

The delivery of safe and effective communication, management and follow-up of test results

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Key points

- A NHMRC partnership project established a national stakeholder forum, including clinicians, consumers, and managers, to identify the key challenges involved with the failure to follow up on test results, which carries significant patient safety risks
- The project identified key clinical and business workflows for effective test result management
- Multilayered and interconnected components are required to achieve safe and effective test-result management, including consideration of diagnostic clinical work tasks across settings and embracing patient-centred and digital health strategies for sharing information and timely communication

Abstract

Objectives: This paper reports on a program of research funded by a National Health and Medical Research Council (NHMRC) partnership grant (2015–2021) entitled “*Delivering safe and effective test result communication, management and follow-up*”. The project’s objectives were to: 1) improve the effectiveness and safety of test-result management through the establishment of clear governance processes of communication, responsibility, and accountability; 2) harness health information technology to inform and monitor test-result management; and 3) enhance consumer contribution to the establishment of safe and effective test-result management systems.

Type of program: The partnership project addressed its key objectives through: i) the development of a consumer-driven approach; ii) using diagnostic stewardship and digital health to enhance safety and quality; iii) identifying clinical workflows that can lead to timely and meaningful communication; and iv) contributing to the Royal College of Pathologists of Australasia and Australasian Association for Clinical Biochemistry and Laboratory Medicine’s work on nationally harmonised alert thresholds for critical laboratory results.

Methods: The project employed a convergent mixed-methods approach using multistage studies across hospitals in South Eastern Sydney and Illawarra and Shoalhaven Local Health Districts. A consumer-centred approach, including patient reference groups and community forums, was used to identify mechanisms to enhance consumers’ role in test-management governance processes and inform the direction of the research and interpretation of findings.

Results and lessons learnt: The body of evidence generated by the project highlights the multilayered and interconnected components required to achieve safe and effective test results management. Addressing the significant patient safety risk associated with the failure to follow-up test results must include consideration of diagnostic clinical work tasks (involving multiple people across numerous clinical settings) and embrace patient-centred and digital health strategies for shared information and timely and meaningful communication.

Introduction

The failure to follow up on test results has been identified internationally as an important patient safety risk with significant consequences for the safety and quality of care, including missed diagnoses and suboptimal patient outcomes.¹ Existing literature has shown evidence of acknowledgement of pathology and imaging test results may be absent for 20–62% of tests ordered for inpatients and up to 75% of tests ordered in the emergency department (ED).² This paper reports on a program of research funded by a National Health and Medical Research Council (NHMRC) partnership project grant (2015–2021) “*Delivering safe and effective test result communication, management and follow-up.*” The partners on the grant were: the Australian Institute of Health Innovation, Macquarie University; NSW Health Pathology; the Australian Commission on Safety and Quality in Health Care (ACSQHC); the South Eastern Sydney and Illawarra and Shoalhaven Local Health Districts; and Health Consumers NSW. The project’s objectives were to: 1) improve the effectiveness and safety of test-result management through the establishment of clear governance processes of communication, responsibility, and accountability; 2) harness health information technology (IT) to inform and monitor test-result management; and 3) enhance health consumers’ contribution to the establishment of safe and effective test-result management systems.

Methods

The project employed a convergent mixed-methods approach using multistage studies across hospitals in South Eastern Sydney and Illawarra Shoalhaven Local Health Districts.³ Qualitative research approaches included semi-structured interviews, focus groups and ethnographic observations, which were used to better understand test-result communication and management practices in hospitals and identify patient safety risks.⁴ Quantitative research approaches were used to examine critical test-result thresholds and test-result notification procedures and their impact on clinical work processes and key indicators of patient care.⁵ A consumer-centred approach, including patient reference groups and community forums, was used to identify mechanisms to enhance the role of consumers in test-management governance processes and inform the direction of the research and interpretation of findings.⁶

The project was funded by NHMRC Partnership Project Grant number 1111925. Ethical approval for the partnership project was granted by the South Eastern Sydney Local Health District Human Research Ethics Committee (HREC/16/POWH/412) and Macquarie University. Published outcomes of the project are described below.

Challenges in managing test results

The research partnership began in 2016 with a national stakeholder forum that brought together more than 30 representatives from 14 stakeholder groups, including project partners and consumer representatives, the Australian Healthcare and Hospitals Association, as well as medical indemnity insurance representatives, clinicians, pathology, and management staff from three Sydney metropolitan tertiary hospitals and one children’s hospital.⁷ The forum identified serious patient safety challenges related to the following factors:

- Test results that are not communicated efficiently to patients or clinicians
- Inadequate lines of responsibility and accountability for test-result follow-up
- Unnecessary variation in the way results (including critical risk results) are reported
- The lack of digital health integration makes communication between settings (e.g. hospitals and general practice), clinicians, healthcare professionals and patients difficult and inefficient
- Current systems do not allow patients to play an active role in the processes needed to ensure safe and effective test result management.⁷

How to improve test-result management

The partnership project sought to address the challenges identified by the national stakeholder forum through the four strategies outlined below.

i) Building a consumer-facing research collaboration to improve the safety of test result management

We planned consumer involvement across all stages of the research process, from conception to dissemination.⁶ This involved the purposeful recruitment of appropriately trained consumers; the provision of support structures for active consumer involvement in research design, analysis and write-up; along with financial support for consumer participation.⁸ Both consumers and researchers signalled the need for additional researcher-led methodology workshops to increase consumer research capacity. Currently, these are limited by the lack of available funding.⁸ This need was highlighted in a statement supporting the need for more funding by the Consumer Health Forum and the NHMRC advising that organisational and research project budgets plan adequate funding to ensure long-term consumer engagement across all research stages.⁹

Patients were also interviewed as part of the hospital-based qualitative studies. For instance, in our examination

of the way that test-related information is communicated to patients in EDs, clinicians and patient participants identified key factors to be considered to modify and optimise the communication process. These factors included the impact of severe time pressures in the ED environment, which should prompt attention to when and where patients are provided with information. In other situations, patient concerns about their health literacy and anxiety about their condition should be used to inform decisions about what information is provided to them and the way in which it is communicated.¹⁰

ii) Diagnostic stewardship enhanced by digital health – a lever for high-value care

Pathology laboratory and medical imaging investigations are critical components of the care process. These investigations contribute to identifying a diagnosis, supporting clinical management, and monitoring a patient's condition. Digital health has a key role in the diagnostic process, particularly as a means to provide effective communication of information and as part of a diagnostic stewardship process to ensure the appropriate use of diagnostic tests for therapeutic decision-making.¹¹

Our program of research was based on the extensive use of an enriched linked dataset incorporating laboratory, hospital admission and ED data from across seven hospitals and two local health districts in NSW. The linked dataset provided the platform for our research into the introduction of rapid diagnostic kits for the identification of influenza agents A, B and respiratory syncytial virus, namely, a rapid flu test (RFT) – a new polymerase chain reaction (PCR) nucleic acid amplification testing technology that can reduce the time to result by approximately 24 hours compared to standard PCR testing.¹² As reported elsewhere, our findings showed that an RFT is not only highly accurate¹³ but can also deliver benefits to patients (e.g., lower admissions) and healthcare (e.g., reduced resource use) both in ED¹² and inpatient settings.¹⁴ The evidence from our RFT studies was used by two leading professional organisations, the Infectious Diseases Society of America¹⁵ and the American Association for Clinical Chemistry¹⁶, to inform guideline recommendations.

iii) The need for timely and meaningful communication within and across clinical settings

We undertook a series of qualitative studies to explore how clinicians manage test results on an everyday basis in a digitally-enabled ED and intensive care unit (ICU) setting. Both ICU and ED represent high-pressure environments where effective communication is crucial for safe and effective care.¹⁰ Our research investigated how clinicians managed test results on an everyday basis

(work-as-done) to identify the contextual factors and strategies employed.⁴

We used the graphical workflow modelling system, Business Process Modelling and Notation, to represent the business processes and workflows to better understand the variation in diagnostic pathways and communications across wards and hospitals. Our modelling enabled work processes to be visually represented for ease of understanding and analysis. This provided a means of identifying potential barriers or problems associated with test-management processes and provided new opportunities to enhance the safety of clinical workflows, particularly through the introduction of electronic decision support tools and the re-engineering of work processes following the introduction of new digital health technologies.¹⁷ Findings from these studies were reported at hospital executive levels.

iv) Building an evidence base for the adoption of nationally harmonised alert thresholds for critical laboratory results

The Australasian Association for Clinical Biochemistry and Laboratory Medicine (AACB) and the Royal College of Pathologists of Australasia (RCPA) have identified high-risk result management procedures as an area requiring evidence-based best practice.¹⁸ The RCPA-AACB High-Risk Results Working Party nominated a priority list of analytes for which harmonised, evidence- and consensus-based critical alert thresholds are required. Our project contributed to the Working Party deliberations by establishing a training program involving laboratory professionals undertaking systematic reviews of clinical outcomes-based evidence for a series of analytes that included glucose, sodium, magnesium, creatinine, creatine kinase, lactate, ammonia and calcium. This evidence informed the Working Party's deliberations and recommendations for harmonised alert thresholds for the communication of high-risk results that require timely notification.¹⁹

Lessons learnt

Digital health systems that are designed to improve test-result management are important tools for enhancing the safety of patient care, but in and of themselves, they do not provide a complete solution to safely managing test results.¹⁷ The body of evidence generated from our research partnership project highlights the multilayered and interconnected components needed to ensure safe and effective management and communication processes for delivering test results.

Translation of the findings from this study will help organisations address key issues related to the management and accountability of test-result management systems. Findings from qualitative investigations⁴ identifying business workflows for test-

result communication were reported at executive level at hospital sites to enable them to identify specific areas for intervention and to address any major safety or process issues related to test-result management. The active involvement of consumers across all stages of the research process has also resulted in the publication of practical learnings and strategies^{6,8} for integrating health consumer representatives in research. Additionally, our studies using linked laboratory, admissions, and ED data^{12,14} have informed local and international diagnostic testing guidelines.^{15,16}

The development of safe and effective digital test-results management systems should consider the multilayered and interwoven layers of the process. This requires patient-centred engagement in research, appreciation of the nonlinear diagnostic processes that involve multiple people across different clinical settings, and the organisational-communication environment that governs the movement of patient information.¹⁷ The research evidence points to the ongoing challenge of developing and enhancing diagnostic stewardship (i.e. coordinated guidance and interventions to ensure the appropriate and effective use of diagnostic tests for therapeutic decision-making)²⁰ while harnessing the power of digital health in generating, gathering, integrating, interpreting and communicating clinical test data and information.²¹

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Peer review and provenance

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Competing interests

None declared.

Author contributions

AG, RH, RL and JIW were involved in the conceptualisation and design of the study. JL performed data collection, and JL, JT, RH, RL, JIW and AG were involved in the data analysis and/or interpretation. AG drafted the article, and JL, JT, RH, RL and JIW critically reviewed the article for important intellectual content. All authors approved the article.

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