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Reducing error with diagnostic informatics

Up to 70% of critical clinical decisions leverage information generated by laboratories—but the US ECRI Institute (formerly Emergency Care Research Institute) identifies diagnostic stewardship, and test result management using electronic health records, as its top patient safety concerns for 2019.

While diagnostic testing (pathology and medical imaging) generates information that is crucial to the prevention, diagnosis, prognosis, stratification of risk and treatment of disease, diagnostic error occurs when there is a failure to: (a) establish an accurate and timely explanation of the patient's health problem(s); or (b) communicate that explanation to the patient.

Diagnostic error is a major contributor to problems related to the safety and quality of healthcare, contributing to approximately 10% of patient deaths and accounting for 6% to 17% of

hospital adverse events.¹

The Diagnostic Informatics team at the Australian Institute of Health Innovation, Macquarie University, aims to reduce diagnostic error. The team looks at the role that information technology (IT) plays in generating, gathering, integrating, interpreting and communicating clinical test data and information. It examines the pivotal role of pathology and medical imaging in the clinical decision-making process, underpinned by the generation and communication of digital clinical information.

The entire diagnostic process is covered, beginning with the selection of the right test/referral to address a clinical question through to the interpretation and follow-up of test results and their impact on patient care outcomes and the value of care.



Laying the foundations for effective, safe and quality patient-centred care.

Finding effective solutions to diagnostic error

There are multiple factors which can contribute to diagnostic error including: problems with collaboration and communication among clinicians, patients and their families; lack of infrastructure to support the diagnostic process; and inadequate attention to understanding the problem and its causes.¹

The diagnostic process is not a single task, but rather a series of tasks that involve multiple people across the healthcare spectrum. Effective solutions must engage all stakeholders to arrive at decisions about who needs to receive the test results, how and when the results are communicated, and how they are acknowledged and acted upon.² Meeting these challenges requires the establishment of robust and resilient

partnerships between managers, clinicians, pathology and medical imaging departments and health care agencies, and must include the involvement of patients.

Our research team has developed a program of work designed to involve healthcare consumers as members of a Consumer Reference Group as partners and co-developers of the research agenda to drive safer and more effective test result management systems.

Test result management and follow-up—an international priority

The World Health Organization's World Alliance for Patient Safety has identified poor test-result management as an international high-priority patient-safety area. Systematic reviews have shown that pathology and imaging test results are not followed up for 20-62% of inpatients, and for >

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up to 75% of patients treated in the emergency department.³

IT has a key role to play in the communication and follow-up of test results, and several electronic applications have been developed to support test result management processes. These include systems that can track pending test results at hospital discharge, deliver result alerts to clinicians, act as safety nets in result notification or use tracking systems to document acknowledgement and clinical actions.

Diagnostic informatics in action— the rapid flu test case study

Australia is facing its worst flu season in a decade. Our Diagnostic Informatics team, in partnership with NSW Health Pathology and the Prince of Wales Hospital, Sydney, used sophisticated data linkage methods and advanced statistical techniques to evaluate the implementation of a rapid flu test.

Performing sophisticated data linkage such as this provides opportunities for leveraging the vast quantities of information already held in existing datasets. Prior to this, evidence about the rate and frequency of the provision of diagnostic tests in hospitals and their impact on patient outcomes has been elusive. Poor integration of electronic systems has failed to overcome issues associated with the existence of hospital data silos, which limit the ability to generate meaningful analyses that link tests and referrals to the different components of the patient journey (e.g. treatment and outcomes).

We linked and analysed sets of routinely collected patient and laboratory data across four emergency departments. Our partnership team found that 67% of patients received results from their rapid flu test before leaving the emergency department—compared with 1.3% who received results before leaving after having the conventional test.⁴

Expedited result availability meant patients could be accurately diagnosed while in the emergency department, preventing unnecessary hospital admissions and alleviating pressure on already busy hospitals.

The study findings also indicate that rapid flu testing supports improved infection control and allocation of hospital resources by avoiding additional laboratory tests and potentially inappropriate treatments. ■

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