

Conference papers

Regional repositories, reintermediation and the new GMS contract: cardiovascular disease in Tayside

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ABSTRACT

Background The new contract for general medical practitioners will make increasing demands on the primary care informatics community. There are a number of potential ways to provide reports which meet the requirements for data on the quality of care being provided by practices. In Scotland there are four components of the national information technology strategy which make meaningful comparisons of data possible.

Objective Using cardiovascular data as an example, to describe how the community health index number, managed clinical networks (MCNs), increasing consistency of Read codes, and regional repositories of data make the acquisition, processing and use of data more straightforward.

Method The cardiovascular MCN collects the majority of its data electronically and four properties are crucial to its success: automatic collection of electronic data from many sources, prioritisation of data derived from multiple sources, record linkage processes, and manual validation of electronic data.

Results Clinicians in primary and secondary care enter data during consultations and see the results of consultations recorded elsewhere. Because all data from the region are able to be Read coded according to prespecified templates, we are able to indicate to practices where they are in relation to the new contract targets and indicate which patients need to be seen, or excluded from, calculations.

Conclusion Effectively integrated management is facilitated by provision of regular prompted recall and review of people with chronic disease by multidisciplinary teams collaborating across the health service and into the community. In Scotland, use of newer informatics tools are proving to be useful contributions from primary care computing to equitable, evidence-based care.

Keywords: computerised medical records, coronary heart disease, data quality, general practice, quality improvement

Introduction

The recent acceptance of the new General Medical Services (GMS) Contract by United Kingdom general practitioners (UK GPs) presents challenges and opportunities to the primary care informatics community. All serious system vendors have promised to

provide users with computer systems that will meet the demands of this new contract for reports that meet the requirements of reporting systems.¹ These will satisfy the demands of individual practices, but there may be difficulties in making comparisons between different practices within the same primary care organisation (PCO), region or nationally if different data definitions are used.

In Scotland there have been four developments that make meaningful comparisons more straightforward: use of a unique patient identifier (community health index [CHI] number), managed clinical networks (MCNs), increasing consistency of Read codes, and regional repositories of data. Patients who register with a GP in Scotland are allocated a unique ten-digit identifier, known as the CHI number, which incorporates date of birth and sex.² Access to the Community Health Master Patient Index enables patients to be tracked as they move between areas within Scotland. Because the CHI number is unique, it enables direct matching of index cases to subsequent events.³ The key concepts and core principles of MCNs in Scotland were set out in a management executive letter and have been described in greater detail elsewhere.^{4,5} They were defined as 'linked groups of health professionals and organisations from primary, secondary and tertiary care, working in a co-ordinated manner, unconstrained by existing professional and health board boundaries, to ensure equitable provision of high-quality, clinically effective services throughout Scotland'. In Scotland, Scottish Clinical Information Management in Primary Care (SCIMP) was set up in 1999 in order to provide a central body to co-ordinate and standardise the management of clinical information in primary care.⁶ The aims of the group were to publicise the benefits of a co-ordinated Scottish approach to data management using Read codes.⁷ Regional repositories of data have been a key principle of the Scottish information management and technology (IM&T) strategy for the past five years.⁸ It is the intention of the National Health Service (NHS) Scotland to create regional repositories of data that enable integrated care throughout the country.⁹

In the Tayside region of Scotland, incorporation of the CHI number within routinely collected primary and secondary care data is almost 100%. The HEARTS (Heart Disease Evidence-based Audit and Research Tayside Scotland) MCN has extended the already successful DARTS (Diabetes Audit and Research Tayside Scotland) model of data sharing between primary and secondary care to coronary heart disease (CHD).¹⁰ In diabetes this model has already become the national system, known as SCI-DC.¹¹ Originally configured as a secondary prevention project, HEARTS MCN now extends to other forms of CHD.¹² This paper describes the process of reintermediation whereby data is collected, validated, prioritised, linked and returned to practices as more useful information for the practice, PCO and region.¹³

Methods

HEARTS MCN collects the majority of its data electronically and four properties are crucial to its success:

- the ability to automatically collect electronic data from many sources
- prioritisation of data derived from multiple sources
- the ability to operate and link patient records regardless of the unique patient identifier (UPI) scheme(s) in place, i.e. the CHI number
- manual validation of electronic data.

Automatic data collection

Automating the collection of information from different health computer systems in the NHS, and elsewhere, remains difficult.¹⁴ The HEARTS MCN addresses this problem through the use of a tool known as GENIE (Generic Importer and Exporter), developed with DARTS, which greatly simplifies the task.¹⁵ GENIE manages the overnight transfer of new or modified data from the practice to a regional computer, where the files are uncompressed and unencrypted. HEARTS MCN takes these data and merges them with patient information already held on the database.

Prioritisation of data from multiple sources

Through a process of consultation between the professions in primary and secondary care, the quality of each data source is determined. Each data source is then allocated values indicating its various abilities to provide information on different aspects of disease. When displaying or summarising data, HEARTS MCN uses the best and most relevant source of information at all times. For example, the cardiology clinic is more likely to generate accurate information regarding risk stratification than a general practice. Conversely, a practice is more likely to be accurate regarding the current treatment regime. Cardiology clinic records then take precedence where there is any ambiguity regarding the state of a patient's risk status, and a general practice record would take precedence when describing a patient's current treatment regime.

Patient identifier linkage

To operate across political boundaries, a system must be capable of dealing with multiple patient identification schemes and of dealing with patients who

have more than one number even within a consistent numbering scheme. The system we use supports any number of patient identification schemes and there is no limit on the number of identifiers any one patient can possess.

Manual data collection and validation

Since comprehensive electronic records are rare and we want to provide a high quality of data to support equitable care, some data must be collected manually. HEARTS MCN minimises this task by identifying data collection holes for a facilitator to target. The facilitators have several roles, including a responsibility for disseminating patient/clinic/practice information, providing a human interface to the project, identifying training needs and aiding in general facilitation.

Results

Clinicians in primary and secondary care are able to enter data during consultations (see Figure 1), and

see the results of consultations recorded elsewhere (see Figures 2 and 3).

Because all data from the region are Read-coded according to pre-specified templates, we are able to indicate to practices where they are in relation to the new contract targets (see Figure 4), and indicate which patients need to be seen or excluded by drilling down into the list of those for whom the target level has not been reached (see Figure 5).

Discussion

The new GMS contract will reward practices for their performance against a set of 76 indicators covering ten disease groups, including CHD. Between 30% and 50% of GPs' income may be dependent on meeting the targets specified in the indicators. The informatics tools developed in Scotland and Tayside over the past five years have enabled rapid access to data on quality of care for CHD for the new GMS contract. This has allowed us to develop a system that allows data sharing for a variety of approved purposes. The UK Data

NHS Tayside Tay Bridge Medical Centre (11058) HEARTS Clinical Review Form **NHS Tayside**

Patient / Practice Details

Review Date: 24 / 07 / 2003 (Today) Official Practice Health Board Number: 11058
 Patient ID: 260342UOMR Hospital ID: CHI
 Annual Review: Administration Form:
 Forename: STANLEY Surname: BELL

Clinical History

Most Recent MI: 18 / 10 / 1999 Most Recent Coronary Angioplasty: 29 / 10 / 1999 Most Recent CABG: / /
 Date Hypertension Diagnosed: / / Most Recent Stroke: / / Type of Diabetes: Not Diabetic
 Date LV Dysfunction Diagnosed: / / Date PVD Diagnosed: / / Date Diabetes Diagnosed: / /

Monitoring Data

Blood Pressure: / / (mmHg) Height: 1.58 (m) Weight: / (kg)
 Urinalysis: Protein: Blood: Glucose: BMI: /
 Lab Investigations: Blood Glucose: 5.4 mmol/L (19/02/2002) Fasting Blood Glucose: No result stored
 Total Cholesterol: 4.9 mmol/L (19/02/2002)


Current Symptoms

Chest Pain? Yes No (0/0) Ankle Oedema? Yes No (0/0)
 CLASP Score: CLASP Score:
 Short of Breath? Yes No (0/0)
 CLASP Score: CLASP Score:


Lifestyle

Alcohol Intake (Units P/W): 0 Exercise (0/0)
 Advice Given Physically Impossible
 Diet: Advice Given Avoids Exercise
 Smoking (0/0) Current Smoker Light Exercise
 Ex Smoker Date Stopped: 01 / 01 / 1987 Moderate Exercise
 Never Smoked Advice Given Heavy Exercise
 Advice Given Advice Given

Figure 1 HEARTS clinical review form



Condensed ECHO Report



[Home](#) [Search](#) [Patient Search Results](#) [Echo results for an individual patient](#) [Condensed ECHO Report](#)

This is the condensed version of the ECHO report; [Link To Complete Version of ECHO Report](#)

Name :	Patient Identifier :	Ward/Clinic: Cardiac Op	Hospital Name: Perth Royal Infirmary	Date of Echo: 23/04/2003
Consultant :	Dr P Currie	Reason for Request :	LV+Valve assessment	
Aortic Valve Appearance :		Aortic Regurg :		
Aortic Stenosis :	No stenosis	Mitral Regurg :		
Mitral Valve Appearance :		Tricuspid Valve Regurg :		
Mitral Valve Comments :	Reduced motion of Ant MVL due to eccentric MR jet	Estimated PA pressure :	0 mmHg	
Tricuspid Valve :	Normal	RA/RV normal		
Pulmonary Valve :				
Left Ventricle :	Normal systolic function			
Summary Information :	Left atrium normal			
Overall Comments :	Echo & report reviewed by Dr Currie. Significant aortic regurgitation. Unchanged from previous exam.			

1 Record(s) Found.

Website Comments

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Figure 2 Condensed echocardiogram (ECHO) report



Complete ETT Report



[Home](#) [Practice Overview](#) [Patient Population](#) [Patient Summary Screen](#) [ETT Results for an Individual Patient](#) [Complete ETT Report](#)

This is the Complete version of the ETT report;

Patient Name:	BROWN, PHILIP	Patient C#:	2109470WWH - CHI	GP Name:	Dr BERENHOLLINS	Consultant:	Johnstone, Dr D
Wd / Clinic :	5/6 OP	Hospital :	Ninewells				
Record Date :	10/03/1998						
Current Cardiac Medication (One):		Test Indication :	Diagnosis of chest pain				
Two :		Test Type :	Full Bruce Protocol				
Three :		Technician :	MF+JS				
Max ST Elevation Resting :			0 mm	Lead :			
Max ST Elevation on Exercise:			0 mm	Lead :			
Max ST Depr Resting :			0 mm	Lead :			
Max ST Depr on Exercise :			0 mm	Lead :			
ST Depression :							
Resting HR :	66 / min	Resting BP :	145/85 mmHG				
Standing HR :	77 / min	Max BP :	150/90 mmHG				
Max HR :	141 / min						
Pred. Max HR :	169 / min	% MaxHR :	83 %				
Exercise Time :	4 mins 39 secs	METS :	6				
Comments :							
Reported By :	Dr Sim						

Figure 3 Complete exercise tolerance test (ETT) report

HEARTS Clinical Information System - Microsoft Internet Explorer

Address: https://ecc.diabetes.scot.nhs.uk/hearts/

	HEARTS Patients on Database	All Known HEARTS Patients in your Practice		Validated HEARTS Patients in Validated Practices	
	9202	87		8697	
HEARTS Criteria		Number	Percentage	Number	Percentage
Population	<div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;"> MI Angioplasty/Stent CABG </div>	66	75.9%	7536	84.7%
		6	6.9%	993	11.2%
		19	21.8%	2260	25.4%
BP and Cholesterol (checked within last year)					
BP Recorded		66	75.9%	3373	37.9%
Recorded within target (<=140/90)		50	(75.8%) 57.5%	2101	(62.3%) 23.6%
Cholesterol Recorded		65	74.7%	6568	73.8%
Recorded within target (<5.0)		52	(80%) 59.8%	4858	(74%) 54.6%
Medication					
Antithrombotics		77	88.5%	7861	88.4%
Beta Blocker (MI Only)		31	47%	3532	46.9%
ACE Inhibitors (MI Only)		40	60.6%	3077	40.8%
Statin		60	69%	5565	62.5%
Miscellaneous (within last year)					
BMI Recorded		65	74.7%	2800	31.5%
BMI (<25)		12	(18.5%) 13.8%	678	(24.2%) 7.6%
BMI (25-29)		30	(46.2%) 34.5%	1177	(42%) 13.2%
BMI (30+)		23	(35.4%) 26.4%	945	(33.8%) 10.6%
Smoking Status Recorded		66	75.9%	2989	33.6%
Status Recorded as non-smoker only		57	(86.4%) 65.5%	2361	(79%) 26.5%
Exercise Status Recorded		65	74.7%	1776	20%
Alcohol Intake Recorded		53	60.9%	2258	25.4%

Figure 4 GP quality indicators summary page

NHS Tayside Tay Bridge Medical Centre (11058) HEARTS CHD8 Listing - Patients who do not meet the criteria

Home: [Regional Comparisons](#) | [GP Quality Indicators](#) | [HEARTS CHD8 Listing - Patients who do not meet the criteria](#)

HEARTS Population - MI, CABG and Angiography/Stent details showing date of most recent event where applicable

Patient Identifier	Name	Number of MIs	Angioplasty	CABG
010941KNNG - CHI	ANDERSON, EILEEN	1 - 02/07/2001		
311248KLGQ - CHI	MACKIE, LESLIE	1 - 15/07/2001		
281132KRBR - CHI	KIDD, DOUGLAS	1 - 09/04/1985		

3 Record(s) Found.

[Click here for Inclusion Criteria Information](#)

[HEARTS System Main Screen](#)
[Website Comments](#)

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Figure 5 Sample drill down for CHD

Protection Act of 1998 has led to major difficulties for everyone engaged in record linkage of patient data.^{16,17} HEARTS MCN employs a variety of approved mechanisms to maintain security and the rights of patients.

- All communications involving confidential data are encrypted.
- Firewalls and subnet address restrictions help prevent inappropriate access via TCP/IP (Transfer Control Protocol/Internet Protocol) and the Internet.
- All attempts to log-on to HEARTS MCN and every action subsequently taken are logged, producing audit trails.
- Patients must be centrally registered as belonging to a practice before that practice can view that patient's data.

The patient is ultimately in control of who can access their records. HEARTS MCN supports informed consent though the use of consent granting and denial forms. Should consent be denied, all records pertaining to that patient, with the exception of that patient's unique identifiers, are deleted. Once consent has been denied, that individual's care is conducted using only their written records.

We use an approved cleaning and anonymisation process (CLAM) to de-identify data items such as the CHI, references to a GP either by the NHS identifier or the General Medical Council (GMC) registration, references to a GP practice and references to a pharmacy.¹⁸ With these references anonymised, very nearly all the remaining data that could immediately identify individuals can simply be removed from the datasets. For example, all names and addresses and hospital or practice names can be removed without losing any information that might be of use to researchers.

The exact role that quality indicators in the new contract will play remains contentious.^{19,20} While GPs are likely to respond to financial incentives aimed at improving quality of care, there remains an important question as to how much total health gain is likely to result from the measures chosen in the new contract.²¹ Use of quality indicators in other countries has sometimes led to perverse incentives or gaming.²² What appears to be required for effectively integrated management of chronic diseases such as CHD, however, is provision of regular prompted recall and review of people with chronic disease by multidisciplinary teams collaborating across the health service and into the community. In Scotland, use of a UPI, the emergence of MCNs, more consistent recording of Read codes and regional repositories of data are proving to be useful contributions from primary care computing to equitable, evidence-based care.²³

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CONFLICTS OF INTEREST

None.

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