Heading?

Using routinely gathered data to evaluate locally led service improvements

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Key messages

- GP consortia can create real-time reports from routinely gathered data that will help local people to assess the effect of their collective actions.
- GP consortia must have routine, online access to such reports if they are to stimulate local collaborative innovation.

Why this matters to us

We have roles in supporting GP commissioning and are aware how difficult many primary care practitioners and managers find it to visualise what is going on in different parts of the healthcare system and how their work contributes to overall cost and quality of care. We want to present routinely gathered data in a way that helps them to see these things better.

ABSTRACT

Background Between 2009 and 2010 NHS Ealing tested the feasibility of a) combining data from more than one data-domain at the same time to quantify patient movement across the primary care/acute hospital boundary, and b) establishing online analyses so they can be constantly updated with near real-time data to compare different subsets of patients. The reports allowed us to see:

- changes in hospital admissions before and after referral to community matrons of patients with complex conditions from one practice-based commissioning (PBC) group
- changes in hospital bed-days of all patients from one practice or PBC group during a complex intervention designed to assist inter-disciplinary collaboration.

Results The teams leading the projects found that the reports gave them confidence in the projects and helped to influence local policy.

Discussion GP consortia need to evaluate complex service improvements in order to contain costs and improve quality. They will find such reports helpful to give ongoing feedback and this may help to keep people engaged. Present plans for data warehousing in London do not have this ability – they do not combine data from across the whole health economy, and are focused either on claims validation or risk stratification.

Keywords: database search, evaluating complex interventions, GP commissioning, routinely gathered data

Introduction

Data are gathered about patient care in many different parts of the NHS (hospitals, community provider services, general practice, out of hours services). Yet these data sets are rarely pooled to reveal complex patient movements between different healthcare providers. Bringing together these data sets might help commissioners to understand aspects of cost and quality that are invisible in discrete data sets.

Also, feeding back to practitioners the impacts of their collective efforts in near real-time is likely to encourage them to remain engaged in improvement initiatives. This is particularly important in complex situations where multiple factors impact.

In 2009 in Ealing there was no facility to allow rapid analysis of data from different databases that would help monitor in real-time whether a local innovation was making a difference. Instead, reports were mostly limited to single database analysis and often arrived too late to make a formative difference.

Two existing projects were used to test the feasibility of: a) searching more than one database at the same time to quantify patient movement across the primary care/acute hospital boundary, and b) setting up the searches so they can be constantly updated with real-time data to compare different subsets of patients. The searches aimed to reveal:

- change in hospital episodes before and after patient referral to community matrons
- change in hospital bed days of all patients from individual practices and PBC groups as a whole during a complex intervention designed to assist inter-organisational collaboration.

Project one: change in hospital activity after referral to community matrons of patients with complex conditions from one PBC group

The opportunity to develop this multi-domain data-amalgamation and analysis was provided by a project funded by Northwest London Collaboration for Leadership in Applied Health Research and Care (CLAHRC) and NHS Ealing. The project examined communication between general practice, community matrons and out of hours services in the Ealing Acton Commissioning Group (EACG).¹

Case management is a way of bringing focused and continued attention to the breadth of problems experienced by a patient/client that, for one reason or another, are difficult to manage in a more *ad hoc* way.²

It claims to be a cost effective and efficient way of coordinating services to improve quality of life.³ In Ealing it was being used by community matrons to look after patients who have long-term conditions and have had a large number of hospital admissions.

In 2009, EACG tested the hypothesis that patients have fewer hospital episodes after referral to community matrons. These patients have severe deteriorating conditions and might be expected to have more hospital episodes. Data from the community services IT system (RiO) were interrogated to identify the date when patients were referred to community matrons, and this was linked with corresponding Secondary Uses System (SUS) data to identify the hospital spells and episodes (a 'spell' is the period between a patient being admitted to hospital, and their subsequent discharge; within any spell there will be one or more 'episodes', each of which corresponds to the periods of time during the spell when the patient is formally under the care of a specific consultant) of these patients in the previous and subsequent 12 months. The NHS number was used to track patients in the two databases.

Figures are automatically adjusted for patients who die within the post-referral period and when the search is performed before a complete year has passed (e.g if a patient dies one month after referral, their corresponding number of hospital episodes would be adjusted by a factor of 12). The data extraction and amalgamation processes are automated; therefore the analyses (which are deployed online through the trust's intranet) are automatically updated using the latest available data.

Figures 1a and b show searches undertaken in July 2010 and April 2011, respectively. They show small differences that are to be expected when monitoring is undertaken before a year is complete (see June 2010).

Both figures encouragingly show that for most months the number of hospital episodes was lower for patients in the year after referral to community matrons. This search became possible in spring 2010, close to the end of the project. This meant that it was not possible to assess its value to community matrons during their project. They were, however, encouraged when they saw the data at a later date.

This approach to database searching allows the impact on hospital activity of a primary care intervention to be seen in near real-time, permitting rapid ongoing assessment and policy adjustment when necessary. The approach could be applied to any activity or condition that has corresponding coding in RiO and SUS. Attaching the cost of spells/episodes will allow assessment of the cost of care for these patients to be compared with the cost of an intervention.

Figure 1a. Search done in July 2010 of hospital episodes in the year pre- and post-referral to community matrons for one PBC group in Ealing

Figure 1b Search done in April 2011 of hospital episodes in the year pre- and post-referral to community matrons for one PBC group in Ealing

Project two: change in hospital bed days of all patients from one PBC group during a complex intervention to assist inter-organisational collaboration

The opportunity to develop this data-amalgamation and analyses was provided by the Southall Initiative for Integrated Care (SIIC), led by NHS Ealing and evaluated with a NIHR Service Delivery and Organisation Programme (SDO) grant. It supports 26 general practices in two Southall PBC groups to collaborate with a range of other organisations. The project started in 2009 and is ongoing.

The project is a complex intervention based on principles of organisational learning.^{4,5} It includes mechanisms that facilitate inter-organisational collaboration for service improvements (crossing the boundaries between primary care, acute care, social care, mental health and community care). The hypothesis is that practitioners and managers will work collaboratively across boundaries when it is easy and when there are tangible valuable outcomes: the automated, online deployment of these near real-time data analyses is proving to be a key component in quantifying those valuable outcomes.

An online SUS data analysis was developed to examine the use of hospital beds by patients registered with Southall practices (a 'bed day' represents a bed occupied across midnight.) The report allowed each individual practice to compare the number of hospital bed days used by its patients' to the average use of each of the four PBC groups in Ealing. The analyses provide for local tailoring of the comparison cohorts, and categorisation by diagnosis (e.g. diabetes).

Figure 2 shows a screenshot of the report in the form it exists on the trust's intranet. The figures (n.b. data are false) compare Hammond Road Surgery against Southall Commissioning Consortium for the number of bed days used by its diabetic patients who were admitted as an emergency between April 2009 and March 2011 (adjusted to 1000 practice population).

Figure 3 uses this facility to amalgamate data for all Southall practices (two PBC groups) and for all other Ealing practices (two PBC groups) to compare the change in hospital bed days used by diabetic patients admitted as an emergency between November 2009 and December 2010. It encouragingly shows considerable reduction in hospital bed days for this group of patients from all parts of Ealing, more marked in Southall.

This search became possible in spring 2011, when GP commissioning was being launched. It had an almost immediate effect on policy. The data supported the argument that the mechanisms of the SIIC are valuable not merely to develop relationships across organisational boundaries, but also to contain costs (i.e. reduce hospital activity). These mechanisms are now being adopted throughout Ealing. Also, the technique itself is being considered as a way to monitor the impact of collective primary care actions in reducing hospital costs for a number of conditions.

Designing the searches and reports

An external consultant developed the online analyses and data visualisations. The reporting element draws

Figure 2 Example of an analysis that allows comparisons between individual practices and PBC groups about the use of hospital services

Figure 3 Non-elective hospital bed days of all diabetic patients from Southall (SPCCG and SCC, solid line) compared to the rest of Ealing (dashed line)

data principally from data-domains, all of which are readily available in most London PCTs. These are:

- 1 Standard SUS tables which are routinely created at all PCTs on (typically) a monthly basis
- 2 The underlying RiO database tables, which are routinely updated on a daily basis, again in virtually all London PCTs, but also in other PCTs and Mental Health Trusts
- 3 Reference data for tying together GPs and their practices, and providing GP list sizes (for example, for normalising calculations)

All the reference data used by the reporting element is universally present in existing information infrastructures, and is readily available to all NHS organisations free of charge (in the case of ODS [The NHS Organisation Data Service (ODS) provides unique identification codes for organisational entities of interest to the NHS, for example NHS trusts or PCTs, organisation sites such as hospitals, or GP practices]. information - e.g. about GPs and GP practices) or through

existing local arrangements for drawing data about GP patient registrations and lists from local NHAIS Systems (often known as 'Open Exeter' systems).

The online reporting element uses Microsoft's SQL Server Reporting Services in conjunction with Microsoft's SQL Server (version 2005 or 2008). Both of these are a near ubiquitous combination within NHS organisations. (Alternatively, Microsoft's 2008 'Express' versions can be used.)

Discussion

These online, multi-domain data amalgamations and analyses were developed to help those leading local innovation to see the impact of their work, and from this adjust policy.

The work has demonstrated that it is feasible to automate the delivery of such analyses for online

self-service review. With appropriate resources, the approach could be used to evaluate a range of complex service improvement initiatives. GP consortia has to facilitate complex service improvements in order to contain costs and improve quality; this approach could demonstrate the effectiveness of these activities. Being able to see quantifiable effects could have a beneficial effect on morale and keep large numbers of people from different organisations engaged in complex, collaborative improvements.

In the complex arena that we are considering, multiple factors impact and none can claim sole agency for changes in hospital activity. For example, the SIIC did not even aim to reduce bed days - it aimed to increase the capacity of local stakeholders, particularly GPs, to collaborate for health improvements. Rather than outcome measures the 'results' might be better considered as improvement measures, indicating behaviour change without specifying agency.

The deployment of these analyses can give insight into the effects of complex interventions. This requires that the extraction and amalgamation processes draw on routinely available data sources, and are automated. The analyses need to be flexible and tailorable to meet local needs and fit with local organisational arrangements, and the data-visualisations need to be available through a single, consistent self-service route, for example by using the familiar interface offered by the trust's intranet.

Presently there is no mainstream way to develop this kind of work across London, despite its importance. For example, the Commissioning Support for London contract is centred on invoice validation and risk-stratification. At present, London-wide plans to provide data about care pathway do not provide for multi-domain amalgamation – for example, Dr Fosters uses only SUS data, and cannot be deployed through a single consistent and familiar route.

Near real-time reports will be embedded within the work of the new Ealing Commissioning Consortium with the following modifications:

- make report creation easier, accessible to less specialised staff and coordinated between our three partner PCTs (Ealing, Hillingdon and Hounslow)
- improve the navigation facilities for the reports on the trust's intranet
- embed the creation of such reports in the annual commissioning cycle of service improvement, including peer review to make sure that the best reports are made
- include a set of such analyses and reports in a 'dashboard' of markers for practices to consider as part of a process of local peer review
- consider other ways to standardise the reports, perhaps with age weighted capitation or deprivation

- design more flexible comparisons between practices (as has been done by the Association of Public Health Observatories website: www.apho.org.uk)
- use it to support local leadership development as local practitioners and managers design and evaluate local innovations (e.g. the use of Telemonitoring)
- explore the potential for a similar approach with databases used by the local authority and GP computer systems, bringing together data about local demographics, disease prevalence, Quality and Outcomes Framework and patient satisfaction, as well as hospital activity.

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ETHICAL APPROVAL

This was a service improvement project that worked with fully anonymised data, so did not need research ethical committee approval. Instead the NHS Ealing Applied Research Unit monitored the project.

CONFLICTS OF INTEREST

None.

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