

*A review of the potential benefits
from the better use of information
and technology in Health and
Social Care*

Final report

14th January 2013

Final report





Department of Health
Richmond House
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London
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14th January 2013

Dear Sirs,

A review of the potential benefits from the better use of information and technology in Health and Social Care

We are pleased to present for publication our Final Report on the review of the potential benefits from the better use of information and technology in Health and Social Care.

This report has been prepared for and only for the Department of Health in accordance with the terms of our Agreement Letter dated 17th December 2012 and for no other purpose. We do not accept or assume any liability or duty of care for any other purpose or to any other person to whom this report is shown or into whose hands it may come save where expressly agreed by our prior consent in writing.

This Final Report reflects feedback that you provided to us in response to the draft report submitted to you on 7th January 2013, as well as your prior and subsequent comments.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Andrew McKechnie', written in a cursive style.

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Section 1

Introduction

1

Introduction

The background and scope of the review

Background

In May 2012 the Department of Health published its information and technology strategy, entitled *“The Power of Information – putting all of us in control of the health and care information we need”* (“the Strategy”). The strategy suggested a number of actions that organisations involved in the provision, commissioning and regulation of NHS services could take in order to *“transform information for health and care... To achieve higher quality care and improve outcomes for patients and service users”*.

At the same time the Department also published an Impact Assessment (“the IA”) that identified and evaluated the likely benefits that would be delivered by, and costs incurred in implementing, each of those actions. The IA identified both financial benefits such as potential cost savings and efficiency / productivity improvements, and non-financial benefits such as potential improvements to service quality or the experiences of patients, service users, carers and family members. The IA considered the major immediately-addressable actions in significant detail, and took a conservative view of their potential.

The IA suggested that, if fully implemented, the actions identified have the potential to deliver a total net present value of £5,059m over 10 years.

A guide to the terminology used in the Strategy, the IA and in this report can be found in Appendix C.

The scope of this review

In December 2012 the Secretary of State commissioned PricewaterhouseCoopers LLP (“PwC”) to undertake a high-level piece of work highlighting the potential benefits that could be achievable through the more efficient and effective use of information and technology in the NHS and social care before any action is taken.

In particular, the review focussed on highlighting further material evidence over and above that presented in the IA that helped to demonstrate *“the most promising areas where significant net benefits in terms of cash, time and resources... can be released from the health and social care system for reinvestment in improved services and patient outcomes”*. The review is therefore additional to the baseline view presented in the IA.

The purpose of highlighting potential additional actions and benefits was to set a challenge to the NHS system by raising the profile of and drawing attention to the benefits that a highly ambitious approach to the use of information and technology could deliver.

This report highlights additional actions that could be taken to drive the more efficient and effective use of information and technology, and identifies the benefits that could potentially be achieved by doing so. This report does not represent a due diligence review of the IA or the Strategy, as the assumptions and calculations underpinning the IA were not re-evaluated as part of this project.

Further work will have to be carried out by the Department of Health, the NHS Commissioning Board and other system bodies to explore these proposed actions further and to drive their implementation.

Introduction

The review approach

The review approach, in brief

The review was completed between the 17th December 2012 and the 14th January 2013.

The review first drew together additional actions that could be taken by ambitious, proactive NHS organisations to better use information and technology. These actions were identified by reviewing existing NHS and private sector best practice, and by drawing on experts in technology and health systems.

The review also drew on best practice from international health systems (including those in the USA, New Zealand and Canada) and other industry sectors including the banking and travel industries.

The resulting set of additional actions is focussed and relevant but not exhaustive, and due to time constraints has not been tested with system bodies.

The review then sought to estimate the benefits to the NHS system and its service users that could be delivered by those actions. Both financial and non-financial benefits were considered, as in the IA.

Finally, the review sought to compile illustrative evaluations of the potential scale and scope of the financial and non-financial benefits that could be delivered. These indicators of scale and scope are approximate, as (i) they are based only on secondary information, (ii) in some cases are hypothesis-driven, and (iii) in some cases draw on information from other countries or industry sectors. They have been included to give a sense of the potential rewards to the system of pursuing an ambitious approach to the use of information and technology, but will require significant further evaluation and verification.

The review was conservative in its approach to evaluations of potential scale and scope, and if no evaluation was possible due to a lack of relevant evidence then this has been noted in this report.

The delivery of these benefits will require key supporting elements to be put in place and appropriate and timely investments to be made.

To support this evaluation of scale and scope, the review drew on a range of primary and secondary sources including:

- NHS statistics and data releases
- Department of Health policy and research documents
- Policy and research documents compiled by other bodies including SHA, PCTs, think tanks, charities and businesses
- Reports and research documents compiled by providers and commissioners
- Interviews with selected PwC staff.

Section 2

Executive summary of findings

2

Potential additional actions that could deliver significant benefits have been highlighted

Key findings

Overall

This review has highlighted potential additional actions related to the use of technology and information that, if fully implemented, could deliver significant benefits to the NHS and its service users. These benefits could be a mix of financial and non-financial benefits, including improvements to quality and efficiency as well as patient experience and satisfaction.

The review findings therefore suggest that the NHS and its service users would see positive short-, medium- and long-term results of responding to the information and technology challenge. However, significant further work is required to further substantiate some of the evaluations of potential benefit, and especially the evaluations of potential financial benefit. This work should be completed before the broad implementation of the recommended actions commences.

The total potential financial benefits that could be achieved from the full implementation of all actions, including those identified by other research projects, could be in the order of c.£4,400M p.a. across the Health and Social Care system in recurring funds for reinvestment, over and above the value identified by the Impact Assessment, after the initial implementation period is complete.

The review did not find that there were significant additional benefits that could be delivered by the implementation of the actions already presented in the Strategy, as the Impact Assessment captured a broad range of potential benefits for those actions.

Key finding 1

Four priority additional actions have been highlighted over and above those identified in the Strategy and evaluated in the Impact Assessment. All four priority additional actions could deliver both financial and non-financial benefits. Cumulatively the financial benefits to be derived from the implementation of these potential actions, if fully delivered, could be as **significant as c.£1.7bn per year in recurring funds for reinvestment**, net of implementation costs. However, further work is required to substantiate this.

The priority additional actions are:

1. Driving the rollout and use of ePrescribing in secondary care and the Electronic Prescription Service (EPS) in primary care;
2. Driving the better use of information to aid the post-operative care of patients;
3. Driving the use of Acute operational performance information to enable commissioners to achieve contractual savings; and
4. Ensuring the widespread provision of complete and accurate clinical and attendance information to clinicians and carers at the point of care via clinical portals or other similar solutions.

Potential actions identified by other research projects could also deliver significant benefits

Further key findings

Key finding 2

Four further additional actions have been highlighted that could deliver benefits in the longer term. However, as a significant amount of further research is needed into the potential effects of these actions, they have been noted but not fully evaluated as part of the review.

The further additional actions are:

- A. Driving the more sophisticated and widespread evaluation of cost and quality information;
- B. Driving the broader use of patient-level treatment and outcomes data to support the personalisation of services;
- C. provide better and more targeted information to patients and carers to facilitate choice of service or clinician; and
- D. Achieving a reduction in clinical negligence and litigation via the better use of information.

Key finding 3

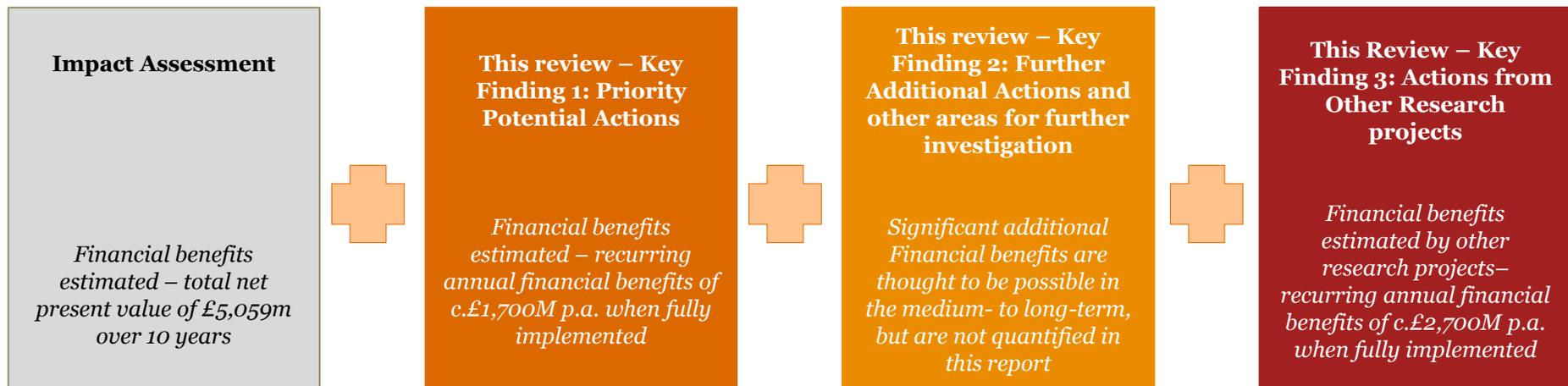
The review has also **highlighted potential benefits that could be delivered by the implementation of actions identified by other research projects** but not currently included in the IA. In particular, the implementation of actions identified by the Digital First initiative led by the Department of Health and the NHS Institute for Innovation and Improvement could lead to the delivery of financial benefits amounting to a further **£2.7bn, and significant non-financial benefits**. It should be noted that a later “Rapid Review” of Digital First stressed the difficulty of achieving these benefits.

The total financial benefits that could be achieved are significant, and additive to those already presented in the Impact Assessment

Estimates of total potential financial benefit

The total potential financial benefits presented in this report are additional to those presented in the IA. The relevant estimates of potential financial benefits are presented below (with additional details on pp.18). However, it should be noted that each was prepared according to a different basis of calculation (e.g. the IA numbers present potential financial benefit over 10 years whereas the findings of this review and other research projects are estimated annual benefits):

Figure 5: total potential financial benefits presented in this review and the IA



The total potential financial benefits that could be achieved from the full implementation of all Review actions, including those identified by other research projects, could be in the order of c.£4,400M p.a. across the Health and Social Care system in recurring funds for reinvestment.

There are delivery risks to be addressed before the potential benefits can be realised

The delivery challenge

The realisation of the potential benefits will depend on the concerted action and commitment of bodies from across the health and social care system. As is stated in the Strategy and the IA, the maximum possible benefits presented by this review will not be realised unless key supporting elements are put in place and unless appropriate and timely investments are made.

- Looking across all of the priority potential actions, the key supporting elements (though there are others that will also be significant) that must be put in place to ensure that actions will successfully be adopted are:
- The availability of funds to cover one-off investment costs in technologies, information gathering or reworked organisational processes;
- The willingness of system bodies to adopt the technologies or commit to information gathering and use;
- The clear and concise documentation of the benefits achieved and challenges faced by pilot programmes or early adopters of technologies or information protocols, to support other organisations in implementing actions in a cost-effective and efficient way;
- Strong and positive leadership to promote use of information and technology, and prioritise the commitment of resources and time to it;

- The incentivisation of the adoption of the proposed actions, particularly when coordinated system-wide action is required;
- Measures to make contracting for the provision of systems and services as easy, quick and cost-effective as possible; and
- The development of new or revised robust governance processes to not only support programme delivery but scrutinise the delivery of benefits.

It has not been possible for this review to fully explore the delivery challenges related to each priority potential action due to the limited engagement with system bodies. When possible the review attempted to identify implementation costs; current uptake rates and challenges to driving further uptake; and evidence arising where actions (or similar actions in other sectors or countries) have already been implemented.

Overall the review found that of the four priority actions presented the majority were of low to medium cost to implement, and were possible to implement in a 3-5 year period. However, some of the priority actions and further actions would take 5-10 years or more to deliver the full set of identified benefits.

Section 3

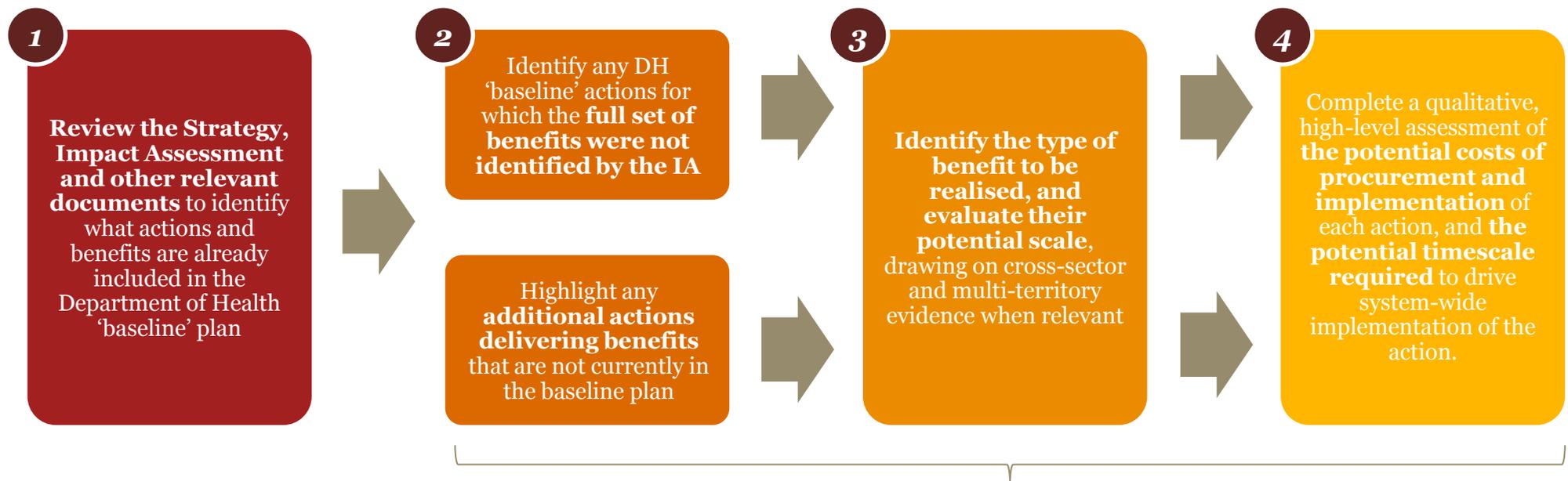
The review methodology

3



This review used a structured process to identify potential additional actions and related benefits

Figure 2: the key phases of the review approach to identifying potential additional actions and related benefits



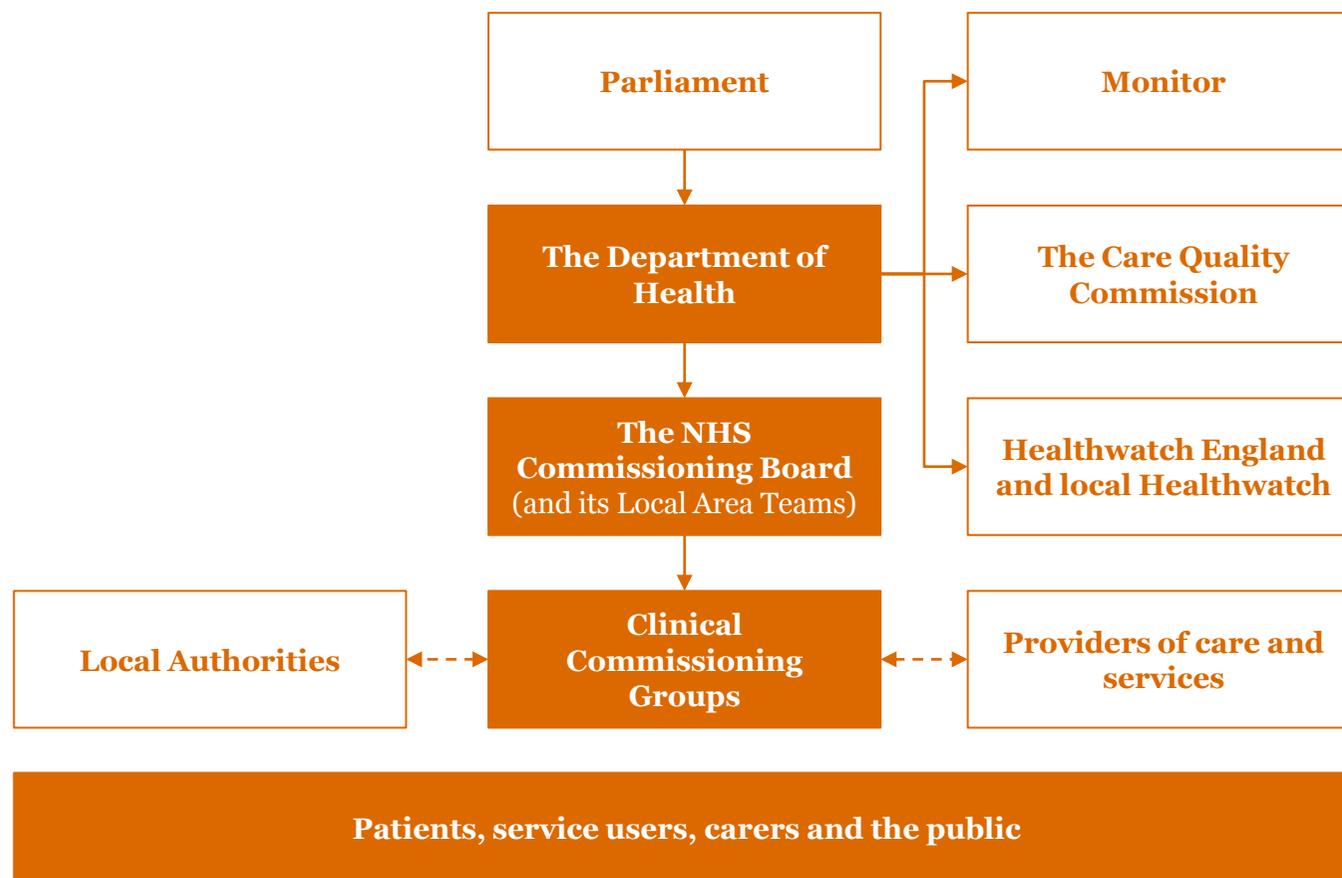
- The documents forming the Department's 'baseline' plan were the Strategy and the IA.
- The forecast benefit targets included in the IA were not re-evaluated as part of this review.

The methodologies for Phases 2, 3 and 4 are discussed in more detail in the following three pages.



In highlighting actions in Phase 2, the roles, needs and perspectives of key system participants were considered

Figure 3: a mapping of NHS system participants



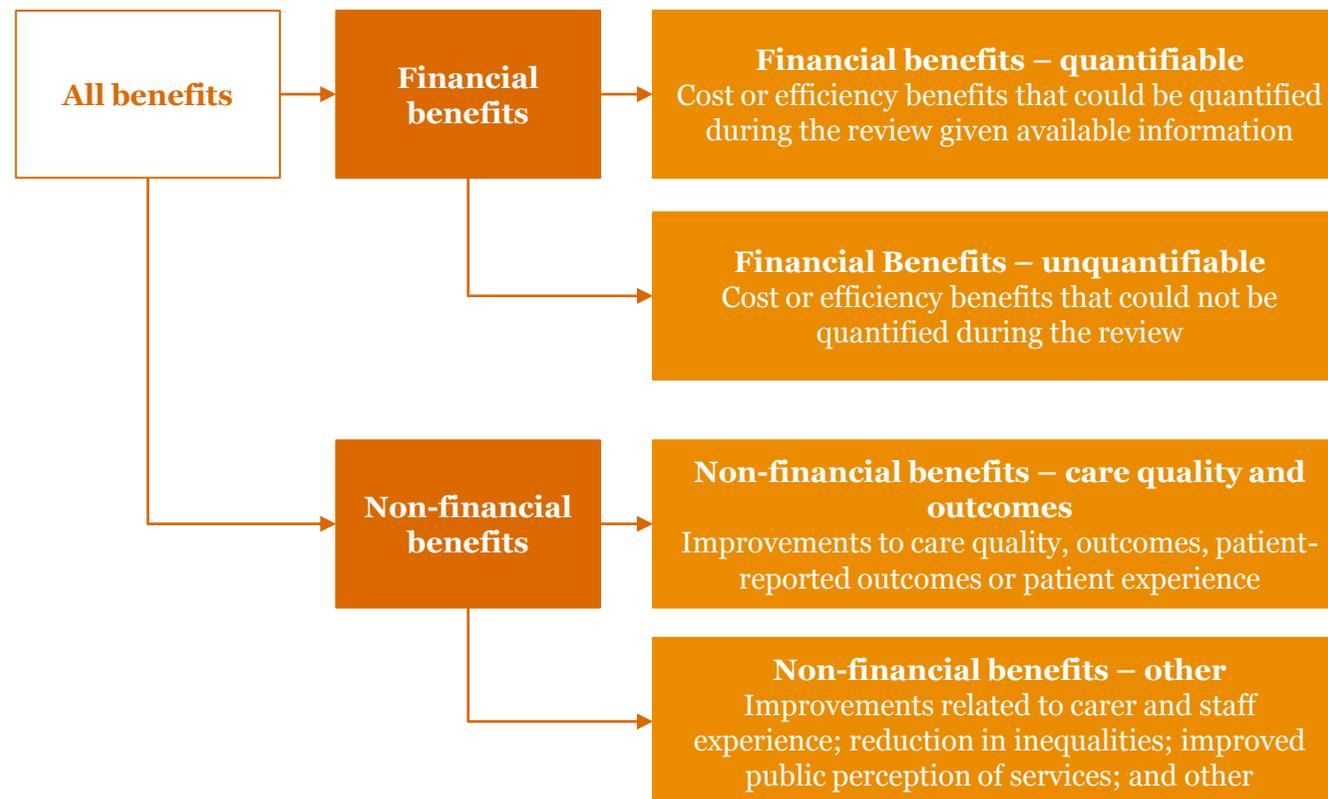
When identifying potential additional actions and the related benefits that could be derived from them the review considered the roles, needs and perspectives of system participants (as mapped at left, with the boxes highlighted representing the bodies that were the primary focus of the review). It sought to determine how those participants could most effectively use and be supported by information and technology.

A longlist of potential additional actions and benefits was then compiled. Further evaluation of the longlist items was then completed to determine whether the actions were compelling and could deliver real value or quality improvements. This process resulted in the identification of the final set of actions included in this report.



In identifying and evaluating potential benefits in Phase 3, an approach similar to that used in the IA was followed

Figure 4: the four option typology of benefits



As in the IA, the benefits that could be delivered via the implementation of the additional potential actions were categorised:

1. According to whether they were financial / efficiency related or non-financial in nature; and
2. If financial / efficiency related, whether they could be quantified during the reporting period given currently available information.

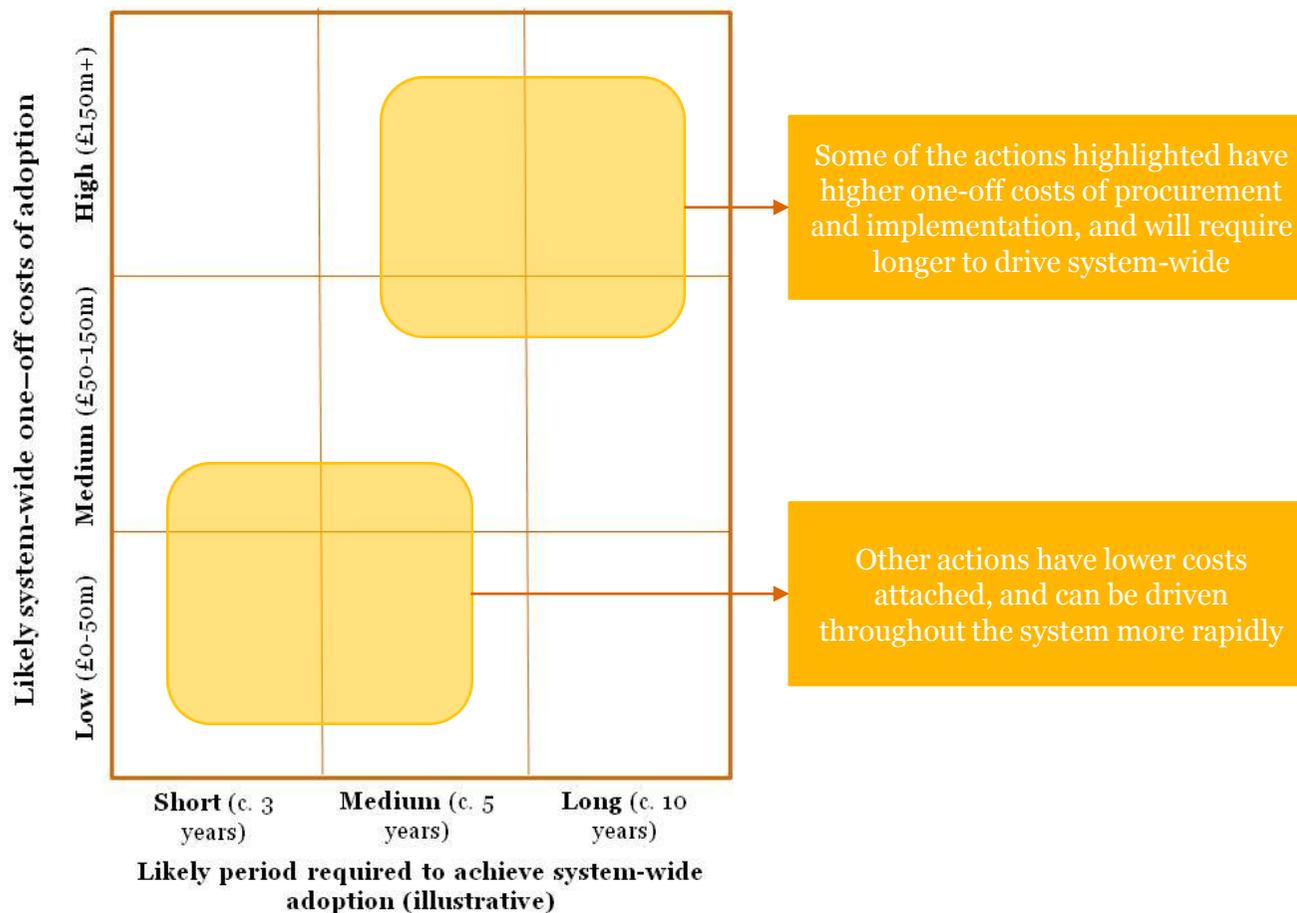
The two categories are not mutually exclusive – some actions could deliver both financial and non-financial benefits, and where appropriate this has been indicated.

The quantification of financial benefits should be treated as illustrative as (i) they are based only on secondary information, (ii) in some cases are hypothesis-driven, and (iii) in some cases draw on information from other countries or industry sectors.



In evaluating the potential costs and timelines of implementation in Phase 4, broad estimates were compiled

Figure 5: the framework for estimating costs and timelines of implementation



To complete the review, for each action a high-level qualitative assessment of its potential costs of procurement and implementation, and implementation timelines was completed. This assessment was limited due to the lack of robust public information on both historical uptake rates and likely future adoption profiles of the technologies or information sources that underpin these actions.

For each action, an assessment of whether the system-wide one-off costs of procurement and implementation are likely to be low (£0-50m), medium (£50-150m) or high (£150m+) has been completed when possible. Likely ongoing annual running costs have also been noted for some actions. The cost evaluations did not include the cost of change management and programme management.

For each action the likely period required to achieve system-wide adoption has also been estimated.

Section 4

Review findings

4

The review highlighted four Priority potential actions, four further potential additional actions, and also referenced a number of actions recommended by other research projects

Key Finding One: Four Priority potential actions were identified

Priority actions under Theme 1: access to information to help service users to participate in 'no decision about me without me'

Actions under this theme aim to stimulate service users to become more active in their care by giving them interactive communication and transactional capability with their GP practice, including access to their GP records on-line, with the ability to share the records with others.

Priority actions under Theme 2: linking and sharing person based electronic records

Actions under this theme aim to ensure (i) the availability of person based information along care pathways and at the point of care, and (ii) to ensure that individual records about service users can be identified across provider boundaries.

Priority actions under Theme 3: capturing person based information at the point of care... leading to real or virtual connectivity across different settings

Actions under this theme focus on standardising the way person based care information is recorded in future to maximise the usability and value of the information for appropriate and legitimate primary and secondary use.

Key Finding Two: Four further potential additional actions were identified no quantification of benefits was attempted

These further potential additional actions have not been assessed as Priority potential actions or grouped under a theme as significant further research is required into the potential effects of these actions

Key Finding Three: A number of actions recommended by other research projects were identified

The Digital First report, led by the Department of Health and building on the *Innovation, Health and Wealth* report, identifies 8 initiatives that go beyond those covered within the IA. Those initiatives have been referenced here but not included as Priority potential actions, to avoid duplication.

The four Priority potential actions identified were grouped under three Themes – the same three themes used to organise the IA

The actions highlighted whose benefit could be quantified during this review have a total estimated post-implementation potential value of c.£4,400M p.a.

Key Finding One: Four Priority potential actions were identified

Priority actions under Theme 1: access to information to help service users to participate in ‘no decision about me without me’

Highlighted Actions:

1. Driving the rollout and use of ePrescribing in secondary care and the Electronic Prescription Service (EPS) in primary care.
Potential benefit – c.£270M+ p.a.
2. Driving the better use of information to aid the post-operative care of patients.
Potential benefit – unquantified

Priority actions under Theme 2: linking and sharing person based electronic records

Highlighted Actions:

3. Driving the use of Acute operational performance information to enable commissioners to achieve contractual savings.
Potential benefit – c.£860M+ p.a.
4. Ensuring the widespread provision of complete and accurate clinical and attendance information to clinicians and carers at the point of care via digital portals or other similar solutions.
Potential benefit – c.£560M+ p.a.

Priority actions under Theme 3: capturing person based information at the point of care... leading to real or virtual connectivity across different settings

Highlighted Actions:

No Priority potential actions were identified under Theme 3
N/A

Key Finding Two: Four further potential additional actions were identified but no quantification of benefits was attempted

Highlighted Actions:

- a) Driving the more sophisticated and widespread evaluation of cost and quality information.
- b) Driving the broader use of patient-level treatment and outcomes data to support the personalisation of services.
- c) Providing better and more targeted information to patients and carers to facilitate choice of service or clinician
- d) Achieving a reduction in clinical negligence and litigation via the better use of information.

Key Finding Three: A number of actions recommended by other research projects were identified

Highlighted Actions:

The Digital First report, led by the Department of Health and building on the *Innovation, Health and Wealth* report, identifies 8 initiatives that go beyond those covered within the IA.
Potential benefit – £2,700M+ p.a.

Section 4.1

Priority potential actions under Theme 1

Two Priority potential actions were identified under Theme 1, delivering significant financial and non-financial benefits

Theme 1: more active user involvement in care

Total incremental value of actions in Theme: c.£270M

Action	Benefit types identified	Summary of potential benefits	Description of estimated financial benefits, when quantifiable
1. Driving the rollout and use of ePrescribing in secondary care and the Electronic Prescription Service (EPS) in primary care	<ul style="list-style-type: none"> Financial benefits – quantifiable Non-financial benefits – care quality and outcomes Non-financial benefits - other 	<ul style="list-style-type: none"> Reduced prescription errors leading to Adverse Drug Reactions (ADRs) Reduced costs relating to lost prescriptions Other benefits relating to reductions in time and resource requirements 	<p>c. £270m p.a. in recurring financial benefits from ePrescribing in secondary care</p> <p>Additional financial benefits likely from EPS in primary care</p>
2. Driving the better use of information to aid post-operative care of patients	<ul style="list-style-type: none"> Financial benefits – unquantifiable Non-financial benefits – care quality and outcomes 	<ul style="list-style-type: none"> Improving clinical efficiency during patient handovers from operating theatre Improving patient outcomes and patient experiences post discharge 	N/A – financial benefits are not quantifiable

Action 1 – driving the rollout and use of ePrescribing and EPS

Sub actions	Potential Benefits
<p>1. Driving the rollout and use of ePrescribing in secondary care, which includes a clinician support decision tool and access to electronic health records to reduce prescription errors leading to avoidable Adverse Drug Reactions</p> <ul style="list-style-type: none"> • Rollout of ePrescribing systems across hospital trusts • Operational changes within NHS trusts • Training for clinical users 	<p>Financial benefits – quantifiable</p> <ul style="list-style-type: none"> • Estimated maximum financial benefits of c.£270m p.a. from year 2 onwards (assuming all system capital expenditure occurs in year 1) as a result of reduced rates of avoidable ADRs <p>Non-financial benefits – care quality and outcomes</p> <ul style="list-style-type: none"> • Improved patient safety • Improved patient experience, and in particular convenience <p>Non-financial benefits – other</p> <ul style="list-style-type: none"> • Reduced avoidable ADRs is likely to improve public perception of NHS prescribing process
<p>2. Driving the rollout and use of the Electronic Prescription Service (EPS) in primary care</p>	<p>Financial benefits – unquantifiable</p> <ul style="list-style-type: none"> • Likely to deliver significant financial benefits as a result of: <ul style="list-style-type: none"> • Administrative time benefits resulting from efficiencies related to routine prescription requests • Reduced data entry and processing workloads in the NHS Business Service Authority, which reimburses pharmacies for prescription data • Dispenser time savings resulting from less data entry and more efficient dispensing <p>Non-financial benefits – care quality and outcomes</p> <ul style="list-style-type: none"> • Improved patient safety and experience, and in particular improvements in convenience

ePrescribing in secondary care facilitates and enhances the communication of a medicine order, aiding the choice, administration and supply of medicines through knowledge and decision support. It also provides a robust audit trail for the entire medicines use process while a patient is in hospital. The rollout and use of ePrescribing has been explored in detail as part of this review, and its implementation forms the recommended action. In particular, the review looked at the potential for ePrescribing systems to reduce rates of avoidable Adverse Drug Reactions and thus increases in acute lengths of stay that often result from ADRs.

Additionally, the Department of Health is undertaking work on the rollout and use of the Electronic Prescription Service (EPS) system in Primary Care. The implementation of such systems is also likely to deliver significant benefits. An overview of this work has been included in this section, but no quantification of the financial benefits likely to be derived from this sub-action have been included, as the review did not have sufficient time to review Department of Health estimates.

Action 1 – driving the rollout and use of ePrescribing and EPS

Summary of supporting evidence, including evidence from other sectors or territories:

Clinical decision support in secondary care leading to a reduction in avoidable Adverse Drug reactions

Based on a number of case studies from the UK and US, it is possible to estimate the NHS system-wide benefits that could potentially be achieved through the implementation of ePrescribing systems in secondary care by all NHS Trusts and Foundation Trusts. Clinician decision support at the point of prescribing in Secondary Care, has the potential to reduce costs via a reduction in the number of acute extended lengths of stay or immediate re-admissions resulting from avoidable Adverse Drug Reactions (ADRs).

- In the UK, a number of patients experience Adverse Drug Reactions (ADRs) leading to extended hospital lengths of stay.
- A more recent report in 2008 estimated the cost of ADR related admission to be c.£1.9bn p.a. This report used the same assumptions as a 2004 study (ref 1.1) and assumed that 6.5% of hospital admissions are the result of adverse reactions, resulting in an average stay of eight days). (ref 1.2)
- The implementation of an ePrescribing system linked to patients' electronic medical records is likely to reduce the number of prescribing errors arising from factors such as incompleteness and illegibility of records, and could also provide decision support to clinicians by warning where prescribed medication is not suitable for certain patients (at the point of prescribing).
- The introduction of an electronic prescribing solution by Doncaster Royal Infirmary was found to have the potential to result in a 60% reduction in ADRs (ref 1.4)
- Based on the assumption that an ePrescribing service could reduce preventable ADRs by c.60% (based on case studies – ref 1.4) and using total NHS costs of ADR related admissions of c£1.9bn, of which 50% are preventable (ref 1.3), an ePrescribing service could result in cost benefits of c.£570m p.a.
- However, the achievability of this cost saving is dependent on the current uptake of such ePrescribing systems within secondary care. It is estimated that the current uptake of such systems is less than 50%.
 - A study in 2009 suggested that ePrescribing in secondary care was at that point less widespread than in primary care, though the number of systems in use is growing (ref 1.5)
 - A questionnaire given to attendees of the National ePrescribing Forum found 82% of the 56 Trusts represented were either 'thinking of implementing' or 'currently implementing' an ePrescribing system. Given these Trusts attended the Forum, it is likely this suggested uptake will be considerably higher than the NHS average (ref 1.6)
- As a result, we conservatively estimate potential NHS total gross benefits of c.£285m p.a.
- This estimate is dependent upon a number of assumptions, including that adequate training for prescribers and other users is provided to ensure proper usage of the systems (benefitting from decision support), supported by lead clinicians and healthcare managers; and that systems operate in line with design and are linked with electronic health records to advise where unsuitable medications are prescribed (at point of prescription).
- Further benefits of reduced prescription errors are likely to include improved patient experiences and reduced litigation claims. In 2001, the Audit Commission found that clinical prescribing errors account for c.20% of litigation claims (ref 1.7). This benefit is not quantified here as it is covered in Action 5 of this report (to avoid double counting).

System costs

- Estimates of the cost to the NHS system of the costs of implementation of ePrescribing systems in NHS Trusts and FTs vary. However, a study by Royal Devon & Exeter Hospital (RD&E) in 2008 suggests a Trust wide system will cost in the region of £488K in one-off capital expenditure and £114K p.a. on an ongoing basis (ref 1.8)
- These costs include software, installation and training but not hardware which would be required on wards (such as laptops or PCs on wheels). The costs do not include any spend required on change management and project management.
- The system-wide cost of implementation depend on the number of Trusts that have already deployed an ePrescribing system. If we assume 50% of Trusts will need to implement a system and that these costs are representative of costs for the majority of Trusts, we estimate a cost of c.£63m capital costs (one off payment) and ongoing costs of c.£15m p.a.
- **Comparison of these costs with the cost benefits of c.£285m p.a. described above, suggests a year 1 net benefit of c.£208m (assuming all capital expenditure occurs in year 1) and net benefits of c.£270m p.a. from year 2 onwards.**

Action 1 – driving the rollout and use of ePrescribing and EPS

Summary of supporting evidence, including evidence from other sectors or territories:

Reduced costs due to an EPS system relating to improved clinical efficiencies (Primary Care)

The Department of Health has been guiding the development of an Electronic Prescription Service (EPS) which allows the transmission of prescription messages and digitally-signed prescriptions from primary care prescribers to a patient-nominated dispensing contractor. The project team is currently rolling out release 2 of EPS to primary care prescribers and dispensing contractors.

The original business case in 2007 highlighted a number of quantifiable benefits which have since been reviewed and updated based on evidence from the early stages of implementation (see interim evaluation published in July 2012)^(ref 1.10). The final report has not been published so final quantification values are not public but there is evidence of significant benefits as a result of the EPS system. Some of the key areas include:

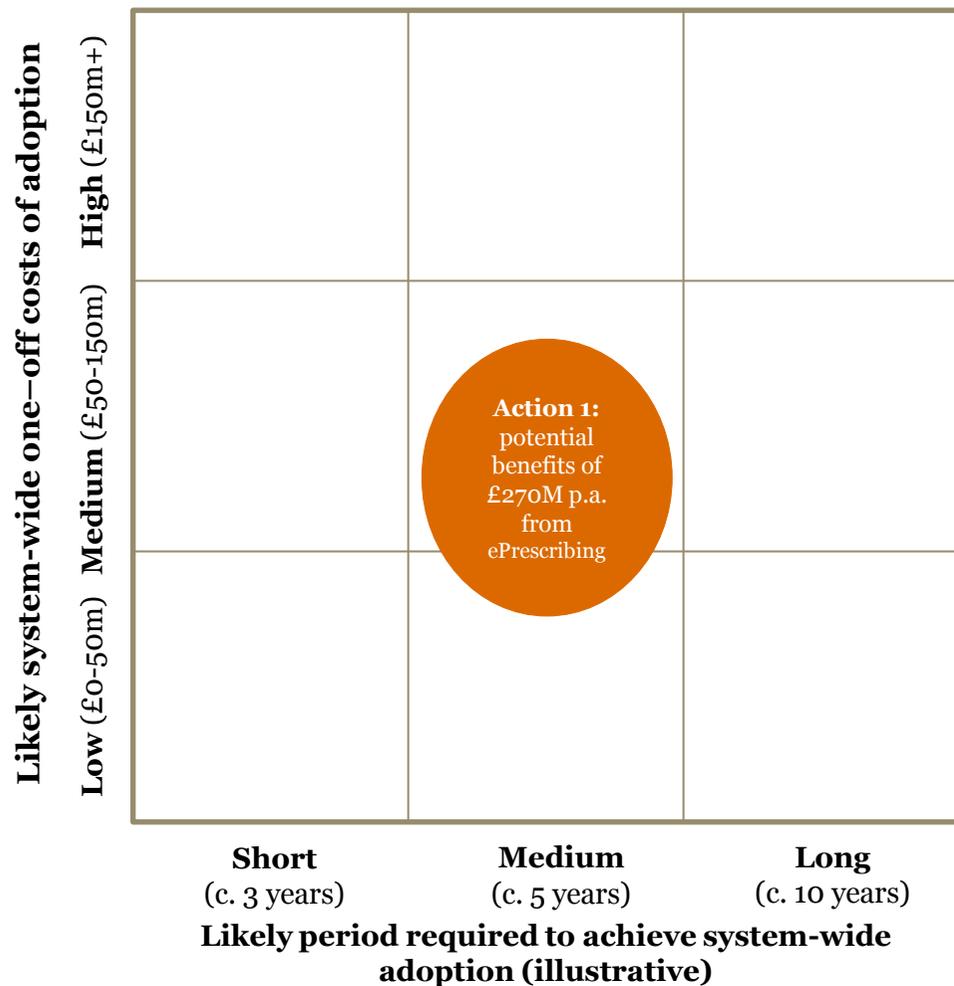
- Administrative time benefits resulting from efficiencies relating to routine repeat prescription requests;
- Reduced data entry and processing workloads in the NHS Business Service Authority (which reimburses pharmacies for prescription costs), as a result of standardised and accurate prescription data; and
- Dispenser time savings resulting from less data entry and more efficient dispensing.

Their work also identified a range of ancillary benefits that have been achieved during the rollout, including a reduction in prescription query calls between GPs and Dispensing contractors and a reduction in time spent dealing with lost prescriptions.

Other qualitative benefits due to an EPS system relating to reduced time and resources required for prescription related tasks (Primary Care)

- The increased use of the EPS service is also expected to result in a number of qualitative benefits:
 - Increased patient safety (e.g. fewer ADRs, increased pharmacist role in medicine management);
 - Enhanced patient experience (e.g. elimination of the need to pick up repeat prescriptions from the GP, improved stock management in pharmacies, faster prescription processing at pharmacies); and
 - Pharmacy stock management efficiencies through earlier notification of what medications need to be dispensed.

Action 1 – driving the rollout and use of ePrescribing and EPS



Only the cost and adoption profile of the rollout of ePrescribing in secondary care have been included on this page.

Likely system-wide costs of adoption

- The likely one off costs associated with the rollout of ePrescribing in secondary care is estimated at £63m.
- The ongoing annual cost is estimated at £15m.

Likely period required to achieve system-wide adoption

- It is estimated that the current uptake of this action is just below 50%.
- Given this current level of adoption it is estimated that there is a likelihood of implementation of an ePrescribing service nationally within the next 5 years.
- Current challenges facing adoption are:
 - Clear establishment of stakeholder requirements and priorities;
 - Making better use of existing IT infrastructure and investment;
 - Ensuring systems work across the patient pathway; and
 - The use of real-time information.

Action 2 - Better use of information to aid post-operative care of patients

Sub actions

1. Create healthcare economy-wide portals containing patient medical information to improve clinical efficiency during patient handovers from operating theatre
 - Create access points at all appropriate locations for medical staff
 - Operational changes within NHS trusts
2. Create detailed online educational source with tailored patient information and patient medical records to improve patient outcomes and patient experiences post discharge
 - Develop limited access password protected access for individual patients
 - Ensure patients know how to access portal and understand confidentiality controls

Potential Benefits

Financial benefits – unquantifiable

- Reduced re-admissions due to avoidable post-operative complications
- Reduced staff time during handovers leading to efficiency savings

Non-financial benefits – care quality and outcomes

- Improved patient outcomes due to reduce medical errors
- Improved patient outcomes due to improved self management of post-operative care
- Increased patient experience due to improved understanding of treatment and recovery process

Summary of supporting evidence, including evidence from other sectors or territories:

Based on the case studies developed by the Harvard Medical School and the HealthUnlocked trial at the Royal National Orthopaedic Hospital, there appear to be potential benefits realisable by driving the increased availability of use of information by clinicians and support staff involved in providing post-operative care to patients.

Increased clinical efficiency during hospitalisation

The implementation of a healthcare economy-wide portal to be used by clinicians and support staff involved in providing post-operative care to patients, which includes patient's full real-time medical history as well as details of the current treatment, could deliver financial and non-financial benefits because:

- The improved availability of clinical information for medical professionals will increase the accuracy of appropriate treatment and increase outcomes in patient recovery and experience; and because
- During the transfer from the operating room to the post anaesthesia care unit (PACU), the anaesthesiologist needs to report to the PACU medical staff on patient's condition including: medical history, present and past medical interventions/ surgery, the patient's baseline observations/ normal parameters, type of surgery performed, type of anaesthesia given, estimated blood loss, total input of fluids and output of urine during surgery, and any complications during surgery. Access to an online portal could drive benefits during this patient handover in these areas:
 - There could be staff time cost savings due to a shorter handover process for those giving and receiving information. Further analysis could be done to quantify the potential saving, by estimating the potential time saved during each patient handover and applying a corresponding staff cost per minute;
 - There could also be benefits related to the more timely availability of information, and ability to re-access if needed, that could improve care and reduce medical errors; and
 - For some patients there could be further cost and experiential benefits as a result of access to real-time patient information during onward transfers to the ICU or general wards.

Action 2 - Better use of information to aid post-operative care of patients

Summary of supporting evidence, including evidence from other sectors or territories:

Improved patient recovery during hospitalisation

Providing patient access to educational material during hospitalisation could also drive benefits by encouraging behaviours that increase recovery speed, including respiratory exercises, movement to prevent blood clots and circulation and pain management

Increased patient quality of care and reduce readmissions post discharge

By providing patients, family members and social care workers with access to an online portal with increased educational information throughout the post-operative process, there could be significant post-discharge benefits for patients. These benefits can be allocated to key post-discharge objectives that indicate a successful end to care:

1. That the level of medical support provided, the number of follow up appointments and readmission rates fall within thresholds

- One of the major goals of the NHS is to reduce the rate of emergency readmissions as they are both costly and impact patient recovery
- According to NHS statistics there was 561k emergency readmissions to the NHS within 28 days of discharge in 2010/11 ^(ref 2.1), of which an sub-set are post operative patients
- A Department of Health funded report by the RAND corporation found evidence that suggested 15-20% of total emergency readmissions to hospitals within 28 or 30 days of discharge from hospital may be avoidable ^(ref 2.2)
- Whilst unplanned readmission may be a result of a range of factors (infections, complications, choice of surgical approach and patient factors), expert opinion has highlighted a lack of patient education as a reason for readmission. A 2012 US study on readmission reasons post-pancreaticoduodenectomy found that poor discharge education was a key factor in high rates of readmission, specifically for dehydration and malnutrition ^(ref 2.3)
- It is estimates that by increasing the availability of educational material for patients to assist self-management of post-operative care, there could be a significant reduction in emergency readmission rates

2. That Patient recovery and comfort is in line with benchmarks for the procedure and patient profile

- The availability of information on correct post-operative activities and clear guidance on process and expected recovery times could deliver both improved outcomes in patient recovery and patient experience, particularly as the ability to take in information whilst hospitalised may be reduced by pain or disorientation. The benefits could be in the following areas:
 - Better medicine management affecting pain management and recovery speed
 - Symptom management and incision/wound care
 - Clear understanding of treatment process
 - Appropriate support for situation
 - Reduced time needed from family and social care to obtain relevant information in order to support the patient
- The implementation of a scheduling tool and an appointment reminder text message process could also be integrated with provision of an online information portal to provide additional experiential benefits to patients and potential cost savings to the Department of Health

Section 4.2

Priority potential actions under Theme 2

Two Priority potential actions were identified under Theme 2, delivering significant financial and non-financial benefits

Theme 2: greater availability of person based information

Total incremental value of actions in Theme: c.£1,420M

Action	Benefit types identified	Summary of potential benefits	Description of estimated financial benefits, when quantifiable
3. Use of Acute operational performance information to drive contractual savings for commissioners	<ul style="list-style-type: none"> Financial benefits – quantifiable Non-financial benefits – care quality and outcomes 	Reductions in: <ul style="list-style-type: none"> Emergency Admissions with 0-1 LoS OP procedures on 0 LoS IP basis OP / IP conversion rate 1st / FU appointment rate 	£860M p.a. in recurring financial benefits
4. Provision of complete and accurate clinical and attendance information to clinicians and carers at point of care via digital portals or other similar solutions	<ul style="list-style-type: none"> Financial benefits – quantifiable Non-financial benefits – care quality and outcomes 	<ul style="list-style-type: none"> Attendance avoidance savings to commissioners Clinician efficiency savings within Acute Trusts Administrative efficiency savings within Acute - Trusts (i.e. Discharge letters) 	£560M p.a. in recurring financial benefits

Action 3 - Use of Acute operational performance information to drive contractual savings for commissioners

Sub actions	Potential Benefits
<ul style="list-style-type: none"> • Improve the breadth and standard of information provision - by organisation, speciality, specific and benchmark data • Drive use of information by Commissioners when contracting with acute providers, in order to incentivised desired forms of treatment and levels of performance 	<p>Financial benefits – quantifiable</p> <ul style="list-style-type: none"> • Estimated maximum net benefits of c.£860M p.a. that could be achieved with limit up-front investment costs. Initially financial benefits will be in the form of commissioner budget savings, but ultimately whole-system benefits can be achieved <p>Non-financial benefits – care quality and outcomes</p> <ul style="list-style-type: none"> • Likely to lead to improvements in care quality and outcomes as treatment will occur in the right form or setting at the right time • Likely to deliver related improvements in the patient experience due to a reduction in unnecessary admissions, and treatment in more appropriate care settings

Summary of supporting evidence, including evidence from other sectors or territories:

Commissioners should be challenged to further utilise available information to develop and modify Provider contracts, forcing Providers to implement operational change.

Detailed and granular information should be made available on a number of metrics to those commissioning organisations, to allow them to make changes to their contracts with providers who are not performing in line with national averages. Four specific metrics that illustrate the potential benefits to be secured have been identified below, and by using HES Data July 10-June 11 & July 11-Jun 12 for all providers in England, excluding specialist commissioning, calculations have been estimated on the basis that all commissioning organisations bring the performance of the providers in their area into line with national averages.

Some commissioners are already using data in this way (as are a number of advanced providers), and local factors and priorities should always be taken into account when doing so. There will be variations in regional activity and speciality profiles that shape the ways in which commissioners choose to and are able to act on information of this type. However, on a nationwide basis there are likely to be significant benefits of using this information in a consistent way that warrant promoting that use.

Reduction in emergency admissions with 0-1 Length of Stay (LoS)

While some / many are necessary, it is estimated that between 20% and 30% (ref 3.1) of short stay emergency admissions could be treated either at the A&E stage or even in primary care. , and admissions are often made to avoid breaches of the 4 hour A&E waiting time threshold. These could be avoided by a number of operational interventions, such as:

- Better management of the A&E department queuing system - including nurse or GP led triage. This requires the A&E dept having reliable information on a patient's history in both hospital and primary care so that unnecessary tests are not repeated and concomitant health conditions and treatments are understood when diagnosing and treating each patient in A&E.
- Better GP out-of-hours services to reduce the numbers of patients going to A&E in the first place. This requires out-of-hours services to have access to up to date patient data so that they can avoid unnecessary hospital referrals.
- Patient education of alternate treatment routes.

Bringing all short stay emergency admission rates down to the current national average would result in over 170,000 fewer emergency admissions, with **initial savings to commissioners amounting to over £130m p.a.** (aggregated across all Commissioners nationally). Ultimately, if providers make operational adjustments to reflect the contractual changes, whole system benefits of a similar scale should be achieved.

Action 3 - Use of Acute operational performance information to drive contractual savings for commissioners

Summary of supporting evidence, including evidence from other sectors or territories:

Reduction in Out-Patient (OP) procedures on a zero LoS In-Patient (IP) basis

Certain hospital elective procedures are considered to be more effectively and efficiently carried out in an Outpatient setting rather than a Daycase setting (zero LoS IP). This is because these simpler procedures do not require the more sophisticated equipment, staffing, anaesthesia and clinical settings required for more complex Daycase surgery. Procedures most suitable to be managed in this way include Minor Pain Procedures, Upper Genital Tract Monitor Procedures and some nasal procedures.

Bringing all Trusts with Outpatient treatment rates above the current national average down to the current national average would result in **savings to commissioners of over £160m p.a.** (aggregated across all Commissioners nationally). Ultimately, if providers make operational adjustments to reflect the contractual changes, whole system benefits of a similar scale should be achieved.

Reduction in the rate of attendances and procedures performed on an inpatient basis that could be performed on an outpatient basis

Certain hospital elective procedures can be treated as OP, rather than as more expensive and inappropriate IP attendances and procedures.

Bringing all Trusts with inappropriate IP attendance and procedure rates above the current national average down to the current national average would result in **savings to commissioners of over £310M p.a.** (aggregated across all Commissioners nationally). Ultimately, if providers make operational adjustments to reflect the contractual changes, whole system benefits of a similar scale should be achieved.

Reduction in 1st / Follow up (FU) appointments

Once a patient is referred to a hospital and a diagnosis and treatment plan is decided upon, the follow-up care can often be carried out in a community or primary care setting rather than requiring repeated visits to hospital. It is estimated that between 20% and 30% (ref 3.1) of hospital follow up visits could be better managed in a primary care setting.

Bringing all Trusts with follow up to 1st attendance ratios above the current national average down to the current national average would result in 3.3 million fewer follow-up appointments per year. This would result in **savings to commissioners of over £260 million p.a.** (aggregated across all Commissioners nationally). Ultimately, if providers make operational adjustments to reflect the contractual changes, whole system benefits of a similar scale should be achieved.

Evaluation of potential benefits

By using the metrics identified here, to further utilise available information to drive Provider contracts, forcing Providers to implement operational change, this could potentially lead to quality of care and safety benefits alongside cash releasing savings of over £860 million per annum, when aggregated nationally for all Commissioners across England.

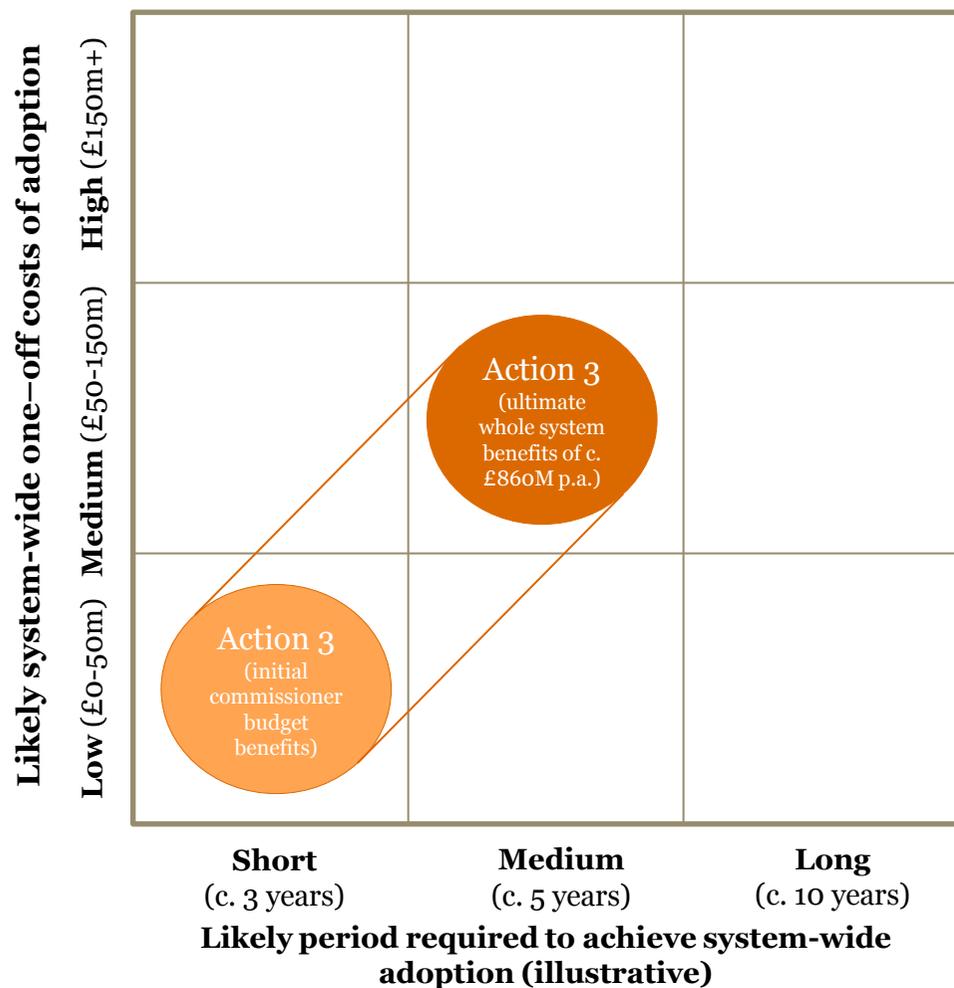
System costs

The Health and Social Care Information Centre (HSCIC) is well placed to present this analysis to the CCGs in England given that it already has the necessary data, infrastructure and staff skill set. As such the additional costs to the system of the provision of this information will be low.

Evaluation of potential benefits:

By using the metrics identified here, and aggregating nationally for all Commissioners across England, this would lead to quality of care and safety benefits alongside cash releasing savings of over £860M p.a.

Action 3 - Use of Acute operational performance information to drive contractual savings for commissioners



Likely system-wide costs of adoption

- The Health and Social Care Information Centre (HSCIC) is well placed to present this analysis to the CCGs in England given that it already has the necessary data, infrastructure and staff skill set. There would therefore be a minimal cost associated with the implementation of this Action.

Likely period required to achieve system-wide adoption

- Commissioners have historically had a strong appetite for HSCIC-provided operational performance information that can be used to drive contracting discussions with Providers.
- It is estimated that the necessary metrics can be implemented by the HSCIC and disseminated to all CCGs with a year.
- Key challenges to the implementation of this Action are:
 - Overall agreement on metrics used for analysis by all stakeholders; and
 - The use of real-time information.

Action 4 - Provision of complete and accurate clinical and attendance information to clinicians and carers at point of care via digital portals or other similar solutions

Sub actions	Potential Benefits
<ul style="list-style-type: none"> • Drive the implementation of healthcare-economy wide information portals <ul style="list-style-type: none"> - Create access points at all appropriate locations for medical staff • Ensure that care pathways are deployed and built on a portal framework to enable monitoring against benchmarks and best practice 	<p>Financial benefits – quantifiable</p> <ul style="list-style-type: none"> • Estimated maximum net benefits of c.£560M p.a., plus could drive related efficiency savings by encouraging more cost-effective decision making and by enabling administrative savings <p>Non-financial benefits – care quality and outcomes</p> <ul style="list-style-type: none"> • Will improve care quality by enabling more timely and effective treatments, and will improve the patient experience by reducing duplication of information provision and by enabling joined up working between medical staff and care workers <p>Non-financial benefits – other</p> <ul style="list-style-type: none"> • Will improve the experience of carers and staff (including GPs, secondary care staff, and community and social care staff) by minimising the duplication of information collection • Will support efforts to reduce inequalities by ensuring that all patient information is appropriately documented and managed regardless of patient profile

Summary of supporting evidence, including evidence from other sectors or territories:

Based on the NIECR ^(ref 4.1) and NWL ^(ref 4.2) case studies (see Appendix) it is possible to extrapolate that the following benefits are realisable through the implementation of a healthcare economy-wide portal i.e. linking data across primary, secondary and social care.

Admission and Appointment Avoidance savings for Commissioners

1. Evidence suggests that certain non elective attendances could be avoided by managing patients in community care settings without compromising outcomes. One of the ways of achieving this would be to provide community teams with access to comprehensive patient data and clinical decision support including diagnostic services. Looking after patients at home is cheaper, mostly because there is no need for 24/7 medical and nursing, and where an overnight sitting service is required, this is substantially cheaper than a hospital ward. Efficiencies would also derive from fewer ambulance journeys, less flow through A&E and for the frail, being looked after at home is more likely to return the patient to their previous functioning level which creates efficiencies on the social care budget, and reduced number of admissions due to chronic disease exacerbation. Although these efficiency improvements will lead to savings in provider payments, the real efficiency is that all parts of the system will do more at the same cost, with improved quality of care, fewer interventions and improved patient experience and safety. Patients and service users will also benefit from a reduction in unnecessary first and follow-up appointments.
2. Through availability of comprehensive clinical information and collaboration between care teams and patients, using a shared primary/secondary care record and discussion between GP and Consultants, this would lead to a reduction in follow-up outpatient appointments, both after 1st OP appointment and after elective admission. Even a moderate reduction in these appointments would lead to significant cash releasing savings to commissioners. For example, a reduction of 5% after first OP and elective admissions would result in **annualised savings to commissioners amounting to over £240M** (aggregated across all Commissioners nationally). In order to realise the System-wide savings, Acute Trusts would need to implement the necessary structural and operational changes based on the reduction in first and follow-up outpatient appointments.

Action 4 - Provision of complete and accurate clinical and attendance information to clinicians and carers at point of care via digital portals or other similar solutions

Summary of supporting evidence, including evidence from other sectors or territories:

Clinical efficiency savings within Acute Trusts

1. By provision of unified information views and availability of information to enhance clinical decision making:
 - Patient flow through emergency and assessment wards will be improved. Even a moderate saving in nurse time, by enabling faster and more accurate decisions relating to patient care, would lead to significant cash releasing savings to Acute Trusts. For example, a conservative 3 minute saving of nurse time would result in **annualised savings to the Acute Trusts amounting to over £50M** (aggregated across all Acute Trusts nationally).
 - A reduced number of duplicate diagnostics may be required. If it is assumed that 0.5% of outpatient attendances would not now require a simple (e.g. blood) test ^(ref 4.1), this would result in **annualised savings to the Acute Trust amounting to over £15M** (aggregated across all Acute Trusts nationally).
 - A reduction in the need for paper notes, leading to a reduction in both nurse and doctor time for all outpatient appointments. If a conservative estimate of 5 minutes were to be saved by both doctors and nurses for all appointments, this would result in **annualised savings amounting to over £130M** (aggregated across all Acute Trusts nationally).
2. Through integrated information and care pathway management that enabled clinicians and the multi disciplinary team to manage patients according to pathways and best practice, length of stay may be reduced. Care pathways can be deployed and built on a portal framework to enable monitoring against benchmarks and best practice, trigger alerts and identify outliers. If a quarter day reduction in bed days on 30% of emergency admissions can be made, this would result in **annualised savings amounting to over £90M** (aggregated across all Acute Trusts nationally).
3. Through more integrated discharge management and better information availability for community staff, 30 day readmissions may be reduced ^(ref 4.1). If a 1% reduction in those patients who are re-admitted within 30 days was achieved, this would result in **annualised savings amounting to over £15M** (aggregated across all Acute Trusts nationally).

Administrative efficiency savings within Acute Trusts

By provision of unified information views, there will be a reduction in paperwork associated with discharge following a non-elective or elective admission. If a saving of 10 minutes per patient for all admissions can be made, this would result in **annualised savings to the Acute Trust amounting to over £20M** (aggregated across all Acute Trusts nationally).

System Costs

Hardware and software costs associated with the implementation of a healthcare economy-wide portal are estimated to be c.£500,000 per health economy. If it is assumed that these portals are rolled out nationally, across all 210 CCGs, this places the system implementation cost of approximately £105m. These costs do not include any necessary costs of change management and project management.

Action 4 - Provision of complete and accurate clinical and attendance information to clinicians and carers at point of care via digital portals or other similar solutions

Potential for further additional benefits – Electronic Medical Records

An additional potential action would be to provide Electronic Medical Records (EMR) systems to health and care economies; this would allow both clinical and non-clinical staff to view, create, update and amend patient records instantly, in real-time and from any location. In its simplest form, solutions would enable staff to scan and store paper medical records in a centralised system, allowing for integration with other hospital systems and devices.

Potential benefits could include:

- Efficiency benefits for clinical and non clinical staff, through instant access to patients' entire medical history from any location and through the removal of paper records 'wait' times;
- Centralised digital storage reducing the possibility of lost records through duplication and fragmentation of files in several locations and between clinical staff;
- Reduced operational costs through a reduction in the need for physical medical records storage, retrieval, delivering, filing and administration;
- Reductions in wait times for paper records – improving efficiency, but also safety and quality of care;
- Reductions in the time taken for, and problems encountered with, the retrieval of files required for clinical, legal, and insurance and Data Protection Authority purposes, and in controlling or auditing access to patient records for legal and purposes; and
- Reductions in clinical risks and improvements to patient experience through the provision of complete and consolidated information for greater clinical efficiency and safety.

It has not been possible to quantify the potential benefits during this review period.

Evaluation of potential benefits:

- Admission and Appointment Avoidance savings for Commissioners – Nationally aggregated cash releasing benefits to commissioners of over £240M per annum alongside improved quality (experience, outcomes) and clinical safety.
- Clinical efficiency savings within Acute Trusts – Nationally aggregated efficiency improvement benefits to Acute Trusts of over £50M per annum and cash releasing benefits to Acute Trusts of over £250M per annum, alongside improved quality (experience, outcomes) and clinical safety.
- Administrative efficiency savings within Acute Trusts – Nationally aggregated cash releasing benefits to Acute Trusts of over £20M per annum.

Action 4 - Provision of complete and accurate clinical and attendance information to clinicians and carers at point of care via digital portals or other similar solutions

Likely system-wide one-off costs of adoption	High (£150m+)			
	Medium (£50-150m)			<div style="border: 2px solid orange; border-radius: 50%; width: 100px; height: 100px; display: flex; align-items: center; justify-content: center; text-align: center;"> <p>Action 4: potential benefits of £560M p.a.</p> </div>
	Low (£0-50m)			
		Short (c. 3 years)	Medium (c. 5 years)	Long (c. 10 years)
		Likely period required to achieve system-wide adoption (illustrative)		

Likely system-wide costs of adoption

- The likely one-off costs to the English public healthcare system for implementing healthcare economy-wide portals is estimated at £105m
- The likely annual on-going costs associated with maintaining these portals is estimated at £15m

Likely period required to achieve system-wide adoption

- A small number of Commissioners and Trusts have already adopted integrated care portals. The implementation time frame can vary between 4 – 12 months.
- It is anticipated that the national rollout of clinical portals will take between 5-10 years
- Current challenges facing adoption are:
 - Clear establishment of stakeholder requirements and priorities
 - Making better use of existing IT infrastructure and investment
 - Ensuring systems work across the patient pathway
 - The use of real-time information

Section 4.3

Further potential additional actions

There are potential additional actions that could deliver further benefits, but that have not been evaluated to date (1/2)

There are potential sources of significant additional benefit to be derived from better use of information that have not been addressed as part of this report, and the value of which has not yet been quantified

Further action (a): driving the more sophisticated and widespread evaluation of cost and quality information

Description

- Further to those actions identified in the IA, there is an opportunity for the NHS, and in particular providers and commissioners, to more completely and rigorously assess data on:
 - the cost (as measured by unit cost per procedure) of services
 - and the quality (as measured by outcome measures, PROMs and experience measures) of services.
- This type of information use has previously only been deployed to a limited extent, primarily in the acute sector, and experts suggest that more could be done to drive efficiencies in this way.
- This action has not been fully evaluated in this report, as research into it is currently being carried out by other system bodies (including Monitor).

Potential Benefits

- This action would enable providers and commissioners to more clearly understand the tradeoffs between cost and quality, and to make more efficient decisions as to which services to provide to which cohorts of patients.
- It is expected that this could lead to significant efficiency benefits.

Further action (b): driving the broader use of patient-level treatment and outcomes data to support the personalisation of services

Description

- Benefits beyond those identified in the Impact Assessment could in future be derived from the more detailed interrogation of detailed patient treatment and outcomes data. This could involve the interrogation of individual patient records (including demographic and profiling information) to examine patterns of incidence and prevalence of conditions, to assess responses to treatment regimes, and to develop more targeted and effective personalised services.
- This action has not been fully evaluated in this report as significant further research into this area is required.

Potential Benefits

- Benefits derived from this action could include improvements in quality and treatment effectiveness, and also related efficiency benefits.
- More personalised services should over time also lead to fewer repeat appointments with GPs and fewer inpatient admissions.
- It is also expected that the personalisation of services could go some way to addressing inequalities in treatment outcomes and care provision.

There are potential additional actions that could deliver further benefits, but that have not been evaluated to date (2/2)

There are potential sources of significant additional benefit to be derived from better use of information that have not been addressed as part of this report, and the value of which has not yet been quantified

Further action (c): providing better and more targeted information to patients and carers to facilitate choice of service or clinician

Description

- Research has suggested that patients and service users do not currently always have access to relevant and appropriately filtered and presented information to enable choice.
- There are also likely to be significant quantitative benefits in the form of efficiency improvements derived from more effective patient choice (of GP, of secondary care setting, and of clinician). The more effective functioning of choice should lead to a reduction in certain economic market failures that reduce efficiency, such as poor allocation of investment and resources; principal-agent problems; and barriers to switching. These efficiency benefits will be in addition to the qualitative and experiential benefits discussed in the Impact Assessment.
- These benefits have not been fully evaluated in this report as other system bodies (including Monitor and the NHS Commissioning Board) are currently investigating this topic further.

Potential Benefits

- This action could lead to the achievement of efficiency and quality benefits, as well as improvements to the patient experience.
- The effective functioning of choice is thought likely, over time, to reduce inequalities of access and treatment quality.

Further action (d): Achieving a reduction in clinical negligence and litigation via the better use of information

Description

- Total litigation as a result of clinical negligence in the NHS grew 46% in 2011/12 to £1.3bn (ref 5.1). Clinical negligence was equivalent to c. 1% of total health care spending in 2010/11 (ref 5.2). There is a clear incentive to reduce these payments and there is evidence of a perception that medical negligence payouts are too high.
- Whilst there are inherent structural differences, comparisons with some international health systems of broadly similar configurations appear to suggest that there is scope to reduce litigation payments in the UK.
- By increasing the availability of patient information to medical staff, it is possible that there could be significant savings in clinical negligence claims where a lack of (or incorrect) information was the key driver of the underlying medical errors.
- The implementation of this Action assumes that the related Actions (health-care economy wide portals and an ePrescribing service) have been deployed.
- A reduction in medical negligence claims is likely to improve public perception of NHS level of care.

Potential Benefits

- The other actions laid out in this report could, when taken cumulatively, lead to a reduction in NHS spend on the resolution of clinical negligence claims and litigation

Section 4.4

Actions recommended by other research projects

Other Actions

Benefits identified within other sources

There has been additional research undertaken to uncover significant benefits accruable through the better use of information, that has not been considered within the original Impact Assessment, but is in keeping with the DH's Information Strategy

Digital First, The delivery choice for England's population ^(ref 6.1).

This paper, led by the Department of Health and building on the *Innovation, Health and Wealth* report, identifies 8 initiatives that go beyond those covered within the IA, the implementation of which could lead to cash releasing benefits of over **£2.7 Billion p.a.** The initiatives included are listed below and follow four key principles: "low implementation cost, implementable using existing technical expertise, will not compromise patient safety and unlikely to impact on information governance". This original report has been qualified by the subsequent Rapid Review ^(ref 6.2), undertaken by the Institute of Digital Healthcare.

Initiative	<u>Annual Value(m)</u>
Pre-assessment in Primary Care	903
Appointment reminders	264
Mobile-enabled community nursing	36
Online Secondary Care pre-operative assessments	34
Remote post-surgical follow-ups in Secondary Care	41
Remote Secondary Care follow-up	326
Remote communication of test results	1120
Total	£2.7Billion p.a.

Appendix A

Supporting Case Studies

A

Action 1: Case Study 1

ePrescribing systems reducing Adverse Drug Reactions (UK)

ePrescribing at Doncaster and Bassetlaw Hospitals (2000)

Source: JAC Medicine Management

(http://www.jac-pharmacy.co.uk/~jacpharmacy/joomla/index.php?option=com_content&view=article&id=58:case-study-eprescribing-at-doncaster-and-bassetlaw-hospitals-nhs-foundation-trust&catid=18:customers&Itemid=11)

Summary of case study

In 2000, the Doncaster Royal Infirmary started work on the development of an ePrescribing system to improve patient safety and reduce the number of clinical errors at the trust.

To do so, the hospital selected JAC Medicines Management to provide the ePrescribing system

The first phase of the project began in 2002 through a trial at Montagu Hospital.

This was followed by a roll-out to three further wards during 2003.

In 2003, the system was updated to link to patients' medical records to check for potential problems relating to medications which were about to be prescribed, and to generate a real-time alert message in problematic situations.

Outcomes

- Increased transcription of accurate prescriptions from 37% to 96%.
- Quality of medicines administration increased from 65% to 100%.
- The use of decision support software resulted in 1 in every 97 orders being reconsidered due to warning or alert.
- The system could reduce potential adverse drug events by up to 60%.

Action 1: Case Study 2

Adverse Drug Reactions prevalence as reason for hospital admissions

Adverse drug reactions as cause of admission to hospital (2004)

Summary of case study

In 2004, an observational study was conducted to understand the current burden of adverse drug reactions (ADRs) on the NHS. This was to address perceived weaknesses in the data available at the time - the majority of studies on ADR were old (having been completed 10-30 years previously) and either small in scale or based on retrospective review of case notes only.

The 2004 study was conducted in two large general hospitals in Merseyside across 18,820 patients aged 16+ over a six month period.

Outcomes

- By looking at the cause of admission for each patient the study found that:
 - 6.5% of total admissions were related to an ADR.
 - The median bed stay as a result of the admission was eight days.
- The study concluded that the burden on the hospitals imposed by ADRs was high (e.g. through morbidity, mortality and additional costs) and estimated that if these patterns were replicated nationwide then ADRs would cost the NHS c. £466m each year.

**Source:
BMJ Group**

(<http://www.bmj.com/content/329/7456/15>)

Action 1: Case Study 3

Analogous benefits from comparable non-medical initiatives – e-voting systems

Comparable benefits of an e-voting system (2012)

Source:
Three Case Studies from Switzerland: E-Voting, Jan Gerlach and Urs Gasser

(http://cyber.law.harvard.edu/sites/cyber.law.harvard.edu/files/Gerlach-Gasser_SwissCases_Evoting.pdf)

The Economist (2012)

(<http://www.economist.com/news/international/21565146-paperless-polling-stations-are-unfashionable-internet-voting-its-way-paper-cuts>)

Electronic voting systems have been trialled in many countries as a method of increasing efficiency in voting systems. There are two types of systems:

- Direct-recording electronic (DRE) voting systems which directly replace paper ballot papers in voting stations; and
- Web-based electronic voting systems (e-voting), where voting can occur remotely.

Summary of case study

- A 2009 study examined the impact of three trials of e-voting in Switzerland in Geneva, Neuchatel and Zurich. The case study found some evidence of benefits of e-voting systems in a number of areas:
 - Some evidence of increased participation levels;
 - Reduced error rates: human error from voters (e.g. spoilt ballot papers) or from administration staff (manual counting errors);
 - Facilitated access to a greater number of voters (e.g. people with disabilities, rural voters);
 - Ability to assist voting decisions providing voter educational material through e-voting portal; and
 - No real evidence of confidentiality or vote manipulation.
- Although not highlighted in the study, there is also the further potential benefit of a faster results declaration with virtually real time tracking of votes.

Action 2: Case Study 1

Increasing patient educational information to reduce post-operative pain

Using the Web to Reduce Postoperative Pain Following Ambulatory Surgery (1999)

**Source:
Harvard Medical School**

(http://pubmedcentralcanada.ca/pmc/articles/PMC2232814/pdf/procamia_symp00004-0817.pdf)

Summary of case study

A study was conducted in 1999 to assess whether the availability of educational information provided via the internet would be accessed and could improve the quality of patient care.

The study included 195 ambulatory surgery patients at the Ambulatory Surgery Center at Beth Israel Deaconess Medical Center (BIDMC) in Boston.

Online pre-operative and post-operative educational informational was provided for a group of patients undergoing surgery.

A number of patients ('intervention group') were given access to a password protected pain management information section of the website.

The results were compared to a 'control group' who were not given access to the online pain management information but otherwise received the same care and information.

Outcomes

- Overall, 85% of the patients in the study accessed the resources made available
- The patients' postoperative pain score was measured using a 5-point Verbal Rating Scale (VRS) which consisted of a list of adjectives that describe different levels of pain.
- Significantly lower post operative pain was reported amongst the intervention group than the control group:
 - On arrival to their home ($p < 0.016$);
 - During the first night after surgery ($p < 0.013$); and
 - On day after surgery ($p < 0.037$).

Action 2: Case Study 2

Using real time information to improve patient outcomes and efficiency

HealthUnlocked - Royal National Orthopaedic Hospital in London (2011)

**Source:
Royal National
Orthopaedic Hospital**

(<http://www.rnoh.nhs.uk/home/news/nhs-patients-have-the-last-word-the-success-their-treatments>)

Summary of case study

A trial is currently being conducted of a system that measures the effectiveness of spinal surgery by asking patients to record their progress on an iPad in real time, whilst in the hospital, and then at home through an online system after being discharged.

Outcomes

- According to the Royal National Orthopaedic Hospital benefits include:
 - Provides instant access to assess a patient's progress;
 - Allows surgeons to track the value of the operations they carry out;
 - Permits hospitals and commissioners to quantify the benefits of different types of operations;
 - Creates up to an estimated 300 new outpatient appointment slots per consultant surgeon per year in the RNOH;
 - Increases patient satisfaction with 95% of patients prefer the new online process to the traditional pen and paper method; and
 - Permits access to reports on PROMS in a clinic and so best use of information, which has been rare when using traditional methods of reporting.
- The process also encourages patients to report more often, which can lead to the identification of post-surgical complications faster than follow up appointments.

Action 4: Case Study 1

Paperless systems increasing clinical inefficiencies

Liverpool NHS trust – Rollout of a clinical patient data portal (2012)

Source: Guardian.co.uk

(<http://www.guardian.co.uk/healthcare-network/2011/apr/07/royal-liverpool-hospitals-nhs-paperless-records>)

Computerworld UK

(<http://www.computerworlduk.com/news/public-sector/3357041/liverpool-nhs-trust-hails-paperless-access-to-patient-data/>)

Summary of case study

Royal Liverpool and Broadgreen University hospitals trust trialled a computerised paperless system on its haematology and dermatology wards.

The trial provided direct access to the databases holding records of patients' demographic data, GP referral letters, letters from clinics, test orders and results and X-ray images and scans.

Objectives of the trial was to eliminate time and cost associated with paper notes e.g.:

- 50% of records were not available when requested (either due to loss or use by other care provider); and
- Clerks spent 60% of their time chasing missing case notes.

Outcomes

- The 'paperless office' was only an element of the overall online portal trial but had specific outlined benefits from paperless working:
 - **Improving Service Efficiency** through a reduction in paper printing for home visits. Measured by the volume of paper per visit before and after implementation of Provider Portal; and
 - **Improving Patient Care** through a change in clinical practice enabled by shift from paper to electronic records. Measured by acceptance of change using interviews and questionnaires with clinicians. Track usage of Provider Portal to see if usage is sustained or increasing week on week.
- The trial has been seen as **successful** and is being rolled out to all in-patient and some out-patient clinics.

"For a three and a half to four hours clinic I can save 30 minutes of time so I can use that time to either see more patients or new patients."

Professor Patrick Chu, consultant haematologist

Action 4: Case Study 2

Paperless systems increasing clinical inefficiencies

**Evanston
Northwestern
Healthcare, Chicago
– introduction of a
full electronic
records system
(2004)**

**Source:
Business Week**

(<http://www.businessweek.com/stories/2004-07-06/a-paperless-health-care-system>)

MSNBC

(http://www.msnbc.msn.com/id/5592501/ns/health-health_care/t/hospitals-move-toward-paperless-age/#.UNRgO28fQk)

Summary of case study

In 2004, Evanston Northwestern Healthcare launched a programme to get its three Chicago-area hospitals switched to a full electronic records system.

The target was to make \$10 million in savings in the first year, largely by reducing the data-collection process.

Key objectives highlighted:

- Reduce the tens of thousands of deaths and injuries caused by medical mistakes every year;
- Cut administrative costs by eliminating the need to produce, maintain and store enormous numbers of paper files; and
- More efficient systems eliminate duplicated treatments, shorten hospital stays and get patients out of intensive care units faster.

The project took around 3 years by which time all three hospitals and 50 affiliated doctors' offices became paperless.

Outcomes

There have been a number of documented successes, including turnaround times for test results falling significantly at the three hospitals (e.g. mammogram results in one day rather than days or weeks).

Action 4: Case Study 3

Evidence of appropriate patient placement

A&E audit - Business case for Blackpool Urgent Care Centre (2008)

Source: NHS Blackpool

(http://www.blackpool.nhs.uk/images/uploads/Urgent_Care_Centre_BC_v2.4_.pdf)

Summary of case study

As part of the 2008 business case for urgent care centre in Blackpool, an audit was conducted to establish the potential flow between primary and secondary care for patients attending A&E.

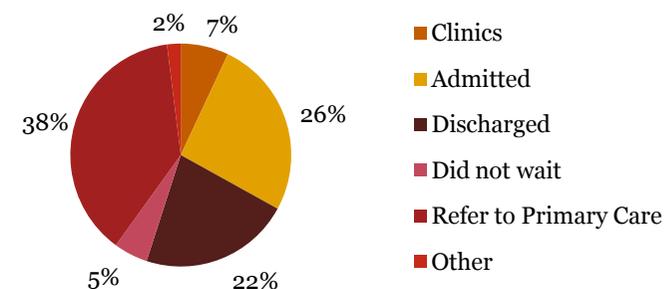
The audit was undertaken between the 15th and 28th January 2007 by Fylde Coast Medical Service (FCMS) trained primary care out of hours operators.

The audit captured 2,416 patients of the 3,240 patients attending A&E during the audit period, 75% of patients were included in the audit.

Outcomes

- A total of 622 were identified as suitable for streaming to primary care using the FCMS protocols.
- This represents 25.74% of A&E attendees that could be streamed to primary care using FCMS emergency protocols as the initial signposting gateway.
- The audit also examined the cost category of the patients that were suitable for streaming to primary care:
 - c.25% were 'high cost attendance'
 - c.25% were 'standard cost attendance'
 - c.50% were 'minor cost attendance'

Disposal routes of patients identified as applicable for primary care - Blackpool A&E audit (2007)



Action 4: Case Study 4

Potential to reduce Ambulatory Care Sensitive Conditions emergency hospital admissions

UK study on the potential to reduce Ambulatory Care Sensitive Conditions emergency hospital admissions (2009)

Source: Kings Fund

Emergency hospital admissions for ambulatory care-sensitive conditions: identifying the potential for reductions. April 2012.

Summary of case study

The total cost of inpatient hospital admissions to the NHS in England in 2009/10 is estimated to be £20.5bn. Of this, c.£12.2bn is emergency admissions.

The commissioning cost of emergency admissions for ambulatory care sensitive conditions is estimated to be c.£1.42bn and account for 16% of all emergency hospital admissions.

The leading causes of emergency admissions for ACSCs include influenza and pneumonia, chronic obstructive pulmonary disease and ear, nose and throat infections.

The study used seven local authority groups to calculate the potential for reducing ACSC emergency hospital admissions by:

1. Improving all hospitals to the level of the best performer; and
2. Improving hospitals by moving from one quintile to the next (e.g. Moving a hospital in the 5th quintile of lowest performers into the average of the 4th quintile).

Outcomes

- Option 1 reduced admissions by 18% resulting in a potential cost reduction of £238m.
- Option 2 reduced admissions by 8% with a potential cost reduction of £96m.
- Improved informational flows to both patients and between primary and secondary would play a key role in achieving these cost reductions.

Action 4: Case Study 5

Deployment of a healthcare-economy-wide portal

North West London Integrated Care Pilot (2011)

Summary of case study

This pilot was set up because local hospital trusts needed to reduce pressure on beds and respond to the funding cap that the tariff system now imposes on emergency admissions, while commissioners wanted to raise quality while cutting costs as part of their response to NHS budget constraints.

The pilot was launched in 2011 to meet the needs of people with diabetes and those aged over 75. It brings together primary care, community services, acute care, social care, and mental health.

The aims are to cut hospital use, including non-elective medical admissions, by 30% over five years and nursing home admissions by a tenth, while reducing the £620m annual cost of services for diabetic and older patients by 24% over five years.

Outcomes

- The savings in non-elective admissions alone—cutting these by 30% equates to roughly one fewer admission per GP per month—are expected to release £10-12m a year for reinvestment.
- Between July 2011 and January 2012 the number of non-elective medical admissions among the 28,000 patients aged 75 and over fell 6.6% compared with the same period in 2010-11. Admissions for such patients at practices in northwest London boroughs not covered by the pilot rose by 6.5%.
- Other benefits include GPs gaining a better understanding of diabetes treatment, increased coordination with social care, and fewer outpatient referrals.

Source: BMJ

Integrated care: a story of hard won success, 31/05/2012.

Action 4: Case Study 6

Trial of an healthcare economy-wide Electronic Care Record

Northern Ireland Electronic Care Record - Proof of Concept Project (2011)

**Source:
Northern Ireland
Electronic Care Record -
Proof of Concept Project
Evaluation Report**

21/02/2011

Summary of case study

Proof of Concept (PoC) trial of an healthcare economy-wide Electronic Care Record (ECR, in the form of a clinical portal) for Health and Social Care Northern Ireland (HSCNI). The key aim of this project was the development of an ECR for Northern Ireland as part of the HSC ICT strategy. In 2009 the ECR Proof of Concept (ECRPoC) Project was initiated to explore potential technical, clinical dataset, access and consent models.

Outcomes

- 74% of the doctors surveyed reported that ECR use helped them to make the right diagnosis, quicker and 84% of doctors agreed ECR use had contributed to a better clinical outcome at least once during the evaluation period.
- The clinical audit of outpatient clinics demonstrated use of the ECR avoided unnecessary review appointments in 6.8% of the patients seen. Putting this into perspective, across all acute Programmes of Care this would equate to more than 100,000 appointments freed up - approaching the total waiting list of 110,220 for first appointments in Northern Ireland, as of June 2010 (NISRA Waiting List Bulletin).
- The clinical audit of use of the ECR in outpatient clinics showed that unnecessary repeat diagnostic imaging was prevented in 3.6% of appointments. This included ultrasound, CT, MRI and ECGs. If this were to be replicated at this same rate across outpatient activity in all acute Programmes of Care, it would represent more than 48,000 unnecessary diagnostic tests prevented, nearly double the 25,000 patients waiting for those 4 categories of diagnostic tests across Northern Ireland as of June 2010 (NISRA Waiting Times Bulletin).
- The outpatient audit also recorded that laboratory tests were avoided in 21.6% of patient appointments. If these results were replicated across all acute Programmes of Care, based on NISRA figures for outpatient activity 2009/2010, this would represent more than 500,000 avoided tests from outpatient departments alone, reducing both unnecessary costs to the HSC and discomfort and inconvenience to patients. It would also reduce delays to treatment decisions whilst awaiting test results.
- 97% of clinicians in the survey stated that by using the ECR they have improved how quickly they can access the information they need. In addition, 85% of clinicians felt that the ECR has reduced the need to order or wait for paper records.

Action 4: Case Study 7

Creation of an integrated health and social care team

Torbay Care Trust integrated Health and Social Care (2011)

Summary of case study

Torbay's integrated health and adult social care services began with the creation of an integrated health and social care team in Brixham in 2004. The team focused on enabling the elderly to remain independent for as long as possible, thereby reducing avoidable hospital admissions.

The team's work led to further discussions to combine the functions of the primary care trust and adult social care services and, as a result, the Torbay Care Trust was established in 2005.

Key aspects of the Care Trust are co-ordinators from both Health and Social Care to put in place appropriate care packages and the sharing of data through the introduction of a single system (for Social Care and Community Health Services).

The Trust also benefitted from its participation in the Kaiser NHS Beacon Sites Programme to learn from the Kaiser Permanente organisation in the US which has integrated health and social care.

Outcomes

- The benefits of integrated working have been suggested through:
 - Reduced bed occupancy (daily average number of occupied beds fell from 750 in 1998/99 to 502 in 2009/10);
 - Reduced emergency bed day usage (emergency bed day use for people aged over 75 fell by 24% between 2003 and 2008 and for those aged over 65 is 1920 per 1000 population compared to an average of 2698 per 1000 in 2009/10); and
 - Delayed transfers of care from hospital have reduced to low levels.

Source: Kings Fund

Integrating health and social care in
Torbay, March 2011

Appendix B

References

B

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Action 1 – implementation of an ePrescribing service	1.2	Compass study, 2008 – also quoted in the Guardian Thursday 3 April 2008
Action 1 – implementation of an ePrescribing service	1.3	Hakkarainen KM, Hedna K, Petzold M, Hägg S (2012) Percentage of Patients with Preventable Adverse Drug Reactions and Preventability of Adverse Drug Reactions – A Meta-Analysis
Action 1 – implementation of an ePrescribing service	1.4	JAC Medicines Management Case Study
Action 1 – implementation of an ePrescribing service	1.5	Effect of Computerized Physician Order Entry and a Team Intervention on Prevention of Serious Medication Errors, Journal of American Medical Association
Action 1 – implementation of an ePrescribing service	1.6	Planned implementations of ePrescribing systems in NHS hospitals in England: a questionnaire study, The Royal Society of Medicine
Action 1 – implementation of an ePrescribing service	1.7	Audit Commission ‘Spoonful of Sugar’ Medicines in NHS hospitals
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Action 1 – implementation of an ePrescribing service	1.9	Electronic Prescribing: Briefing for senior executives, Connecting for Health, http://www.connectingforhealth.nhs.uk/systemsandservices/eprescribing/challenges/Senior_execs_brief.pdf
Action 1 – implementation of an ePrescribing service	1.10	Interim Report on the Findings from the Evaluation in Early Implementer Sites 9th. July, 2012 http://www.ucl.ac.uk/pharmacy/documents/staff_docs/EPS
Action 2 - Better use of information to aid post-operative care of patients	2.1	NHS Emergency Readmission Statistics
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Action 4 - Provision of complete and accurate clinical and attendance information, via deployment of healthcare economy-wide portals, to clinicians and carers at point of care.	4.1	Northern Ireland Electronic Care Record - Proof of Concept Project Evaluation Report, 21/02/2011
Action 4 - Provision of complete and accurate clinical and attendance information, via deployment of healthcare economy-wide portals, to clinicians and carers at point of care.	4.2	Integrated care: a story of hard won success, BMJ, 31/05/2012
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Action 5 - Use of information to drive reduction on clinical negligence claims	5.1	NHSLA Factsheet 2 2011/12
Action 5 - Use of information to drive reduction on clinical negligence claims	5.2	PwC Calculation, NHS, NHSLA
Action 5 - Use of information to drive reduction on clinical negligence claims	5.3	Audit Commission 'Spoonful of Sugar' Medicines in NHS hospitals
Action 5 - Use of information to drive reduction on clinical negligence claims	5.4	New Zealand ACC, New Zealand Treasury Canada Canadian Medical Protective Association The Canadian Institute for Health Information
Other actions	6.1	Digital First - The Delivery of choice for England's population (digital.innovation.nhs.uk/dl/cv_content/32200)
Other actions	6.2	Report of a rapid review on Digital First, Institute of Digital Healthcare, 12 th December 2012

Appendix C Terminology

C

Terminology used in the Strategy, the IA and this report

Use of terminology

Certain key terms are used throughout this report:

- *Theme*: the three main categories in which suggested actions were grouped by the DH in the Strategy
 - *Theme 1*: “[actions to drive] access to information to help service users to participate in ‘no decision about me without me’”
 - *Theme 2*: “[actions to drive the] linking and sharing of person based electronic records”
 - *Theme 3*: “[actions to drive the] capturing of person based information at the point of care to enable effective and appropriate sharing of clinical and management information, leading to real or virtual connectivity across different settings”
- *Action*: a specific intervention that can be taken to transform information for health and care (e.g. the adoption of a new information standard, or the deployment of a new piece of technology)
- *Benefit*: a positive outcome that can be derived from the adoption of an action
- *Cost*: an investment or ongoing funding commitment required to deliver an action

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