Patient information is necessary for clinical care of the individual patient and for research and analysis. For a multitude of reasons the ability to create, access and analyse paper patient records is problematic. A discharge summary should be a permanent record containing the relevant information for the patient and any healthcare worker to understand the nature, events and outcome of a hospital admission.

The value of an electronic discharge summary lies not only for the individual patient and healthcare provider but also allows downstream and aggregated data analysis for audit, planning and quality control.

Hospital practitioners are one group of healthcare workers within a multi-level healthcare system. Communication between healthcare workers, practices and institutions is a fundamental component of clinical practice.

**WHY THE DISCHARGE SUMMARY?**

The discharge summary represents a functional point in the clinical process where information is captured. This lends itself to the creation of an electronic instrument to act as a clinical record, improve patient care and enable repurposing of aggregated data.

**INTERNATIONAL RECOMMENDATIONS AND FORMATS**

In South Africa, there is no universally adopted template or format for a discharge summary. We are not alone. There is global differential adoption of regulations and guidelines defining the content of an ideal discharge summary. This has resulted in individual healthcare institution, organisations and a few countries creating their own recommendations.
In the United States, the Joint Commission on the Accreditation of Healthcare Organisations published guidelines suggesting six essential components:

1. Reason for hospitalisation
2. Significant findings
3. Procedures and treatment provided
4. Patient’s discharge condition
5. Patient and family instructions
6. Attending physician’s signature

The Republic of Ireland National Standard for Patient Discharge Summary

Information suggests seven components:

1. Patient details
2. Primary care healthcare professional details
3. Admission and discharge details
4. Clinical narrative
5. Medication details
6. Future management
7. Person(s) completing discharge summary

The University of the Witwatersrand Department of Surgery Electronic Discharge summary (ED) has the following components:

1. Patient Details
2. Referral Details
3. Patient History
4. Procedures
5. Complications
6. ICU or High Care Admission
7. Radiology
8. Medication
9. Discharge and Follow up details
10. Diagnosis

Each section has a series of subcomponents depending on the speciality and information necessary.
WHAT IS THE IDEAL LENGTH OF A DISCHARGE SUMMARY?
The length of the discharge summary is inversely proportional to its quality. Quality decreases significantly over two pages in length.

HOW IS A DISCHARGE SUMMARY CREATED?
There are two broad ways in which a discharge summary is created.

The first is where it is compiled from a set of predetermined and already completed fields of an electronic health record. These are extracted and used to populate a pro-forma to create a summary.

The second is where a healthcare worker abstracts the information from the patients record to create a summary. This is traditionally what happens with paper-based records. This has the advantage of using the clinician as the data abstractor and creating a more human friendly document.

WHAT IS THE LEGISLATION IN SOUTH AFRICA?
According to Act No. 61, 2003, National Health Care Act; there is a broad scope of content and format for a discharge report.

“Act No. 61, 2003. National Health Care Act, Section 10 Discharge Reports:

1. A health care provider must provide a user with a discharge report at the time of the discharge of the user from a health establishment containing such information as may be prescribed.
   • In prescribing the information contemplated in subsection the Minister must have regard to-
   • the nature of the health service rendered;
   • the prognosis for the user; and
   • the need for follow-up treatment

2. A discharge report provided to a user may be verbal in the case of an outpatient, but must be in writing in the case of an inpatient.”
THE DIFFICULTY OF ACQUIRING DATA IN THE CLINICAL SPACE
The language of clinical medicine is narrative text. As clinicians we tell each other the story of the patients journey under our care. There is a broad and specific vocabulary for unambiguous communication. From a data point of view however, narrative text is unstructured and very poorly suited for electronic storage and subsequent interrogation. This may improve with artificial intelligence and machine learning but at present this is a major obstacle in the abstraction of clinical information into an ideal electronic format.

MYTHS OF TECHNOLOGY IN HEALTHCARE
There is an ubiquitous technological wave that has transformed society. The manner in which we interact with the environment has changed. Mobile technology has progressed to become part of each individual’s phenotype. We are constantly looking for ways to make our lives easier and more efficient with technology.
For the clinician, access, documentation and transfer of information are the core of patient care yet the perceived benefits of technology for healthcare records have not been broadly realised.

Myth 1: Technology Makes it Cheaper
As consumers and end users we expect technology to become more efficient and cheaper with time. This is often not true in healthcare. While clinical metrics may improve with the introduction of new technology, seldom does this result in cost saving. Examples include MRI; the newer antibody based chemotherapeutic agents, emerging medications for dementia and even robotic surgery. It is not generally true that technology makes things cheaper in healthcare.

Myth 2: Technology is a Solution to a Disordered Process
The gee-whizz factor that captures our attention with a new application or product is often misinterpreted as a solution to myriad problems.

“Any sufficiently advanced technology is indistinguishable from magic.” Arthur C. Clarke⁵.
Technology combined with a disordered process will accelerate the disorder and chaos. Technology requires a functional process to be in place before implementation. Often implementation will unmask multiple problems in workflow and process. Implementation of information technology in healthcare is a subject well addressed in “Nancy Lorenzi’s book”\(^6\).

**Myth 3: Technology Saves Time**

Technology does indeed save time. Certainly this is the perception brought out by our daily experience. But not always in healthcare. Why? There is a well-recognised technology adoption curve (Figure 1)\(^7\).

**Figure 1. The Technology Implementation Curve (7)**

![Technology Implementation Curve](image)

This curve applies to most technology. Examples could include the introduction of laparoscopy, a new drug, or a new procedure. New technology gains traction to a point where it has a defined role. A peak of expectation follows. With experience there is a slide into the trough of disillusionment, followed by a slow climb to the plateau of productivity. The key to implementation is to manage the trough of disillusionment and the consequent drop in productivity.

Failure results from discarding the technology during the trough of disillusionment with all the attendant costs and none of the benefits. Implementation of any new technology has to manage the divide between expectation and end-user experience.

**WORKFLOW AND PROCESS**

It bears repeating that technology is not a solution to a dysfunctional workflow. Clinicians are busy people with often unstructured and unpredictable daily task list. The process of medicine is a complex and variable path and difficult to predict.
This makes design and more importantly implementation of an electronic data capture instrument cumbersome. Moreover, clinicians are generally intelligent and trained to act and think independently. Most do not respond well to any change perceived to impinge on their time and patient care. We use one medium of information capture (paper/electronic/dictation) but only one. Presently in the public health system paper is the favoured record format.

IMPLEMENTATION

People are not the barrier. Generally healthcare workers are all educated and literate and have the necessary ability to utilise an appropriate electronic instrument. Implementation, in part, requires a change in the philosophy of the present hierarchical management structures.

Instructing healthcare workers to adopt any system is often met with resistance and ultimately failure. The end user (healthcare worker) should be seen as a customer. The customer pays the provider in data and feels a material benefit to using the instrument. A process of early engagement and iterative feedback improves adoption.

THE INSTRUMENT IS CRUCIAL TO SUCCESSFUL ADOPTION

There is a large divide between the understanding of the clinical process by Information Technology professionals and corresponding lack of insight into the details of Information Technology by most clinicians. A solution is to focus on creating an instrument to enable the clinician end user. Doctors are notoriously difficult to engage in any change in workflow. Most operate independently as individual practitioners, more so in the private healthcare structures in South Africa.

This may be described as an anarchic structure. There is no unified approach to information management and individuals and units collect, analyse and curate their own information in whatever manner best suits them. The costs are obvious, systems cannot communicate, redundant efforts are abound and data quality is compromised. There is however some benefit and the individuals needs may be met. Overall the costs far outweigh the benefits.
Interns complete most discharge summaries and the quality of the summary can be improved by training and support.

**WHAT HAVE WE DONE AT WITS?**

Following several exploratory attempts at implementing an electronic patient record we learnt a number of key lessons relating to clinical workflow and the unpredictable process in the public sector environment, specifically in the Department of Surgery at Charlotte Maxeke Johannesburg Academic Hospital.

The discharge summary was identified as a consistent and defined point in the clinical workflow. The legacy system was paper based with two copies of a summary being created with carbon paper. The content and quality of the summaries are monitored by a registrar and unit head review during a weekly discharge summary meeting.

Ethical approval was obtained and a consent form for electronic storage of patient records was drawn up in conjunction with the University of the Witwatersrand Legal and Human Research Ethics Committee offices (Appendix 1).

There was no change in the discharge process. With support and funding from the department of surgery and the faculty of health sciences at Wits, Internet access to the university network was established and a workstation (PC, monitor, printer and peripherals) was placed in the intern’s offices at the exact location where the summaries were previously completed on paper. Two copies of the summary are printed, one is given to the patient and the other stored for weekly review.

A bespoke software program, called ED (Electronic Discharge) was created by a team of software developers and clinicians with the end user in mind. The application is hosted on one of the faculty of health sciences servers and is protected with the appropriate firewalls, security and back up for a critical system. A short introduction and training session of approximately one hour allowed the interns to become familiar with the program. The issues surrounding an electronic format were discussed and feedback encouraged.
One area where graduates lack experience is in procedure and ICD-10 coding. A look-up feature for both coding systems within the system was highlighted. A help feature and support for the system was also provided. A default paper discharge was available as a backup in the event of a technology failure.

Generally the adoption was successful and compliance was excellent. The electronic discharge summary does not solve the problem of a poorly completed discharge summary. Most likely the summary would have been a poorly competed on paper too.

By May 2016, there were almost 3,500 patient summaries on the system. A weekly report is generated for the heads of department and unit. It includes sex and age numbers, top 10 diagnoses, top 10 procedures and other metrics. Moreover there is now a clinical repository of information available for research and immediate retrieval for point of care information when and if a patient returns. For an example of a printed discharge summary see Appendix 2.

We are expanding the ED footprint within the faculty of Health sciences to the Department of Orthopaedics at CMJAH and to other University affiliated hospitals, namely Helen Joseph Hospital and Chris Hani Baragwanath Academic Hospital.

APPENDICES

Appendix 1. University of the Witwatersrand Consent form for electronic records
Appendix 2. Example of a Printed Discharge Summary

REFERENCES

1. Kind AJH, Smith MA. Documentation of Mandated Discharge Summary Components in Transitions from Acute to Sub acute Care.