

Online referral and OPD booking from the GP desktop

Caroline Nicholson, Claire L Jackson, Bernadette Wright, Paul Mainwaring, Dimity Holliday, Andrew Lankowski and Christine Kardash

Abstract

The Brisbane Inner South E-referral Project (BISEP) developed an application which allowed general practitioners, from their desktop, to successfully search for and book an available hospital outpatient appointment for patients with suspected cancer, send the referral electronically, and inform the patient of both the appointment and referral during the consultation. The hospital changed their outpatient department processes to allow such functionality for local GPs with patients with suspected cancer, working from a mutually agreed set of best practice referral criteria. A group of 19 GPs participated in an 11-week pilot implementation of the application, and were enthusiastic about continuing and expanding the approach. Patient satisfaction measures post intervention indicated that they perceived no major disadvantage in this form of outpatient department referral.

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Caroline Nicholson, MBA, GAICD, GradDipPhysio, Business Manager, Mater Centre for Integrated Health Care and General Practice

Claire L Jackson, MBBS, MPH, CertEc, GradCertMt, FRACGP, Director, Mater Centre for Integrated Health Care and General Practice

Bernadette Wright, MInfTech, MPH, GradDipNut&Diet, BSc, Director, Information Services

Paul Mainwaring, MBBS, MD, FRACP, Associate Professor in Oncology

Dimity Holliday, BPhy(Hons IIA), MBA(exec), Manager Clinical Information Systems
Mater Health Services, Brisbane, South Brisbane, QLD.

Andrew Lankowski, CertIV(AWT), IT Officer

Christine Kardash, DipNut&FoodSci, CEO
Brisbane Inner South Divisions of General Practice, South Brisbane, QLD.

Correspondence: Ms Caroline Nicholson, Mater Health Services, Brisbane, Level 2, Community Services Building, Raymond Terrace, South Brisbane, QLD 4101.

Caroline.Nicholson@mater.org.au

What is known about the topic?

The health system continues to search for effective ways of integrating care processes, particularly for those with chronic disease. The potential for information and communication technology (ICT) to link providers for this purpose has not yet been realised.

What does this paper add?

This pilot project demonstrated a successful approach to enabling general practitioners to book urgent patients into a hospital oncology clinic from their desktops, instantaneously. Attention to the human and organisational factors was as important as the right technology.

What are the implications?

Innovative use of ICT for the purposes of integrating care requires some permeability in organisational boundaries and careful change management, as well as acceptable technical solutions. ◆

HEALTH CARE SYSTEMS INTERNATIONALLY struggle to improve the integration of their acute and primary care systems, in order to better manage an ageing population with increasing chronic disease needs. Timely, legible and relevant clinical information transfer between acute and community care providers is critical to this goal. There is an abundance of literature discussing information transfer, systems integration and models of sharing data within institutions, however there is limited literature demonstrating successfully applied solutions in clinical practice that enhance information transfer across the continuum of care.^{1,2} Success criteria from the literature in this area include timeliness and relevance of information, clinician leadership and engagement, patient consent and effective change management.³⁻⁶

The setting for this pilot project, the Brisbane South Centre for Health Service Integration (BSCHSI), was established as Queensland's GP-Hospital Integration Demonstration Site in 2003.

This multi-organisational collocation involved Queensland Health (via Brisbane South Community Health Service), the Brisbane Inner South Division of General Practice and Mater Health Services (Mater) working collaboratively to facilitate the development of an “integrated” health care approach. A key element of the integrated information management approach for the BSCHSI was to build on an identified need, from both hospital and community, to provide more timely access to appropriate hospital assessment and management for patients with suspected cancer.

In 2004, the BSCHSI was approached by IBA Health Ltd to pilot an electronic online referral and booking system process. This pilot (the Brisbane Inner South E-Referral Project [BISEP]) was funded in June 2004 by the Commonwealth Department of Communications, Information Technology and the Arts via the Information Technology Online Program for 12 months. The goal was to assess the feasibility of electronic booking and referral from general practitioners’ desktops to the Mater’s outpatient department (OPD), focused on acute oncology assessment and referral. Specifically, GPs external to the Mater were to be able to refer and urgently book Category 1 patients (appointment within 30 days desirable) with suspected cancer into the Mater’s specialist OPD, confirm appointments with the appropriate clinic while the patient was still at the consultation, and attach to the appointment an electronically generated referral with timely, relevant and legible information for the appropriate hospital specialist.

BISEP’s three key objectives were to:

- Improve effectiveness in health service delivery (via the creation of an effective means to e-refer and e-book from the GP desktop, improvement in the quality of information transferred and the timeliness and appropriateness of appointment bookings);
- Improve the patient experience by decreasing anxiety and improving satisfaction with care; and,
- Improve health professional satisfaction with health service delivery.

Methods

BISEP was a 12-month project incorporating three distinct phases — the design, development and successful deployment of the software (8 months); implementation and training within the hospital OPD and local general practices (2.5 months) and evaluation and reporting (1.5 months).

All general practitioners from the Brisbane Inner South Division of General Practice who had broadband access and used clinical software applications were invited to participate. Of 20 potential participants approached, 19 GPs from five practices agreed to have their computers configured by the Divisional Information Technology Officer so that they could participate in the pilot.

Software design and development

BISEP required that GPs be able to make patient appointments into the appointment management systems in use at the Mater. To facilitate this, an external interface was required to allow access to view available clinic time slots for each participating clinic, provide the ability to select a time for the patient, and then allow the GP to upload their referral details. An initial solution made available to the Mater was from Oracle, however, irwinSolutions was subsequently contracted to provide its software solution because of its compatibility with the Mater’s SQL server platform.

Essentially, the solution consisted of an existing irwinSolutions product, SmartAppoints, which was situated on a server in the Mater’s demilitarised zone, a firewall configuration allowing GP access to the system on a Mater server while securing the Mater’s local area network (Box 1). This was linked via a web service to one of the hospital’s appointment systems, Plexus, and was able to display real-time information on available appointments for particular OPD clinics. Information on other clinics, managed in the legacy system HBCIS (hospital-based corporate information system), was manually entered into SmartAppoints for display, as it was not possible to provide a real-time interface with the HBCIS system.

An administration module was developed to allow for the maintenance of the clinics and appointments in SmartAppoints. The ability to upload a referral into SmartAppoints was also developed. The SmartAppoints online application and BISEP application were installed in the Mater environment on 12 January, 2005. Testing was conducted between 12 January, 2005 and 18 February, 2005. The application went “live” for GP training and implementation at this time, after 8 months of design. Training and installation in the practices continued until early May 2005.

System security was supplied by a two-stage authentication process, based on lightweight directory access protocol (LDAP) authentication using Mater’s e-Directory and Medicare Australia’s Health eSignature Authority (HeSA) Public Key Infrastructure (PKI) web certification. Due to technical difficulties in trying to incorporate the Health Insurance Commission’s HeSA PKI

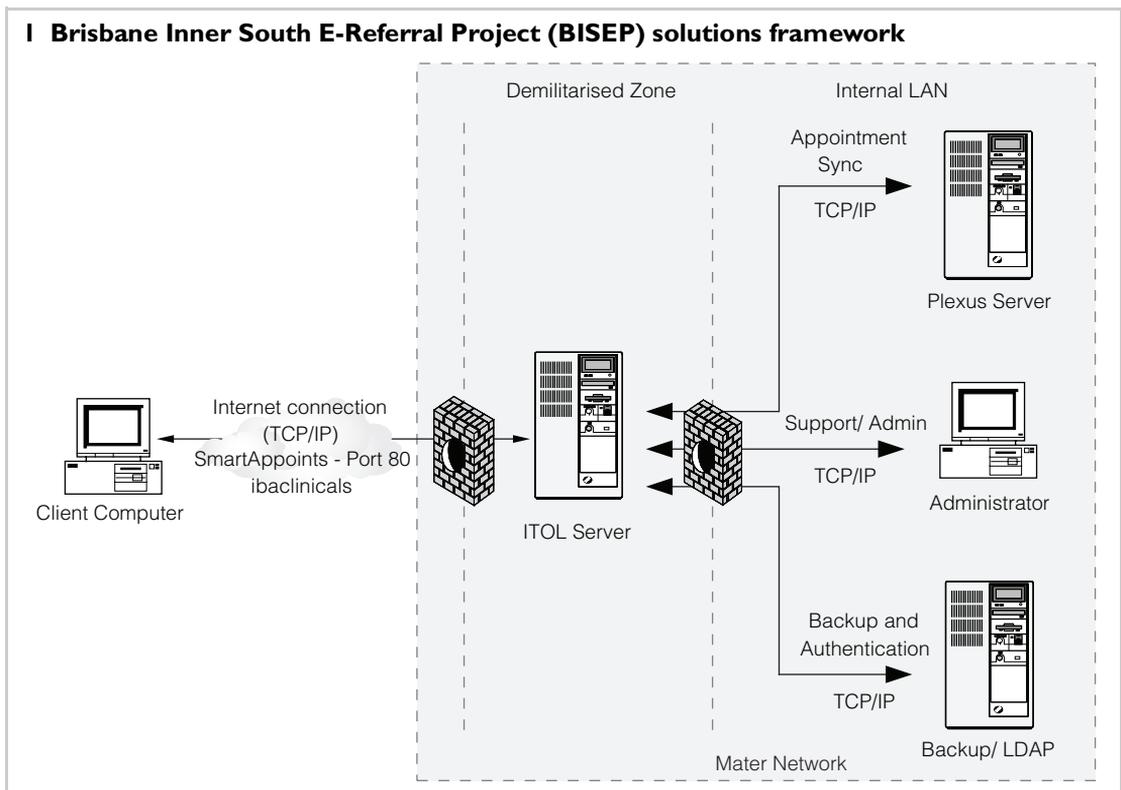
authentication with Mater’s reverse proxy, it was necessary in a number of cases, for those who did not already have it, to provide GPs with static internet provider addresses and treat them as “trusted sites”. As this alternative internet provider address configuration was not possible with one practice during the pilot phase, due to service provider plan limitations, this practice was excluded.

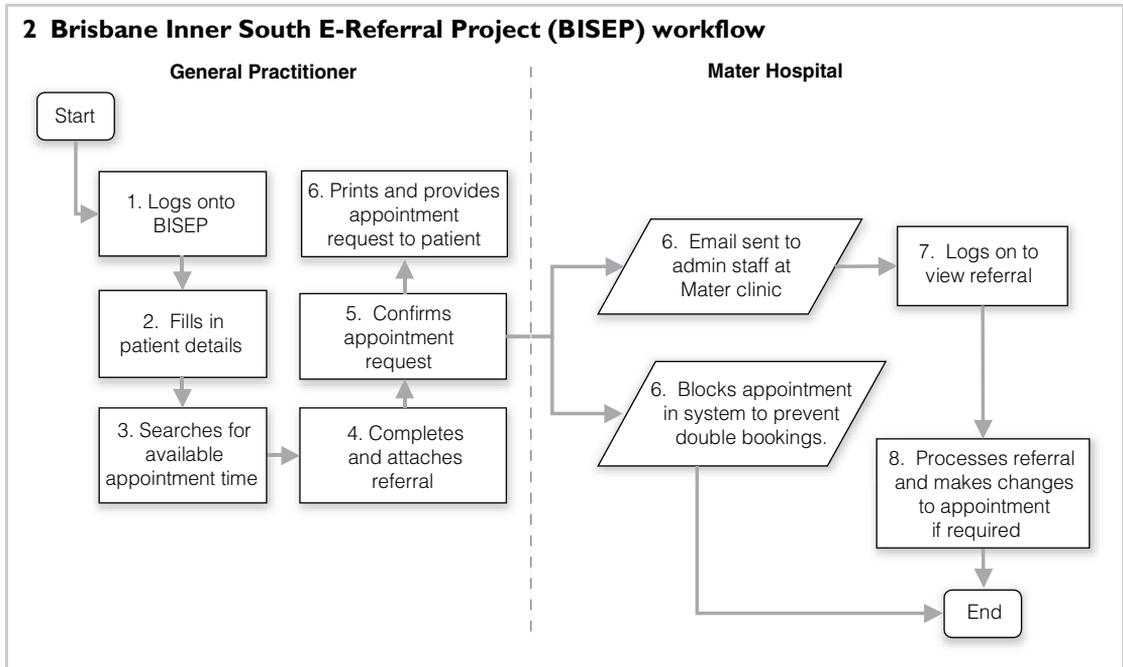
Practice use of broadband was a prerequisite for GP participation in the trial.

Change management and system redesign

Change in administrative practice

The BISEP pilot required managers, clinicians and administrative staff in both the general practices and the hospital OPD to adopt a new approach to information transfer. The pilot required changes in administrative practice in both settings, use of new e-business systems,





and the hospital to share control of OPD bookings with GPs. These processes presented significant attitudinal and practice challenges. The Project Manager and sponsor met repeatedly with hospital administration and clinical staff to highlight the beneficial impact on anxious patients of easier and timelier access to appointments and assessment. Similarly, the Divisional IT Officer provided GPs and practice staff with information about the aims and objectives of the study, study tools and requirements, and IT implications for the practice. An educational evening, midway through the project, provided another opportunity to highlight the patient benefits, as well as the likely costs in time and retraining, for each practice.

Significant business process re-engineering, including the development of best practice clinical guidelines, and mapping both current and proposed OPD workflows, required collaboration and commitment from clinicians, managers and administrative staff. A number of processes historically undertaken by hospital OPDs such as categorising patients, searching for available appointments, informing patients

when and where the appointments were available, and performing some of the clinical work-up, such as medical imaging and pathology, were transferred to the GPs and GP practice staff (Box 2).

Development of a best practice referral tool to support clinical change

A referral tool based on the NHS "Guidelines for urgent referral of patients with suspected cancer"⁷ was adapted for use via consultation with the GP and hospital clinician group. After initial revision by the project team, ownership and input was sought from those clinicians participating in the pilot. Hospital and GP clinicians involved in the project team met with the Mater Leadership Team, Mater Adults Hospital Advisory Council, and the Directors of Medicine, Surgery and Cancer Services, OPD staff and specialists involved in the Right of Private Practice (RoPP) clinics. Input from all these groups was incorporated into the guideline redesign. The referral tool was then presented to the local GPs and further revised. It was finalised in January 2005.

3 Patient satisfaction survey results (n = 6)

Satisfaction criteria	Mean (SD)
<i>Regarding the care you have received for your condition from health care staff at the hospital or in your general practice related to your recent referral and assessment:</i>	
I understood what was planned for my care at all times	4.5 (0.837)
The information I received from the health professionals was easy to understand	4.33 (1.211)
I was sometimes anxious not knowing if I had an appointment or not at the Mater hospital	3.17 (1.472)
I needed to have a number of my tests repeated at the Mater hospital because the results were not available from my GP	2.67 (2.082)
I believe staff maintained confidentiality and respected my privacy	4.80 (0.447)
My GP has been up to date with current medical information/issues relevant to my health problem	4.67 (0.516)
I believe my GP got all the information that he/she needed about my condition from the Mater hospital (eg, test results)	5.00 (0.00)
<i>General satisfaction</i>	
I am satisfied with the care I received for this condition in the past 6 months	5.00 (0.00)
I believe the necessary information about my condition was smoothly transferred between my GP and the Mater hospital health care team	4.75 (0.500)

General practitioner training

Over months eight to eleven, the Divisional Information Technology Officer visited all practices to train the GP users. This included individual GP familiarisation with the software application, security passwording, completing a “dummy-run” OPD booking, and a question-and-answer session. Information packs, a simple trouble-shooting guide, and a laminated copy of the referral guidelines were provided to GPs and practices using the system.

Nineteen GPs from five practices agreed to have their computers configured by the Divisional Information Technology Officer. This process involved the set-up of a desktop shortcut, loading of the generic GP Referral Tool, installation of PKI location certificates, and testing and training of the BISEP application. Of the five pilot practices, four used Medical Director (MD), and one used IBA Plexus (GP software programs). An education evening was held midway through the pilot to familiarise GPs with the software application, criteria for referral, and the new e-referral process.

E-booking system design

Before the “live phase” the Divisional Information Technology Officer configured the computers of all GPs participating in the pilot. This included the set up of a desktop shortcut; loading of the HeSA PKI location certificate; and loading the generic GP Referral Tool required for the pilot. GPs wishing to refer an appropriate patient to the Mater OPD would navigate to the appropriate web page via the BISEP desktop icon. GPs would then enter their password and patient details, search by provider or speciality, identify an appropriate time and date for an OPD appointment, book the appointment in real-time and attach and forward an e-referral. The referral document (either Microsoft Word or pdf) was appended in the same way as attaching a document to an email.

Evaluation

Evaluation of the three project objectives was undertaken by audit and survey. Responses were scored on a Likert-type scale of 1–5, with “strongly disagree” = 1 and “strongly agree” = 5 (neutral = 3).

Pre-pilot evaluation

A pre-evaluation audit was undertaken of new referrals categorised as urgent in the 2002–2003 financial year to the clinics that would be targeted in the BISEP pilot (*n* = 301). This audit demonstrated that these referrals took, on average, 5.0 days to achieve an OPD booking.

The average percentage of “did not attends” for initial appointments for clinics targeted in BISEP was calculated as 27%.

Post-pilot evaluation

Post-pilot evaluation included:

- GP satisfaction survey. The GP survey was administered to the 19 GPs — eight who had referred a patient over the 11-week “live” phase (two “initial pilots” to test the system and six “real” patients), and 11 who had received training in the final month of the pilot. Response rate was 84% (*n* = 16).
- Patient satisfaction survey. All patients (*n* = 6) were interviewed face-to-face, using a standardised format, before their appointments at the Mater OPD.
- Hospital specialists staff satisfaction survey. Four of the five specialists involved (80%) responded.

4 GP satisfaction survey results (n = 16)

Satisfaction criteria	Mean (SD)
<i>Being involved in the e-booking and referral project . . .</i>	
increased the amount of collaboration I have with members of other health professions/ sectors/my Division of General Practice	3.88 (1.025)
supported more efficient information sharing between hospital and community providers	3.94 (0.998)
promoted an approach which values teamwork between health professionals in the hospital and community	4.13 (0.885)
has saved me time in referring my patients to the Mater’s OPD	3.75 (1.612)
promoted an attitude of respect for the opinion of health professionals in other health settings	3.88 (0.885)
contributed to a feeling of increased trust between hospital and community	3.88 (0.806)
<i>Tools for this project have . . .</i>	
given me an improved form/referral template for patients with suspected cancer	3.75 (1.183)
provided me with a useful guideline to assist in booking urgent appointments for patients with suspected cancer	4.19 (0.981)
provided me with a new electronic OPD referral approach that is technically easy to use	4.06 (0.929)
<i>Through participation in the project . . .</i>	
I have been adequately prepared/trained for this new approach	4.38 (0.518)
the new approach to Mater OPD booking reduces test duplication for the patient	4.13 (0.835)
the new approach to Mater OPD bookings makes the best use of health professionals’ time	3.88 (1.246)
I believe the new process delivers best patient care	4.38 (0.744)
I believe the new process improves the timeliness of Mater OPD bookings	4.62 (0.518)
<i>The BISEP process has . . .</i>	
increased my confidence that my referral is being actioned	4.50 (0.535)
made the referral process as easy as possible for my patients	4.62 (0.518)
made little difference to booking a Mater OPD appointment	1.75 (0.707)
improved the quality of information sharing between hospital and community providers relevant to patient care and safety	3.88 (1.356)

OPD = outpatient department.



- OPD audit of patient referrals ($n = 6$) sent via the BISEP application.

Results

Objective 1: Improved effectiveness in health service delivery

OPD referral audit

Over the 11-week live phase of the pilot, a total of eight GPs attempted online booking and referral. All real patients ($n = 6$) were successfully booked an appointment electronically and had an e-referral attached. The e-booking and e-referral to Mater OPD was achieved instantaneously compared with five days pre-pilot.

Objective 2: Patient satisfaction

Patients agreed that they understood what was planned for their care at all times; received information from health care professionals that was easy to understand; believed staff maintained confidentiality and respected their privacy; that their GP was up to date with issues relevant to their health; and that their GP had received all relevant information about their condition from the Mater Hospital (Box 3).

Objective 3: Improved health professional satisfaction

GP satisfaction

GP satisfaction with BISEP was high overall (Box 4).

Hospital specialist staff

Four of the five consultants returned a completed questionnaire (response rate, 80%). Hospital specialists, while supportive, noticed little difference in the processes from their perspective, as most of the change related to processes before consultant assessment. There were a high proportion of "not applicable" items in all questionnaire areas. In four questions (Box 5) there was a response rate $\geq 50\%$. Hospital specialists agreed that BISEP had increased their confidence that referrals were being efficiently actioned, and that it made the referral process as easy as possible for the patient (Box 5).

Discussion

The success of BISEP, even on a small scale, demonstrates the importance of addressing software challenges (including security) and partnering with clinicians in development, training and clinical change, to successfully implement new e-processes in the health sector. The development of the software interface, like many such initiatives, took longer than planned due to changes in the software platform, security requirements and accessing GPs for training. This left a short implementation window within a fixed-term project. Despite this, the GPs who identified appropriate trial patients within the 11-week live phase of the trial both booked and e-referred their patients successfully to OPD. Time taken to process OPD referral decreased, and GP survey results demonstrate their high level of enthusiasm for the new processes, and posi-

5 Hospital specialist survey results ($n = 4$)

Satisfaction criteria	Mean (SD)
The BISEP process . . .	
has increased my confidence that referrals are being efficiently actioned	4 (1.00)
made the referral process as easy as possible for patients	3.67 (0.577)
made little difference to booking a Mater outpatient department appointment	3.33 (1.528)
has improved information sharing between hospital and community providers	3 (1.00)

tivity about the effectiveness and broader application of the technology. GPs also indicated that time taken to e-book would lessen as they became more familiar with the e-booking and referral process. Patient satisfaction measures post-intervention were high, indicating they perceived no major disadvantage in this form of OPD referral. As most of the change related to processes before consultant assessment, hospital specialists, while supportive, noticed little difference in the processes from their perspective.

Just as important as an efficient e-booking and referral tool was the change management approach underpinning it. This included excellent cooperation and teamwork between the hospital OPD, the Brisbane Inner South Division of General Practice and participating hospital clinicians and GPs. It also included broad consultation between hospital and community clinicians concerning the best practice referral guidelines and the approach to be taken, individualised practice training with ongoing learning support, seamless integration between solutions to avoid duplication of data, and effective communication tools and resources to support a successful change management process. The time devoted to communication, inclusion, support and review by the Project Manager and Divisional Information Technology Officer was considerable, but was one of the key success factors. The unifying focus was to provide patients with a timely, high quality assessment, which neutralised anxiety concerning effective processing of the GP referral.

In 2006, with systems now capable of supporting the use of Medicare Australia's HeSA PKI certificates, the scope of e-referrals will be broadened to include GP e-referrals into the Domiciliary Allied Health Acute Care and Rehabilitation Team, and Mater Mothers' Antenatal Clinic. The Mater is also considering using the application for internal online referrals.

The success of this initiative again demonstrates the key factors underpinning better

integrated care — a unified vision, patient focus, high-quality communication and information exchange, attention to cultural differences between providers, and commitments and incentives to change established practices.

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Competing interests

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