Safety and Quality Evaluation of Electronic Discharge Summary Systems

Final Report

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AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTHCARE

Clinical Handover
ACSQHC

Safety and Quality Evaluation of Electronic Discharge Summary Systems Final Report

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This document can be downloaded from the ACSQHC web site: www.safetyandquality.gov.au

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Executive Summary

Background

Clinical handover refers to the "transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis"[1]. Clinical handover at the point of patient discharge is of critical importance for patient care. Hospital to community handover, involving patient discharge from the hospital to the community, is a particularly high risk scenario due to the potential impact of poor discharge processes, poor communication and differences in information quantity and quality[2]. As a result, there are increased risks of medical errors (including medication errors) and subsequent patient re-hospitalisation[3].

Given the critical nature of discharge handover, the Australian Commission on Safety and Quality in Health Care (the Commission) engaged KPMG to conduct an evaluation of the quality and safety impacts of introducing electronic discharge summary systems (EDS systems). The evaluation was conducted at two primary lead sites and a third jurisdiction in Australia, all of which had recently implemented an EDS system. The evaluation delivered two key outputs, specifically a Self Evaluation Toolkit and this final report. This final report provides an overview of the major findings related to the evaluation activities conducted during the project period.

The primary focus of the evaluation was to assess the impact of EDS systems on patient safety and the quality of care provided during patient transfers between acute health settings and GPs. This final report details the achievements and benefits associated with the implementation of an EDS system, components of successful implementation, associated potential safety and quality risks, and recommendations for the future.

Achievements and benefits

At the lead sites, the introduction of the EDS system was associated with a number of positive benefits. These benefits related to improved processes, alignment with best practice and pursuits toward a more integrated health information environment. Specific benefits reported following implementation of an EDS system included improved timeliness of receipt, legibility and consistency of content, and increased security of transmission. It should be noted that the evaluation did not have available detailed 'pre and 'post' measures; as such, the potential benefits are reflective of stakeholder consultation and data analysis undertaken.

Components of a successful implementation

The success of EDS system implementation was dependant on a number of factors, which can broadly be described as enablers and barriers.

The enablers which facilitated the EDS system implementation included ensuring adequate training for end users, effectively managing relationships with key stakeholder groups throughout planning and implementation, and being able to use measurement and feedback to reinforce the positive changes as they occurred.

The barriers to EDS system implementation were related to change management and system limitations. The change management barriers included the challenges of finding and maintaining strong ownership and leadership of the EDS system, engaging key stakeholders (particularly clinicians), and failing to fully assess the impact of EDS implementation on workflows. System barriers were associated with lack of clarity around system flexibility and system limitations, such as the limited ability of systems to auto-populate the EDS and the requirement for manual transcription of medications from multiple sources of information into the EDS.

Potential safety and quality risks

The evaluation highlighted a number of potential patient safety and quality of care risks that need to be considered and understood within the local health service context. Some of the potential risks identified were that key patient information can be difficult to locate within the EDS, there remains the potential for transcription errors, and the system interactions may affect the accuracy of information transcribed. Given the evaluation was conducted post EDS implementation at the lead sites, these potential risks have not been quantified but rather stated as they may or may not in fact reflect ongoing, rather than new, issues and risks associated with patient discharge.

Conclusions and recommendations

The identification of clear benefits and risks remains emergent, given the timing of the evaluation, after each of the lead sites had implemented their EDS system. There is qualitative evidence to suggest quality of care and patient safety improvements which may be derived through the implementation of an EDS system.

Areas for future work for the Commission and national research priorities focus on continuing to promote the importance of a high quality EDS system, from a patient safety and care perspective. The specific recommendations for the Commission are:

- promote, publicise and advocate the use of the self evaluation toolkit developed in the evaluation
- consider developing a similar self evaluation toolkit for general practitioners (GPs) and general practice staff
- continue to promote the importance of a high quality EDS system, from a patient safety and care perspective
- develop tools to identify and quantify the quality and safety risks during and post implementation of an EDS system that health services can use to manage risks in their projects

- continue to work with NEHTA to ensure that national eHealth strategies, relating to EDS systems, are appropriately linked with the Patient Controlled Electronic Health Record (PCEHR) directions.

The following research activities are recommended to further inform the quality and safety implementation and use of EDS systems within Australia:

- investigation into the medication errors associated with the multiple sources of medication information currently being used

- investigation of the risk management systems used at both the GP and acute end to identify the common issues that are attributable to the implementation of an EDS system

- further investigation into and quantify the actual work load and work flow impacts on staff in the implementation of an EDS system and compared to previous discharge processes.

1 Introduction and Background

1.1 Context

Clinical handover is the term used to refer to the "transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis"[4]. Clinical handovers occur frequently along a patient's journey through the health system, such as between like workers at shift change in a single facility, between clinicians upon transfer to a different unit within a hospital, or when a patient enters or leaves a particular health care facility.

The frequency at which clinical handovers occur has increased in recent years, partly due to the reduction in doctors' work hours which has increased the number of shift turnovers and, as a consequence, the number of handovers. The complexity of handovers is also increasing, due to the increasing complexity of care, the use of more technology, and the involvement of more health care professionals and support services for each patient[5].

Clinical handover at the point of patient discharge is of critical importance. In a literature review of clinical handover conducted in 2008, a group of Tasmanian researchers identified a number of high-risk scenarios in clinical handover. Identified as one of these high-risk scenarios was the hospital to community handover (that is, discharge from the hospital to the community). These risks related to poor discharge processes due to poor communication and differences in information quantity/quality depending on a patient's community destination[6]. Stemming from these risks was the increased incidence of medical errors (including medication errors) and re-hospitalisations[7].

Unlike handover at many other points in patient care where information may (partly or wholly) be transferred verbally, clinical handover at the point of discharge generally occurs via a written document, usually in the form of a discharge summary. A discharge summary is a "collection of information about events during care by a provider or organisation"[8]. Its purpose is to provide the information about the patient's hospital stay such that health care providers in the community can maintain continuity of care. These providers may include GPs, specialist doctors, residential aged care facilities or other health care providers involved in the patient's care (e.g. allied health, community nursing).

A range of problems have been identified with discharge summaries, including delays in communication, the inclusion of inaccurate information, and the omission of important information. These problems may be associated with adverse events for patients. There is well documented evidence of such events relating to medication errors. [9] [10]

A variety of strategies have been trialled to improve the quality of discharge handover using a discharge summary, such as education and training, the establishment of

standard operating procedures, and change management strategies. One of the chief interventions however, has been the introduction of electronic tools, such as EDS systems.

An EDS system changes not only the mode of delivery of the discharge summary, but also the format and method used to populate the discharge summary.

The literature highlights that the term 'electronic discharge summary' is applied to a range of different configurations. Some examples of electronic discharge systems include those where:

- discharge software is added to an existing eHealth system (e.g. EMM, PAS, ePrescribing systems) and information is electronically transferred between the existing system/s and the eDischarge system
- the discharge summaries are generated electronically but then manually (e.g. faxed or mailed after being printed) transmitted to the GP
- some data is automatically populated into the electronic discharge summary, whilst other items must be entered by manual transcription from the paper medical record.

For the purposes of this report, we have defined 'EDS' as an end-to-end electronic transfer from the hospital to the community, using a secure messaging system, with the information populated using both pre-populated fields and manual transcription.

1.2 Project purpose and scope

The Australian Commission on Safety and Quality in Health Care engaged KPMG to conduct an evaluation to measure the impact of using structured document templates for discharge summaries, including for electronic discharge, on safety and quality. Additionally, KPMG produced a self-audit evaluation toolkit for future implementations based on the evaluation findings.

The primary focus of the evaluation was to assess the impact of EDS systems on patient safety and the quality of care provided during transfers between acute health settings and GPs.

Specifically, the objectives of the project were to:

- undertake a safety and quality evaluation of EDS systems

- measure the impact on safety and quality of using structured document templates for discharge summaries, including EDS[1]
- develop a self-audit evaluation toolkit, produced to assist future implementations.

Further, the scope of the project was to:

- develop a set of safety and quality measures for use in evaluating the impacts of using a structured document template for discharge, including for EDS
- develop a thorough project methodology, encompassing a multi-method approach to evaluation
- satisfy all ethics requirements of the case study sites
- conduct the evaluation at two case study sites nominated by ACSQHC
- provide detailed reports on project progress at regular intervals
- present a detailed analysis of the evaluation data in an evaluation outcomes report
- liaise closely with ACSQHC, clinicians and management at the case study sites and any other parties nominated by ACSQHC throughout the project.

1.3 Purpose of this report

This report is the final report associated with this project, and provides an overview of the major findings related to the evaluation activities conducted during the project period.

It should be noted that this report does not focus on findings associated with the self-evaluation toolkit or the literature scan, which were both developed as part of the project. These documents are available for download from the Commission's website: www.safetyandquality.gov.au.

[1] The original evaluation project scope included reviewing Structured Document Templates, being mindful that, at the time, many health services may not have been using full EDS systems. However, given that each of the lead sites involved in the evaluation had an EDS system in place, the scope was narrowed by the Project Oversight Group.

2 Evaluation Methodology

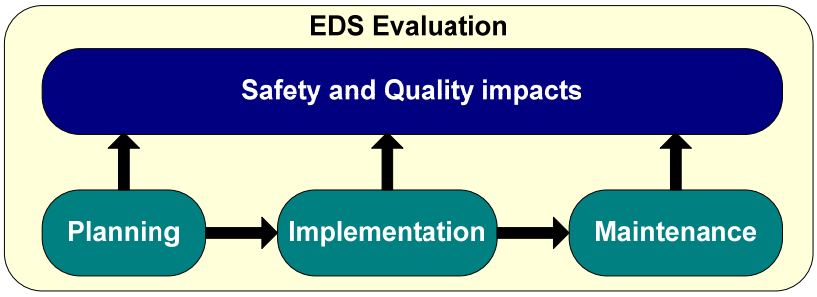
In undertaking this project, KPMG developed a comprehensive evaluation framework. This framework served to establish the approach and focus of the evaluation, articulate the evaluation areas of enquiry, and specify the data collection activities. This section of this final report provides a high level overview of the overall evaluation approach and the data collection activities undertaken.

2.1 Evaluation approach

The purpose of the evaluation was to evaluate the safety and quality impacts related to the implementation of EDS systems at two lead sites.

To provide structure, our approach to the evaluation considered the process of implementing an EDS system in three principle phases: planning, implementation and maintenance. As such, the evaluation sought to identify and understand the safety and quality effects at each of these three stages. This is illustrated in Figure 1 below.

Figure 1: Evaluation focus

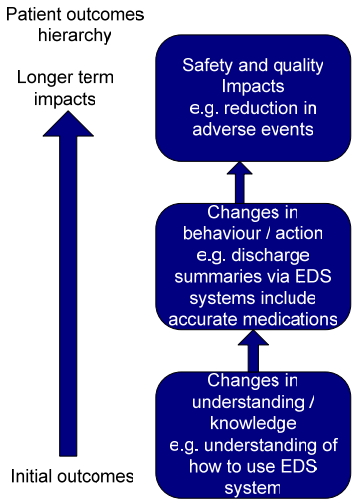


Source: KPMG (2011)

The principal challenge for the evaluation related to the difficulty in accessing data that truly reflects the safety and quality impacts attributable to the implementation of EDS systems. Ideally, the evaluation would be able to measure elements, such as reduction in adverse events associated with discharge, and link a change in these events to the introduction of the EDS system.

Figure 2 demonstrates the various levels at which the safety and quality effects of implementing an EDS system might be considered. In the implementation process, changes can be expected in the knowledge and understanding of the importance and use of the EDS system. This can then be expected to influence behaviour or action, which can be assumed to be a consequence of the change knowledge and understanding. It is further to this change in action that it can be logically assumed that safety and quality impacts (such as the reduction in adverse events) might ensue.

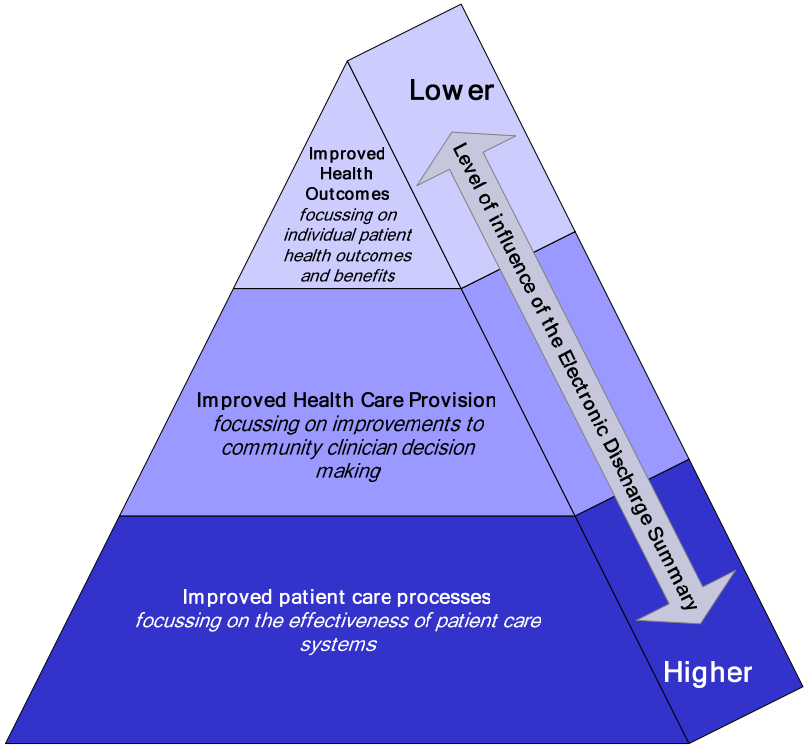
Figure 2: Outcomes hierarchy for safety and quality



Source: KPMG (2011)

However, as implementation of an EDS system is an ongoing and iterative process, it is commonly difficult to have appropriate and reliable pre- and post-implementation data available in a timely manner to inform the evaluation. Further, given the myriad of factors at play, it is difficult to identify data that enables attribution of a change in patient outcomes directly to the implementation of an EDS system. This is illustrated in Figure 3, below.

Figure 3: Level of influence of the EDS system, by outcomes



Source: KPMG (2011)

Given these challenges, the evaluation approach included measures taken of elements which can be logically assumed to be precursors of such safety and quality impacts.

As such, measuring these initial outcomes of changes in understanding and knowledge, and changes in action, may provide some indication of the safety and quality impacts of the process, particularly where access to true safety and quality impact indicators is difficult. Further, given the literature emphasises the significance of 'change management' challenges associated with introducing an electronic discharge system, more detailed investigation of the behavioural change aspects of implementation appeared prudent.

The evaluation focused on two key objectives:

1. To assess the safety and quality impacts, both positive and negative, associated with the introduction of EDS systems

2. From the experiences at the lead sites, to focus on the safety and quality impacts related to the planning, implementation and maintenance operations associated with the EDS system, to determine:

    a. what worked (the enablers)

b. what were the challenges (the barriers)

c. what should have been done differently.

Within each of the three phases of EDS system implementation, a number of evaluation questions were established. The purpose of these questions was to articulate the key issues to be examined and in turn direct both the appropriate evaluation activity and identify the sources of data required.

Understanding the importance of the context

Critical to the approach was developing an understanding of the context within which each site planned, implemented and maintained their EDS system. This was important because the context is often a key determinant of solution design and implementation strategy. Local context is also critical to consider when understanding the level of benefits and outcomes achieved through the implementation of an EDS system. For example, a site progressing from a local electronic version of a structured discharge template is likely to experience less benefit than a site moving from handwritten discharge summaries when moving to a full EDS system.

2.2 Evaluation Activities

To inform the evaluation, a number of evaluation activities were conducted. These are outlined below.

Targeted consultations

A range of consultations with individuals and groups were conducted at both lead sites, as well as a health service within a third jurisdiction. The purpose of these consultations was to capture the views and experience from individuals from a broad range of areas. Stakeholders consulted included those such as:

- GPs and practice managers
- representatives from the local divisions of general practice
- GP liaison officers or units
- eHealth representatives from jurisdictional health departments
- clinical systems / IT staff at evaluation sites
- medical records and HIMS
- pharmacists

- quality and safety units
- hospital based medical practitioners, including consultants, registrars and junior medical officers (JMOs)
- hospital executives.

The specific issues discussed in the targeted consultations were guided by a semi-structured interview tool, the evaluation framework and the background of the individual being interviewed.

It should be noted that patients and carers were not directly consulted as part of this project.

Surveys

Two online surveys were circulated at both sites. One survey was distributed to acute health staff and the other to GPs and practice managers from the Divisions of GPs in the local area. The purpose of the surveys was to increase the breadth of coverage across health services and community clinicians.

It should be noted that, given the relatively small number of responses[2], care should be taken in interpreting the results of these surveys. The results of the surveys are in no way wholly representative of all acute service staff and GPs at the evaluation sites. The results of these surveys should therefore be viewed in conjunction with the findings of the other data collection initiatives.

Copies of the surveys are available within the self evaluation toolkit developed as part of the evaluation.

Desktop review

Review of a range of documentation was undertaken as part of the evaluation process, including:

- policies and strategies (site specific and jurisdictional)
- procedures and templates
- records of meeting minutes
- training guides

[2] Across the two evaluation sites, a total of 29 responses were received to the Acute Health staff survey, and 41 were received to the GP survey.

- planning / business development proposals
- progress / monitoring / evaluation reports.

Data analysis

KPMG undertook an analysis of the lead site activity data[3] from a safety and quality perspective. Where available, the data provided was analysed to compare pre EDS system implementation with post EDS system implementation.

The data included, where available:

- the total number of discharges / separations per month
- the proportion of discharges per month (and, if possible, by specialty or ward) in which the EDS was used
- readmissions data
- coding data
- training statistics, including both numbers of clinicians trained and the results of any evaluations conducted
- outstanding discharge summary data
- data related to the proportion of GPs who are able to receive EDS
- Healthlink[4] data for one site relating to the proportion of GPs with a Healthlink account (i.e. giving them the capacity to receive the EDS) and locations of medical practices that received at least one EDS
- other data as identified as relevant by the Commission, KPMG and the lead site.

Discharge summary file audit

A file audit of discharge summaries was completed at both sites. The purpose of the audit was to assess discharge summary content (including accuracy and completeness), summary length, timeliness of completion with respect to the patient's discharge date and consistency with NEHTA's core discharge summary components.

To undertake the audit, 30 patient files were randomly selected by each site's medical records department, within the following parameters:

[3] Included data from both the evaluation sites and Healthlink.
[4] Healthlink is a secure messaging system used by evaluation sites for the transmittal of the EDS from the hospital to the GP

- the patient had been discharged from the site during August 2010
- the patient had been discharged from the following units / ward areas:
  - general medical admissions admitted via ED (10 records)
  - general surgical (10 records)
  - specialist medicine (10 records), e.g. cardiology, neurology.

Files were then audited using a standardised assessment template, which is available with the self evaluation toolkit. The audit assessment template was developed to align to the NEHTA core components of a discharge summary, and contains four core domains:

- ***Encounter record:*** including discharge date, admission date, method of transmission and length of EDS, amongst others
- ***Event:*** including GP details, separation mode, encounter / admission summary and responsible health professional
- ***Health profile:*** including diagnoses, medical history, and medication, amongst others
- ***Discharge planning:*** including the discharge plan, recommendations and information provided to the subject of care, amongst others.

Key stakeholder workshops

Stakeholder workshops were conducted at each site, following the completion of most of the other evaluation activities. The purpose of the workshops was to present the evaluation findings to date and test their validity with a range of stakeholders. Stakeholders invited to participate at the workshop included staff from the following areas: EDS system project staff, medical practitioners, pharmacists, quality and safety staff, medical records staff, IT / clinical systems staff, GP representatives, and GP liaison officers and Divisions of General Practice.

3 Achievements and benefits

At both sites, the introduction of the EDS was associated with a number of positive impacts. Some of these impacts relate to processes which are easily measured, whilst others reflect a more general move towards changing practice and a more integrated delivery of health services. It should be noted that this evaluation did not undertake 'before' and 'after' measurement and, as such, these benefits reflect mainly those reported by stakeholders, or as characteristics of data reviewed as part of the evaluation.

The following achievements and benefits were identified during the evaluation, with each described further below:

- legibility
- consistency
- accessibility
- inclusion of key discharge information
- security
- timeliness
- strengthening the eHealth environment.

Legibility

One of the benefits associated with many eHealth systems is improvements in legibility, as information is produced and stored in a typed, rather than handwritten, form. Prior to the introduction of the EDS system, both evaluation sites used an electronic Microsoft Word template to generate discharge summaries. As such, a proportion of the potential benefit in relation to legibility associated with the introduction of an EDS system had already been realised.

Despite this, stakeholders in the general practice setting described improvements in the move from the typed and faxed discharge summary to the EDS version. It was reported that, through the faxing process, some of the discharge summary text, though typed, often became distorted, thus making it difficult to read. These distortions reflected the quality of resolution of scanned documents that contained typed information. In contrast, the electronic transmission ensured that no such image distortion occurred, and all text was clearly legible.

However while legible, the level of readability of the output was described at one site as having been a major barrier to the EDS. This means that, whilst the information was

legible, the EDS output itself was not easy to read, both on a screen or in hard copy, commonly due to a lack of formatting.

Consistency

One of the potential benefits relating to the introduction of the EDS system relates to the consistency of the information presented. The EDS reports discharge summary information under a structured series of headings in a standard order. This standardisation facilitates GPs and other identification and retrieval of relevant information when required.

Whilst initial benefits relating to consistency have been identified, the full benefit is possibly not being realised. Further benefit may be realised with better formatting (issues discussed in section 3.4. below), achieving consistency between sites (i.e. a national standard) in the section headings, and ensuring the order of information is consistent between sites which may assist in achieving the full potential benefit of consistency available through the use of EDS systems.

Accessibility

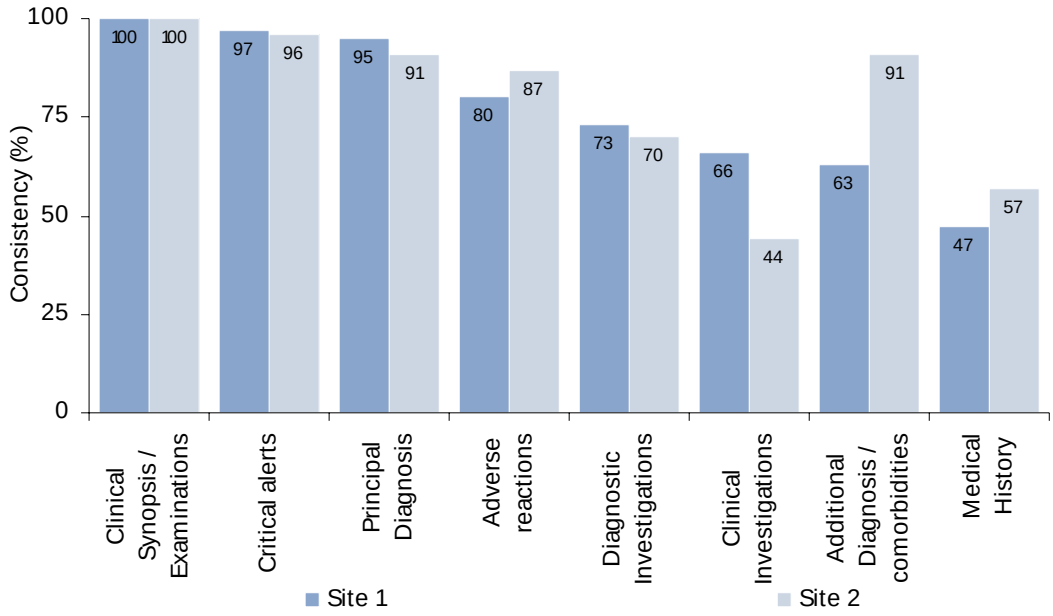
With the introduction of the EDS system, some benefits with respect to accessibility of information were noted. Some stakeholders from the general practice setting highlighted that a GP working from multiple practices can access the EDS system from multiple locations. As such, the GP had instant access to the information, at the time the patient presented, rather than needing to have fax or hard copy sent.

Inclusion of key discharge information

Through the file audit, it was identified that certain information, pertinent to the patient's discharge care, was included much more often in the EDS than was present in the patient's medical record. This information is shown in Figure 4.

At both sites, parts of the EDS which specified particular headings, such as discharge plans, recommendations to GPs, information provided to patients, additional diagnoses / co-morbidities and arranged services / planned activities, were all recorded more regularly in the EDS than the medical record. It is likely that the provision of these headings in the EDS as mandatory fields led to increased compliance in the supply of information. In the medical record, information relating to these fields is not usually delineated into the different categories, and can be very brief. It would be reasonable to assume that the EDS system has therefore led to improved information handover in these fields for those in receipt of the EDS.

Figure 4: Consistency between the medical record and EDS, based on the results of the file reviews at each lead site



Source: Results of the EDS file review, KPMG (2011)

It is important to note that, in interpreting the above figure, the consistency between the medical record and the discharge summary prior to the implementation of the EDS system was not measured, and therefore comparisons were not able to be made.

Security

One of the principal benefits sought by both sites in relation to the EDS system was that of increased security. At both sites, the EDS was delivered directly to GPs through a secure transmittal system using HL7 messaging, depositing the document directly into the GP's inbox or results 'holding area' within their practice management software. This process is a more secure process than previous systems where discharge summaries were generally faxed, and paper copies filed somewhere in the practice until administration staff scanned them into in the practice management system.

A review of data provided by the evaluation sites demonstrated that the benefit of security is being realised with the implementation of the EDS system, though not always to its full extent. At one site, the most recent audit results show that 73 per cent of discharge summaries were being delivered via secure messaging, with the remainder being sent via print, post or fax[5] [6]. At the other evaluation site, 47 per cent were sent via secure transmission, with 18 per cent transmitted via fax and 30 per cent by print and post (Figure 5 and Figure 6).[7]

Figure 5: EDS delivery method at lead site 1

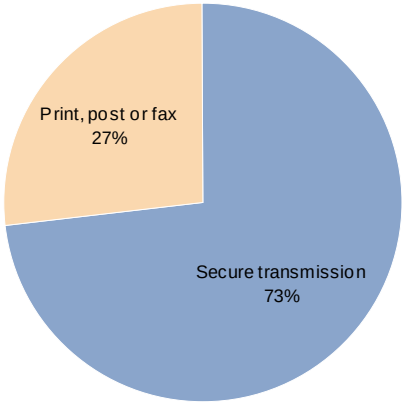
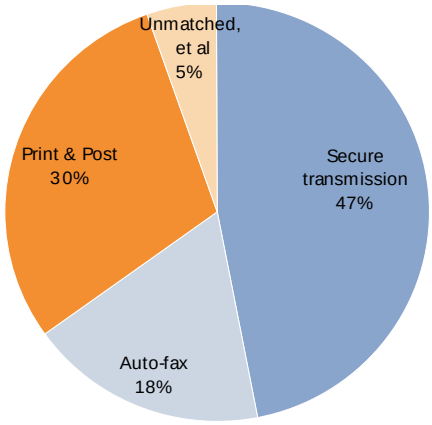


Figure 6: EDS delivery method at lead site 2



Source: KPMG analysis of data provided by evaluation sites (2010)

Timeliness

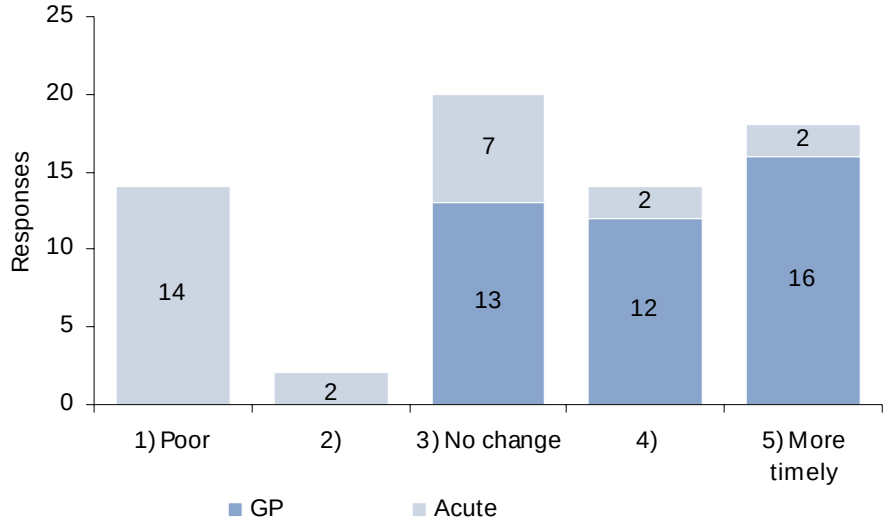
At both sites, there was evidence to support the assertion that discharge summaries were delivered in a timely manner following the introduction of the EDS system. At one site, the time between patient discharge and transmittal of the EDS was 1.31 days, whilst at the other site, it was 5.82 days. Whilst one facility clearly demonstrated more favourable performance, both were within timeliness parameters associated with 'good quality' as identified in the literature[11]. However it should be noted that performance measures in place at the state, territory and local health service level promote receipt of the discharge summary sooner, commonly within 48 hours.

The perceptions of GPs who responded to the survey also demonstrate some positive effect of the EDS system on timeliness. In response to a question about the effect the EDS system had on discharge summaries with respect to timeliness of discharge summary receipt by the GP, 68 per cent of GPs were of the view that the EDS system had made a positive impact. All other GP respondents reported no change in terms of

[5] Secure transmission includes secure automated fax, based on GP preferences.
[6] It should be noted that the system at this site only allows for one copy of the discharge summary to be sent via secure transmission. If the discharge summary is sent to two recipients (e.g. GP and a specialist), only one is sent via secure transmission, whilst the other is sent (electronically) via fax. As such, the ability for this site to achieve higher levels of performance with respect to secure transmission may be limited by the system's present capability.
[7] Note: transmission data for site 2 is based on a four month period, with the data for site 1 based on the most recent audit results (November 2010).

timeliness. Interestingly, responses to the same question to acute health staff demonstrated that these stakeholders held a different view; 59 per cent of acute health staff perceived that the introduction of the EDS system had had a poor impact on the timeliness of discharge summaries, whilst 26 per cent perceived there had been no change (Figure 7).

Figure 7: Perceptions about the effect of the EDS system on the timeliness of discharge summaries



Source: KPMG analysis of survey responses (2011)

Strengthening the eHealth environment

In line with national and jurisdictional e-Health strategies, both sites were working towards an integrated eHealth environment. The introduction of EDS systems marks one positive step towards this end and, as such, represents an achievement with respect to meeting this longer term goal.

4 Enablers and barriers to implementing an EDS system

4.1 Enablers

This section provides an overview of the factors which were most significant in facilitating the successful implementation of EDS systems in evaluation sites. Issues discussed include training, management of relationships, 'selling' of the product, building on existing technology and the use of measurement and feedback.

4.1.1 Training

One of the important enablers identified at both evaluation sites was the provision of effective training to end users. Training which was timely and individualised was thought to be particularly important. Some of the characteristics of training which were reported to be particularly influential included:

- making it compulsory to receive training prior to receiving a password to access the new system
- providing training options in the end users' own work environment, e.g. on the ward
- providing a variety of training methods, including end user training, one-on-one training and web-based training
- training 'super-users' prior to system roll out, to provide peer support to clinicians, in the wards
- placing trainers or other change managers on the wards in the first few days after system roll out to provide support and troubleshoot issues as they arose.

It should be noted that the majority of the training provided at evaluation sites focussed on process issues, that is, training in relation to how the clinician could use the new system. At one site however, additional training was provided to JMOs about the content which populated the EDS. This training incorporated feedback from GPs about discharge summaries using real cases. This type of training was perceived to be particularly relevant and effective in improving the quality of discharge summaries.

4.1.2 Managing relationships

The introduction of an EDS system involves a range of change management activities and, as such, effective engagement of stakeholders is critical to the success of the project (this is described further in section 4.2.2). Two particularly important stakeholders in the process are the end users (clinicians) and the suppliers of the software and messaging systems.

Engaging clinicians

Whilst establishing and maintaining effective relationships with clinicians was challenging at both sites (as discussed as a barrier below), there were also some successes experienced. Given that clinicians are the key users of the EDS systems, having the implementation led by clinicians is an important element for a successful project.

At one site, it was identified that the challenge of ongoing clinician engagement was not unique to the EDS project, and that effective end user engagement was critical for all eHealth initiatives underway. To address this need, a clinical advisory group was established. This advisory group consisted of a range of clinical stakeholders, including junior and senior medical staff, nursing and pharmacy. The group was voluntary and, as such, harnessed the expertise of clinicians who had an interest in eHealth. Further, the group operated through trying to ensure that the activities undertaken were instigated by the clinicians themselves rather than administrative or IT staff. This group had been in operation for less than one year at the time of the evaluation; however EDS project staff reported that, thus far, it had achieved a productive level of clinician engagement and fostered good working relationships.

Relationships with suppliers

Other relationships critical to the success of an EDS implementation project are those with the EDS system suppliers. The most important of these are the vendors of the EDS system software and the providers of the secure messaging (transmittal) system.

An effective relationship with the EDS system software provider is important because it is certain that some degree of refinement will be required to optimise the system's functioning once implemented. At both sites, project teams reported that there were a significant number of changes required to optimise the standard system. Good working relationships with the providers however, resulted in the effective resolution of these issues. Further, despite it being recognised at one site that the current product was not able to deliver all the desired functionality, the vendor and facility have agreed to establish an onsite project team in order to develop a system which meets the health service's specifications. Projects such as these were recognised as being critical to the success of the EDS system, but also dependent on the vendors and health facility's staff working effectively together.

Another important relationship is that with the transmittal system provider. Both sites recognised that this provider holds information which is crucial in measuring system performance which is not captured by any system at the health facility. Relevant measures include the proportion of positive and negative acknowledgements received from health services / GPs. An effective ongoing relationship with the provider is necessary both to ensure that the health facility receives timely reports on system performance should that be the agreement between both parties, and also in assisting the health facility in troubleshooting activities or in determining alternate, or more effective measures of the system's performance should the need arise.

4.1.3 Promoting use of EDS

Sites experienced a range of challenges in engaging clinicians and managing the stakeholder expectations with regard to changed work practices (discussed further in section 4.2.2). However, a number of successful strategies contributed positively to the change process.

Outlined below are a number of actions taken at evaluation sites which facilitated the 'selling' of the EDS system to its users and in turn aided in clinician engagement, and decreased resistance to change.

Use of clinical champions

One of the effective mechanisms used to engage clinicians was through strong leadership of a colleague. For example at one site, the interest of a particular consultant had facilitated a number of positive effects, such as the ward being an early adopter of the EDS system, and a team, who despite having rotational staff, were consistently willing to provide feedback. At the other site, the early but public endorsement and involvement of the facility's chief medical officer was reported to have a positive effect by validating the necessity and utility of the system in the eyes of other medical practitioners.

Employ a dedicated change manager

Change manager positions were established at both evaluation sites and reported to be integral to the change management process. At the time of system roll out, this individual spent time on the hospital wards, both recruiting JMOs for training sessions, and troubleshooting for new users. The early and visible presence of practical help was reported to be particularly important.

At one site, the change management team produced a change management workbook that sought to identify all current work processes that would be impacted by implementing the EDS system, provided a job impact analysis to help identify the risks associated with, and competencies required for, the implementation of the new system, as well as an outline of baseline measurements to be used to measure the proposed benefits from the implementation of the clinical systems project.

Link to another benefit

The use of incentives has long been used to facilitate changes in clinician behaviour. At one site, the EDS system sat within a larger portal which provided the user with other capabilities, such as organisation of patient lists or identifying outstanding work tasks. This capability was highlighted at the time of system roll out and during training, providing an additional benefit for clinicians and another 'reason' to learn to use the new system.

Communicate effectively

The introduction of eHealth initiatives is an inherently lengthy process, and choosing the right communication strategy is essential, balancing the need to inform stakeholders about activities, without overwhelming them with unnecessary information over a long time period. This is particularly important when engaging clinicians, who are both time poor, and usually dealing with a number of competing priorities, with eHealth initiatives usually secondary to immediate patient needs. The communication reported to be effective at both sites was characterised by being targeted, timely, and tailored to the particular audience it was trying to reach, and provided just in time for the stakeholder to act on the information.

Examples of effective communication in relation to EDS system activities at evaluation sites included:

- one site developing a Communications and Marketing Plan which was used to raise the profile of the project, to increase understanding of the benefits associated with the project, and how these will translate into improved patient care
- informing GPs of the introduction of EDS systems both directly and via regular correspondence from their Division, such as monthly newsletters, flyers and weekly faxes, in the weeks prior to system roll out
- providing information about the EDS system, including training, to new interns at orientation
- through the presence of trainers and change managers on wards, providing information to JMOs about the system, as well as prompt training, just as the system is being rolled out in their area.

4.1.4 Building on existing technology

One of the clear facilitating factors for EDS system implementation was the use of existing technology. At both sites, this involved the use of a pre-existing transmittal system as the secure messaging vehicle for the EDS. The transmittal systems were not only already in place, but also used by the great majority of general practices. The systems were currently in place to deliver pathology and radiology results to GPs and, as such, there was no need to introduce new infrastructure or necessitate additional learning by GPs or practice staff. This was beneficial given there were significant change management needs associated with the implementation of the EDS project purely in the hospital setting, and the use of existing technology to support transmission mitigated the need to conduct similar activities in the general practice setting. Instead, the introduction of the new EDS system was simply introduced to the majority of general practices through communication informing them that discharge summaries were now to be transmitted electronically, rather than by fax or post. This was reported to be an adequate and effective approach at both sites.

4.1.5 Using measurement and feedback

Another enabler identified by sites related to the use of feedback mechanisms to measure and improve performance, both of the system, as well as the users.

With respect to the EDS system, a number of performance measures were considered at evaluation sites. These measures were monitored over time, both at the point of system roll out, as well as through the process of system upgrades and improvements. The trends identified were then used to identify issues and direct the required remedial action. Examples of measures used included:

- number of EDSs completed for each clinical area (and the number sent by post, for example)
- the time between patient discharge and the time the discharge summary was sent
- trends in issues raised by end users when calling the IT helpdesk for support
- feedback / complaints received by the GP liaison unit from GPs regarding problems with the EDS.

Not only were feedback measures used to monitor and direct action on the EDS system's performance, but feedback was also used to identify examples of good practice. At one site, a discharge summary prize was awarded to the best discharge summary at grand rounds. This award served to highlight the value of completing a good quality discharge summary and gave an opportunity to publicise the features which had made the discharge summary an excellent product.

4.2 Barriers

This section provides an overview of the factors which presented the most significant barriers for sites in their efforts to implement an EDS system. Barriers identified included ensuring leadership and ownership, achieving the effective engagement of end users, identifying and managing the effect on workflows, establishing clarity about system capability, managing the interactions with other systems, and managing medications. These barriers are explored in detail below.

4.2.1 Finding ownership and leadership

Change management is at the heart of EDS system implementation. Change management initiatives require a number of key stakeholders to lead and drive the change, with all those who are affected by the transformation to buy in, take 'ownership of' and participate in the change.

Achieving the necessary leadership and ownership for the EDS system was a challenge at both evaluation sites. At one site, this presented itself as an issue at the project's inception stage which was resolved over time, whilst at the other site; ownership became problematic later in the implementation stage.

Whilst the origins of this challenge varied across lead sites, there were a number of consistent key contributing factors, such as:

- The EDS system is a 'whole of health service' project, and spans across the acute to community sector. While there are multiple stakeholders who have an interest in or are affected by the implementation of EDSs, the system as a whole does not clearly sit within the interests or responsibility of a particular clinical department or health support service.

- There was no specific 'hook' or major event to spark the interest of clinicians, such as a clinical incident or error. From a hospital clinician perspective, there was no perception that the previous system was broken and that there was a need to change. Further, on an individual level, there was little incentive for clinicians to change their behaviour and use the new system, with no link between individual or ward performance metrics and the EDS.

- The benefits of the EDS system were not experienced directly by those impacted by the necessary work practice changes to implement the system. That is, the JMOs who completed the discharge summaries did not directly experience the benefits (e.g. improved timeliness and legibility) and commonly did not receive feedback about these benefits from other stakeholders in the process, such as GPs. This impacted on their motivation to use the system and drive its implementation.

- At one site, the decision to proceed with the EDS system was not related to a significant event or driver, such as a change in government policy or a particular clinical event.

4.2.2 Engaging the key stakeholders

Following the initial system roll out, clinicians reported a range of issues requiring attention from the project team. Whilst many concerns were simply addressed, other issues (e.g. lengthy time to complete, discussed in section 3.1.3) were not easily resolved, particularly where these difficulties were perceived as a lack of product fitness for purpose.

As a result, many clinicians became frustrated, preferring instead to revert to previous practices. Without proactive management and a strong commitment to ongoing improvement of the system's fitness for purpose, such views can spread amongst clinicians and significantly impede system uptake.

Some of the specific issues experienced included:

- **Ensuring the full breadth of stakeholders were engaged.**

  Maintaining the interest of the full complement of stakeholders was challenging, but necessary, for success. For example, at one site, there was limited involvement by the facility's safety and quality unit. As a result, safety and quality issues were not considered as a key priority in the project. Another group of clinicians also reported

that they believed consultation with end users had been inadequate during the design and selection phases, and that many of the issues which subsequently arose during implementation would likely have been avoided.

- **Managing the engagement fatigue.**

  At both sites regular feedback was sought from end users throughout various project stages, from system selection, through user-acceptance testing, to ongoing system refinement. Gaining enough interest from busy clinicians, especially the key end users and JMOs, to provide this feedback however, was an ongoing challenge. Getting the system 'right' meant multiple rounds of testing and other activities over a lengthy period, and few clinicians had the time or interest to sustain their level of participation.

- **Managing resistant views and perceptions.**

  Following the initial system roll out, clinicians reported a range of issues requiring attention from the project team. Whilst many concerns were simply addressed, other issues (e.g. lengthy time to complete, discussed in section 3.1.3) were not easily resolved. As a result, many clinicians became frustrated and, in turn, resistant to use the system, preferring instead to revert to previous practices. Without proactive management, such views can spread amongst clinicians and significantly impede system uptake.

- **Containing expectations.**

  Whilst managing resistance to change was a challenge, both sites also reported that some stakeholders appeared to expect the new system to achieve more than was originally intended. For example, stakeholders at one site reported that, in addition to improving continuity of care, the EDS had an important role in acting as a record of the inpatient episode and in supporting clinical coding. One contributing factor to this belief may relate another view expressed during consultations, which was that there was a lack of clarity about the system's primary purpose.

4.2.3 Understanding the impact on workflows

The implementation of the EDS system had a significant impact on workflows at both evaluation sites. The main impact experienced was an increase in time to complete the EDS when compared to the time required to complete the discharge summary using the former system.

Some of the factors which significantly contributed to the increased time were:

- The more complex and cumbersome medications sections of the EDS, which (at both sites) needed to be entered manually (i.e. no auto-population from other systems or prompts provided as text was entered).

- The need to log-in to multiple systems in order to open programs to retrieve information required to populate the discharge summaries (e.g. radiology reports). This was compounded by the fact that the log-in processes themselves were reported to be very slow.

- Inadequate hardware to run the software, which contributed to making the programs run more slowly.

- Inadequate numbers of terminals on some wards to service the demand, particularly with JMOs requiring longer time at the computer to complete the EDS. JMOs were often requested to vacate the terminals in order to allow other staff to access the system, which in turn further increased the time taken to complete the EDS as it often required several sessions in order to fully complete all the required documentation.

- The move to an EDS structure with a greater number of requisite fields than previously in place with the local electronic templates (now aligned with the NEHTA standards).

The increase in time taken to complete the EDS had a significant and negative impact on clinician behaviour. Clinicians, particularly the JMOs who were completing the documentation regularly, complained about the time it took to complete the EDS. At one site, there were several clinical areas that abandoned the use of the EDS system completely and reverted to handwritten discharge summaries. Unsurprisingly, complaints were most significant in areas with high volumes of discharges.

The increased time required to complete the EDS also further delayed the completion of some discharge summaries. Given that some discharge summaries, particularly those relating to complex patients, would take 30 to 40 minutes to complete, JMOs reported they often completed those which were simple first, leaving the complicated ones for another time. This sometimes resulted in a delay in the GP receiving the discharge summary, with the risk that patient care may be adversely affected following hospital discharge. The delay in completion may also have flow on clinical coding and funding effects based on the potential subsequent re-coding of the primary diagnosis estimated by clinical coding team.

It is important to note that neither site reported that they had identified the likely challenges with respect to workflows prior to the EDS system roll outs. Whilst both sites had undertaken user acceptance testing, this process did not incorporate a comprehensive workflow analysis, considering how the new system would impact on the users' daily work patterns. Consideration was given to the particular requirements of clinical areas in terms of EDS template fields; however the interaction of these fields with JMO workflows was not given scrutiny. As a result, neither site was well prepared for the subsequent reaction from clinicians.

Not only were there impacts on the workflow patterns of clinicians using the system at the acute facility end, but there were also some effects reported by users in the general practice setting. Whilst general practice users reported these effects to be of a lower

degree of impact than those in the acute facilities, these impacts contributed to increasing the time required to review and then act on the information provided in the discharge summary. Some of these are issues discussed in section 4.2.5 below in the context of interactions with other systems.

4.2.4 Clarity about system flexibility

Establishing a sound understanding about the EDS system's capability proved to be a significant challenge, particularly at one evaluation site.

The main issue identified by hospital stakeholders at this site related to their understanding of the level of flexibility of the templates within the EDS system, and the extent to which they could be adapted to the needs and preferences of users. Most stakeholders reported that, at the time of system selection, they believed that the discharge summary templates would not only be flexible, but that any changes made could be completed easily and quickly. Unfortunately, the expected level of system adaptability did not eventuate.

This mistaken belief was significant in that it drove the nature of the initial clinician engagement and user acceptance activity. Operating under the belief that the template was very flexible, the EDS project managers from the hospital worked closely with clinicians to develop an 'ideal' discharge summary template. Unfortunately, many of these features were unable to be incorporated in the EDS system. As such, the lack of clarity about the system's capability not only caused unnecessary delays, as the EDS project managers had to recommence the testing once the true capability of the system had been clarified, but it generated a degree of fatigue from clinicians, who had to be "re-engaged" for their views, this time to comment on a less capable system. This led to challenges establishing the same level of clinician engagement in follow up consultation.

4.2.5 Interaction with other systems

EDS systems typically sit within an operating context involving multiple other health information systems. These include those such as patient administration systems, pathology information systems, radiology information systems and pharmacy dispensing systems. The way in which these systems can and cannot interact with each other has a significant impact on the ability of end users to successfully and efficiently access and then use clinical information.

EDS systems are further complicated by their need to interact with systems outside those core to the acute facility. Not only do they need to interact with electronic transmittal systems (such as Healthlink), but also with the software used by the GP in the general practice setting. These interactions, particularly those with GP software, proved to present a significant challenge to ensuring the utility of the resulting discharge summary.

A range of issues were reported by stakeholders relating to the interaction between systems. At the acute hospital end where the EDS system did not seamlessly integrate

with other hospital systems, the JMO was required to log-in to each clinical information system, and then locate and copy the results into the EDS. This had a number of consequences, which included:

- an increase in the time required to complete the discharge summary
- room for error, as the JMO must ensure that, for each system, they located the correct patient and identified the relevant results
- inclusion of a greater volume of information in the EDS, increasing the overall EDS length and making it more difficult for GPs to identify the most recent and relevant results (rather than sorting through results themselves, JMOs often saved time by using the 'select all' option).

In the general practice setting, stakeholders reported that in the transmission process, many of the features of the discharge summary document which were in place when it left the hospital, were lost, which in turn made the relevant information more difficult to identify and use. Whilst the particular issues raised differed somewhat, depending on the particular GP software being used, some of the key concerns included:

- a loss of formatting, resulting in headings not being bolded, spacing between sections missing, and the loss of column alignment, all resulting in increased difficulty for the GP to scan the document, locate and then read the relevant information
- the order of content being presented alphabetically instead of by relevance, making it even more difficult for the GP to locate important information, such as primary diagnosis (one system also listed the diagnoses in alphabetical order if more than one diagnosis had been identified)
- critical information, such as patient name and details, unable to be viewed when the EDS is opened in some GP software
- when received into the GP's inbox, the discharge summary document not being named, so that it needed to be opened in order to be identified
- the inability of the GP to electronically annotate the EDS, thus requiring the GP to undertake these tasks (e.g. asking practice staff to call the patient in for an appointment) manually.

4.2.6 Medications management

At both sites, stakeholders raised a range of concerns relating to the medications section in the EDS.

The most commonly cited issue was that the medications section was cumbersome to complete, and reported by JMOs at both sites to be the most time consuming of all the fields in the new system. Contributing to this was that there were no auto complete

functions for medications as this was a free text field. This was different at one site to the previous discharge summary system which had provided prompts. As a consequence, with the introduction of the new EDS system, there was both an increase in the time required to complete the EDS and an increased likelihood that the JMO may enter in the incorrect drug, or enter in incorrect spelling, which may create confusion as to which drug was intended.

Another significant issue relating to medications was that there was no capability for the pharmacist to update the medications electronically, should they notice errors in the initial discharge script. At neither site were pharmacists able to amend or annotate the discharge script in the EDS system, nor was there electronic integration of pharmacy dispensing and (if present) electronic medication management systems. As such, any changes to the original discharge script required the JMO to re-enter the system, make the changes, and re-send the amended discharge summary to the GP. Whilst the patient may go home on the correct medications through the hospital pharmacy, if the JMO fails to make the required changes in the EDS, the GP will receive incorrect information about the patient's medications in the discharge summary.

5 Potential Safety and Quality Risks

Introducing any new practice into the health care setting, including eHealth initiatives, carries the risk of introducing new, or exacerbating existing safety and quality risks. Through the evaluation, a number of potential safety and quality risks associated with the introduction of EDS systems were identified. It should be noted that, as this evaluation did not collect data around adverse events or critical incidents and their relationship to EDS systems, the risks discussed below discuss potential sources of risk to patients, not actual risk.

5.1 Key information can be difficult to locate

Despite improvements in characteristics, such as timeliness of receipt and legibility, the introduction of the EDS system also had the effect of making the document challenging to use from the perspective of GPs. Discharge summary length and loss of or poor formatting contributed to making it difficult for GPs to quickly locate relevant information. This presented a risk of GPs missing critical information about the patient's care (e.g. medications or principal diagnosis) in the discharge summary, with subsequent potential risks of adverse outcomes to the patient.

Discharge summary length

It was reported that following the introduction of the EDS, discharge summaries had become too long, with the inclusion of too much information. Length was of particular concern as there were a number of reports that GPs often only read the first or perhaps second page of the discharge summary, as they were often looking for information during a patient consultation. Looking for information in longer documents was often abandoned due to time constraints.

Reports about the unnecessary length of discharge summaries are unsurprising given the length of summaries reviewed during the file audit. At one site, the average discharge summary length was 4.9 pages, with a minimum of two pages and maximum of 10 pages. At the other site, the average length was 3.4 pages. The findings from the consultations were generally consistent with the results of the surveys. Thirty-seven percent of GPs and 67 per cent of acute facility staff perceived the EDS to be too long. This perception may in part be a function of the NEHTA standards for structured discharge summary templates, given the increase in requisite fields included in the new EDS system.

Formatting issues

A number of issues relating to formatting of the discharge summary document presented GPs with safety risks. Issues included:

- a loss of formatting, resulting in headings not being bolded, spacing between sections missing and the loss of column alignment
- order of content presented alphabetically instead of by relevance (one site's system also listed the diagnoses in alphabetical order if more than one diagnosis had been identified)
- critical information, such as patient name and details, unable to be viewed in the EDS output received by the GP in some practice software.

5.2 Transcription errors

At both sites, transcription errors were possible in the entry of data into the EDS system. Two of the key transcription risks included:

- **Manual entry of patient discharge medications into the EDS system** (this also populated the discharge medication script). The medications sections were free text fields with no auto complete functionality with respect to drug names, frequency or doses.
- **Limited auto-population or interaction with the EDS system**. This meant that, to retrieve certain patient results (e.g. reports from radiology), the user was required to log-in to the relevant program and locate the patient's results. This process provides the opportunity for errors, such as retrieving the wrong patient's results, or suboptimal practice such as retrieving results which are not current or particularly relevant to the patient's episode of care. It is acknowledged however that, in the case of medications, auto-population of medications presents a risk to accuracy if medical staff do not update the medications list for discharge.

5.3 Resistance to change

As discussed in section 4.2.3, the process of introducing a new system that requires a change in clinician practice can be associated with resistance. Resisting uptake of new practices can present quality and safety risks, as occurred at one of the evaluation sites.

As a result of frustration about the length of time it took to complete the discharge summary in the new EDS system, clinicians in a number of clinical areas with high volumes of discharges ceased using the system. Given that the previous 'typed' template was no longer available, JMOs instead reverted to producing handwritten

discharge summaries. This behaviour was significant as not only were the potential safety and quality benefits of the new EDS system not realised, but it gave the opportunity for new errors to occur. Risks associated with the reversion to handwritten summaries included poor legibility due to messy handwriting, missing patient information as fields were not marked as headings to prompt population, and transcription errors about basic patient information such as correct patient or doctor details.

5.4 Incomplete monitoring / feedback systems

Whilst effective monitoring and feedback systems are enablers for successful implementation of an EDS system, where there are gaps in the ability to monitor system performance, safety and quality issues may ensue. One particular risk identified in the evaluation was the lack of ability for the acute service to monitor whether the GP had successfully received the EDS. The acute facility was only able to monitor the performance of the EDS system which they owned, not the performance of the transmittal service, which was outsourced. As such, they were only able to determine whether or not the EDS had been sent to the transmittal service, no further. This raises the risk that the GP may not receive the EDS, and neither the acute health facility nor the GP would be aware that this had occurred.

5.5 System may affect accuracy

Through the file audit, a number of issues were identified relating to content of the medications section in the EDS. At both sites, there was a significant level of inconsistency with respect to the medications listed on the EDS when compared to the medications listed in the medical record, namely progress notes, medication chart, medication reconciliation record and, if present, the discharge script. At one site, 33 per cent of EDSs audited were consistent with the medical record in relation to medications, whilst at the other site, 48 per cent were consistent.

The nature of the inconsistencies did vary, however they most commonly related to analgesics (one site) and PRN medications (the other site). Other inconsistencies included those such as no medications being listed or the text ‘meds supplied’ being inserted in this field.

It should be noted that the evaluation did not provide a direct causal link between the introduction of the EDS system at either site and the presence of these types of accuracy issues. However, the evaluation did identify a number of issues with respect to medications which may have contributed to the problem. These include:

- the complexity of the medications section present in both EDS systems (discussed further in section 4.2.6)

- the inability of the EDS system to interact with other systems, e.g. direct link between EMM systems or pharmacy dispensing systems (discussed in section 4.2.5)

- the possibility of transcription errors (discussed earlier in this section).

Whilst not likely to contribute to the accuracy of the medications content in the EDS, a further issue relates to the possibility that multiple documents which detail the discharge medications may be produced. These include the discharge summary itself, the list of discharge medications provided to the patient by the hospital pharmacy at the time of discharge and, at some sites, a fax to the patient's GP from the hospital pharmacy detailing the patient's discharge medications. As discussed in section 4.2.6, pharmacists cannot annotate the discharge summary or script directly and, as such, there is the possibility that these documents may specify different medications or medication details. This will further complicate the picture for the GP as to the actual discharge medications, thus increasing the potential for harm for the patient.

In this context, it should also be highlighted that neither of the EDS systems reviewed integrated any form of clinical decision support, which may have mitigated some of the issues raised above. At both sites however, there was an overarching plan for the EDS to be integrated into a broader e-health environment which included EMM and e-prescribing systems which included clinical decision support features.

5.6 Perceptions on quality

One of the significant findings of the evaluation was the disparate views held by GPs and acute health staff on the quality of discharge summaries following the introduction of the EDS system. These views were most evident in the results of the surveys.[8]

Overall, respondents to the survey from the general practice setting indicated that they perceived there had been an improvement in quality. In response to the same questions, they indicated that, while they perceived that discharge summaries had been good or better 41 per cent of the time prior to the EDS system, the quality had improved, such that discharge summaries produced after the EDS system implementation were good or better 83 per cent of the time.

In contrast, the responses from the survey indicated that acute health service staff perceived there had been a drop in the quality of discharge summaries with the introduction of the EDS system. In response to questions asking respondents to rate the quality of discharge summaries prior to the introduction of the EDS system and the quality of EDSs, acute health staff indicated that they perceived discharge summaries to be good or better 89 per cent of the time prior to the introduction of the EDS and only 25 per cent of the time after the introduction of the EDS.

These findings are presented in Figure 8 and Figure 9.

[8] Note: given the low sample size of the survey responses, the results need to be considered as indicative of the sample of GPs and acute health staff at the two evaluation pilot sites.

Figure 8: Quality of discharge summaries, comparison of the EDS to previous system – GPs

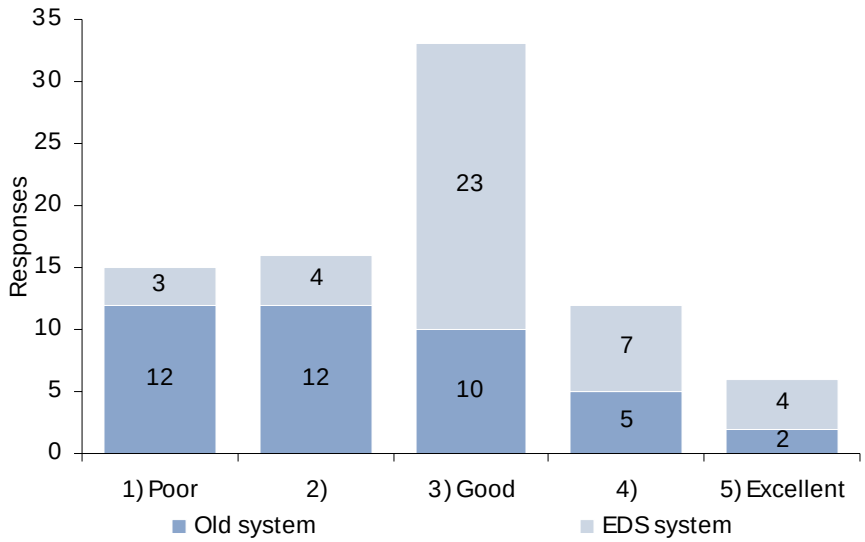
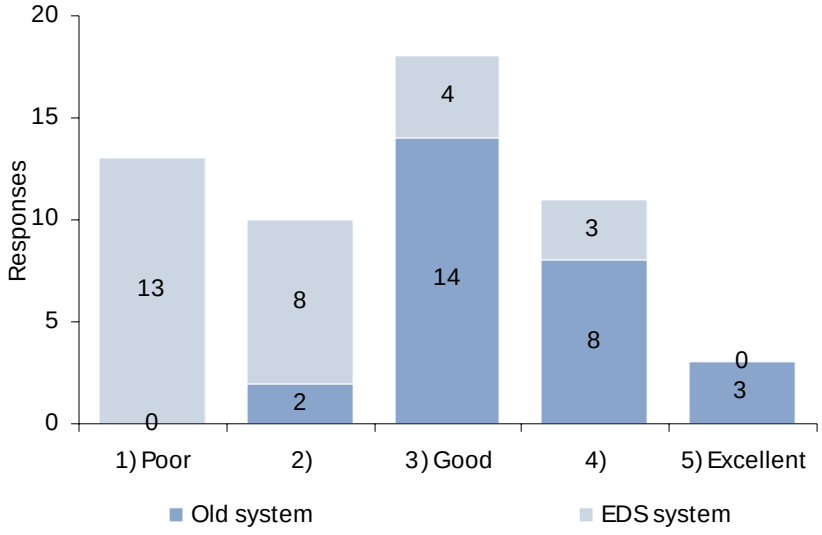


Figure 9: Quality of discharge summaries, comparison of the EDS to previous system – acute health staff



Source: KPMG analysis of survey responses from GPs and clinicians, both lead sites (2011)

The responses to further questions about specific characteristics of discharge summaries in the survey only served to solidify these differing views. In response to questions about the effect the EDS system had had on discharge summaries with respect to timeliness of completion and receipt, discharge summary accuracy, discharge summary completeness and discharge summary length, acute health staff indicated that the effect of system introduction had been negative, whilst those responding from general practice indicated they believed the system had had a positive effect.

Whilst there is no concrete data which clearly demonstrates the reason behind these views, responses to the free text fields in the survey provides some indications. (similar views were also raised in the consultation activities). From the acute health staff perspective, there were reports indicating a significant level of frustration with the EDS system software, such as the following comment:

"It has failed as an effective system, is too difficult to use and the information is presented in a way that is not user friendly and actually impedes access. The system needs to be much more simple and easy to use to be effective."

In contrast, respondents from the general practice setting may perceive that there had been an improvement overall because of improved receipt, timeliness and legibility, such as illustrated by the following survey comments:

"Just good to get one."

"Most positive consequence is actually being able to read the information as it is typed, not a faxed carbon copy."

6 Conclusions and Recommendations

This section presents conclusions relating to the evaluation of the implementation of an EDS system, and provides recommendations for future work for the Commission and national research priorities.

6.1 Conclusions

The evaluation identified a number of benefits which may be associated with the implementation of an EDS system. These benefits need to be considered in the context of potential quality and safety risks and the local health service context.

Evaluating the impact of implementing an EDS system on the quality and safety of patient care has been the primary focus of the evaluation; however, given the absence of tangible pre and post EDS implementation data available, the identification of clear benefits and risks remains emergent.

There are early positive signs of quality of care and patient safety improvements which may be derived through the implementation of an EDS system. Furthermore, there are identified potential risks, but also potential strategies, to ameliorate these risks that need to be further researched.

Achievements and benefits

At the lead sites, the introduction of the EDS system was associated with a number of positive impacts. Some relate to processes, others reflect a more general move towards better practice and a more integrated health information environment. The key benefits identified with the implementation of an EDS system were:

The timeliness of receipt of the discharge summary – While perceptions of the timeliness of receipt by the GP of the EDS varied, with GPs of the view that it had improved post EDS implementation, the acute health staff believed the opposite; initial indications from one jurisdiction has seen a decrease in the time taken to send the discharge summary.

Legibility of the summary – Having a non-handwritten and non-facsimile copy was reported by GPs in particular to be a real and tangible improvement, particularly with regard to reading medications and related information.

Consistency of content – The consistent fields (aligned with the NEHTA standards) in the EDS have promoted consistent information being included in the discharge summary, independent of the specialty ward from which the patient was discharged.

Accessibility of the EDS – GPs who work across multiple sites or practices have highlighted the benefit of access to the electronic EDS being available regardless of which site the patient sees them, now being able to access the EDS from multiple sites.

Inclusion of key discharge information – With requisite fields in the EDS, consistent information (depending on site auto population) is now included in all EDSs, such as demographic information, treating medical officer, and discharge address.

Increased security of transmission – With HL7 standards being used as a criterion for all EDS systems evaluated, the security of patient information in the EDS has increased, particularly over the print and post and facsimile transmission methods.

Strengthening the overall eHealth environment – With a move towards an eHealth environment both within Australia and internationally, the development and successful implementation of EDS systems provides specific content which will ultimately form part of a Patient Controlled Electronic Health Record (PCEHR).

Potential Safety and Quality Risks

The evaluation highlighted a number of potential patient safety and quality of care risks that are more associated with design of the EDS or with source systems rather than the EDS concept itself. These need to be considered and understood within the local health service context. These potential risks are:

Key patient information can be difficult to locate within the EDS – This potential risk relates directly to the length of the EDS (an average of 3.4 and 4.9 pages at the evaluation lead sites) and the variation in formatting and layout of the EDS as read by the GP (which may vary in different practice software systems). Given GPs are often time poor, there is a potential for critical information to be missed due to either being 'lost' in the volume of the EDS text or not being able to pick up quick cues such as bolding or highlighting commonly used in most other reporting advice they receive, such as pathology results for example.

The potential remains for transcription errors – While the typing of medications has increased the readability of medication information, where there exists multiple sources of medication information (such as the medication chart, medical file, medication reconciliation chart, and local pharmacy records), the potential risk for manual transcription errors remains present. While these multiple systems remain in place, the risk of omission, duplicated or conflicting advice to the GP is possible; however, the move toward consolidated eMM (eMedications Management) systems may have a direct influence in decreasing these risks.

Overcoming a resistance to change (and the potential to revert back to previous discharge summary formats) – Both overt and covert resistance was observed during the evaluation, while at one site some clinical specialties reverted directly back to handwritten discharge summaries, the other lead site experienced an increase of outstanding discharge summaries during the EDS implementation period. Each of these types of resistance create clear risks to patient care, with the potential for patient discharge information not being received or being received in a form that may be less legible or missing standard content than would be present in an EDS.

There may be incomplete monitoring / feedback systems in place – While historically many health services have audited a fax 'read receipt' report to confirm the success of arrival of discharge summaries, within the new EDS systems, they are often reliant on a third party transmittal service for reports, and the ability of various practice software to send a positive or negative receipt acknowledgement is inconsistent. This risk highlights the potential for a GP to be unaware of their patients EDS, and the discharging health service may also be unaware that the EDS has not been received.

The system may affect the accuracy of information transcribed - The risk to patient care regarding accuracy of the content in the EDS remains present as it did in previous discharge summary systems and formats. As the evaluation has been conducted post implementation of EDS systems at the lead sites, it remains unclear whether this risk has increased or decreased. Given the significance of the risk of misinformation or missing information in the EDS, this is an area that warrants further focus.

Given the potential impacts of some of these risks, those of key importance are identified in the future research section (below).

6.2 Recommendations

Successful implementation of an EDS system

While the considerations for future sites implementing an EDS system are not the focus of this report, the change management and planning required to successfully implement the system is significant. For this reason, the Self Evaluation Toolkit should be read in conjunction with this report to allow for a full understanding of these considerations (available for download on the Commission's website).

Future work for the Commission

Areas for future work for the Commission and national research priorities focus on continuing to promote the importance of a high quality EDS system, from a patient safety and care perspective.

It is recommended that the Commission undertake the following activities to further support the quality implementation and safe use of EDS systems in Australia:

Promote, publicise and advocate the use of the self evaluation toolkit developed in the evaluation – This would be undertaken using a range of communication methods, to ensure the self evaluation toolkit gets exposure to all stakeholders that it could support (i.e. including hospital executives, change managers, GPs, clinicians who are completing an EDS). Communication strategies could include publishing on the Commission website and other appropriate websites; mail outs and flyers; presenting at conferences; and using existing organisations and governance structures such as the CIO forum, AGPN and DGPs.

Consider developing a similar self evaluation toolkit for GPs and general practice staff – As the self evaluation toolkit developed for this evaluation was from the perspective of acute health services, the Commission could consider developing a similar tool for GPs. The future toolkit should consider the needs of the GPs due to the introduction of the PCEHR. It should also address and measure any safety and quality issues identified through the research suggested in the section on 'national research' priorities below.

Continue to promote the importance of a high quality EDS, from a patient safety and care perspective – Promoting the need for high quality content within the EDS, and highlighting the potential safety risks to clinicians. For example, this may draw on the evaluation findings and be facilitated by leading GPs who could present to hospital executives and clinicians on their experiences.

Development of tools to identify and quantify the quality and safety risks during and post implementation of an EDS that health services can use to manage risks in their projects.

Continue to work with NEHTA to ensure national eHealth strategies, relating to EDS systems, are appropriately linked in with the Patient Controlled Electronic Health Record (PCEHR) directions – Considering such strategies as the EDS being sent via secure transmission to both the community healthcare professional (e.g. GP) and the PCEHR concurrently.

National research priorities

It is recommended that the following research activities are undertaken to further inform the quality and safety implementation and use of EDS systems within Australia:

Investigation into the medication errors associated with the multiple sources of medication information currently being used – Such as pharmacy dispensing system, discharge script, EDS, medication chart, medication reconciliation forms and the patient's own copy of either of these). This research will be important for the development of an accurate electronic health record.

Investigation of the risk management systems used at both the GP and acute end to identify the common issues that are attributable to the implementation of an EDS system.

Investigation and measurement of the safety and quality impacts in the general practice setting associated with the implementation of EDS systems.

Further investigation into and quantify the actual work load and work flow impacts on staff in the implementation of an EDS and compared to previous discharge systems – This research could help to identify strategies to minimise the impact of an EDS system on clinical staff, for health services implementing an EDS and those that already have one in place.

Investigation of the impact that length, structure and layout of EDS has on GP decision making – During the evaluation, stakeholders highlighted the issue of quality of discharge summary content and benefits associated with having consistent fields, yet many noted concern about the length and volume of information. Understanding the impact of EDS length on the decisions made by the intended recipient (such as the GP) will go some way to informing future iterations of structured document templates.

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