Costing transformation programme

Patient-level costing: case for change

April 2016
About NHS Improvement

NHS Improvement is responsible for overseeing foundation trusts, NHS trusts and independent providers. We offer the support these providers need to give patients consistently safe, high quality, compassionate care within local health systems that are financially sustainable. By holding providers to account and, where necessary, intervening, we help the NHS to meet its short-term challenges and secure its future.

NHS Improvement is the operational name for the organisation that brings together Monitor, NHS Trust Development Authority, Patient Safety, the National Reporting and Learning System, the Advancing Change team and the Intensive Support Teams.
Foreword

I am pleased to introduce *Patient-level costing: Case for change*. It is one of a suite of documents we have written to develop the use of patient-level costing in the Service.

This document gives the strategic reasons behind our push for better health costing in the NHS in England, as well as highlighting the real value providers derive from patient-level costing.

More accurate costing shows us where and how resources are spent. We are confident that providers that implement patient-level costing produce high quality information that can be used locally to identify how patient outcomes can be improved and where efficiencies can be made.

However, we appreciate that procuring, installing and running these systems comes at a cost. For providers that have already implemented patient-level costing (70%), this will be at a marginal or reduced cost. For those that have yet to implement patient-level costing (30%), implementation will require new investment. It is our job to demonstrate that, while there would be obvious Service-wide benefits, each individual provider would benefit from procuring a comprehensive patient-level costing system.

We are working closely with our external partners to support transformation of the costing of NHS-funded services, as well as with the Department of Health and NHS England to help providers build their business cases for change. When faced with competing calls on limited funds, provider boards must have confidence in committing resources to this endeavour.

We very much welcome your involvement in developing quality costing processes, and your feedback on how we can support you throughout this transition.

Richard Ford
Costing Director, NHS Improvement
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1. Introduction

In response to the Five Year Forward View (5YFV), NHS England, NHS Improvement and our national partners are agreed that growing demand for health services and flat real-term funding "would produce a mismatch between resources and patient needs of nearly £30 billion a year by 2020/21". Even after the increases to the NHS budget in the Spending Review, providers have been challenged to improve efficiency by 2% a year for five years, to close the gap.

Improving costing systems is one element of the wider system improvements expected from the NHS. Providers that have yet to implement patient-level costing face three challenging questions:

1. How do you deliver cost efficiencies when you don’t know what you are spending money on?
2. How do you know if a new model of care is better than an old one when you don’t know what either costs?
3. How do you manage clinical variation when you don’t know what the patient-level cost variation is?

About 70% of the Service has already implemented patient level information and costing systems (PLICS) in one form or another, or is in the process of doing so. Our aim is to ensure these systems are used in the right way and according to the same set of standards.

This document illustrates the national need for change, and highlights the elements that are required to unlock value for money from costing data. The case studies in Appendix 1, from providers already using patient-level costing data, show that clinician engagement is as important as the actual implementation of PLICS to realise value for money from costing data.

Good use of patient-level costing data can unlock efficient care delivery from our system to achieve the efficiency targets required.

2. The story so far

In December 2014, we consulted the Service on the collection and the costing approach in the proposed new healthcare costing standards for England. The response to that consultation supports the move to patient-level costing.

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1 [www.england.nhs.uk/2014/08/15/5yfv/](http://www.england.nhs.uk/2014/08/15/5yfv/)
2 In this document, NHS Improvement refers to Monitor exercising functions under Chapter 4 of Part 3 of the Health and Social Care Act (Pricing) 2012, unless otherwise stated.
3 From response to 2014/15 reference cost collection questionnaire.
Our proposed route to a mandatory patient-level cost collection would take four years for each sector of the Service. We have made it clear that high quality and effective cost management at the patient level is required and that it should be an enforcement issue for organisations not providing costing data to set standards.

In August 2015, we asked providers that are already using patient-level costing systems for examples of where their investment in those systems has generated real savings and value for money. As we expected, the case studies (see Appendix 1) demonstrated that the benefits from patient-level costing far outweighed the implementation and operating costs of the systems. The case studies are important as we intend to require the use of the new healthcare costing standards for England and a national cost collection of data produced using those standards, and they also demonstrate that the burden on individual providers does not increase.

Our regulatory framework supports our approach to patient-level costing implementation. The provider licence includes conditions relating to the recording and reporting of information on the costs of providing NHS services in England – in particular, enabling us to specify mandatory methodologies for cost collection and to require providers to report costs in a particular format. By extension, providers would need to procure and implement local PLICS software systems to meet the standards specified by us.

While we have spelt out the national impetus for Service-wide use of these systems, before they could become mandatory we are required by statute to undertake an impact assessment and consultation to consider the likely impacts and obtain the views of those affected by the proposals (see Impact assessment below). This document is a prelude to an impact assessment or early formal consultation. The response from the Service will inform further impact assessments by us.

Subject to a statutory impact assessment, we expect that every acute provider will be required to comply with the healthcare costing standards for England, to be formally published in January 2018, and with annual cost collections from July 2019. The installation of a PLICS system would be essential to support the new approach to costing.

3. Patient-level information and costing systems

Clinical costing systems are often called patient-level information and costing systems or ‘PLICS’. Clinical costing is derived from tracing resources used by an individual patient in diagnosis and treatment, and calculating the expenditure on those resources using the actual costs incurred by the provider.
The PLICS systems\(^5\) that we propose providers implement require providers to capture better and more accurate cost information at each stage of a patient’s journey. The data should accurately reflect the ‘causality of costs’ in the system; tracing why costs are being incurred, who is incurring them, by doing what type of activity and for which patient.

To note, the acronym PLICS has been used interchangeably in the past as a system, a group or a process. For clarity and the purposes of this document:

- **PLICS** (patient-level information costing system) is a system to derive costs at the patient level. It is IT software (and sometimes infrastructure) locally installed and supported by the provider or the provider’s preferred supplier.
- **Patient-level costs** (PLC) are an output of the PLICS system.
- **Patient-level cost recording** is the act of providers inputting data into the PLICS system.
- **Patient-level cost collection** is the process of providers submitting data to NHS Improvement on a national basis (taking over from the Department of Health (DH) in 2019).

Although PLICS refers specifically to patient-level costs, the methodology can also be used for other objects that aggregate costs, eg medical students (education and training) or research.

### 4. The case for patient-level costing

The current principal source of data used in the Service is reference costs. These support the development of currencies, setting prices for NHS services in England, and the development of productivity and/or efficiency measures. As reference costs are commonly used and understood, they are frequently cited as the basis of analysis. There are however serious issues with reference costs:

- the guidance informing cost collection can be variably interpreted, complicating meaningful comparison across providers
- a significant amount of costs are excluded from the cost assigned to patient care, meaning data are incomplete
- costs are collated based on healthcare resource group (HRG) averages; information relating to the underlying diagnoses or operative procedures is not included.

These weaknesses of reference cost data make it difficult to determine the true cost of the provision of care and to develop Service-wide improvement plans.

\(^5\) We have adopted the common vernacular ‘PLICS system’, which is similar to using the phrase ‘ATM machine’.
The case for patient-level costing is made by the significant Service-wide pressure for better information to drive improved decision-making.

4.1. Five Year Forward View

The 5YFV\(^1\) sets out the need for better measurement of costs and the relationship with clinical outcomes by “measuring what matters, requiring comprehensive transparency of performance data and ensuring this data increasingly informs payment mechanisms and commissioning decisions.”

4.2. The Carter report into operational productivity and performance

Operational productivity and performance in English NHS acute hospitals: unwarranted variations\(^6\) (the Carter report) states clearly the need for more accurate data: “We cannot stress strongly enough how important it is for trusts to report data accurately, particularly as this data will be used for a more open and integrated approach to performance management across the NHS...there is huge inconsistency in costing and budgeting approaches across the NHS, which is impairing our ability to compare data across the service. We understand [NHS Improvement’s] costing transformation programme will address these issues and we recommend every effort is made to deliver the programme by the 2020 deadline.”

The goals of the costing transformation programme and the Carter team are shared; good quality data support robust information which in turn supports better decision-making.

4.3. Care Quality Commission (CQC)

CQC promoted the importance of high quality data and the need for transparency in its report The state of health care and adult social care in England 2014/15\(^7\): “Every provider should have good, benchmarked data for all the services it provides, to assure itself that it is providing safe and effective care and to know where improvements are needed. This is particularly important when looking to share learning effectively at a local and national level. The drive to integrate health and adult social care also cannot succeed without an improved knowledge of information across traditional organisational boundaries...Without this it is difficult to systematically understand the current quality of care beyond our inspections, or assess the impact that changes are having on quality of care.”

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4.4. National Audit Office (NAO)

The NAO scrutinises public spending for Parliament and is independent of the government. NAO has statutory authority to examine and report to Parliament on whether departments and the bodies it funds have used their resources efficiently, with its studies evaluating the value for money of public spending, nationally and locally. Its report *Managing the supply of NHS clinical staff in England*, published in February 2016, leads with the simple statement: “There are significant gaps in the data that are needed to make well informed decisions.”

NAO recommends that arm’s length bodies ensure that there are comprehensive data to monitor the capacity, in this case, of the workforce. The new standards combined with an integrated collection, tracking against a prescribed list of resources and activities, while not a leading indicator, would be a repository of the information required to collate exactly the type of data referred to in the NAO report to fill the identified gaps.

4.5. National Institute for Health and Care Excellence (NICE)

In its guidance on safe staffing levels in acute hospitals, NICE referred explicitly to the lack of patient-level costs: “Patient-level costing data were also limited, which hampered a clearer understanding of the cost implications of nursing staff changes and skill mix.”

4.6 Summary

The national case for change is well understood and it is commonly accepted that we need a better system. If NHS England, DH, arm’s length bodies (like NHS Improvement) and other relevant stakeholders had access to accurate, timely and comprehensive data that were consistent across all providers, more could be achieved from the system for both patient care and significant cost reductions.

5. Developing the local case for change and business case

5.1. Local case for change

The development of any case for change starts with an assessment of value for money; that is, whether or not what has been achieved was worth the investment made. In this case, is a provider’s investment in procuring, implementing and

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9 A leading indicator is a measurable factor that changes before a trend or pattern starts to occur. Patient-level costs occur after the fact.

managing a PLICS system worth it? There needs to be a causal link between the installed PLICS system and the cost reductions generated by the information returned from the system. For ease, we will adopt the concept of value for money as defined by NAO: “optimal use of resources to achieve the intended outcomes”. The outcomes in this case are management information that can drive efficiencies and cost reductions within a provider.

NAO uses three criteria to assess value for money:

1. economy: minimizing the cost of resources used or required (inputs) or ‘spending less’
2. efficiency: the relationship between the output from goods or services and the resources to produce them or ‘spending well’
3. effectiveness: the relationship between the intended and actual results of public spending (outcomes) or ‘spending wisely’.

The Carter report states that by following its 15 recommendations, endorsed by the Secretary of State, we could save the Service £5 billion a year by 2020/21. We posit that we can only act on these recommendations by having a detailed understanding of costs at the provider level. This requires investment. PLICS is the process to unearth the data to identify where practices can be improved.

5.2. Business case support collateral

As well as asking NHS providers already using PLICS systems to send us their case studies (see Appendix 1), we also requested copies of successful business case collateral from their PLICS implementations. We have collated the strong messages that won their cases. Appendix 2 lists this support collateral for you to use in your provider business case for further investment (or new investment) in patient-level costing systems.

6. Financial investment

Providers will need to invest in appropriate systems to support the production of more comprehensive and high quality patient-level cost information. As a guide to planning this investment, we have sought to determine the implementation costs among acute providers already using fully integrated patient-level costing systems. Factors influencing the costs and resources needed include:

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11 www.nao.org.uk/successful-commissioning/general-principles/value-for-money/assessing-value-for-money/#
• size of provider – larger providers tend to undertake more patient interventions and as such their data requirements and analytical resource requirement will be bigger

• complexity of care – the more specialist or complex the casemix, the more expertise is required to ensure the costing model accurately reflects patient care

• range of services – a wider variety of services usually means more data input feeds

• quality of data ‘feeder’ systems – high quality data feeds, available in a quality-controlled environment, will require less work to integrate compared to data delivered as ‘raw’ files

• costing expertise – a period of education and training must follow any new system implementation. Significant knowledge and understanding of costing through a dedicated costing team, the wider informatics and finance teams or in clinical departments contribute to a more straightforward implementation.

6.1. Local investment

We estimate from gathered data that implementation and operational costs range from £138k to £288k per year, depending on the size of the provider. The costs in Table 1 are indicative and could be offset by existing reference and service-line reporting costs.

Table 1: Implementation and operational costs of patient-level costing, by size of provider

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>Small provider</th>
<th>Medium provider</th>
<th>Large provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costing team (between two and six WTE)</td>
<td>£90,000</td>
<td>£135,000</td>
<td>£158,000</td>
</tr>
<tr>
<td>Software (PLICS: average over five years)</td>
<td>£18,000</td>
<td>£30,000</td>
<td>£60,000</td>
</tr>
<tr>
<td>Indirect WTE (use of data across organisation)</td>
<td>£30,000</td>
<td>£50,000</td>
<td>£70,000</td>
</tr>
<tr>
<td>Total (per year)</td>
<td>£138,000</td>
<td>£215,000</td>
<td>£288,000</td>
</tr>
</tbody>
</table>

It is important that appropriate investment is made in both the initial implementation and the maintenance of systems to ensure that they accurately reflect the services being delivered. Experience indicates that inattention to these issues generally leads to more expensive and slower implementations, and fewer benefits, as costing staff
become more involved in the production of cost information at the expense of engagement and use of the information.

We recognise that this level of investment may be challenging for providers. Boards need to scrutinise all spend to ensure that it is in the best interests of patients. Appendix 2 provides an outline business case for providers looking to secure investment in patient-level costing, whether in the systems or required expertise. This highlights some factors which providers may wish to consider when designing their approach. Each provider needs to consider these alongside their own circumstances, expertise level and organisational goals.

To monitor the levels of patient-level costing usage, we have modified the questionnaire we send as part of the reference cost collection guidance in January (Table 2). Your more detailed responses will allow us to better categorise providers and their maturity of PLICS implementation.

**Table 2: Reference cost collection questionnaire excerpt**

<table>
<thead>
<tr>
<th>Q3</th>
<th>The Service is moving towards a deeper understanding of patient-level costs. What is the status of patient-level information and costing systems (PLICS) in your organisation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4</td>
<td>If implemented, when was it implemented and who is your supplier?</td>
</tr>
<tr>
<td>Q5</td>
<td>If in implementation phase, when is it planned to be fully implemented?</td>
</tr>
<tr>
<td>Q6</td>
<td>If you are not planning to implement PLICS, what are the main reasons why?</td>
</tr>
<tr>
<td>Q7</td>
<td>How many dedicated cost practitioners do you have working within your organisation? (ie these individuals only do cost-related activities)?</td>
</tr>
<tr>
<td>Q8</td>
<td>How many whole-time equivalent (WTE) staff are engaged in running your costing system and producing cost information for this year? For example, a provider may have a dedicated resource for reference cost collection (100%) and a proportion of a finance manager’s time (20%). This would be represented as 1.2 WTE.</td>
</tr>
</tbody>
</table>

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12 IT system purchased, installed and being used to cost at least some services. Where the trust has a PLICS system, but is in the process of updating or replacing it, it should still consider itself as having implemented PLICS.

13 IT system is in the process of being purchased and installed.

14 Funding or resources have been allocated or provided to implement a PLICS system; it has not yet been implemented but there is an agreed ‘implement by’ date.
The cost of procuring and implementing systems that support patient-level costing may be cited as a reason for many boards’ lack of investment in this area of development. So while there is regulatory and external pressure to implement costing at the patient-level and the Service-wide implementation value is clear, the value for money and speed of payback of the investment at the provider-level needs to be established. Provider boards must be comfortable with committing resources in this area when faced with competing calls on limited funds.

6.2. NHS Improvement investment

We intend to invest resources to realise patient-level costing across the Service. In particular, there is a need to invest in infrastructure and capability to process the large-scale data that would be received from the Service.

The existing data collection systems cannot support the functionality or data volumes necessary to deliver the expected benefits. Existing systems are designed to collect aggregated information based on Excel templates, which are not scalable. The collection of patient-level cost information requires the submission of data at a level of detail that exceeds the capability of Excel.

We are investing in a system to process the patient-level cost data that would be submitted annually by providers. The required system comprises three elements:

- cost collection service: a mechanism to transfer information from providers securely in accordance with information governance processes and best practice
- analysis service: a scalable data repository and analysis platform to store and analyse the information collected, based on our existing infrastructure
- sector publication service: an online analytical reporting tool for stakeholders to use to identify and understand performance variation and enable Service-wide benchmarking.

7. Non-financial investment

Investment by providers is fundamental to establishing financial efficiencies and clinical best practice. The investment is as much in support and engagement in the approach to costing, as it is in the initial financial investment to procure a patient-level costing system. Buy-in at all levels is essential if the benefits of improved cost management are to be delivered in a sustained way across the NHS. For providers to realise the benefits of patient-level costing, the following investment is required.

7.1. Board leadership and responsibility

The case studies in Appendix 1 show variation across the NHS in the extent to which boards oversee and take responsibility for the development and use of effective
costing. Effective board engagement with costing is a prerequisite to delivering improvements and better use of patient-level cost information. Boards also have an important role in securing greater engagement between clinical and financial staff. Without board support and appropriate governance, a patient-level costing system may be implemented, but the management information produced and insights within will not be effectively used.

7.2. Clinical and operational engagement

*Effective clinical and financial engagement: a best practice guide for the NHS*\(^{15}\) provides a best practice template for executing improvements. This shows that close clinical involvement in the production of cost information leads to more successful cost improvement. Clinicians and operational managers are responsible for the delivery of care and only they can make the changes and improvements suggested by analysis of cost information. Greater involvement of these staff groups in the production and use of costing information will therefore build its credibility and quality.

7.3. People and skills

There is a real need to ensure that costing staff, as well as staff directly supporting the costing process (such as in IT and informatics), are in place in sufficient numbers and with the right skill set. Meeting this need drives both high standards in costing processes and the ability to disseminate the outputs. Costing staff with the appropriate seniority and training should be the primary point of engagement with non-financial staff, who in turn should be trained to understand cost information and how to use it to improve the delivery of patient care.

8. Types of benefits

This document directly addresses one element of the total benefits case (set out in Table 3) – provider-level cost management financial savings (CM1). We will contribute to all aspects of the total benefits case as use of patient-level costing matures.

We have identified three stages of benefit that can be derived from the systems:

1. Early benefits from activity and volume data – this stage involves costing data at their most basic, checked with costing teams and specific clinicians, emphasising data integrity issues and quick wins from discovery of previously unknown costs.

2. Mid-term benefits from financial data – this stage involves the matching of cost and activity data in a uniform way to national standards, and producing business intelligence for use by clinicians to understand their costs.

3. Long-term benefits from cost of care data – once activity and volume data are checked, the costs of care are correctly aligned to this activity, and then the full cost of care can be internally benchmarked and then later benchmarked locally, nationally and internationally.

Table 3: Total benefits case

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Benefit</th>
<th>Cost management</th>
<th>Cost benchmarking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providers</td>
<td>CM1 cost improvement plan (CIP) delivery, new efficiency opportunities, informing strategic decision-making and production of business cases</td>
<td>PLC used to assist the management of an organisation’s cost base through:</td>
<td>PLC used to assist the comparison of costs within organisations and between organisations by:</td>
</tr>
<tr>
<td></td>
<td>CM2 including informing local/national price modification, Quality, Innovation, Productivity and Prevention (QIPP) initiatives and tendering of services</td>
<td>CB1 identifying best practice across parts of the Service, identifying efficiency opportunities via comparisons and informing strategic development/investment or divestment decisions</td>
<td></td>
</tr>
<tr>
<td>Commissioners</td>
<td>CB2 support care pathway redesign, informing procurement decisions and assessing the impacts of modifications/variations to tariff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National bodies</td>
<td>CM3 including informing national investment activities, foundation trust authorisation and compliance regimes, and identifying possible financial failure</td>
<td>CB3 supporting the development of specialist services to determine opportunities for economies of scale around service provision, and to assess/approve merger and acquisition transactions</td>
<td></td>
</tr>
</tbody>
</table>

8.1. Activity and volume data

These data give information on patient activity (activity) and the number (volume) of services that have been provided. Costing systems can hold 10 to 60 data feeds that include, for example, coded patient data, acute admission numbers, theatre minutes and clinical support services used (imaging, pathology services and pharmacy).
Case studies 1 and 2 in Appendix 1 demonstrate the use or correction of volume/activity data to improve service delivery. While this may appear a simplistic use of data, once organisations correct any issues found, they can undertake more detailed work using PLICS. This practice increases clinicians’ confidence in the activity/volume data, a level of information they recognise is built from their clinical practice.

8.2. Finance data

The second level of costing data adds finance information to the activity/volume data. For example, theatre volume data tell you the number of prostheses used and the financial information tells you how much these prostheses cost. Clinicians’ choice of prostheses will be influenced by patient outcomes but also personal preference. However, if they are fully informed of the cost implications of their choice and aware that a different choice will reduce costs without compromising quality, they may be more likely to make a different decision.

As another example, finance information allows you to explore nursing bands and costs. A quality costing system can use human resource system data (eg payroll or staff scheduling) to investigate if the skill mix of nurses on each shift is the right one to deliver quality patient outcomes. While systems are available that combine volume and cost data (eg purchasing systems), these do not report fully ‘absorbed’ costs (ie those including overheads), and instead just give a simple purchase price. PLICS systems calculate the fully absorbed cost, including direct, indirect and overhead charges against items purchased and used.

Case studies 3 to 5 in Appendix 1 demonstrate the use of finance data from costing systems to improve service delivery.

8.3. Cost of production data

This third level of costing data can only be derived from full implementation of a patient-level costing system as it combines volume and cost data, and links this combination to patient outcomes. Patient outcomes can then be linked to a product of care classification (usually an HRG) that places the care provided into clinically meaningful groups with similar resource consumption.

These healthcare products can be easily benchmarked; doctors, nurses and health managers can compare like-for-like healthcare. This avoids the situation where a doctor claims that their patients are more acute and so need to stay in hospital longer, justifying higher patient costs, as the classification system already takes account of patient acuity. By comparing costs at the patient level, managers can question why a patient, or group of patients, costs more to treat, and check if comparable hospitals are achieving a similar quality of outcome for a lower cost.
Case studies 6 to 8 in Appendix 1 demonstrate the use of cost of production data to improve service delivery.

9. Impact assessment

We are committed to assessing the impact that the implementation of the healthcare costing standards (and the need for a PLICS system) would have on providers of NHS services.

We will start this work later in 2016/17 to meet the timetable given in this document (see PLICS implementation timetable below). The reduced costing burden in moving from three collections to one collection will be considered in this assessment. Where a provider needs to implement a new system and fund this, we will weigh the downstream benefits of such an implementation (and reduced WTE required to undertake the collection process) against any upfront cost.

9.1. Statutory impact assessment

We are required by law to undertake impact assessments before implementing any proposals likely to have significant impacts on providers of NHS services in England or the general public (Table 4). We will carry out an impact assessment (or assessments where required) of the likely impacts of any decision to require providers to follow the healthcare costing standards for England in 2018/19 and provide information collected using those standards to a central national collection in July 2019. This will include looking at the case for change, such as individual provider value for money considerations. Impact assessments must be published and followed by a consultation on the proposals before they can be implemented. The impact assessment(s) of the costing proposals will therefore be available to inform the Service’s consultation responses.

A good impact assessment will enhance the evidence base provided in the case studies in Appendix 1 and help to evaluate the impact of changes. It will help us identify the risks and potential unintended consequences of policies before they are implemented, and to take pre-emptive action to mitigate any issues. In developing our assessments, we will draw on relevant international experience and the case studies in Appendix 1.

Table 4: Impact assessments (IAs)

<table>
<thead>
<tr>
<th>Potential significant impact on:</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providers of NHS services</td>
<td>IAs need to consider potential impacts of proposed changes on providers of NHS services, which includes trusts, foundation trusts, private and third-party providers of NHS services</td>
</tr>
<tr>
<td>Patients using services</td>
<td>IAs need to consider potential impacts of proposed policies on</td>
</tr>
</tbody>
</table>

|
### Potential significant impact on:

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>patients or users of NHS services</td>
</tr>
<tr>
<td>General public</td>
</tr>
<tr>
<td>IAs may consider other wider groups of stakeholders</td>
</tr>
<tr>
<td>NHS Improvement's activities</td>
</tr>
<tr>
<td>Where policies could change NHS Improvement’s activities, an IA should be conducted</td>
</tr>
<tr>
<td>General licence conditions</td>
</tr>
<tr>
<td>Providers of NHS services are licensed by NHS Improvement. The IA needs to consider if these conditions are impacted through changes in cost collections and adherence to standards</td>
</tr>
</tbody>
</table>

### 9.2. Understanding the benefits

Most NHS-funded healthcare services are free at the point of delivery. Cost reductions do not manifest themselves directly through financial impact on patients or income, education or training. Instead, the implementation of patient-level costing affects patients through the incentives they create for providers and commissioners.

Obtaining better costing data supports Service-wide benchmarking and detailed analysis of variability in costs for the same patient pathway. Understanding the optimum cost or most efficient cost enables NHS England and NHS Improvement to change prices and create tariffs that may encourage providers to adopt new models of care or commissioners to commission services differently. These changes could then affect the care patients receive and the choices available to them.

Costing systems have been used in the NHS for a number of years. In the accountancy profession the identification and analysis of costs has long been integral to business decision-making. The current problem in the NHS is that patient-level costing is not used consistently. The inconsistency in the application of costs does not allow their real benefits to be realised: to establish comparable costs between peer providers and to enable clinical engagement in analysing genuine variances, thereby developing best practice in patient care as well as delivering financial savings.

We will assess benefits by seeking to understand how data are currently used to drive clinical improvement, and comparing the level of maturity against peers to check the benefits are comparable. We will work with providers to review cost improvement commitments and identify where savings could be greater through better understanding of costs, and compare these against other external reports (eg the Carter report) to ensure there is no double counting of cost reduction targets.
10. Timetable

10.1. Standards implementation

We are publishing the draft *Healthcare costing standards for England: Acute focus*[^16] for use by our acute sector roadmap partners and also to signal the direction for the rest of the Service. Roll-out across all providers would be based on the following timetable.

**Acute sector:** In January 2018, we would publish the costing standards we intend to be mandatory for the acute sector. These standards would be forward guidance, applying to the 2018/19 financial year. In July 2019, there would be a mandatory collection against the new costing standards for the acute sector.

**Mental health and ambulance sectors:** In January 2019, we would update the costing standards, and the mental health and ambulance sectors would join the acute sector in the mandatory use of the standards. These standards would be applied from the 2019/20 financial year.

**Community sector:** In January 2020, we would update the standards and publish Service-wide costing standards that would be mandatory for the whole Service. They would apply to the financial year 2020/21, with the integrated collection occurring in July 2021.

10.2. PLICS implementation timetable

The implementation timetable for the installation, test and run for PLICS systems (Table 5) is dependent on the above timetable for standards implementation. The key dates that providers that have not yet implemented PLICS should be aware of are based on the collection timetable.

1. Acute: PLICS to be installed from April 2018 for a July 2019 collection.
2. Mental health and ambulance: PLICS to be installed from April 2019 for a July 2020 collection.
3. Community: PLICS to be installed from April 2020 for a July 2021 collection.

Acute or, where it is deemed beneficial by the provider, integrated providers supplying services across the sector have between now and January 2017 to begin work on the design for implementation of a PLICS system. We estimate it takes 15 months to implement a PLICS system from scratch, including business case development. This added to 12 months of use and three months to collect data equates to a 2.5-year time horizon from business case to a national collection (Figure 1).

[^16]: https://improvement.nhs.uk/resource/costing-standards
Table 5: Overview of PLICS implementation in an acute provider

<table>
<thead>
<tr>
<th>Month</th>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2017</td>
<td>Commence business case drafting and submit to provider board</td>
<td>3 months</td>
</tr>
<tr>
<td>April 2017</td>
<td>Sign off business case and commence procurement process</td>
<td>5 months</td>
</tr>
<tr>
<td>October 2017</td>
<td>Select supplier and begin implementation of PLICS system</td>
<td>1 month</td>
</tr>
<tr>
<td>March 2018</td>
<td>PLICS system fully implemented</td>
<td>6 months</td>
</tr>
<tr>
<td>April 2018</td>
<td>PLICS system tested in live environment and rolled out</td>
<td>12 months</td>
</tr>
<tr>
<td>April 2019</td>
<td>End of financial year – collate relevant data for collection in July</td>
<td>3 months</td>
</tr>
<tr>
<td>July 2019</td>
<td>Submit data</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Figure 1: Timeline for PLICS implementation in an acute provider

Having the right IT system and operating model to support the costing standards and the collection of data is crucial to the efficient and effective operation of the NHS. Selecting the right software system, building the team to support the implementation and management of costing information, and the reporting of the resultant data is not an exact science. The required use of the healthcare costing standards for England would mean that for the first time there would be a national standardised framework for how costs should be tracked, managed and reported.

In Appendix 3 we have included a detailed PLICS implementation timetable and summary to support providers in their planning.

11. Conclusion

When applied effectively with board commitment, patient-level costing can improve care delivery, have a cost benefit and provide a compelling case for change. It takes time for the use of a new costing system to mature and for returns to be maximised. The case studies in Appendix 1 demonstrate that you can get early results from cost-per-product studies and the start of clinical involvement in some of these cost
decisions. This normally leads to better alignment between costs and output, and tests the quality of data systems capturing this cost information.

The last step in full implementation, the true cost of care considerations, is shown by the case studies to create a new way for clinicians to get involved in the cost of delivering care. The case studies show that, given the right information, clinical staff can make smart decisions about how to deliver care in the most efficient fashion, and true ‘cost transformation’ decisions are made.

This last step is not easy; all levels of management, both clinical and general, need to see value in producing and using patient-level costing data. As shown in the case studies, the more involved managers are in creating and using patient-level costing data, the more useful these are and the more impact they have.

Please let us know of your experience of using patient-level costing systems and data to change how you deliver care. We would like to compile and publish as many case studies as possible.

We are also keen to hear about your experiences of patient-level costing – whether you have found it useful or whether you are facing any barriers in implementing or using patient-level data. We also welcome any feedback on this document.

Please contact us with your case studies or your views at NHSI.costing@NHS.net
Acknowledgements

We are particularly grateful to the following providers for their information and examples of value derived from PLICS:

- Alder Hey Children’s NHS Foundation Trust
- East Sussex Healthcare NHS Trust
- Leeds Teaching Hospitals NHS Trust
- Lincolnshire Community Health Services NHS Trust
- Liverpool Heart and Chest Hospital NHS Foundation Trust
- Maidstone and Tunbridge Wells NHS Trust
- North East Ambulance Service NHS Foundation Trust
- Nottingham University Hospitals NHS Trust
- Plymouth Hospitals NHS Trust
- Plymouth Community Healthcare
- Stockport NHS Foundation Trust
- The Christie NHS Foundation Trust
- Warrington and Halton Hospitals NHS Foundation Trust
- Wrightington, Wigan and Leigh NHS Foundation Trust
- York Teaching Hospital NHS Foundation Trust

We are grateful to senior post holders at the following organisations for giving interviews:

- Bristol University
- Canadian Institute for Health Information
- Care Quality Commission
- Cambridge and Peterborough CCG
- Department of Health
- Health and Social Care Information Centre
- Health Education England
- Healthcare Financial Management Association
- Statens Serum Institute
- Imperial College
- NHS England
Appendix 1: Case studies of local benefits from using patient-level costing

Case study 1: York Teaching Hospital NHS Foundation Trust identified £160,000 additional income as part of its breast surgery review

The trust set up a ‘deep dive’ process to agree the income and expenditure treatment methods in the patient-level costing system, to identify areas of improvement and to check that the data were as expected. This was a rolling process which, over time, included all specialties across the trust.

Team working

The breast surgery review, led by the costing team, required input from one of the breast surgeons, the directorate management team and the finance manager for the service, with additional support from clinical coding when required. During the review, the breast surgeon identified that activity relating to one procedure, mastectomy with breast reconstruction, looked particularly low.

Recording review

All patients’ notes were fully reviewed, focusing on which procedure and diagnosis codes had been recorded. The clinical coding of these patients resulted in the activity being attributed to one of four HRGs relating to breast procedures:

- JA07A: Major Breast Procedures category 2 with Major CC
- JA07B: Major Breast Procedures category 2 with Intermediate CC
- JA07C: Major Breast Procedures category 2 without CC
- JA09D: Intermediate Breast Procedures with Intermediate CC.

However, the surgeon expected that patients would be grouped to:

- JA16Z: Mastectomy with Breast Reconstruction.

Recording review

Analysis showed that the reconstruction element of the procedure had not been included in the patient coding. As a result, the procedure was classed as a major or intermediate breast procedure, instead of one with reconstruction, and the wrong HRG was generated. The team sought advice from the National Casemix Office to confirm the coding of these procedures should be corrected to JA16Z. Once this confirmation was received, the trust gave notice of the coding correction to commissioners and implemented the change.
Patient and financial benefit

The team calculated that this coding correction would increase income by £160,000 per year due to the higher tariff for the HRG JA16Z. This correction would also feed into more accurate patient-level costing data for the trust.

The correct payment for this activity contributed to a sustainable breast surgery service accessible to local patients. Introducing regular coding reviews embedded this type of analysis in the service and should help ensure other services are sustainable.

Acknowledgements: Our thanks to Victoria Pryszczyk (Head of Service Line Reporting and Costing), Liz Hill (Directorate Manager for General Surgery and Urology), Boo Tse (Finance Manager – SLR and Costing), Sanya Basich (Finance and Performance Manager for General Surgery and Urology) and Ben Mancey-Jones (Breast Surgeon).

Case study 2: Lincolnshire Community Health Services NHS Trust: using PLICS to engage clinicians, share best practice and support decision-making

Lincolnshire’s community trust implemented a patient-level costing system in 2011/12 and has been developing its systems and approach for several years. Around 90% of the trust’s activity data are now collected and costed at the patient level. The trust has used these data to develop a range of activity and cost measures, including those in Table A1.1.

Table A1.1: Activity and finance metrics

<table>
<thead>
<tr>
<th>Activity metrics</th>
<th>Finance metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team structure and skill mix</td>
<td>Cost per contact</td>
</tr>
<tr>
<td>Number of contacts per day, duration of contacts and patient-facing time</td>
<td>Cost per patient</td>
</tr>
<tr>
<td>Patient-facing hourly profile of working day by individual and team</td>
<td>Cost per capita</td>
</tr>
<tr>
<td>Location of activity, ratio of clinic to home visits</td>
<td>Cost per type of intervention</td>
</tr>
<tr>
<td>Ratio of face-to-face and non face-to-face contacts</td>
<td>Profitability by business unit or team</td>
</tr>
<tr>
<td>Number of non-clinical activities performed by clinician and team</td>
<td>Number of interventions and cost of interventions per patient</td>
</tr>
</tbody>
</table>
Analysis

A reporting and analysis dashboard gives clinicians and managers across the trust access to these cost and activity data. The data can be analysed at all levels, from trust to individual patient, as well as by team or staff member.

PLICS data are being used for numerous purposes, including:

- **Best practice**: clinicians and teams use the data to review their work. The data allow teams in a service to compare their skill mix, productivity and cost, which can help identify indicators of a ‘best practice team’.

- **Tenders**: the data were used to give a quick, high-level view of the viability of a tender from a financial perspective.

- **Strategic direction**: the data are helping the trust to analyse the resource deployment and financial contribution of each service, informing strategic development.

The trust is increasingly using PLICS to engage clinicians in activity and cost discussions. Figures A1.1 and A1.2 give examples of how this information is being used.

The activity-driven graph in Figure A1.1 shows the percentage of each team’s time spent with patients by hour of the working day. This shows a clear morning peak in patient-facing time with a second, smaller peak after lunch. This type of information can raise questions about whether this trend is driven by staff availability or patient needs, and whether staff resources are appropriately distributed throughout the day for each of the teams.

**Figure A1.1: Comparison of four teams’ patient-facing time by hour**
In Figure A1.2, each bubble represents a different team, and its size the number of patients seen by that team. The axes show the notional income and notional margin percentage for each team. For example, bubbles in the top right quadrant show that the team’s notional income is higher than costs, and notional income generated is high. Bubbles in the top left quadrant show that costs of delivering the service are exceeding the notional income generated by the service. This clear display of information helps managers prioritise areas to review, identify what is influencing the costs of these services and look for potential cost efficiencies.

**Future developments**

The trust is looking to develop its systems further to make better use of the activity and cost information across the organisation, in particular to:

- make the presentation of data more relevant to users
- capture patient-level data for every service provided by the trust
- complete the move to monthly reporting and embed the process in the finance team’s monthly work plan
- build quality measures into the data to complement the quantitative financial metrics.

**Acknowledgements**: Our thanks to Matt Miles (SLR & Costing Accountant) and Beckie McConville (Locality Lead).

**Case study 3: By reviewing its cancer drugs, Alder Hey Children’s NHS Foundation Trust recovered the investment in its costing team for the year**

The costing lead met with the clinical leads in several specialties to demonstrate his ‘PLICS dashboard’ functionality. In these meetings he identified individual cases
where the income received by the trust did not cover the costs of care for the patient, and used the dashboard to interrogate what was driving the costs.

**Expert review**

A meeting with one clinical director for haematology identified an oncology patient for whom the costs of care were significantly higher than income received. The patient had been treated with one drug that had a high cost associated with it. The knowledge that a particular oncology drug was driving the cost was the starting point to finding out whether the costing information was correct and if there were any opportunities to recover or reduce costs.

The costing lead contacted the head of contracting and commissioning to find out why the trust received no income for this high-cost drug. With help from the pharmacy assistant manager, they discovered the drug was eligible for reimbursement from the Cancer Drugs Fund (CDF) but had not been flagged in the pharmacy system, so no income had been received for it.

**Process change**

The team reviewed all CDF drugs and found other drugs eligible for reimbursement had not been flagged. The system was corrected and the trust now reviews the CDF drugs list regularly.

**Impact of change**

This small process change increased income by £90,000 that year. This is more than the cost of the costing staff, IT and software for the full year.

The review process should ensure any changes to funding are captured in future. This type of consistent approach will support the trust’s financial sustainability and protect patient services.

**Acknowledgements:** Our thanks to Jason Dean (Costing Lead), Dr Mark Caswell (Clinical Director), Laurence Murphy (Head of Contracting and Commissioning) and Lisa Hegarty (Pharmacy Assistant Manager).

**Case study 4: Liverpool Heart and Chest Hospital NHS Foundation Trust saved £547,000 through reduced device costs**

The Liverpool Heart and Chest Hospital used patient-level costing data to reduce expenditure on high-cost devices without compromising clinical preference.

Cost data from PLICS were linked to the stock management system in cardiology theatres. This provided information on device usage for each theatre patient. Initially, over 7,000 device items were matched through PLICS – too many to be analysed. Further analysis focused on the devices that together accounted for approximately 85% of the device costs (100 to 150 devices). In particular, the analysis looked at
variation in costs between similar devices, and highlighted devices for which the variation was large. One such device was the heart valve.

Cost review

The patient-level data were used to benchmark the type of devices used by each consultant (Figure A1.3).

This revealed a large difference in the average cost of different heart valves, as well as in the heart valve cost by consultant (from £1,000 to £2,500).

Figure A1.3: Average heart valve cost by consultant

Clinical involvement

To understand what was driving these variations, the trust needed to know why different valves were being used in different scenarios; therefore, it was important to involve the consultant cardiologists. The director of finance met clinicians to highlight variances in the cost of heart valve procedures. This was followed by more detailed conversations about heart valve device usage between trust procurement representatives, the general manager for surgery, trust theatres manager and consultants. A range of valves was identified that addressed different clinical needs without compromising clinical preference.

Standardisation

At the time of this analysis, the trust was operating within a four-year framework agreement that allowed changes to be made to procurement. This meant that following the review, the trust stopped procuring devices from some suppliers and procured some devices from other suppliers for certain specifications only. The procurement of devices from the remaining suppliers increased (Figure A1.4).

Figure A1.4: Changes to procurement of heart valves
While it is likely that a commercial review with the valve suppliers would have yielded some cost reductions, the savings would not have been as significant without the standardisation and resulting increase in valve volumes from specific suppliers. This leverage arose directly from the opportunity identified by patient-level cost information.

**Patient and financial benefits**

The trust transferred the procurement of some heart valves from the most expensive supplier to cheaper suppliers, without adverse impact on patients and without compromising its legal obligations to the framework agreement.

Figure A1.5 shows the average cost of heart valves, by consultant, in the years before and after the review. In 2011/12 the average cost of a heart valve was £1,743; after the review this was reduced by £369 to £1,374 in 2012/13. The increased standardisation following review also reduced variation between consultants.

**Figure A1.5: Average heart valve cost by consultant: 2011/12 (top) and 2012/13 (bottom)**

![Average Heart Valve Cost by Consultant](chart.png)

**Wider benefits**

These reviews of device use and cost have been completed for several devices. The use of patient-level data in this type of review has given easy visibility to trends by consultant and between consultants across many devices. In particular, catheter use in the electrophysiology subspecialty was similarly reviewed. The savings on both heart valve and catheter procurement total £547,050 per year (Table A1.2).

**Table A1.2: Savings on cardiac surgery and electrophysiology**
### Acknowledgements

Our thanks to Ann Maher (Category Specialist Procurement Manager) and Gan Raman (Head of SLM Finance)

### Case study 5: Stockport NHS Foundation Trust’s ophthalmology service improved its financial position by £211,000

The ophthalmology service made a loss of £206,000 between April and September 2013, prompting the associate medical director for surgical services and critical care to launch an improvement project to achieve a surplus so that the trust could develop its ophthalmic services. The project involved all consultant ophthalmologists, nurses, allied health professionals and the divisional management team; its launch was chaired by the trust’s chief executive.

### Cost analysis

The team used patient-level costing data to examine the costs of each procedure and identify the main ‘cost drivers’ among them. Day cases had contributed £173,000 of the £206,000 loss. Cataract surgery accounted for 46% of day cases and each cataract procedure was losing the service on average £217. Spending on theatres and medical staff involved in surgery accounted for 59% of costs, as shown in Figure A1.6 for April to September 2013. The team felt it could influence theatre utilisation cost and focused its attention on this.

### Better theatre utilisation

Divisional management and clinicians reviewed theatre usage and found that a significant number of funded theatre minutes were not being used (either part or full sessions), mainly due to late starts and incomplete lists. This was increasing wait times, which led to an increase in work being outsourced to the private sector to try to meet access targets for surgery. This meant that the costs of running theatres and delivering the required activity were increasing, but without any increase in income.
Figure A1.6: Costs for cataract extraction and lens implant, April to September 2013

Measures were taken to increase utilisation of theatre sessions, including:

- changes to practice to ensure lists start on time
- review of casemix to move any suitable cases to the outpatient setting or outpatient treatment suite
- grouping patients requiring anaesthetist support on the list to reduce anaesthetist time.

As a result, the number of funded theatre lists that were not utilised fell, allowing a 15% increase in ophthalmology theatre activity in 2014/15 compared to 2013/14.

**Patient and financial benefits**

As costs have remained fairly stable, theatre costs per patient have effectively decreased by 12%. The loss incurred by each cataract day case procedure has been reduced to £150. This is shown in Figure A1.7 for costs for April to December 2014. Given that there are over 4,000 cataract day cases per year, this is a financial improvement of £211,000.

Patients have also benefited from the increased theatre activity as this has reduced:

- waiting times for cataract procedures, which can have a particularly significant impact on quality of life in this group of patients
- the number of patients being sent to other hospitals for their treatment: 140 patients were treated by other providers in 2013/14 compared to 11 in 2014/15, improving continuity of patient care.
Figure A1.7: Costs for cataract extraction and lens implant, April to December 2014

Acknowledgements: Our thanks to Karen Hatchell (Director of Surgery and Critical Care), Hayley Ringrose (Chief Financial Analyst) and Mr Colin Wasson (Associate Medical Director for Surgical Services and Critical Care).

Case study 6: Alder Hey Children’s NHS Foundation Trust increased its endocrinology capacity by 32% without increasing costs

In 2009/10 Alder Hey Children’s NHS Foundation Trust reviewed its paediatric endocrinology services, partly in response to British Society of Paediatric Endocrinology and Diabetes guidelines that patients on growth hormones should be seen in clinic every four months. The trust was not meeting this recommendation consistently for all patients and needed to increase outpatient attendances to rectify this. In addition, regional demand for the service, both inpatient and outpatient, was growing. As the endocrinology service was making a loss, it was necessary to look at the operating model and identify how capacity could be increased without adding to the financial pressure on the trust.

Patient-level costing is most effective when clinicians, costing experts and operational managers develop a shared view of a service. Alder Hey’s transformation director spent significant time with clinicians, using data from the service and from PLICS to report on the service’s costs. This helped the team to develop a strong working relationship based on respect and listening, as well as a joint understanding of the service and what the data were telling them about its costs.
Capacity review

The trust's transformation director together with clinicians looked for ways to increase activity without compromising patient care or increasing costs. Using PLICS data, they looked at the costs associated with each attendance. This highlighted a cost difference between nurse-led and consultant-led attendances. Adjusting the service delivery model so that nursing staff did more would allow capacity to be increased without significantly increasing costs.

To realise this, the consultants trained the senior nurse specialist and advanced nurse practitioner to work more independently. This allowed nursing staff to contribute more effectively to the care of inpatients, as well as to see more patients on their own in clinics. Between 2009/10 and 2014/15, numbers of nurse-led clinics rose from 223 to 867, an average 31% year-on-year increase.

In addition, a new associate specialist was recruited, initially seeing patients under the supervision of a consultant, but then moving to seeing patients on their own. These changes ensured that significantly more patients were seen, with little increase in staff cost.

Cost analysis

A review of patient costs by type of expenditure identified that growth hormones accounted for two-thirds of the direct and indirect cost base. When clinicians analysed the use of these drugs, they identified inconsistency in the age at which patients were transferred from the paediatric to the adult service. Those who transferred to the adult service at a later age received the growth hormone treatment for longer. In addition, research showed that if a patient didn’t demonstrate significant benefits from growth hormones within a year there would not be a benefit. In response to this, the clinicians introduced procedures to ensure transfer of patients to the adult service when clinically appropriate.

Impact of changes

As a result of the above changes, British Society of Paediatric Endocrinology and Diabetes guidelines are met, and in 2011/12 the service delivered 55% more inpatient activity and 27% more outpatient activity than in 2009/10. Drug costs have remained stable despite the increase in patients. Despite the significant increase in capacity, costs for the service did not increase during this period.

Ongoing analysis has shown that the quality metrics have been maintained or improved. For example, the standardised readmission rate reduced from 35.79% to 29.55% between 2011/12 and 2014/15, the best for the four specialist children’s trusts in England.

Acknowledgements: Our thanks to Mohamed Didi (Consultant Paediatric Endocrinologist) and Jason Dean (Costing Lead).
Case study 7: Nottingham University Hospitals NHS Trust’s better theatre utilisation, reduced length of stay and increased elective activity improved the burns and plastic service’s finances by £1.4 million

Over the last four years, the whole trust has been involved in developing its patient-level costing approach, from including clinicians in the team selecting the system to setting up a data-quality panel involving all professions.

PLICS generates simple and easily understood tables and charts for performance dashboards. Clinicians across the trust can access and interrogate this cost information about their patients. Any clinician responsible for a service is expected to understand the patient-level data.

A trust-wide transformation team, known as ‘Better for You’, helps services resolve any queries raised by the patient-level costing information. It has worked with burns and plastics, a service that was making a loss.

Financial improvements

Senior burns and plastics clinicians reviewed the PLICS-generated performance dashboards to identify the activities having greatest impact on the costs of the service. In particular, they looked at the ‘costs per day’ dashboard (Figure A1.8) to identify trends in costs through each inpatient spell. It can be seen that:

- early in the spell, a range of professional interventions and patient care activities introduce costs
- in the middle of the spell, costs are mainly associated with bed occupation, not professional interventions
- towards discharge, professional costs increase.

Figure A1.8 ‘Cost per day’ dashboard
This analysis was then used to explore a number of options to improve financial performance:

- **Recording activity**: Clinicians identified activities that were not reimbursed. Working with the coding and information team, operational managers revised recording procedures to ensure clinicians recorded all procedures appropriately. The process was agreed with the commissioners to ensure that the trust was appropriately reimbursed as a result of the improvement in recording.

- **Length of stay**: Costs of an episode increased as the length of stay increased. The trust set a length of stay ‘trim point’ that, when crossed, triggered a clinical review of the patient’s fitness to be discharged. This prompted earlier engagement with the wider health community so that a fit patient could be discharged without delay.

- **Pathway review**: The data showed that a number of patients referred from the emergency department (ED) to the burns unit could have been treated as outpatients. To reduce these inappropriate referrals, the team devised a telehealth solution in which ED staff contact burns nurses via webcam for a remote assessment of their patient and decision on the appropriate care pathway. This has resulted in more patients being treated as day cases or outpatients, and a drastic reduction in burns admissions.

- **Theatre utilisation**: The improved patient pathway led to more elective procedures, allowing better planning of theatre time. Patient-level information and the theatre-scheduling feeder systems were used to complete a detailed analysis of clinician performance, including peer comparison. This identified significant variation in the time taken and hence cost of surgery. This was used to challenge clinicians, with an emphasis on identifying best practice and improving performance. A surgery time standard is now set for each procedure based on a break-even tariff point. For example, if costs exceed the tariff once theatre time runs over 30 minutes, this is the time set as the standard. Exceeding the standard triggers discussion about the reasons why. As a result, theatre recharge for burns and plastics has been reduced by £650,000 per year. Importantly, the more efficient use of theatres by burns and plastics has released surgery capacity across the trust.

**Impact of changes on patient care**

While this work has realised financial efficiencies, the aim of this senior clinician-led project was to establish best practice to improve patient care. Several benefits to the patient experience and care can be identified:

- reduced length of stay and more timely arrangement of post-discharge care
- more timely intervention as a result of reduced admissions to the burns and plastics unit, and improvements to day case and theatre scheduling
• an 11% shift in activity from non-elective to day case and elective activity; this reduced pressure on beds and waiting times, as well as theatre delays and cancellations

• increased professionalism from the challenge to clinical performance and influence of senior clinicians leading these reforms, re-enforced by setting and monitoring standards. Reputation and quality of service have greatly improved, as reflected in the friends and family test results.

The financial impact of each of these changes is difficult to quantify. However, the financial position of the service has improved by around £1.4 million per year following all these changes.

Acknowledgements: Our thanks to Jason Neil-Dwyer (Surgeon, Plastics), Scott Hodgson (Head of Costing) and Duncan Orme (Deputy Director of Finance).

Case study 8: Alder Hey Children’s NHS Foundation Trust has improved patient outcomes and predicts 6,000 bed days a year will be released by redesigning its rehabilitation service

The Alder Hey service-line reporting (SLR) system showed the neurology service to be 21% in deficit, prompting a review of the service. Patient-level costing data and SLR data were used in a detailed review of all costs to identify ways to make this service financially sustainable.

Patient pathway

The service lead for neurology and a cost accountant reviewed care interventions along the neurology pathway. They identified that patients were receiving treatment from therapists after discharge, which was not covered by the inpatient tariff or by a separate outpatient tariff. This treatment was incurring costs for the trust without reimbursement. Further analysis of patient-level data showed ten patients accounted for half the service’s financial loss. All of these patients had lengths of stay over 55 days and received intensive rehabilitation therapy during their inpatient spell. While the trust received some income for the excess bed days, this did not cover the rehabilitation costs.

As neurology was not the only service where patients received rehabilitation, the review was widened across the trust. This identified similar patterns in other specialties: trust-wide 26% of bed days related to only 123 patients (<1% of patients).

In addition, the rehabilitation approach was inconsistent across wards, with patients starting rehabilitation at different points in their care and having different arrangements for care post-discharge. There was inconsistency in reimbursement too, with separate funding for adult rehabilitation but not for paediatric rehabilitation.
Proposals for change

Rehabilitation teams, clinical specialists and costing accountants developed proposals to redesign the delivery of paediatric rehabilitation throughout the trust. The revised model includes:

- a specialist rehabilitation ward and team for the first stage of a patient’s rehabilitation, to ensure all patients receive consistent specialist care
- rehabilitation is begun earlier in each patient’s stay, resulting in quicker discharge
- a specialist transitional unit for the most seriously affected patients, to allow the team to continue rehabilitation and work closely with the patient and family, including planning care post-discharge. While on the unit, parents gradually take over their child’s care.

Following discussion with commissioners, the specialist rehabilitation ward has now been opened and introduction of the transitional unit is under consideration.

Impact of changes on patients and finances

This new model is already bringing many benefits for patients and the trust:

- patients receive the right care, at the right time and in the right place
- length of stay is reduced through earlier intervention and there is a focus on needs post-discharge
- staff time and skills are used more efficiently across the trust through a more consistent and co-ordinated rehabilitation service
- improved outcomes for children undergoing rehabilitation.

When fully implemented, the specialist transitional unit is expected to build the family’s skills and confidence as carers: families will start to take over their child’s care while they are still on the rehabilitation ward. This will empower them to meet their child’s needs once they return home; it also equips them to identify if their child’s condition changes and they need to seek advice from the rehabilitation team or have their child readmitted.

Earlier discharge is expected to release up to 6,000 bed days per year. This will have a significant impact on the region’s paediatric inpatient capacity. The improvement in clinical outcomes should reduce the need for future interventions, reducing costs across both the acute and community settings.

Acknowledgements: Our thanks to Jason Dean (Costing Lead), Dr Ram Kumar (Service Lead, Neurology) and Andy McColl (Business Development Manager).
Appendix 2: Provider-level business case – supporting collateral

This appendix outlines factors that a provider may wish to consider when making a business case for new or additional investment to support the installation of PLICS software that meets the minimum software requirements issued by NHS Improvement. The format is based on the Treasury Five Case business model, which comprises the following sections:

- **strategic case:** frames the investment proposal in its strategic context and demonstrates the case for change, in conjunction with investment objectives
- **economic case:** identifies and appraises a range of options to demonstrate that the preferred option balances cost, risks and benefits to optimise value for money
- **financial case:** confirms the funding arrangements and affordability of the preferred option
- **commercial case:** outlines the commercial arrangements for the preferred option
- **management case:** demonstrates that the preferred option can be delivered successfully within the funding envelope and timescale.

**What problem is patient-level costing solving?**

Reliable, complete costing data are a prerequisite to sound decision-making in the NHS. It is only with access to this type of information that we can see how to improve current services, and whether changes made to care delivery really are better for patients.

Understanding the real cost of delivering patient care improves decision-making. Clinical teams use benchmarking to identify how to develop their services. Provider boards use reliable cost data to make decisions about how to save, where to invest and which services to develop.

The current method of measuring costs in England is known as ‘reference costs’. Reference costs allow unit costs of healthcare to be compared down to the level of a grouping of treatments, eg the costs incurred in providing one hip replacement or one outpatient attendance. At their most basic level, costs are taken from the general ledger and then averaged over a number of activity units to give an average cost per unit.

It takes time and resources to collate reference cost data, yet the significant weaknesses to this costing approach mean these data are limited in how they can be used to support decision-making. In particular:

17 [https://improvement.nhs.uk/resource/minimum-software-requirements](https://improvement.nhs.uk/resource/minimum-software-requirements)
• guidance informing costing and cost collection can be interpreted differently, complicating meaningful comparison

• the full costs are not assigned to patient care, meaning the data are incomplete

• costs are collected and assigned based on an average cost of an HRG, which makes it difficult to identify how the component parts of the total cost vary between services

• data are not detailed enough to highlight variation between individual patients so cannot be used to benchmark between organisations to identify potential for efficiency gains

• costs are collated based on HRG averages; information relating to the underlying diagnoses or operative procedures is not included.

These limitations are restricting the usefulness of costing data for providers and at a national level.

Given these limitations, NHS Improvement and other national bodies are supporting the roll-out of a patient-level cost collection, based on national standards, across all healthcare sectors by 2021.

It has been flagged by NHS Improvement and DH that patient-level costing would subsume the role of reference costs in the future. Having just one collection from PLICS limits the burden of reporting requirements on providers and would ensure they obtain more value from cost reporting.

**Why patient-level costing?**

Patient-level costing identifies the cost of care for each individual patient. Rather than giving the cost of one hip replacement or one outpatient attendance, patient-level costs give the cost of the doctor and nurse time, as well as the prosthesis, pharmacy and pathology used in an individual patient’s care.

A properly implemented patient-level costing system has quality assurance built in through reviews by clinical experts. These ensure that the data are accurate, and can be trusted as a core tool in business decisions.

Patient-level costing has significant benefits over the reference cost approach:

• the complete cost of care for each patient is understood

• patient-level data can be aggregated to any level – HRG, dominant procedure or specialty – to allow more versatile cost analysis

• variation in the cost of care can then be easily benchmarked against best (or better) practice, eg across clinicians in an organisation.
NHS Improvement is developing national standards for patient-level costing that would ensure consistency in the way all providers collate their patient-level costs. This improvement in costing information would enable providers to:

- make the best possible use of their resources
- evaluate clinical practice
- support better ways of working.

Patient-level costing is not new. Many trusts already collect information at patient level and use it to support cost improvement programmes. A recent NHS Improvement publication\(^{18}\) gives case studies that show how patient-level costing has enabled service redesign and capacity improvement, and supported cost improvement projects. These have delivered significant financial benefits for the providers involved, as well as improving or maintaining patient care.

**Why now?**

Financial challenges facing providers and the health economy as a whole means we need to focus on new ways of delivering care to meet increasing demand without increases in budget. Without reliable and complete cost information, it will not be possible to identify where costs can be reduced without negatively affecting patient care.

NHS Improvement intends to make the costing of patient-level data mandatory within five years across all sectors. There is limited time to implement before this becomes an enforcement issue.

It takes time to realise the benefits from a patient-level costing system, so the sooner the system is implemented, the sooner the benefits can be realised.

**Options**

Set out the benefits and disadvantages of each of the approaches:

- do nothing
- implement a PLICS system purely to submit costs to meet potential requirement
- wait until the decision to make patient-level data submissions mandatory is taken
- implement PLICS and embed the data produced in trust decision-making processes.

\(^{18}\) That is, this document.
Benefits

- Greater engagement of clinicians in costing and financial decision processes, which empowers them to make decisions in the best interests of patients, being fully aware of the cost implications.
- Improved data quality, in all data feeds, helping national submissions and local commissioning datasets to capture procedures more fully.
- Greater transparency of care costs can help target cost efficiencies on the areas of greatest potential. This has been shown to increase efficiency when applied to the redesign of patient pathways.
- Supporting each provider’s long-term financial sustainability by increasing its understanding and ability to act on detailed cost analysis.
- Ability to learn from other providers that have already (or are preparing to) implement patient-level costing.
- Meeting national expectations around delivery of quality costing information, which is proposed to become an enforcement/licence issue in due course.
- Better understanding of the service area’s information, to allow better resource and business planning.
- Better quality data for use in negotiation of local tariffs and variations, or to support business cases for commissioner agreement.

Investment required

An estimate of implementation costs for acute trusts is included in Section 6.1.

- Procurement – outline of process needed in organisational procurement policy.
- Cost of implementation – including system costs, costing and informatics expertise, and time for clinical engagement in setting up system.
- Ongoing costs – including costing and systems expertise, ongoing software costs, clinical and management time to apply data to support service development.
Risks

Value derived from patient-level costing can be limited by:

- Lack of board engagement and senior commitment to deliver improvements through better use of patient-level cost information.

- Lack of clinical and operational engagement in the costing process. Clinicians and operational managers are responsible for the delivery of care, and only they can make the changes and improvements suggested by analysis of cost information.

- Resources unavailable locally to procure the PLICS system, implement it appropriately and embed the use of costing data in day-to-day management decisions. The resources required are a mix of financial resources, staffing time, and clinical, management and finance expertise.

- Removal of clinical, management and financial expertise after implementation. This would remove the ability to analyse and use costing data in day-to-day management decisions.

- Any local operational risks specific to the implementation plan.

Dependencies

The ability to maximise benefit from the patient-level costing system will depend on:

- development of national costing standards by NHS Improvement according to its proposed timetable

- NHS Improvement’s delivery of a reliable, useable IT platform to allow the collection, analysis and sharing of information on costs.
Appendix 3: A model for patient-level costing implementation

As part of our work with acute trusts, we discussed the implementation of PLICS systems. From these interviews we were able to build a generalised approach to PLICS implementation, as well as document what providers have learned during implementation.

A generalised approach to implementation

We have developed a generalised process for implementation from conversations with providers that have made good progress in implementing and maintaining costing processes, and in using their cost information (Figure A3.1).

This generalised implementation has the following major stages:

- capability assessment and system specification – makes it clear what the provider is currently capable of and what the new system must be capable of
- procurement – normally a competitive process with multiple PLICS supplier bidders
- initial build – working with the external provider to build the first functional system
- engagement and use – at this stage the phases are more fluid and in practice happen in parallel
- financial management engagement – while continuing to develop the accuracy of the costing system, ensuring that the financial management organisation is the interface with the larger organisation
- clinical engagement – speaking with clinicians and operational managers to continue to improve the costing processes, and to begin to discuss how to use the information
- application – progressing to using the information to support improvement projects
- evaluation – assessing and quantifying the impact of improvement work.

What we learned from past implementations

We have made a number of general observations that may assist providers seeking to implement in the near future.
Figure A3.1: Suggested process for PLICS implementation
Implementation scope

In some cases, patient-level costing implementations have been incorporated into larger business warehousing projects. This has made it difficult to isolate the specific costs of implementation for the costing element of the project. However, it is interesting to note that some implementation projects have been confined to implementing the PLICS system and developing processes for redirecting existing information to construct the input datasets. In these cases, no additional information was produced or collected, making implementation more manageable. While this will not always be possible, it is helpful to know that implementation projects do not necessarily need to be synchronised with larger information management projects, which require greater cost and time.

Executive-level project governance and support

Providers have adopted different governance structures and approaches to their own implementations. But experience suggests that clinical, operational and executive team representation on the project board from day one is essential to enable timely and high quality delivery. Such implementations require champions from these key areas. Failing to have champions in place risks project failure.

Dedicated costing staff levels

Given the various duties already required of costing professionals for national cost collection and general quality assurance, we believe that a minimum of two (and ideally three) dedicated costing staff are necessary to make significant developmental progress. This need becomes even clearer when the annual cycle of financial management, preparation and national collection is broken down into detail.

Transition of focus over the project life cycle

The most developed implementations – those making use of the information produced – have demonstrated that significant shifts in focus and governance structures were necessary at different stages of the project. The typical stages are:

- procurement and initial build – focused on requirements definition and delivery by the external providers of PLICS software
- build refinement – focused on refinement of costing allocations, in particular data collection, with instances of project support structures focusing on data quality assurance
- engagement and use – focused on engaging with an increasingly large group of clinicians and operational managers, to further develop the quality of the information and to begin to use the outputs.

These shifts in focus require a re-evaluation of project governance, resourcing and support at each stage, eg gradually shifting the balance of the project board from technical, information management and finance professionals to clinical and operational champions.
Implementation difficulties

There are many stages at which the implementation process can falter. Experience suggests that it is possible to achieve full implementation, refinement, engagement and use of the outputs within a five-year period. However, in practice most implementers experience delays due to variation in the level of support for the work against other priorities, or due to local issues such as discontinuity of personnel. The costing implementation life cycle is significant and there are a number of stages where implementation can lose momentum, as illustrated in Figure A3.2.

Figure A3.2: Phases of PLICS implementation
NHS Improvement is the operational name for the organisation that brings together Monitor, NHS Trust Development Authority, Patient Safety, the National Reporting and Learning System, the Advancing Change team and the Intensive Support Teams.

This publication can be made available in a number of other formats on request.

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