ten 'extremely important' (Figure 9). Despite a long and diverse list, nearly every barrier we asked GPs about was rated above six on a scale of ten for importance.

Figure 9 GP responses to the survey question: ‘Please indicate on a scale of 1-10 how significant you believe each of the following barriers is to adoption of innovations within your practice.’



Unsurprisingly, time and money were the most highly rated barriers, scoring 8.3 and 8.0 respectively. Resource barriers are not only an issue when going through the process of adopting a specific innovation; indirect costs associated with switching to new infrastructures or procedures also factor into practices’ decisions to adopt. While still highly scored, the lowest ranked barriers among GPs included patient resistance and lack of engagement around innovations, as well as a lack of decommissioning of existing approaches.

It is extremely telling that GPs found every barrier to be at least moderately important. Theoretically, every time a new innovation is on the cusp of being introduced, practices need to consider and evaluate the risks and barriers to their adoption. Based on these responses, we were able to identify four types of barriers:

- 1. Structural barriers to innovation uptake:** Staff resistance and lack of engagement, patient resistance and lack of engagement, management barriers, lack of decommissioning of existing approaches and risk aversion.
- 2. Resource barriers to innovation uptake:** Financial constraints, time constraints, not enough resources to put into staff training, not enough incentives and lengthy adoption process time.
- 3. Lack of administrative or technical support:** Insufficient technical support and insufficient administrative support.

4. Informational barriers to innovation uptake: Lack of information on how to implement a given innovation, difficulty accessing good quality evidence and no systematic plan for introducing new innovations.

These types provide a useful framework for considering the various barriers at hand and could even inform a tool for thinking through risks. Barriers will arise in different forms, at different stages, and in different levels of severity depending on the innovation. These can be easy to identify and prepare for once an innovation has been widely taken up, but early adopters may not have the luxury of extensive information – they are in effect *creating* precedents that will guide the wider population at a later date.

Below we consider the adoption processes of different types of innovation.

IT innovations

As we saw in Chapter Two, IT systems play a significant role in whether or not a GP practice will, or can, adopt an IT innovation. In order to carefully consider the specific barriers to adopting IT tools and infrastructures, we have separated the IT innovations which are managed by a practices internal IT systems (internal IT innovations) and those which are managed on an NHS or external IT system (external IT innovations).

Ultimately, IT innovations were found to be challenging for practices to adopt. Existing systems limit practices' ability to adopt an innovation, but insufficient technical support makes it particularly challenging to navigate the difficult part of the adoption process.

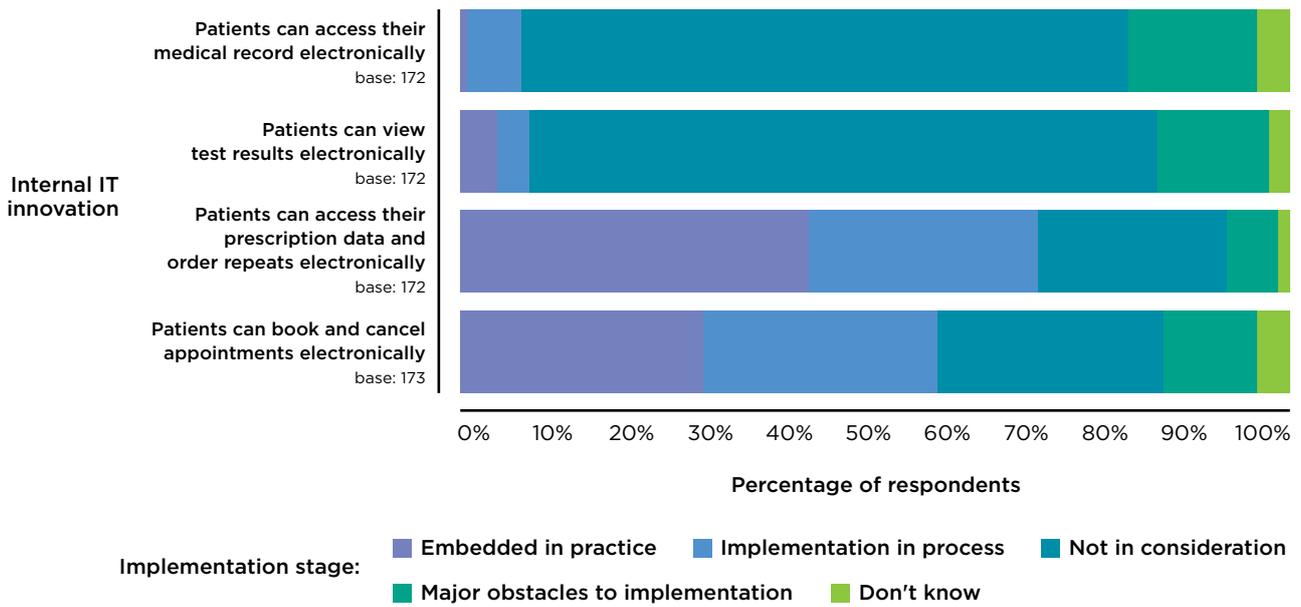
Telephone interviews with the practices identified as technophiles showed that:

- Not surprisingly, the very earliest adopters who piloted innovations tend to encounter the most technical difficulty.
- However, early-adopting practices say there is far more external support on offer than for later adopters.
- PCTs/CCGs often put forward practices in their area to pilot new technologies, and identify IT 'leads'.

Barriers to Internal IT Innovations

Once a GP practice is aware of a new IT innovation, they can decide whether or not to embed it within their practice. Our survey indicated that the selected internal systems were not well adopted: only one participant had fully embedded all of the selected internal IT innovations in their practice, while just under half of respondents had not embedded any. Figure 10 outlines these results.

Figure 10 Implementation stage of internal IT innovations, according to surveyed GPs

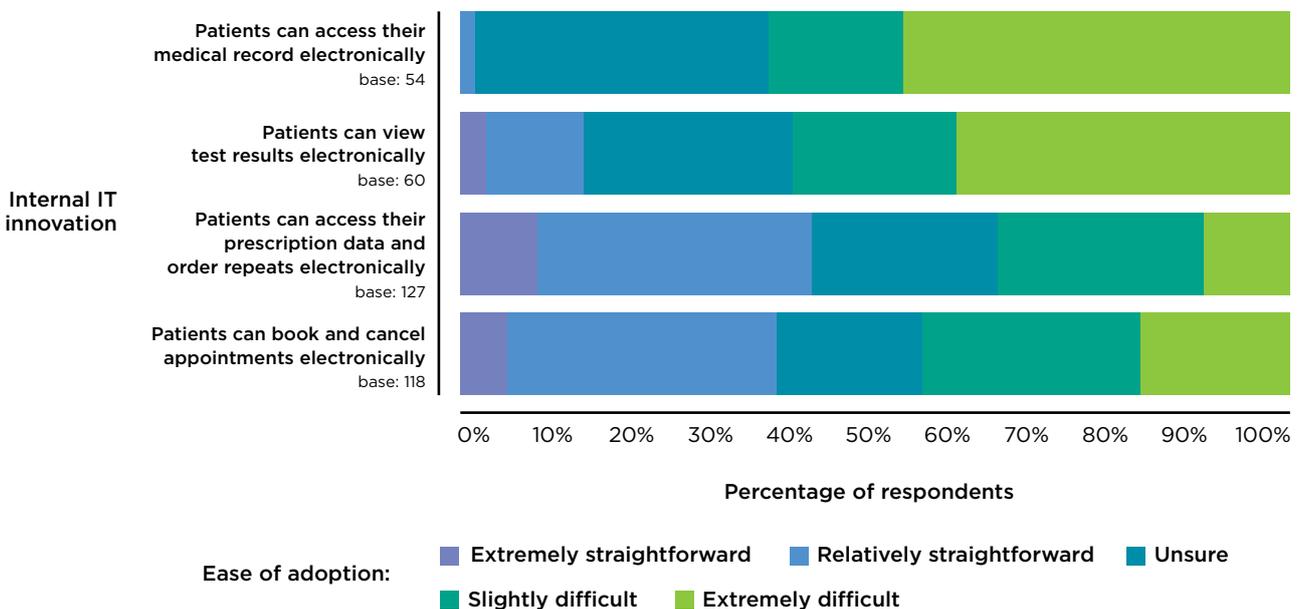


Along with varied levels of adoption, it is worth noting that the majority of respondents said that their practices were not considering implementing changes to enable patient access to electronic medical records and electronic test results. What can we learn from this low level of consideration for these kinds of IT innovations?

The barriers to implementation we identified come from a relatively small sample. Still, many practices would not consider adopting it because they did not have the right IT systems in place. Additionally, interview responses did suggest concerns that patients would misinterpret results and records, along with concerns of increased workload for practice staff due to patients' questions and concerns surrounding online records.

Across our research, adoption rates for innovations tended to reflect their ease of adoption. Figure 11 below presents the ease of adopting the internal IT innovations.

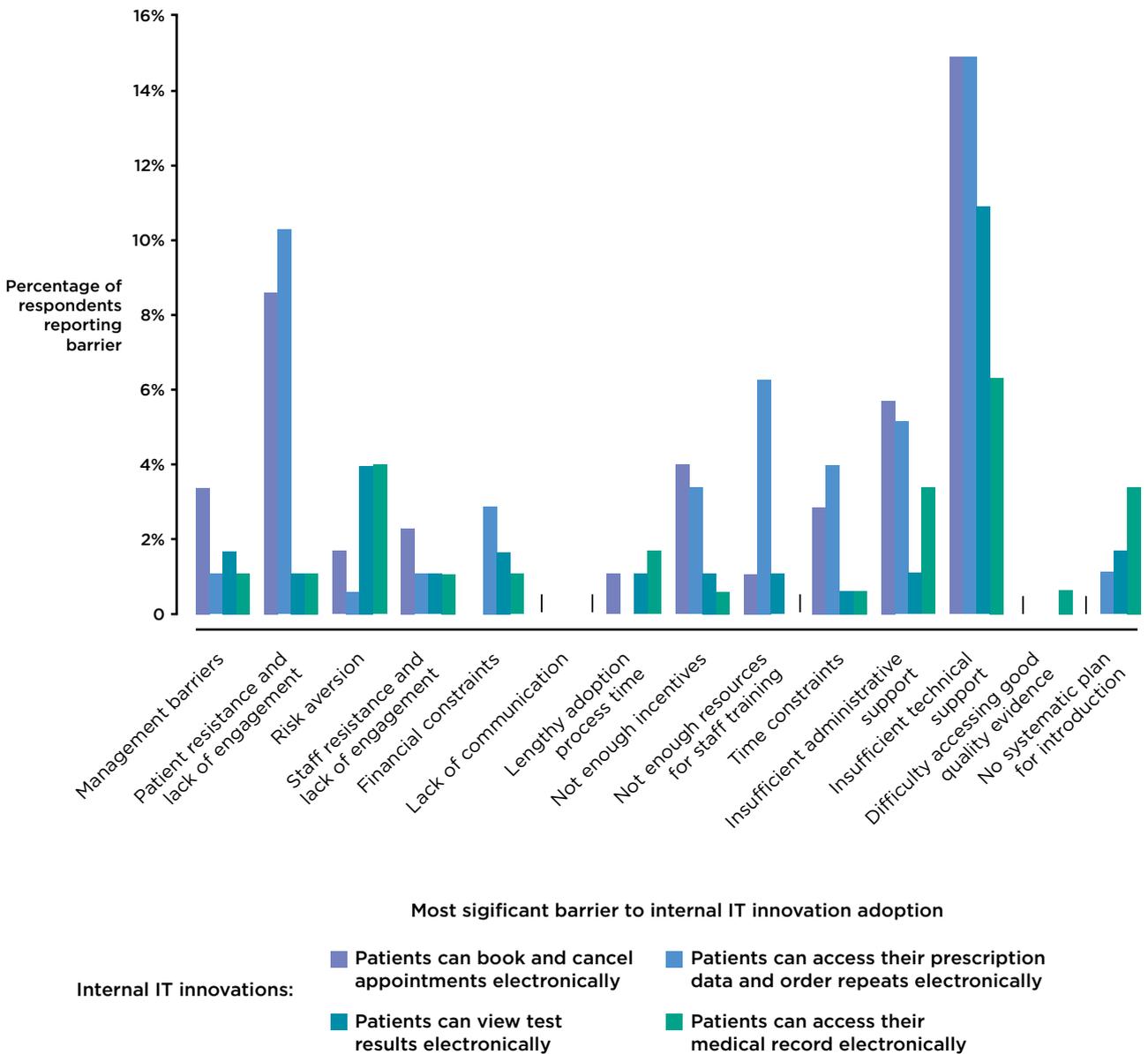
Figure 11 Ease of adopting internal IT innovations, according to surveyed GPs



Among our survey respondents who had already adopted or were currently adopting an internal IT innovation, ease of adoption appeared to mirror the likelihood that the innovation had been fully embedded. Therefore, electronic medical records and test results were reported to be more difficult to implement than online prescription data and appointment booking systems. Still, fewer than 10 per cent of respondents indicated that any individual internal IT innovation was extremely straightforward to implement.

Those who did attempt to implement internal IT innovations within their practices found the process very difficult and felt they had not received enough support. But what was so problematic about the adoption process for these practices? Figure 12 reflects this.

Figure 12 Most significant barrier to the adoption of internal IT innovations, according to surveyed GPs



Across all internal IT innovations, insufficient technical support, patient resistance and lack of engagement were the dominant sources of difficulty reported by GPs in the survey. Alternatively, certain barriers appeared to be more prevalent for specific innovations.

Semi-structured interviews provided additional qualitative insight on why GP practices embedded some functions but not others. When practices were asked why they were not enabling online prescription ordering and appointment booking services, responses revealed several prevailing reasons:

- A degree of psychological resistance from practices with more limited IT skills.
- Concerns about how the system would be received by patients.
- Concern over whether they had enough resources to implement the system.
- Lack of confidence in the technologies themselves.

Practice manager testimony - adopting patient online systems

Technophile practice: *"We're strongly considering the other EMIS patient online systems but we are concerned about the level of interpretation on medical records. This could lead to overburdening of the surgery. But in general principle we think it's a good thing"*

Technophile practice: *"EMIS advertised, we contacted them, received a demonstration to practice managers and doctors, asked for a free trial period to test it, EMIS trained a couple of people how to use it. We trained the rest of the staff, and advertised to patients via posters and leaflets. We introduced the system a couple of years ago and it took about two months to implement it."*

Similar reasons for were given for not adopting patient access to electronic medical records and test results, including:

- Concerns about data security around the electronic release of confidential patient information.
- Misinterpretation of results if healthcare professionals are unavailable to explain them.
- Potential influx of phone calls from patients with concerns and complaints, and the inability of a practice to deal with the increased workload.

Practice manager testimony - adopting electronic medical records

Technophile practice: *"We heard other practices had introduced or piloted the technology. We discussed it with the practice partners and initially there was a lot of hesitancy but eventually we decided to go ahead. It took two years liaising with EMIS to find out how to do it! No other governance was needed (we didn't need to consult the PCT)."*

It is difficult to extrapolate these concerns to a national level, but the perceived risk alone is important to consider. Given how early adopters find out about new innovations, what influence does a potentially bad review in a practice management meeting or discussion among GPs hold? Negative feedback from practices could discourage others from considering an innovation.

Barriers to external IT innovations

Like internal IT innovations, external IT systems were also not straightforward to adopt. In fact, they appeared to be even more difficult. Our survey respondents reported that external IT innovations, EPS (Electronic Prescription System) and Summary Care Records (SCR), were even less widely adopted than internal IT innovations and QOF indicators: Nearly 40 per cent had neither innovation fully embedded within their practice, with EPS receiving the lowest uptake of only 28.7 per cent among respondents.

Practice manager testimony - Electronic Prescription Service

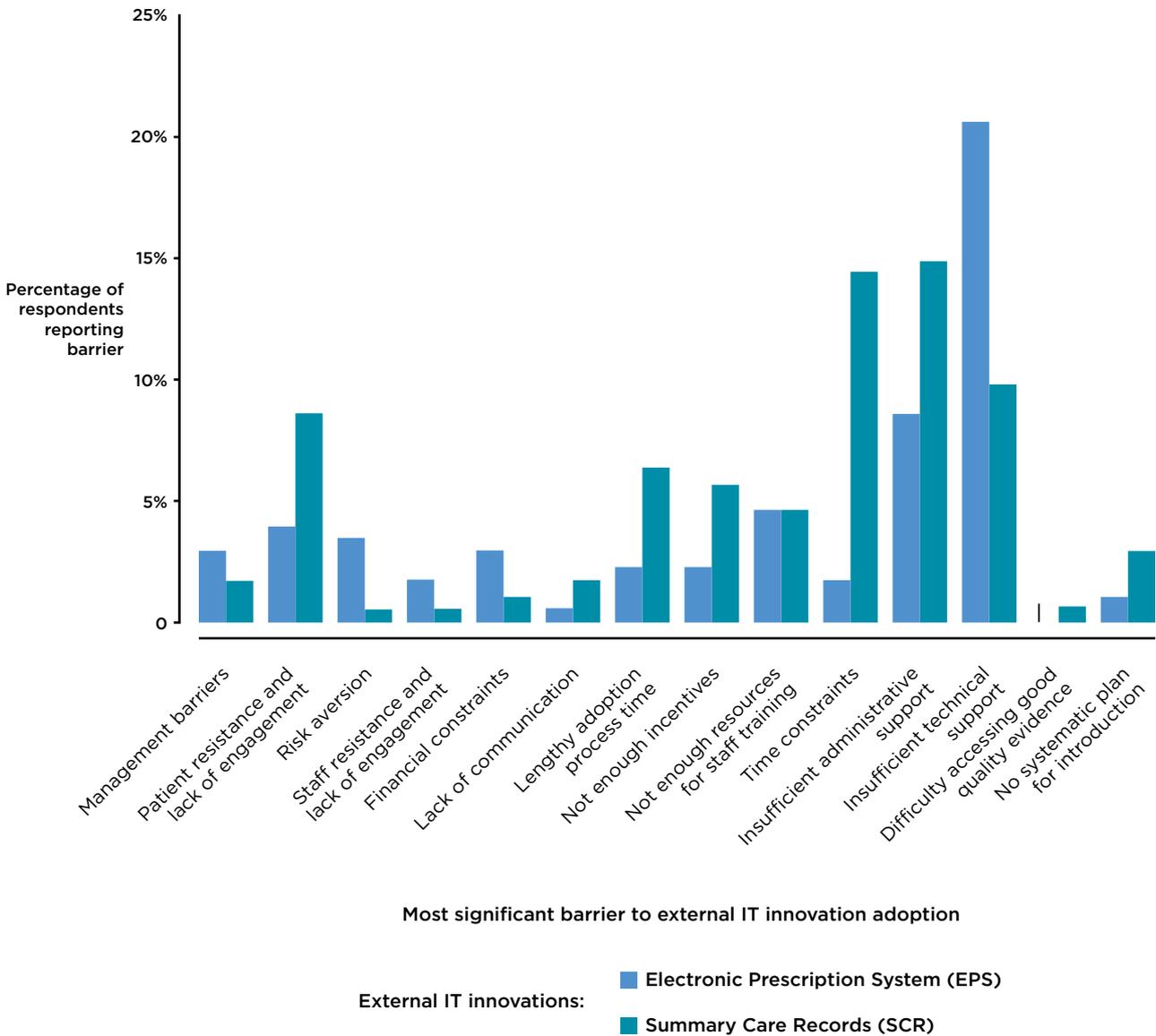
Technophile practice: *“The PCT put us forward to pilot the EPS system a couple of years ago. It was seen as the way forward and what is expected of general practice. We held several in-house practice meetings before and during adoption. Our IT department provided staff training for the system. We also engaged the local chemists and the patient participation group.”* The practice reported finding implementation extremely difficult at some stages of the process.

Overall high-score practice, including patient experience: *“It was seen as the way forward. Looking at the processes, we find it frees up telephone lines and gives patients more opportunities. We advertise the service to patients.”*

This low uptake is not without reason. Less than 50 per cent of respondent who had adopted external IT innovations indicated that they found them ‘extremely straightforward’ or ‘relatively straightforward’ to adopt. EPS appeared to be associated with particularly difficult adoption: only 20 per cent of survey respondents indicated that they had adopted this service and that this had been a straightforward process. This is perhaps surprising, as the majority of practices (89 per cent) in England are live with the first iteration of Electronic Prescription Service (EPS1), so one might have inferred that the adoption process is simpler than some of the other focus innovations, which were more poorly adopted. Similar in many respects to ESP1, the updated EPS2 offers several additional features, including the option for patients to nominate a dispenser, electronic cancellation of prescriptions, electronic repeat dispensing, and submission of electronic reimbursement endorsements.⁵⁴ As of March 2012, more than 20 months after first deployment, ESP2 was embedded in only 110 (out of over 8,000) out GP practices in England.⁵⁵

Like internal IT innovations, lack of technical support remained the main barrier for practices that attempted to adopt an external innovation (for instance, when the innovation was connected to another service). In particular, EPS had the added challenge of integrating its technical infrastructure with pharmacies. Figure 13 highlights the barriers for both innovations.

Figure 13 Most significant barrier to the adoption of external IT innovations, according to surveyed GPs



As seen in Figure 13, we found that limited resources and administrative support were recurrent issues, especially to adopting SCR. Speaking to practices revealed that implementing this technology creates a big strain on practice resources initially, as they need to receive and code ‘opt-out’ forms from every patient on their list. Providing better access to technical support and expert representatives from practices that have already implemented the system might be a solution. Some of the practices contacted for interviews had recently signed up for SCR pilots, which was not reflected in the data. Consequently, the actual adoption numbers might soon be higher than 17 per cent.

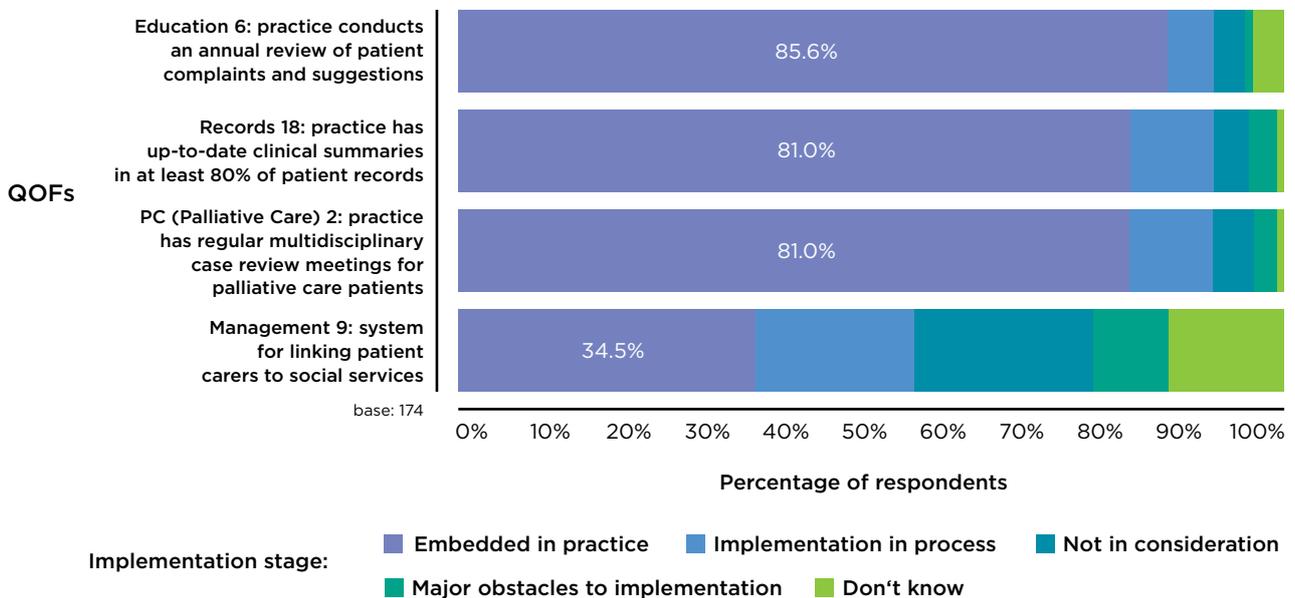
Practice manager testimony - online appointment booking and EPS

Overall high-score practice, excluding patient experience: *“Online appointment booking involved contacting the clinical supplier to confirm that it was free of charge, and to have outline information sent through. This was presented to the practice partners, who agreed it was convenient for patients and a driver to move work from internal areas. No training was required –the system runs itself... The EPS changed the flow of working for the GPs who needed to be more disciplined and process-driven. It was important to identify early wins to keep them interested and motivated.”*

QOFs

Unlike IT innovations, QOFs have high adoption rates among GP practices. On the one hand, many practices are already meeting QOFs before they are introduced, which ensures a high rate of ‘early adopters’ – if early adoption is detected by being adopted prior to QOF issuing. Additionally, our research found that QOFs tend to require fewer systems changes and less training than IT innovations, which make them easier to adopt. Figure 14 demonstrates the higher rate of adoption among QOFs.

Figure 14 Implementation stage of selected QOFs, according to surveyed GPs



The majority of respondents reported that each of the QOF indicators listed above were fully embedded in their practice, with the exception of having a system to link carers to social services. Only 35 per cent reported this QOF was embedded in practice. Less than three per cent indicated that all QOF indicators were not fully embedded, while 27 per cent indicated that all QOF indicators were embedded in their practice. Generally, time constraints appeared to be the main barrier to adoption.

Survey respondents experienced different levels of ease when adopting each of the selected QOF measures. In particular, difficulties associated with adopting Management 9 (‘There is a system for linking patient carers to social services’) and PC 2 (‘There are multidisciplinary case review meetings for palliative care patients’) were reported by 46 per cent and 44 per cent of respondents respectively.

Practice manager testimony - Adopting QOFs

Overall high-score practice, excluding patient experience: “We first identified the groups of patients to target and then think of the best ways to communicate with them (e.g. letter or text message).”

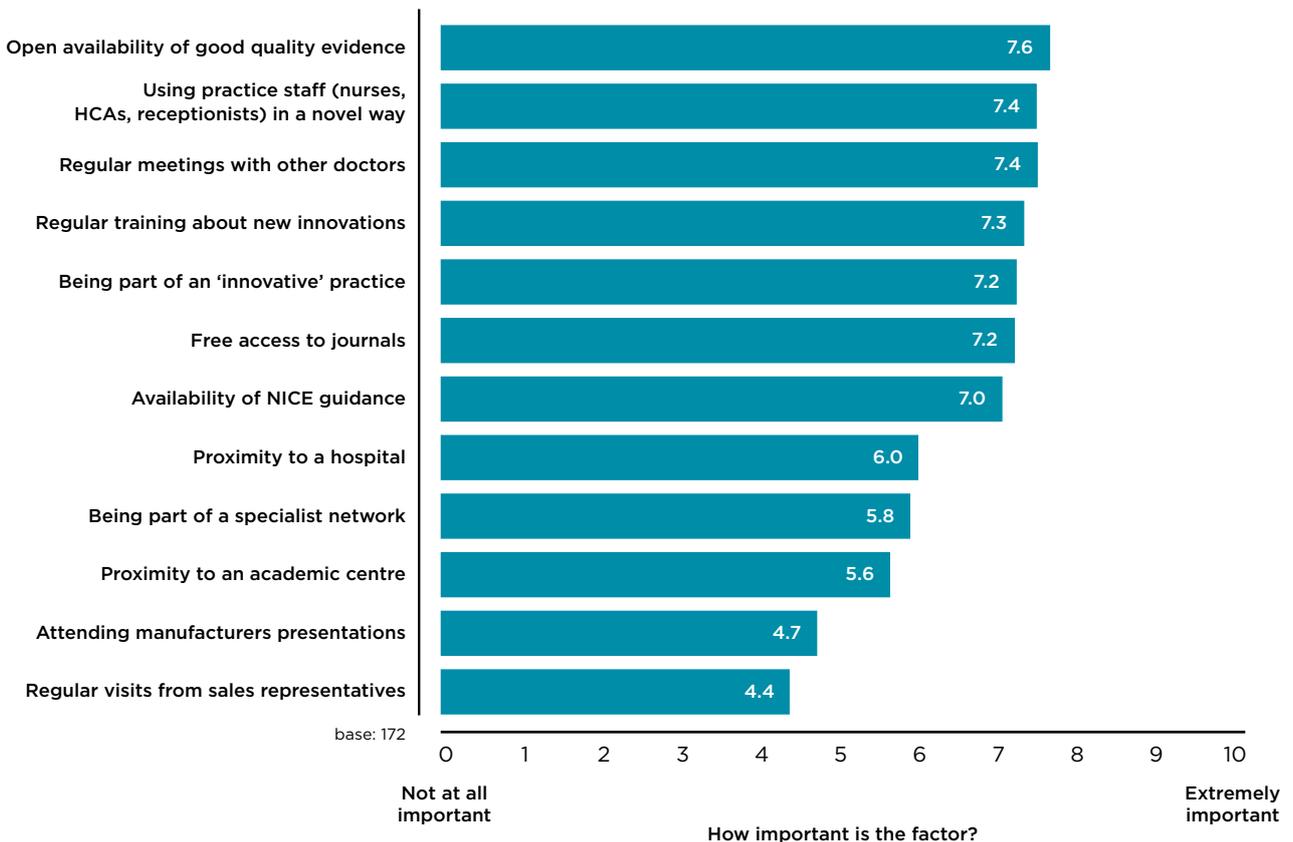
Overall high-score practice, including patient experience: “A receptionist received training for social services, and she is the first point of call if patients want to register a carer. Application is via a pack which is advertised on a practice notice board.”

Enabling adoption

Just as certain barriers can inhibit the adoption process, other factors can help facilitate it. At times, practices can implement these enabling factors simply and independently. For instance, a practice adopting online appointment bookings can minimise potential difficulties by ensuring frontline staff receive sufficient initial training and have ongoing support. Other times, enabling factors required to adopt an innovation may be external - such as the availability of effective evidence or additional funding. Considering the high rates of adoption for the incentive-driven QOFs and the top barriers to adoption identified in our research, time and money cannot be ignored when attempting to facilitate adoption in primary care.

Based on our survey, the most highly rated facilitators of adoption were open availability of good quality evidence, using practice staff in a novel way and regular meetings with other doctors. Respondents were asked to rate 12 potential facilitators to the adoption of innovations according to the experience of their practice on a 10-point scale (from 0 = ‘not at all important’ to 10 = ‘extremely important’). All facilitators were rated above five on the scale, with the exception of regular visits from sales representatives and attending manufacturers’ presentations. Figure 15 below outlines full range of responses from our survey.

Figure 15 GP responses to the survey question, ‘Please indicate on a scale of 1-10 how vital you think each of the following factors is in enabling you to adopt innovations within your practice.’



Looking across the leading factors for enabling adoption, two types of factors appear to be particularly vital: support from others and useful information.

Over the course of this research, we have continuously been reminded that **adoption is a social process**. GPs are among the most influential information sources for one another. Before even beginning the adoption process, practices need buy-in and support from colleagues and staff, and must also consider the willingness of their patients. Finally, external support, such as training or technical advice, help to fill any gaps in capacity and expertise so that practices can see through an adoption process.

Secondly, **practices rely on having useful information on hand at every stage of the adoption process**. Evidence is crucial for making an informed decision about which innovations to adopt, but it alone is not enough. In addition to understanding what innovations work, practices benefit from more detailed information on how to adopt them and how to overcome common challenges.

Arguably, these kinds of enabling factors are far from systematic and tend to come into being organically rather than through a directive or set of guidelines. Still, finding more ways to filter these informal networks and conversations upwards into the public domain could be beneficial.

Just as these factors can help enable practices to adopt an innovation, we should also consider current mechanisms used to enable and achieve the same outcome. All of the enabling factors we reviewed and gathered are already occurring in some form across primary care in England. However, much of this depends on the individual GP or practice manager to take the initiative and seek out these resources. While some professionals in primary care are already proactive and networked early adopters, while others require additional support and justification for dedicating time and energy towards the adoption of innovations.

With this in mind, how can we improve process of innovation dissemination, adoption and implementation in primary care – and public services more generally? More fundamentally, how do we encourage and support more GP practices to take on the early adopter role? This needs to begin with celebrating and understanding those who are already acting as early adopters. In the previous sections we have considered the adoption process from decision to implementation. In final section, we will consider how early adoption can be encouraged and spread across primary care and public services.

CONCLUSION: LESSONS FOR IMPROVING EARLY ADOPTION

Public services are faced with a challenge. Tasked to provide the best possible service to the public, they must be confident in their choices. Adaptability and openness to change must be integral so that new products and approaches can improve current performance and outcomes. This is a difficult line to tread, but one which must be navigated if we are to benefit from the ever-increasing range of innovations available.

Despite many innovations in health emanating from the UK, the NHS is recognised as a consistently slow adopter. By mapping the adoption rates of different innovations, this report has reinforced such claims. Our analysis showed that few GP practices are serial early adopters of a variety of innovations. While some clusters were found around specific types of innovations – for instance, technophiles – early adoption remains variable among GP practices in England.

Adopting new and best practices is important, but only if it improves patient outcomes. Consumer health advocate Regina Herzlinger has argued that many health agencies have had limited success due to their focus on process over outputs in the improvement of patient health.⁵⁶ To achieve better health outcomes, we must not only ask what changes are needed to incentivise adoption earlier. We must also consider how we can capture and analyse patient outcomes as well.

Adoption is an inherently complex process, involving a diverse combination of people, organisations, resources, and information at every stage. From identifying an innovation to embedding it within everyday routines, each stage will throw open challenges to those involved along the way. If one lesson is taken from this work, it should be that adopting innovations is never a linear or generalisable process controlled by a single individual, but it can nevertheless be understood and supported.

Lessons for primary care

At a time when the government is placing increased freedom and responsibility in the hands of GPs, encouraging early adoption is both an opportunity and challenge. Devolved power offers GP practices and CCGs more freedom to determine which innovations are relevant to their services. But GP independence is not a panacea. Based on our research, several issues must be addressed if we are to enable greater early adoption in primary care:

Involve patients more consistently in adoption processes. Patient wellbeing is an immensely important consideration for any GP or practice. Unfortunately most patients are only peripherally involved in the decisions about take-up of new innovations at present. Yet they can be incredibly effective advocates of innovation, encouraging rapid change within their practices. Such influential power has already produced transformative changes to treatment for various conditions. New initiatives have begun to capture patient opinion and knowledge. However, we can do more to ensure that patients' invaluable contributions are integrated more widely across primary care.

Champion and support adoption through local intermediaries. Innovations are ultimately used and adopted at a local level. GPs consider personal and informal connections as important sources for finding out about innovations. Likewise, nearby GP practices consistently have similar rates and patterns of adoption. While we cannot definitely conclude that local practices have similar adoption patterns because they are influenced by their neighbours, it is important to acknowledge that information about support for adoption is localising.

As NHS resource and power is devolved to local practices and intermediaries, there is a unique opportunity to encourage early adoption from the ground up. CCGs will inevitably have a role in assembling and supporting local networks. The newly formed AHSNs are also particularly relevant, since they have been tasked with supporting the spread of innovation and bringing together stakeholders across sectors and institutions. Time will tell whether AHSNs are able to rise to the challenge of being simultaneous supporters, drivers and evaluators of innovation take up. Yet, by connecting informal local networks with national information sources, AHSNs could lead in coordinating and encouraging early adoption among local practices within their jurisdiction.

Support different types of innovations and all stages of the adoption process. Adoption cannot be improved with clinical guidelines or financial incentives alone. At present many of the most successfully spread innovations have been those that are easiest to implement. Unfortunately, these also tend to be more peripheral or incremental in their impact. If we are to encourage the adoption of different types of innovations – particularly those that offer significant demonstrable benefit despite being more disruptive – we need to create a diverse range of information and support mechanisms that can respond to different institutional structures, adoption processes and stakeholder behaviours.

As a starting point, the NHS and local intermediaries could classify the existing range of support on offer to CCGs and local practices by innovation types and the stage of adoption process. Based on our findings, we would propose that intermediaries, such as AHSNs, also explore the following strategies for supporting each stage of the adoption process in primary care:

Identifying innovations:

- Provide concise and actionable information on innovations ready for early adoption.
- Appoint ‘early adopter’ GPs as local area leaders.
- Establish peer-to-peer networks to share new innovations for adoption.

Deciding to adopt innovations:

- Expose practices to influential GPs and opinion leaders advocating innovation.
- Use peer-to-peer networks to gather buy-in from ‘follower’ GP practices.
- Provide financial and non-financial incentives for adoption.

Adopting innovations:

- Provide step-by-step instructions for adoption.
- Make available a wider range of technical support available to GPs in the process of adopting innovations.
- Publish and recognise early adoption of innovations and performance based on outcomes.

Lessons for public services more broadly

Although this research explores the early adoption of innovations in primary care, the findings offer some lessons which can be applied to public services more generally:

Adoption is crucial, so let's celebrate it. So often, we limit our understanding of innovation to the creation of new ideas, products and approaches. But innovations must be widely used to have impact.

Innovations will only transform a service if they are adopted. By taking the risk of being first, early adopters will encounter more challenges in the adoption process than those who follow. Yet their lessons inform subsequent adopters. This task is not always easy, but it is invaluable for ensuring that our public services continue to improve their outcomes and efficiency.

Whether acknowledgement or reward, more should be done to recognise and celebrate the value of this work, and those who chose to undertake it.

Adoption is variable and there is need for improvement. Appreciating the variability of adoption does not mean we should abandon every structure and framework for understanding adoption. Such tools can be useful for understanding the importance and role of adoption in general, but the nuances of adopting different innovations across diverse contexts needs to be accounted for in practice.

Use open data to increase transparency around adoption. To encourage adoption we must first understand it. Open data can show us who is adopting what and when. Through the analysis of open datasets, this report has been able to show the adoption rates of a handful of innovations. Care must be taken to provide context for such information, but there is an immense opportunity to make such analysis a real force for change.

Translating existing open datasets and advocating for more to become available, we can start to draw a clearer picture of the adoption landscape within the NHS. With increased transparency around adoption rates and trends, GP practices, patients and other health bodies can make more informed decisions about adoption and, hopefully, become involved in early adoption themselves.

Make early adoption more widespread. Improving early adoption in public services isn't simply a matter of adopting more innovations faster. Many of the challenges surrounding the adoption of innovations reflect the generally messy, persistent and interrelated challenges found within a public service organisation – including *“formal decision processes (including planning), evidence, communication, resources and decommissioning, and innovative culture”*.⁵⁷ These issues are interconnected and must be addressed to achieve any lasting organisational change.

Early adoption will not increase with a singular, technocratic, deficit-based solution. Encouraging early adoption within public services begins by making it easier for service providers to identify potentially beneficial innovations that suit their needs. Early adopters then need information, resources and support to help overcome any disruptions that arise. Once an innovation is adopted, lessons from the process can help inform and propel further adoption. Successful early adopters can share not just what they've accomplished, but how they've done it – so that others can learn from these underrated innovators.

APPENDIX I

Complete list of innovations relating to GP practice considered for study in phase two of research

Diagnosis

- Reagent strips for blood testing machines for diabetes.

Infrastructure

- Whether GP practices provide functionality for patients to book or cancel appointments electronically.
- Whether GP practices provide functionality for patients to view letters electronically.
- Whether GP practices provide functionality for patients to view or order repeat prescriptions electronically.
- Whether GP practices provide functionality for patients to view subset of medical records.
- Whether GP practices provide functionality for patients to view test results electronically.
- Whether GP practices provide functionality for patients to view their full medical record electronically.

IT Services

- Annual referrals initiated via Choose and Book.
- GP Practices across England who are live with Release 1 and/or Release 2 of the Electronic Prescription Service.
- GP Practices uploading Summary Care Records.

Quality Outcomes Framework

- 80 per cent of newly registered patients have had their notes summarised within eight weeks of receipt by the practice.
- All practice-employed non-clinical team members have an annual appraisal.
- All practice-employed nurses have personal learning plans which have been reviewed at annual appraisal.
- Patient experience of access (2). Patients who, in the appropriate national survey, indicate that they were able to book an appointment with a GP more than two days ahead.
- The blood pressure of patients aged 45 and over is recorded in the preceding five years for at least 80 per cent of patients.
- The number of hours from requesting a prescription to availability for collection by the patient is 48 hours or less (excluding weekends and bank/local holidays).
- The practice conducts an annual review of patient complaints and suggestions to ascertain general learning points which are shared with the team.

- The practice has a policy for auditing its cervical screening service, and performs an audit of inadequate cervical smears in relation to individual smear-takers at least every two years.
- The practice has a protocol that is in line with national guidance and practice for the management of cervical screening, which includes staff training, management of patient call/recall, exception reporting and the regular monitoring of inadequate smear rates.
- The practice has regular (at least three monthly) multidisciplinary case review meetings where all patients on the palliative care register are discussed.
- The practice has up-to-date clinical summaries in at least 80 per cent of patient records.
- The practice meets the PCO prescribing adviser at least annually, has agreed up to three actions related to prescribing and subsequently provided evidence of change.
- The practice offers a range of appointment times to patients, which as a minimum should include morning and afternoon appointments, five mornings and four afternoons per week, except where agreed with the PCO.
- The practice supports smokers in stopping smoking by a strategy which includes providing literature and offering appropriate therapy.
- There is a system to alert the out-of-hours service or duty doctor to patients dying at home.
- Women prescribed an oral or patch contraceptive method who have also received information from the practice about long-acting reversible methods of contraception in the previous 15 months.
- Women prescribed emergency hormonal contraception at least once in the year by the practice who have received information from the practice about long-acting reversible methods of contraception at the time of, or within one month of, the prescription.

APPENDIX II

Individual innovations and measures assessed in phase two of research.

Innovations					
Type	Metric	Innovation	Explanation	Data Source	Data Available
QOF	Level of engagement with social services	System for linking patient carers to social services	The practice has a protocol for the identification of carers and a mechanism for the referral of carers for social services assessment	NHS Information Centre	2005–2010
QOF	Whether there is a system for ensuring regular discussion about palliative care	Multidisciplinary case review meetings for palliative care patients	The practice has regular (at least 3 monthly) multidisciplinary case review meetings where all patients on the palliative care register are discussed	NHS Information Centre	2007–2012
QOF	Clinical summaries	Highest level of up-to-date clinical summaries	The practice has up-to-date clinical summaries in at least 80% of patient records	NHS Information Centre	2005–2010
QOF	Whether there is a system for reviewing and reacting to patient opinion	Patient complaint meetings	The practice conducts an annual review of patient complaints and suggestions to ascertain general learning points which are shared with the team	NHS Information Centre	2005–2010
IT Infrastructure	Ability for patients to book and cancel appointments electronically	Electronic appointment booking	Whether GP practices provide functionality for patients to book or cancel appointments electronically	NHS Information Centre	2012
IT Infrastructure	Ability for patients to access their prescription data and order repeats electronically	Electronic repeat prescriptions	Whether GP practices provide functionality for patients to view or order repeat prescriptions electronically	NHS Information Centre	2012
IT Infrastructure	Ability for patients to view letters from their GP electronically	Electronic letter viewing	Whether GP practices provide functionality for patients to view letters electronically	NHS Information Centre	2012
IT Infrastructure	Ability for patients to view test results electronically	Electronic test results	Whether GP practices provide functionality for patients to view test results electronically	NHS Information Centre	2012
IT Infrastructure	Ability for patients to access their medical record electronically	Electronic medical record viewing	Whether GP practices provide functionality for patients to view their full medical record electronically	NHS Information Centre	2012

IT	Uptake of the Electronic Prescription Service technology	Electronic Prescription Service	'A new way to get your medicines and appliances. The Electronic Prescription Service (EPS) is an NHS service. Your GP practice can send your prescription electronically to the place you choose to get your medicines or appliances from.'	NHS Information Centre	2012
IT	Uptake and maintenance of the Summary Care Record system	Summary Care Records	GP practices uploading Summary Care Records	NHS Information Centre	2012
Patient Experience	Whether patients are satisfied with the level of access to their GP via telephone	Patient experience of getting through to their practice on the phone	From the GP Patient Survey	NHS Information Centre	2010-2011
Patient Experience	Whether patients are satisfied with their experience of telephone consultations	Patient experience of speaking to the doctor on the phone	From the GP Patient Survey	NHS Information Centre	2010-2011
Patient Experience	Whether patients are satisfied with the time frame for booking appointments	Patient experience of being able to see a doctor fairly quickly	From the GP Patient Survey	NHS Information Centre	2010-2011
Patient Experience	Whether patients are satisfied with the practice opening hours	Patient satisfaction with opening hours from the GP Patient Survey	From the GP Patient Survey	NHS Information Centre	2010-2011
Patient Experience	Whether patients feel involved in the self-management of their illness	Patient experience of the doctor involving them in decisions about their care	From the GP Patient Survey	NHS Information Centre	2010-2011
Patient Experience	Whether patients feel satisfied with the level of support they have received to manage their long-term condition	If the patient thinks that in the last 6 months they have had enough support from local services or organisations to help manage their long-term health condition(s)	From the GP Patient Survey	NHS Information Centre	2010-2011

APPENDIX III

List of early adopters

Two lists of the earliest adopters of each of our focus innovations were compiled – one including patient experience scores, another omitting them.

Practices were scored using the following system for status of adoption of IT tools:

Scoring system for assessment of both the internal systems and external IT systems:

0 = IT system doesn't offer this functionality,

1 = the functionality is possible but not implemented,

2 = the functionality has been implemented.

N = each surgery has a summary internal or external systems score (**N**), which is a weighted average of the four original indicators. This is weighted so that a surgery scores more points for implementing a more unusual technology/service (e.g. viewing test results online) and fewer points for things that are more commonplace.

Practices also received a score of **0** or **1** depending on whether they had adopted each focus QOF innovation and, if included, a score of **0-1** for each patient experience measure.

Ranked by score, this produced two lists of overall 'SuperAdopters'.

Individual innovation adoption lists

To investigate whether there were any clusters or similar characteristics of early adopters of each group of focus innovation (IT tools, QOFs and also patient experience score), individual lists were also produced. When it became apparent that there was a clearly-defined group of technology early adopters, a specific 'technophile' scoring system was designed.

List of technophiles

A list of the most technologically inclined surgeries was compiled. To facilitate analysis of the data, an IT-indicators scoring system was devised for the each of the four internal IT systems indicators, and four external IT systems indicators (see Appendix II).

Internal systems indicators (systems mainly dependent on the GP practice's own computer systems e.g. EMIS)

- Online access of full medical records by patient.
- Online viewing of test results.
- Online viewing/ordering of repeat prescriptions.
- Online appointment booking.

External systems indicators (nationally-controlled systems like the EPS):

Electronic prescription service (EPS 1)
EPS2

Summary Care Records (SCRs)

The same *'Scoring system for assessment of both the internal systems and external systems'* as described above was used.

'Technophile' score

Finally, a total score comprised of the internal systems score, the external systems score, normalised score for use of the 'choose and book' appointment system and a weighted QOF Records 18 score (which assesses whether the practice has up-to-date clinical summaries in at least 80 per cent of patient records) provided a 'technophile' score.

The 'technophile' score is designed such that the average score is zero and practices are evenly distributed across the score range (-1.95 to 2.01).

APPENDIX IV

Questionnaire for Survey

The survey interrogates GP experiences of innovation adoption in primary care. The following definition of ‘innovation’ was used in this survey:

Innovation = new ways of working, services, technologies, procedures or drugs whose purpose is to improve outcomes for patients or to make the practice work better.

The survey was designed with the assistance of Rob Horne, Professor of Behavioural Medicine, School of Pharmacy, University of London and UCL’s academic lead for the Centre for the Advancement of Sustainable Medical Innovation (CASMI).

Section one: BASIC INFORMATION

Please enter some basic information into the boxes below. It is very important that we receive this information in order to gather data for the project.

Gender

Male Female Prefer not to say

GP practice identification code:

Do you personally participate in a Clinical Commissioning Group (CCG)?

Yes No

Are you a member of the NAPC network?

Yes No

Please list any specialist networks that you are a part of:

Are you happy for your responses to this survey to be anonymised and published?

Yes No

Are you happy for us to contact you with further questions at the next stage of the project?

Yes No

Section two: WHAT DOES INNOVATION MEAN TO ME?

Here are some statements made by GPs about adoption and innovation. To what extent do you agree with these statements?

Innovation = new ways of working, services, technologies, procedures or drugs whose purpose is to improve outcomes for patients or to make the practice work better.

- **“Early adoption of innovations is a key part of my role”**

Strongly disagree Disagree Unsure Agree Strongly Agree

- **“Adopting new innovations quickly is essential to being a good GP”**

Strongly disagree Disagree Unsure Agree Strongly Agree

- **“Being more innovative is a key priority for me”**

Strongly disagree Disagree Unsure Agree Strongly Agree

- **“My practice has an open culture to innovation and the adoption of new technologies”**

Strongly disagree Disagree Unsure Agree Strongly Agree

Section three: FACILITATORS OF INNOVATION

Please indicate on a scale of 1–10 how vital you believe each of the following factors are in enabling you to adopt innovations within your practice.

	1 (not at all important)	2	3	4	5	6	7	8	9	10 (extremely important)
Being part of an 'innovative' practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Being part of a specialist network	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regular meetings with other doctors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regular visits from sales representatives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Free access to journals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using practice staff (e.g. nurses, HCAs, receptionists) in a novel way	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability of NICE guidance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Open availability of good quality evidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to an academic centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to a hospital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regular training about new innovations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attending manufacturers presentations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If there are any other enabling factors that you have come across, please list them here:

Section four: BARRIERS TO INNOVATION

Please indicate on a scale of 1–10 how significant you believe each of the following barriers are to adoption of innovations within your practice.

	1 (completely insignificant)	2	3	4	5	6	7	8	9	10 (extremely significant)
Lack of communication about the implementation of a given innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Financial constraints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty accessing good quality evidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time constraints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not enough resources put into staff training for new innovations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Staff resistance and lack of engagement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patient resistance and lack of engagement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No systematic plan for introducing an innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insufficient technical implementation support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insufficient administrative support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Management barriers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of decommissioning of existing technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Risk aversion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not enough incentives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lengthy adoption process time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If there are any other barriers that you have come across, please list them here

Section five: THE ADOPTION PROCESS - QOFs

Below is a list of QOFs. **Please select the stage of adoption your practice is at for each option.**

1. There is a system for linking patient carers to social services
2. There are multidisciplinary case review meetings for palliative care patients
3. The practice has up-to-date clinical summaries in at least 80 per cent of patient records
4. The practice conducts an annual review of patient complaints and suggestions
5. The practice offers a range of appointment times to patients, which as a minimum includes five mornings and four afternoons per week

(RP each of these questions has the following options to select from)

- | | |
|--|---|
| <input type="checkbox"/> Embedded in our practice | <input type="checkbox"/> Not in consideration |
| <input type="checkbox"/> Implementation in process | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Major obstacles to implementation | |

(Each of the above questions is followed by two drop down questions)

If adopted, how easy did you find the adoption process overall?

- | | |
|--|---|
| <input type="checkbox"/> Extremely difficult | <input type="checkbox"/> Relatively straightforward |
| <input type="checkbox"/> Slightly difficult | <input type="checkbox"/> Extremely straightforward |
| <input type="checkbox"/> Unsure | |

If relevant, please select the most significant barrier you came across when adopting this innovation

- | | |
|---|--|
| <input type="checkbox"/> Lack of communication | <input type="checkbox"/> Management barriers |
| <input type="checkbox"/> Financial constraints | <input type="checkbox"/> Insufficient administrative support |
| <input type="checkbox"/> Difficulty accessing good quality evidence | <input type="checkbox"/> Insufficient technical support |
| <input type="checkbox"/> Time constraints | <input type="checkbox"/> No systematic plan for introduction |
| <input type="checkbox"/> Lengthy adoption process time | <input type="checkbox"/> Patient resistance and lack of engagement |
| <input type="checkbox"/> Not enough incentives | <input type="checkbox"/> Staff resistance and lack of engagement |
| <input type="checkbox"/> Risk aversion | <input type="checkbox"/> Not enough resources for staff training |
| <input type="checkbox"/> Lack of decommissioning of existing technology | <input type="checkbox"/> Other, please specify: |

Section six: THE ADOPTION PROCESS - Infrastructures

Below is a list of Infrastructures. Please select the stage of adoption your practice is at for each option.

1. Patients can book and cancel appointments electronically
2. Patients can access their prescription data and order repeats electronically
3. Patients can view letters from their GP electronically
4. Patients can view test results electronically
5. Patients can access their medical record electronically

(Each of these questions has the following options to select from)

- | | |
|--|---|
| <input type="checkbox"/> Embedded in our practice | <input type="checkbox"/> Not in consideration |
| <input type="checkbox"/> Implementation in process | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Major obstacles to implementation | |

(Each of the above questions is followed by two drop down questions)

If adopted, how easy did you find the adoption process overall?

- | | |
|--|---|
| <input type="checkbox"/> Extremely difficult | <input type="checkbox"/> Relatively straightforward |
| <input type="checkbox"/> Slightly difficult | <input type="checkbox"/> Extremely straightforward |
| <input type="checkbox"/> Unsure | |

If relevant, please select the most significant barrier you came across when adopting this innovation

- | | |
|---|--|
| <input type="checkbox"/> Lack of communication | <input type="checkbox"/> Management barriers |
| <input type="checkbox"/> Financial constraints | <input type="checkbox"/> Insufficient administrative support |
| <input type="checkbox"/> Difficulty accessing good quality evidence | <input type="checkbox"/> Insufficient technical support |
| <input type="checkbox"/> Time constraints | <input type="checkbox"/> No systematic plan for introduction |
| <input type="checkbox"/> Lengthy adoption process time | <input type="checkbox"/> Patient resistance and lack of engagement |
| <input type="checkbox"/> Not enough incentives | <input type="checkbox"/> Staff resistance and lack of engagement |
| <input type="checkbox"/> Risk aversion | <input type="checkbox"/> Not enough resources for staff training |
| <input type="checkbox"/> Lack of decommissioning of existing technology | <input type="checkbox"/> Other, please specify: |

Section seven: THE ADOPTION PROCESS - IT Tools

Below is a list of IT Tools. Please select the stage of adoption your practice is at for each option.

1. Electronic Prescription Service
2. Summary Care Records
3. GP2GP

(Each of these questions has the following options to select from)

- | | |
|--|---|
| <input type="checkbox"/> Embedded in our practice | <input type="checkbox"/> Not in consideration |
| <input type="checkbox"/> Implementation in process | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Major obstacles to implementation | |

(Each of the above questions is followed by two drop down questions)

If adopted, how easy did you find the adoption process overall?

- | | |
|--|---|
| <input type="checkbox"/> Extremely difficult | <input type="checkbox"/> Relatively straightforward |
| <input type="checkbox"/> Slightly difficult | <input type="checkbox"/> Extremely straightforward |
| <input type="checkbox"/> Unsure | |

If relevant, please select the most significant barrier you came across when adopting this innovation

- | | |
|---|--|
| <input type="checkbox"/> Lack of communication | <input type="checkbox"/> Management barriers |
| <input type="checkbox"/> Financial constraints | <input type="checkbox"/> Insufficient administrative support |
| <input type="checkbox"/> Difficulty accessing good quality evidence | <input type="checkbox"/> Insufficient technical support |
| <input type="checkbox"/> Time constraints | <input type="checkbox"/> No systematic plan for introduction |
| <input type="checkbox"/> Lengthy adoption process time | <input type="checkbox"/> Patient resistance and lack of engagement |
| <input type="checkbox"/> Not enough incentives | <input type="checkbox"/> Staff resistance and lack of engagement |
| <input type="checkbox"/> Risk aversion | <input type="checkbox"/> Not enough resources for staff training |
| <input type="checkbox"/> Lack of decommissioning of existing technology | <input type="checkbox"/> Other, please specify: |

Section eight: INNOVATION WITHIN MY PRACTICE

We would greatly value your comments on these final questions about the uptake of innovations within your practice.

Where do you look for new innovations?

- | | |
|--|---|
| <input type="checkbox"/> Open access journals | <input type="checkbox"/> Pharmaceutical representatives |
| <input type="checkbox"/> Subscription-only journals | <input type="checkbox"/> NICE guidance |
| <input type="checkbox"/> Speak to other doctors | <input type="checkbox"/> Other, please specify: |
| <input type="checkbox"/> Speak to members of specialist networks | |

Which type of innovation are you most likely to adopt within your practice?

- | | |
|--|---|
| <input type="checkbox"/> Drugs | <input type="checkbox"/> Infrastructures |
| <input type="checkbox"/> Diagnostic technologies | <input type="checkbox"/> Using nurses/HCAs in a novel way |
| <input type="checkbox"/> IT tools | <input type="checkbox"/> Other, please specify: |
| <input type="checkbox"/> Patient feedback tools | |

Which 3 groups are you most likely to collaborate with when adopting a new innovation?

- | | |
|---|---|
| <input type="checkbox"/> Other doctors | <input type="checkbox"/> Specialist networks |
| <input type="checkbox"/> PCT / CCG | <input type="checkbox"/> Nurses |
| <input type="checkbox"/> Practice manager | <input type="checkbox"/> Other people working in the practice (e.g. HCAs) |
| <input type="checkbox"/> Patients | <input type="checkbox"/> Other, please specify: |
| <input type="checkbox"/> NICE | |

Are you currently taking up a new innovation into your practice?

No Unsure Yes (please specify):

Are you looking at taking up a particular innovation into your practice in the future?

No Unsure Yes (please specify):

Who would you say is the key person responsible for innovation within your practice? Please list their full job title:

What are you currently doing to promote innovation uptake within your practice?

- | | |
|---|---|
| <input type="checkbox"/> Holding meetings with other doctors | <input type="checkbox"/> Organising training sessions |
| <input type="checkbox"/> Actively engaging other practice members | <input type="checkbox"/> Other, please specify: |
| <input type="checkbox"/> Actively engaging patients | |

How do you encourage patients to use new innovations?

- | | |
|--|--|
| <input type="checkbox"/> Discuss during consultations | <input type="checkbox"/> Encourage feedback via a survey |
| <input type="checkbox"/> Provide them with paper material | <input type="checkbox"/> Encourage face-to-face feedback |
| <input type="checkbox"/> Provide them with electronic material | <input type="checkbox"/> Other, please specify: |

Are there any incentives currently in place that encourage you to early-adopt?

- No Unsure Yes (please specify)

What would make you feel more supported to adopt novel innovations at an earlier stage?

- | | |
|--|--|
| <input type="checkbox"/> Greater accessibility to journals | <input type="checkbox"/> More guidelines about innovation uptake |
| <input type="checkbox"/> Being part of a specific innovation network | <input type="checkbox"/> More training |
| <input type="checkbox"/> Monetary incentives | <input type="checkbox"/> Other, please specify: |

We really appreciate the time you have taken to fill in this survey.

If you have any further comments or questions regarding the survey, please contact us.

APPENDIX V

Sample Survey Characteristics

174 GPs completed the survey. Approximately two-thirds (63.2 per cent **N** = 110) of respondents were male and one-third (36.8 per cent **N** = 64) were female.

151 survey responses were collected online from a panel of GPs via a professional market research company. The demographic information of their entire panel is as follows:

- Average years of experience post residency: 14.47 years
- Percentage of respondents by practice setting:
 - Group practice: 95 per cent
 - Hospital: 2 per cent
 - Solo practice: 2.5 per cent
 - Other: 0.5 per cent
- Average number of patients visited on a typical month for all conditions: 445
 - Group practice: 415 patients per month
 - Hospital: 160
 - Solo practice: 440
 - Other: 300

For this study, only responses from practice-based GPs were taken into account.

GP involvement in groups/networks:

- Only 12.1 per cent of respondents (**N** = 21) stated that they were a member of the NAPC network while 87.9 per cent (**N** = 153) reported that they were not NAPC members
- 44.3 per cent (**N** = 77) of respondents reported that they personally participated in a CCG and 55.7 per cent (**N** = 97) reported that they did not
- Just over half of respondents (**N** = 95; 54.6 per cent) reported that they were not part of any specialist networks and 45.4 per cent (**N** = 79) respondents reported that they were part of a specialist network. GPs listed a diverse range of networks including CCGs (**N** = 7, 4.0 per cent of respondents), the RCGP (**N** = 13, 7.5 per cent of respondents), diabetes specialist groups (**N** = 10, 5.7 per cent), substance misuse networks (**N** = 4, 2.3 per cent), dermatology specialist groups (**N** = 3, 1.7 per cent of respondents), safeguarding boards (**N** = 2, 1.1 per cent of respondents) and a wide range of other bodies and organisations

APPENDIX VI

Questionnaire for telephone interviews with practice managers

Thank you for agreeing to take part in this short telephone interview. As we discussed, we are running a major project on the adoption of innovations in primary care, which aims to uncover why some practices adopt innovations earlier than others, how the process currently works and how it might be improved to encourage non-adopters to uptake novel innovations.

As I mentioned before, you are one of the earliest adopters of our focus technologies (specify which they have adopted).

I'm going to ask you a few quick questions about the adoption process of a couple of these innovations, with a particular emphasis on the barriers and facilitators of their uptake.

We'll take one or two of those technologies as specific examples– ideally that you were personally involved with adopting and that are fairly representative of your practices uptake process. Do you have a preference of which we talk about today?

I'll ask questions in an open-ended manner but I have a list of options in case you need prompts.

1. How do you tend to hear of novel innovations in the first place?

- | | |
|--|--|
| <input type="checkbox"/> Open access journals | <input type="checkbox"/> NICE guidance |
| <input type="checkbox"/> Subscription-only journals | <input type="checkbox"/> Conferences |
| <input type="checkbox"/> Speak to other doctors | <input type="checkbox"/> Online search engines |
| <input type="checkbox"/> Speak to members of specialist networks | <input type="checkbox"/> NHS websites |
| <input type="checkbox"/> Pharmaceutical representatives | <input type="checkbox"/> Other websites |

2. Please could you describe the step by step process by which you adopted X and Y? (how do you decide which to adopt? Who do you speak to? Who needs to agree? Funding? Informing rest of practice? Training?)

3. How easy did you find the process(es) overall? (extremely difficult, moderately difficult, unsure, moderately straightforward, extremely straightforward)

4. In your opinion, what were the key barriers or difficulties you encountered in adopting X and Y?

- | | |
|---|--|
| <input type="checkbox"/> Lack of communication | <input type="checkbox"/> Management barriers |
| <input type="checkbox"/> Financial constraints | <input type="checkbox"/> Insufficient administrative support |
| <input type="checkbox"/> Difficulty accessing good quality evidence | <input type="checkbox"/> Insufficient technical support |
| <input type="checkbox"/> Time constraints | <input type="checkbox"/> No systematic plan for introduction |
| <input type="checkbox"/> Lengthy adoption process time | <input type="checkbox"/> Patient resistance and lack of engagement |
| <input type="checkbox"/> Not enough incentives | <input type="checkbox"/> Staff resistance and lack of engagement |
| <input type="checkbox"/> Risk aversion | <input type="checkbox"/> Not enough resources for staff training |
| <input type="checkbox"/> Lack of decommissioning of existing approaches | |

5. Were there any external support or incentives that made their adoption easier?

- | | |
|--|---|
| <input type="checkbox"/> Being part of a specialist network | <input type="checkbox"/> Open availability of good quality evidence |
| <input type="checkbox"/> Regular meetings with other doctors | <input type="checkbox"/> Proximity to an academic centre |
| <input type="checkbox"/> Regular visits from sales representatives | <input type="checkbox"/> Proximity to a hospital |
| <input type="checkbox"/> Free access to journals | <input type="checkbox"/> Regular training about new innovations |
| <input type="checkbox"/> Using practice staff (nurses, HCAs, receptionists) in a novel way | <input type="checkbox"/> Attending manufacturers presentations |
| <input type="checkbox"/> Availability of NICE guidance | |

6. Do you share and disseminate information about these types of technologies further, or influence other practices to adopt them in any way? (organize meetings, hold events, promote online- where?, produce material to disseminate, present to specialist networks)

7. In your opinion, how might the pace of adoption of these types of technologies be improved?

- | | |
|--|---|
| <input type="checkbox"/> Greater accessibility to journals | <input type="checkbox"/> More training |
| <input type="checkbox"/> Being part of a specific innovation network | <input type="checkbox"/> More time to dedicate to adoption |
| <input type="checkbox"/> Monetary incentives | <input type="checkbox"/> More flexible management processes |
| <input type="checkbox"/> More guidelines about innovation uptake | |

8. Do you have any further comments about the adoption process that might be of interest?

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33. Non-QOF indicators don't have historical data, so we can only show the latest available value. The lack of time dimension for the non-QOF data is explained in the methodology.
34. Updated features include the ability for doctors to electronically sign prescriptions and the ability for patients to nominate their chosen pharmacy.
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