

# The eCollaborative: using a quality improvement collaborative to implement the National eHealth Record System in Australian primary care practices

ANDREW W. KNIGHT<sup>1,2</sup>, CRAIG SZUCS<sup>3</sup>, MIA DHILLON<sup>2</sup>, TONY LEMBKE<sup>2</sup> AND CHRIS MITCHELL<sup>3</sup>

<sup>1</sup>University of NSW, Fairfield, NSW, Australia, <sup>2</sup>The Improvement Foundation, Adelaide, South Australia, Australia, and <sup>3</sup>National eHealth Transition Authority, Sydney, New South Wales, Australia

Address reprint requests to: Andrew Knight, The Fairfield GP Unit, PO Box 5, Fairfield NSW, Australia 1851. Tel: +61-296168520; Fax: + 61-296168400; E-mail: wallynite@gmail.com

Accepted for publication 8 April 2014

---

## Abstract

**Quality problem.** The new national patient-controlled electronic health record is an important quality improvement, and there was a pressing need to pilot its use in Australian primary care practices. Implementation of electronic health records in other countries has met with mixed success.

**Initial assessment.** New work was required in general practices participating in the national electronic health record. National implementers needed to engage with small private general practices to test the changes before general introduction.

**Choice of solution.** The National E-health Transition Authority contracted the Improvement Foundation Australia to conduct a quality improvement collaborative based on 9 years of experience with the Australian Primary Care Collaborative Program.

**Implementation.** Aims, measures and change ideas were addressed in a collaborative programme of workshops and supported activity periods. Data quality measures and numbers of health summaries uploaded were collected monthly. Challenges such as the delay in implementation of the electronic health summary were met.

**Evaluation.** Fifty-six practices participated. Nine hundred and twenty-nine patients registered to participate, and 650 shared health summaries were uploaded. Five hundred and nineteen patient views occurred. Four hundred and twenty-one plan/do/study/act cycles were submitted by participating practices.

**Lessons learned.** The collaborative methodology was adapted for implementing innovation and proved useful for engaging with multiple small practices, facilitating low-risk testing of processes, sharing ideas among participants, development of clinical champions and development of resources to support wider use. Email discussion between participants and system designers facilitated improvements. Data quality was a key challenge for this innovation, and quality measures chosen require development. Patient participants were partners in improvement.

**Keywords:** quality improvement, primary care/general practice, health system reform, ehealth

---

## Quality problem

New work is required in Australian family practices for creating and uploading Shared Health Summaries (SHSs) to the new national, patient-controlled electronic health record. How could the new processes be tested in real-life, busy primary care practices before roll-out across the country?

The SHS comprises a patient's medical history, their medication list, their allergies and their immunization record. An

SHS is uploaded and updated by a particular provider nominated by the patient (usually their general practitioner/family physician). Patients can review their summary before it is uploaded to the national record.

Efforts to improve the quality of health care through electronic health records have had mixed results with proof of benefit hard to find [1, 2]. One large systematic review of the impact of health information technology found benefit in

adherence to guidelines, in surveillance and monitoring and in decreased medication error [2]. Veterans Affairs (USA) [3] and Kaiser Permanente [4] have claimed positive cost benefit from their ehealth record systems. The NHS England implementation had mixed success with the Summary Care Record being retained and having strong growth from 5 million records in January 2011 to over 34 million records by February 2014 [5].

Patients favour accessing their own records [6–11]. There is evidence that patient access to records enhances the doctor–patient relationship [9], increases adherence [7, 8] and increases empowerment [11], though up to a third of patients have difficulty understanding their own records [8].

## Initial assessment

By November 2011, the imminent date for the electronic health record infrastructure being launched (July 2012) made testing the new processes in actual primary care practices a pressing priority. The National E-health Transition Authority (NEHTA) faced the challenge of doing this with the many small, privately owned businesses that provide most primary care in Australia.

The new tools, skills, processes and systems needed to upload the SHS include the following:

- processes to register patients, providers and organizations in the online system,
- updating computers and software to be compliant with the new system,
- processes to improve and maintain data quality to ensure SHS are useful,
- processes for upload of summaries and
- obtaining patient consent and engaging them in ensuring the accuracy of clinical information.

## Choice of solution

NEHTA contracted the Improvement Foundation (IF) to conduct a quality improvement collaborative (QIC) to pilot these innovations, test systems and technology, identify improvements required and provide adoption stories and champions.

QICs have been used extensively to improve health systems. Evaluations have identified the QIC as possibly the most effective strategy available for closing the ‘quality chasm’ while acknowledging unanswered questions about cost effectiveness [12–14].

The Australian Primary Care Collaboratives (APCC) Program has employed QICs to improve primary care since 2005 [15–17]. The success of this programme in improving chronic disease care led to it being chosen for this project.

## Implementation

The collaborative occurred between November 2011 and August 2012. A reference panel made up of information technology experts, general practice experts and improvement experts set the aim (Box 1), the change principles (Box 2) and

### Box 1. Aim of the collaborative programme

Two thousand patients from participating general practices and health services in the eCollaborative wave have an accurate SHS established and maintained on a PCEHR by 1 August 2012.

the improvement measures (Box 3) for the project. This was done in a 1-day meeting designed to achieve realistic compromise between theoretical and practical priorities. The aim was deliberately set as a stretch that would be hard for the group to achieve. Measures addressed the number of SHS uploaded as well as practice data quality. Data quality measures needed to be extractable with existing tools used by the IF. These measures were brainstormed by the group and narrowed to two, which were thought likely to reflect improvements in the medication list and past history list, which are two important fields in the SHS.

The quality of past history recording was assessed by measuring the percentage of diagnoses, which had been recorded using a recognized coding system. The quality of the medication list was measured by assessing its currency. This was done by measuring the percentage of medications on the list for which a current script had been issued.

The change ideas listed below were proposed by the Expert Reference Panel after considering the processes required for creating and uploading an SHS. As this was a new activity, it was expected that they would be modified and new ideas created by the participating practices to suit their local teams and circumstances.

Small practice teams completed a series of three webinars alternating with two face-to-face national workshops (see Fig. 1). Between workshops, teams returned to their practices for activity periods implementing the change principles they had learnt. Practices used plan/do/study/act (PDSA) cycles to test and refine the changes that they made.

Each month, the data quality measures were extracted by practices from their practice software and uploaded to the qiConnect data portal of the IF. A monthly count was made of uploaded SHS. Results were fed back to practices to show progress and allow comparison with the group.

Sharing of successful strategies and failures occurred at workshops, through a wiki, through an email mailing list and at weekly ‘Tweet Up’s’ using Twitter. A series of audio and video podcasts and online instruction guides were produced.

Practices were supported by Collaborative Program Managers (CPMs) situated in their regional primary health care organization. A small experienced team from the IF organized the events, coached and supported the CPMs, coordinated data management and solved technical problems with the help of key NEHTA staff.

Progress in the QIC was assessed by changes in improvement measures. Participation was assessed by data submission rates, attendance at workshops, attendance at webinars and social media activity. Participants were required to submit PDSA cycles online as an indication of improvement activity. Each workshop was evaluated by participants.

**Box 2. eCollaborative change principles and change principles**

<b>Change principle</b>	<b>Change ideas</b>
Build and maintain the team	<ul style="list-style-type: none"> <li>Set realistic goals</li> <li>Communicate with other team members</li> <li>Engage the team</li> <li>Assign roles and responsibilities</li> <li>Reflect on and review what you are doing</li> </ul>
Undertake foundational work for the electronic health record	<ul style="list-style-type: none"> <li>Obtain a health provider identifier for individual health professionals (e.g. general practitioners, registered nurses and aboriginal health workers) (HPI-I)</li> <li>Obtain a health provider identifier for your organization (HPI-O)</li> <li>Obtain a patient's individual health identifier</li> </ul>
Develop systems to improve and maintain data quality across your clinical system	<ul style="list-style-type: none"> <li>Archive inactive and deceased patients</li> <li>Use consistent disease coding</li> <li>Develop a practice policy to ensure that patient's current problem and past history diagnoses are reviewed regularly</li> <li>Record results in the right place, including pathology results with HL7</li> <li>Use your clinical software or compatible data extraction tool to improve data quality</li> <li>Develop systems to maintain data quality, including medications, allergies and immunizations lists</li> </ul>
Develop systems to support the SHS	<ul style="list-style-type: none"> <li>Use process mapping to identify opportunities to integrate the SHS into the general practice and health service work flow</li> <li>Decide and document the nominated provider(s) responsible for maintaining the currency and accuracy of the SHS</li> <li>Inform your practice team about the processes of uploading an SHS</li> <li>Develop policy and procedures for checking, uploading and maintaining an SHS</li> </ul>
Engage your patients in the electronic health record system	<ul style="list-style-type: none"> <li>Identify patients who would most benefit from an SHS</li> <li>Inform your patients about the electronic health record system and, in particular, the SHS</li> <li>Develop systems to obtain informed consent from identified patients</li> <li>Process map the points of care at which patients can input into their SHS</li> <li>Design processes to increase patient review of their SHS</li> <li>Develop policies about points of care when patients are prompted to review their SHS</li> <li>Develop processes for patients to advise of any changes to their medication lists</li> <li>Seek patient advice on how they can contribute to the development and maintenance of their SHS</li> </ul>
Develop systems to improve the integration of care through use of the SHS across the care team	<ul style="list-style-type: none"> <li>Communicate with your local providers concerning the SHS</li> <li>Develop ways to use the SHS with other members of the patient's care team</li> <li>Develop processes that include the SHS in team care arrangements, Home Medicine Reviews, mental health plans, referrals to emergency, specialists and allied health providers</li> <li>Explore tools and resources to share care plans electronically</li> <li>Engage the patient to develop new strategies for sharing their SHS across their care team.</li> </ul>
Develop systems and processes to improve patient self-management skills using the electronic health record system.	<ul style="list-style-type: none"> <li>Use the electronic health record system to improve health literacy and self-efficacy</li> <li>Ensure the whole team is aware of and able to access the electronic health record to enhance patient self-management skills</li> <li>Develop key messages and terminology that support the reinforcement of key self-management concepts by the team</li> <li>Explore patients' use of the electronic health record</li> <li>Use the electronic health record system to promote other online health resources</li> <li>Bring patients together to provide feedback about the electronic health record and how its use can be improved</li> </ul>

## Evaluation

Practices were keen to participate with 222 expressions of interest received between 18th and 25th November 2011. Funding permitted 56 practices to begin the QIC. Two withdrew leaving 54 completing.

As the national infrastructure for uploading of SHSs was delayed, two alternative software solutions were used to enable participants to test the practice processes required. The delay in provision of the national technological solution as well as the temporary nature of the alternative structures delayed and reduced the number of summaries uploaded.

Participants communicated with each other, IF and NEHTA staff at national workshops, through their CPMs, by email and through social media. Email discussion was particularly active and detailed. NEHTA staff monitored the email discussion and gave rapid responses to the challenges practice staff were experiencing. Problems in registration of providers and consumers, the upload process and other areas were progressively identified and addressed. Issues were recorded and passed on to the appropriate party such as NEHTA, and other government departments and agencies. These key participants emerged as clinical leaders of the Collaborative and later were local champions for wider implementation.

A GP with a special interest was appointed social media director of the eCollaborative in order to explore and promote its use. The eCollaborative Twitter account had 93 registered followers with 217 'tweets' being shared. Only 5 of the 54 participating practices actively contributed to the Tweet ups. A larger number listened in including government and media, which led to some external attention [18]. One workshop had live

tweets displayed allowing participants to comment throughout the day. Feedback indicated that Twitter may have been utilized more frequently if participants were provided with detailed instruction on its functionality and advantages.

A wiki to which all participants could contribute was developed for the eCollaborative wave as a central repository of news and resources. A survey of participants in the collaborative indicated that 75% had a preference for face-to-face workshops and 74% chose email as their preferred method of communication.

Patients participated in workshops and provided advice and enthusiasm for the project. Concrete suggestions from them included using patients to recruit other patients to register for the PCEHR and using an iPad to share their summary with their specialist. For the trial system used in this project, patients and providers were given a secure password to access the patient's SHS. Patients gave informed consent to have their SHS uploaded. They expressed significant desire for rapid implementation of the National eHealth Record System. Practices were funded to include patient input in their local improvement changes.

Practice electronic health record data quality improvement measures are reported in Figs 2 and 3 and show little change. It is possible that the measures failed to capture the improvement that did occur. This is supported by the observation that there was a considerable increase in the absolute numbers of current scripts and coded diagnoses, suggesting that work was done and improvements were made. The development of useful, validated data quality improvement measures for Australian general practice is a need demonstrated by this project.

Nine hundred and twenty-nine patients registered to participate in the project. Six hundred and fifty SHSs were submitted as indicated in Fig. 4. There were 519 patient 'views' of records. Four hundred and twenty-one PDSA cycles were submitted, which is an average of 7.6 per participating practice.

### Box 3. eCollaborative improvement measures

#### Main outcome measure

Number of SHSs uploaded

#### Data quality measures

Percentage of diagnoses in the clinical database that are coded

Percentage of prescriptions in the 'active medication list' that are current

## Lessons learnt

This collaborative was different from the many health improvement collaboratives that the APCC has conducted, in that it focussed on a technical innovation rather than known health evidence. The Breakthrough Series quality

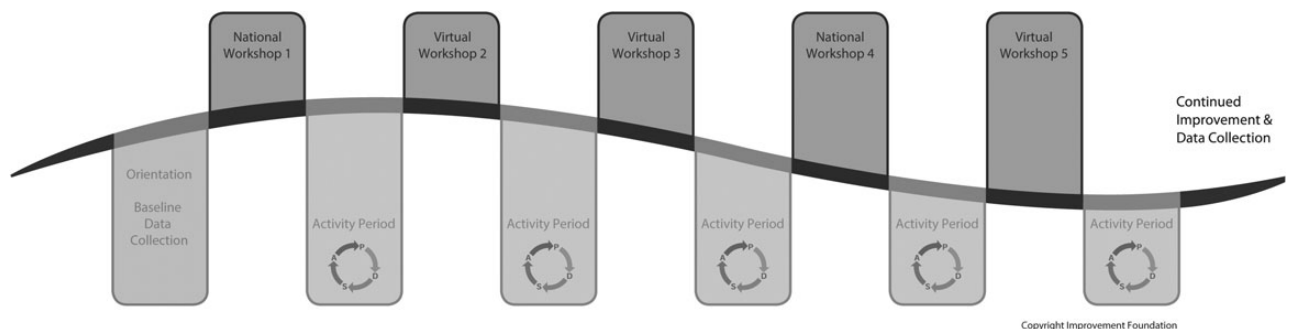


Figure 1 Outline of collaborative programme.

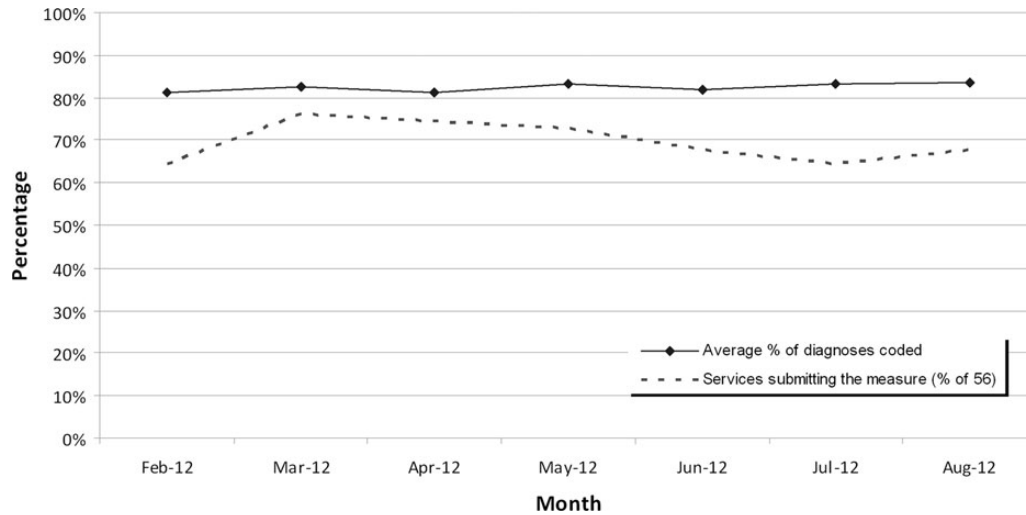


Figure 2 Average percentage of diagnoses coded in practice electronic health records ( $n = 56$ ).

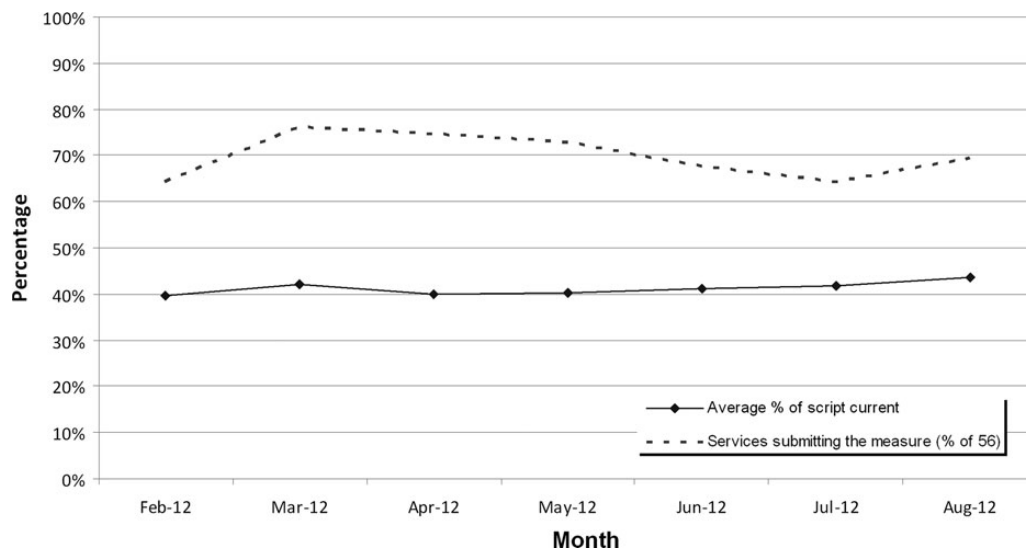


Figure 3 Average percentage of scripts current in practice electronic health records ( $n = 56$ ).

improvement collaborative methodology was created to ‘help health care organizations make “breakthrough” improvements in quality’ [19]. This collaborative is an adaptation of the methodology to test a technological innovation. Primary care-focussed health systems are emerging as the key to high-quality, cost-effective provision of health care in the future, but spreading innovation in multiple small private practices can be difficult.

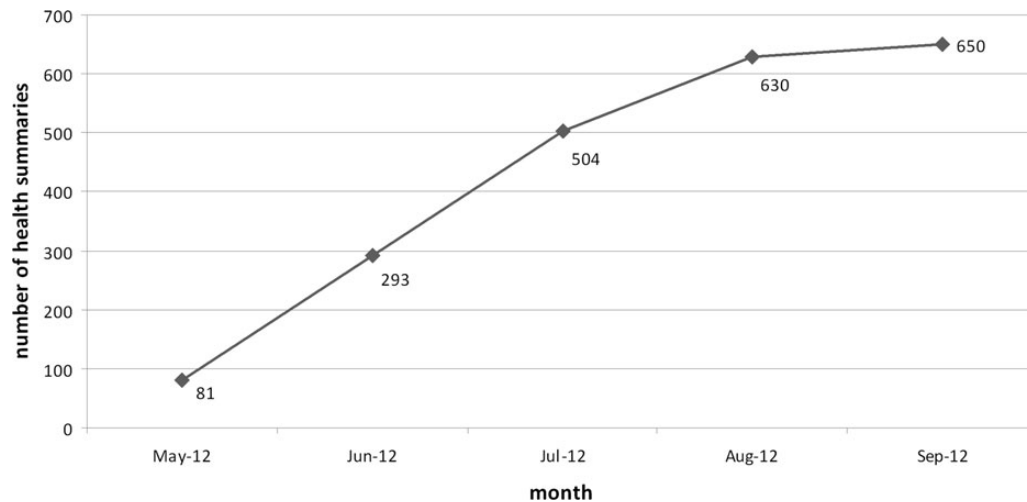
Experience overseas has shown that introducing a web-based electronic health record is not easy, and other countries have been variably successful. The upload of 650 summaries in real-world general practices under a tight time frame was a significant achievement while falling short of the stretch goal of 2000. Nine hundred and twenty-nine patient registrations and 519 views indicate good consumer engagement with the project.

Other health systems seeking to innovate in a similar primary care context may learn from the lessons listed below.

**We found the QIC to be a useful methodology for testing innovations because**

- The collaborative methodology provided a known and trusted model for engagement with multiple small private practices. Ecollaborative practices had previously participated in the APCC and so understood the methodology and quality improvement principles. The collaborative format has proven to be effective for building enthusiasm in participants, which was particularly important when dealing with a new topic such as ehealth changes.
- The existing infrastructure and methodology for collecting and feeding back data developed for the APCC could be easily adapted to support this project.
- Using a model such as a QIC limits risk by testing new technology with a small number of real-world practices. The QIC strategy is one model for trialling processes in a





**Figure 4** Number of SHSs uploaded.

small number of well-disposed, resilient real-world practices prior to wider roll-out and deserves consideration by others undertaking similar projects.

- By closely connecting the implementers (NEHTA) and the frontline clinicians, the QIC model used in this project facilitated identification and correction of difficulties with the technology of the innovation. Group email discussion proved the best channel for this. While interim systems were used in this collaborative, the processes involved in uploading were a good reflection of the mature system. NEHTA used an explicit process to capture and spread the lessons learnt by participating practices.
- QICs provide a context for the development of champions. Enthusiastic and creative individuals emerged as the collaborative progressed who participated in solving problems. Some of these have become credible clinical champions for the introduction of the national electronic health record in their local regions.
- It facilitated development and testing of resources and frequently asked questions. Development of these prior to the public launching of the electronic health record has improved credibility and smoothed wider implementation. Lessons from the collaborative have been incorporated into the Australian eHealth learning centre (<http://www.ehealth.gov.au>).

#### **Data quality remains a challenge after technical implementation has been achieved**

Good clinical data quality will require constant effort by all practices if useful information is to be uploaded and kept current to improve patient care.

Reliable, useful measures of data quality are required so that practices can measure the effectiveness of their improvement efforts in this area. Some participating practices were able to achieve large improvements in the data quality measures; however, overall the measures we chose were not responsive to the data improvement work done by the practices. In the short period of the collaborative practices tended to focus on

improving the data of patients whom they considered would most benefit from having an SHS such as those with multiple chronic conditions and older patients. Improving data of these patients did not result in noticeable movement in the overall data quality of the patient population of the practices. Measures of data quality are being reviewed. It may be better to measure changes in data quality in subgroups.

#### **Patients can be partners in implementation**

Patients were enthusiastic about the electronic health record. They were creative in identifying strategies for registering other patients in the health system and for using the records to inform their health care team. Having patient participation in workshops helped clinicians see beyond their own personal and organizational challenges to the importance of the innovation for patient care. Patients proved effective allies in checking the accuracy of their own clinical data and helping practices improve it.

#### **Funding**

This study was funded by the Australian Government Department of Health and Ageing through the National Ehealth Transition Authority and conducted by the Improvement Foundation Australia. Funding to pay the Open Access publication charges for this article was provided by Improvement Foundation Australia and the National E Health Transition Authority.

#### **References**

1. Bjerkeli Grovdal L, Grimsmo A, Ivar Lund Nilsen T. Parent-held child health records do not improve care: a randomized controlled trial in Norway. *Scand J Prim Health Care* 2006;**24**:186–90.
2. Chaudhry B, Wang J, Wu S *et al*. Systematic review: impact of health information technology on quality, efficiency, and costs of medical care. *Ann Intern Med* 2006;**144**:742–52.

3. Evans DC, Nichol WP, Perlin JB. Effect of the implementation of an enterprise-wide electronic health record on productivity in the Veterans Health Administration. *Health Econ Policy Law* 2006;**1**(Pt 2):163–9.
4. Chen C, Garrido T, Chock D *et al*. The Kaiser Permanente Electronic Health Record: transforming and streamlining modalities of care. *Health Aff (Millwood)* 2009;**28**:323–33.
5. Health and Social Care Information Centre. Key statistics for Summary Care Records. <http://systems.hscic.gov.uk/scr/staff/aboutscr/benefits/scrkey> (cited 2 June 2014)
6. Earnest MA, Ross SE, Wittevrongel L *et al*. Use of a patient-accessible electronic medical record in a practice for congestive heart failure: patient and physician experiences. *J Am Med Inform Assoc* 2004;**11**:410–7.
7. Ross SE, Moore LA, Earnest MA *et al*. Providing a web-based online medical record with electronic communication capabilities to patients with congestive heart failure: randomized trial. *J Med Internet Res* 2004;**6**:e12.
8. Bhavnani V, Fisher B, Winfield M *et al*. How patients use access to their electronic GP record—a quantitative study. *Fam Pract* 2011;**28**:188–94.
9. Fisher B, Bhavnani V, Winfield M. How patients use access to their full health records: a qualitative study of patients in general practice. *J R Soc Med* 2009;**102**:539–44.
10. Pyper C, Amery J, Watson M *et al*. Access to electronic health records in primary care—a survey of patients' views. *Med Sci Monit* 2004;**10**:SR17–22.
11. Ross SE, Lin CT. The effects of promoting patient access to medical records: a review. *J Am Med Inform Assoc* 2003;**10**:129–38.
12. ØVretveit J, Bate P, Cleary P *et al*. Quality collaboratives: lessons from research. *Qual Safety Health Care* 2002;**11**:345–51.
13. Mittman B. Creating the evidence base for quality improvement collaboratives. *Ann Intern Med* 2004;**140**:897–901.
14. Schouten L, Hulscher M, van Everdingen J *et al*. Evidence for the impact of quality improvement collaboratives: systematic review. *BMJ (Clinical Research ed)* 2008;**336**:1491–4.
15. Ford DR, Knight AW. The Australian primary care collaboratives: an Australian general practice success story. *Med J Aust* 2010;**193**:90–1.
16. Knight AW, Ford D, Audehm R *et al*. The Australian primary care collaboratives program: improving diabetes care. *BMJ Qual Saf* 2012;**21**:956–63.
17. Knight AW, Caesar C, Ford D *et al*. Improving primary care in Australia through the Australian Primary Care Collaboratives Program: a quality improvement report. *BMJ Qual Saf* 2012;**21**:948–55.
18. Croakey. The Crikey Health Blog. Learning from the 'pioneers of ehealth' in general practice. Melissa Sweet. 9.8.12. <http://blogs.crikey.com.au/croakey/2012/08/page/3/> (cited 2 June 2014).
19. The Institute for Healthcare Improvement. The Breakthrough Series: IHI's Collaborative Model for achieving breakthrough improvement 22.5.12. <http://www.ihl.org/resources/Pages/IHIWhitePapers/TheBreakthroughSeriesIHI'sCollaborativeModelforAchievingBreakthroughImprovement.aspx> (cited 2 June 2014).