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Ewens, A., Orr, M., & Starr Jr, R. G. (2014). *Clinical ICT Tools: Are we able to measure their effectiveness? A Case Study*. Poster session presented at the meeting of Royal Australian College of Medical Administrators Annual Conference. Sydney, Australia.

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Clinical ICT tools: are we able to measure their effectiveness? A case study.

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Introduction

The application of Information and Communication Technology (ICT) tools in the health Sector is expanding. New Zealand already has a very high uptake of computerisation in Primary Care. Electronic Health Records (EHR) and Electronic Medical Records (EMR) are being developed locally and nationally.

A central trend in IT is the effective use of resources. In Health IT systems assessing effectiveness is a complex and contentious area. There is a recognised risk that Health IT Systems do not contribute as we may expect to greater efficiency, productivity and better patient outcomes.¹

Measuring the benefits of ICT tools in the health sector is difficult, due in part to multiple stakeholders' perspectives.^{2,3} One approach is to form an expert advisory group to determine the attributes of an ideal system. Another approach is to look at a current system and determine areas for improvement.

We decided to perform a gap analysis of an established clinical IT platform, progressing towards a full EMR. A detailed expert advisory group guideline, developed for implementation of an ideal system, was used as a reference and audit tool. The question for the case study site being: can we determine what sequential development steps are necessary, if any?

Method

A gap analysis was performed of a large New Zealand Emergency Department's IT system, developed over more than a decade and considered to be leading in the country, compared to a multi-stakeholder, nationally developed ED IT system Request for Proposal (RFP) document. This document lists 337 criteria defining the characteristics of an ideal system.

The RFP is a consensus document developed in 2011 by clinicians, clerical staff, Ministry of Health representatives, National Health IT Board representatives and selected health software developers and vendors. The National Health IT Board requested a list suitable as a procurement and implementation advisory document.⁴ Standardised ED processes were agreed as a first step. The 337 criteria were defined as either essential (283) or preferred (54).

This gap analysis assessed the existing clinical IT tools using the RFP criteria in the 'live' clinical system. An authorised national 'test or virtual patient' was used when required. Each criterion was assessed and then coded as either: met, partially met, not met or indeterminate. The coding was done by a clinician, clerical administrator and IT services manager. All had more than 5 years experience using the IT system.

Additional usability testing was carried out for an indicative single clinical process. The example chosen was a 'test' patient registration event analysed for time taken and ease of use.

The RFP standard: 13 sections itemised on an Excel spreadsheet.

National Emergency Department Clinical ICT Requirements for RFP
With thanks and recognition to Nelson/Marlborough and Northland DHB who did the original work

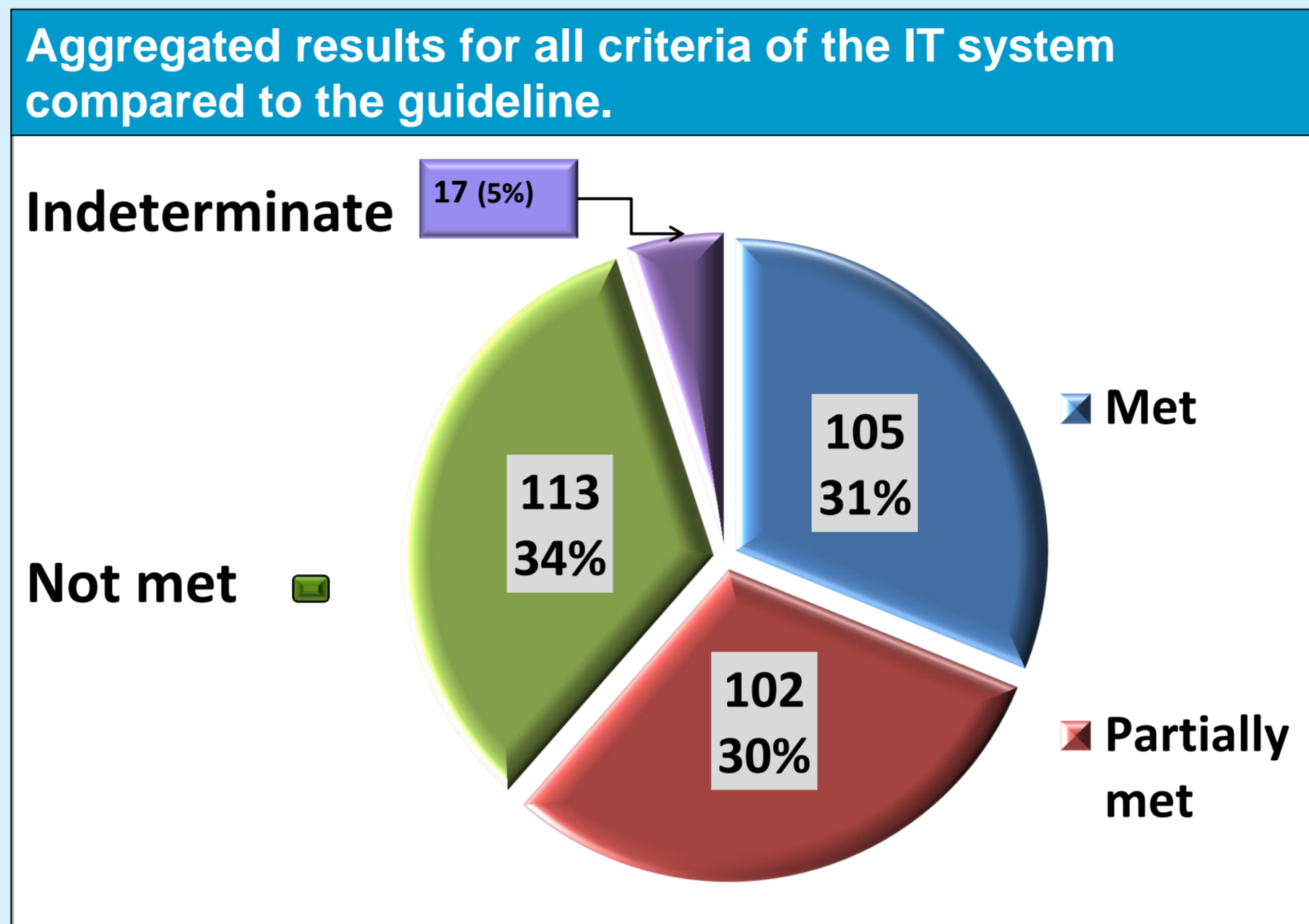
The requirements are structured into the following sections:

1. Detailed Requirements	
1.3.1 Pre-Arrival	
1.3.2 Registration	
1.3.3 Triage	
1.3.4 Clinical Documents	
1.3.5 Diagnostic Tests and Results	
1.3.6 Discharge	
1.3.7 Discharge Medications	
1.3.8 Drug Administration	
1.3.9 General Whiteboard	
1.3.10 Management Reporting	
1.3.11 ACC Information	
1.3.12 Technical Requirements	
1.3.12.1 Operational Characteristics – Server	
1.3.12.2 Operational Characteristics – Client	
1.3.12.3 Operational Characteristics – Network	
1.3.12.4 Back-up, Recovery and Reliability	
1.3.12.5 Security	
1.3.12.6 Current Interfaces/Integration	
1.3.12.7 Future Interfaces/Integration	
1.3.13 General Requirements	
1.3.13.1 Usability and Configurability	
1.3.13.2 Bed Management	
1.3.13.3 Asset Management	
1.3.13.4 Coding	

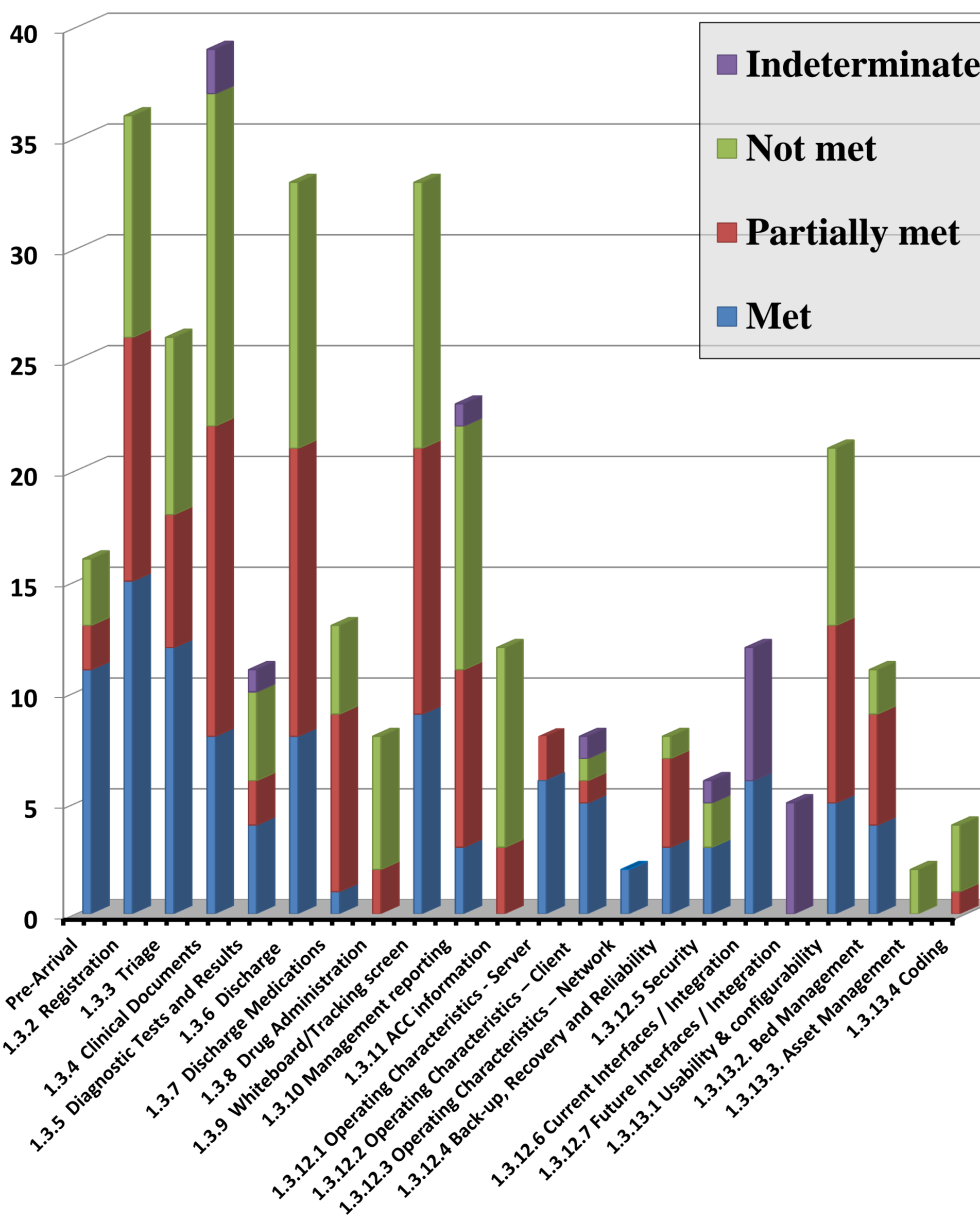
Results

The chart shows the respective proportions for all criteria across the 13 sections, totalling 337 items. Approximately two thirds (61%) of the criteria are met or partially met, with one third not met at all. A small group were unable to be interpreted or applied to the system (5%). Further breakdown of the essential and preferred criteria showed that proportionately more of the essential criteria are met.

This may be considered a significant gap to the expected compliance of one of the more advanced and integrated systems in New Zealand. The detailed breakdown of all items indicates variation across all sections.



Detailed breakdown of all criteria in the 13 sections.



Additional usability testing was carried out for a single patient registration process. This was completed in 2 minutes 30 seconds and required 28 screen window-let refreshes.



Methodology limitations include that this is an audit of an operational system not the systems potential.

Discussion

Case site gap analysis:

As a case study the results indicate that there is considerable potential to further develop and refine this ED IT system to meet a multi-stakeholder determined set of operational and performance criteria. The gaps are noted across all 13 sections. Usability testing indicates further areas for improvement to assist clinical staff. Prioritisation for development will require further analysis.

End user interface:

The end user interface and efficiency parameters do not feature clearly as criteria in the guideline. Even if an ED IT system meets all criteria fully it is not guaranteed to be fully acceptable to the end user.

Expert Advisory group guideline.

As a designated standard the utility of using this document for post-implementation analysis of a maturing system is problematic. It is not clear that the RFP type format is fully meaningful. A broader health ICT context is not referenced for guidance. The documents development was not aimed at post-implementation analysis although it was considered likely to be applicable.

Conclusion

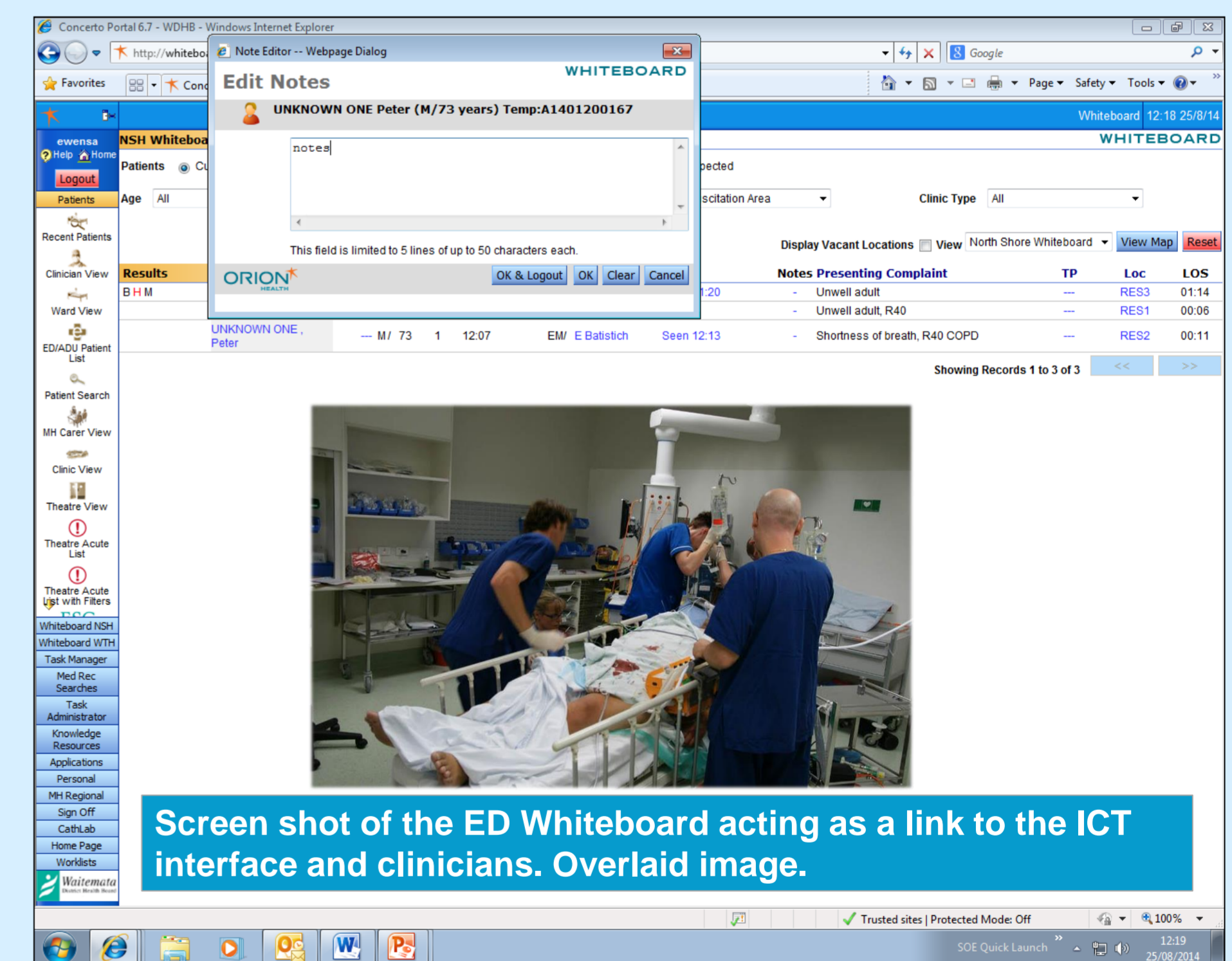
Measuring Clinical ICT is complex and the extant literature is lacking on how this might be optimally performed.⁵ Added to this are the inherent complexities of hospital acute care environments.⁶

Governance of ICT health sector resources requires a clear vision and accurate measurements to monitor progress.⁷ A set of standard attributes and metrics to define the contribution to improved health care is essential.

The EDIT standard goes along way towards guiding a pre-implementation phase in an acute care environment. Additional development is required for application in areas of post-implementation analysis, ongoing monitoring and optimisation.

The development of evidence based assessment tools, able to accurately determine ICT performance criteria, will greatly aid monitoring of efficiency and the effective use of scarce resources.

Guidelines for representative sector groups to use when creating strategic ICT documents are necessary. End user engagement in design and development is associated with successful outcomes in Health IT.⁸



Screen shot of the ED Whiteboard acting as a link to the ICT interface and clinicians. Overlaid image.

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