REDUCING UNNECESSARY TESTing WITH A CLINICIAN-LED APPROACH

Unnecessary testing can expose patients to harm, impact patient flow, and result in inefficient use of clinical resources and excessive expenditure. Building on earlier work, Eastern Health used a clinician-led approach to reduce unnecessary testing across its emergency, intensive care and general medicine programs.

## Background

Testing is considered ‘unnecessary’ if it is not clinically indicated, shows no evidence of benefitting the patient, and/or is more appropriate to defer to a different setting, such as an outpatient clinic.

A variety of factors can lead to unnecessary testing, including:

* lack of knowledge and education within a health service to inform staff on when pathology and imaging tests should be ordered
* lack of decision support tools, clinical pathways and guidelines to guide the appropriate ordering of diagnostic testing
* expectations around the tests that should be performed, including from patients, general practitioners, hospital units and consultants, such as visiting medical officers (VMOs).

Eastern Health implemented the NUTs project to build on work it began in 2012 to reduce unnecessary diagnostic testing at its Box Hill Hospital emergency department (ED).

The health service aimed to scale and embed the successful test reduction strategies it had developed through earlier projects across its emergency, general medicine and intensive care programs.

By ensuring patients only received diagnostic tests that were evidence-based, beneficial to clinical decision-making, and appropriate for the hospital setting, Eastern Health sought to improve the efficiency of its hospitals and reduce inconvenience, discomfort and potential harm to patients.

No unnecessary tests (NUTs)

**Lead** Eastern Health

**Partner** Austin Health

**Duration** October 2016 – January 2018

**Key outcomes**

* In the ED program:
  + reduced target tests numbers by 38,890 over two years through the introduction and embedding of test reduction strategies
  + achieved aggregate reductions in VBG, COAG, CCa, CRP and UMC testing over two years, ranging from 31 per cent (2,986) for UMC to 46 per cent (5,619) for VBG
  + implemented CXR test reduction strategies for the first time, resulting in an 8 per cent (3,005) annual reduction
  + reduced annual CT-L scans by 8 per cent (29) at the Box Hill Hospital ED
* In the general medicine program:
  + achieved a combined annual reduction of 4,983 target tests over three general medicine clinics
  + decreased ordering in three of the four target tests, with annual reductions ranging from 5 per cent (1,376) for U&E to 12 per cent (1,774) for CRP
* Reduced annual CXR orders by 26 per cent (1,503) across two intensive care units
* Reduced risk of patient harm, improved efficiencies, and saved on unnecessary costs

## Key activity

* Clinical champions identified potential areas of unnecessary testing through literature and by conducting a review of best practice.
* Nine tests were targeted for reduction across the three programs:
  + **ED:** venous blood gas (VBG), coagulation studies (COAG), corrected calcium (CCa), C-reactive protein (CRP), urine micro and culture (UMC), chest x-ray (CXR), and CT scan of a limb (CT-L)
  + **general medicine:** urea and electrolytes (U&E), full blood examination (FBE), CCa and CRP
  + **intensive care:** CXR.
* The clinical champions undertook an audit and clinical assessment of the appropriateness of the targeted tests.
* Test reduction strategies tailored to each individual program were developed and implemented, including guidelines, clinical pathways, decision support tools and targeted education.
* Signage, prompts and game-playing elements were used to raise awareness of and encourage engagement with NUT principles. A ‘Test of the month’ initiative was launched at ED sites, where posters, memes, clinical pathways and decision support guidelines were used to highlight inappropriate ordering of one of the unnecessary tests each month.
* After the strategies were implemented, further auditing and real-time data analysis was undertaken to measure their effectiveness and identify areas for further improvement. Feedback was also provided to clinicians to promote cultural change.
* In addition to expanding test reduction strategies to more programs, the project included work to embed practices and sustain reductions achieved in earlier trials, including a trial that began in late 2015 to reduce VBG, COAG, CCa, CRP and UMC testing in Eastern Health EDs.

## Outcomes

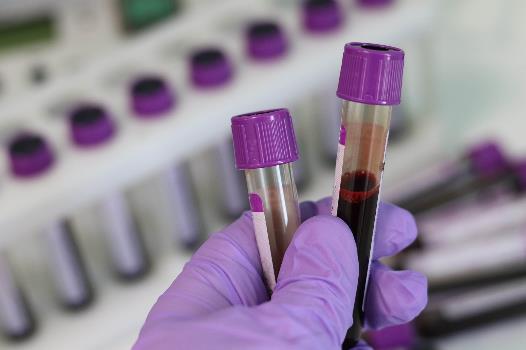
The project achieved significant annual reductions of targeted tests across all three programs.

### ED

* ED program results were evaluated to measure the impact of interventions introduced in 2016 as well as to see if reductions from the 2015 trial had been sustained. Results were aggregated over two years.
* There were significant and sustained reductions in the ordering of targeted tests across all three Eastern Health EDs, particularly for pathology testing.
* The three EDs collectively reduced the number of target tests by 38,890 over two years. There were 20,439 fewer tests ordered in 2017 compared with 2016, with 2016–17 project activity accounting for 53 per cent of the total tests reduced over two years.
* Reductions were achieved in VBG, COAG, CCa, CRP and UMC testing over two years. Aggregate reductions ranged from 31 per cent for UMC (2,986 tests) to 46 per cent for VBG (5,619 tests). The target test with the largest number of orders avoided was CRP, with 16,808 (45 per cent) fewer tests ordered in 2017 than in 2015.
* CXR test reduction strategies were implemented across the three EDs for the first time in 2017, resulting in an 8 per cent (3,005) reduction across all three EDs compared with 2016.
* 8 per cent (29) fewer CT-L scans were ordered at the Box Hill Hospital ED in 2017 compared with the previous year. This was the only site that targeted this test.

### General medicine

* Three general medicine clinics achieved a combined reduction of 4,983 target tests in 2017 compared with 2016.
* Ordering decreased in three of the four target tests, with reductions ranging from 5 per cent (1,376) for U&E to 12 per cent (1,774) for CRP. The target test with the greatest number of tests avoided was FBE, with 1,961 (7 per cent) fewer tests in 2017 than in the previous year.
* Annual ordering of CCa tests increased slightly by 2 per cent (128).
* Analysis of general medicine data was complicated by a number of factors, which meant reductions from the program may have been underestimated.



### Intensive care

Two intensive care units (ICU) collectively reduced CXR ordering by 26 per cent (1,503).

### Qualitative benefits

The project achieved the following additional benefits:

* better patient flow and reduced wait times for necessary testing
* more efficient use of medical, nursing, pathology and imaging staff resources
* a reduction in costs associated with ordering and performing unnecessary tests.

## Key learnings

* **Leadership from clinical champions and the involvement of staff at all levels helps to facilitate cultural change –** Site-based clinical champions were integral in the daily delivery of project information, education, data and feedback. It was also vital to involve junior staff as, due to inexperience, they are among the most frequent requestors of unnecessary tests. During the project, junior staff performed auditing, developed clinical pathways under the guidance of senior medical staff, delivered education sessions, and presented results at national conferences. This has improved confidence and capability in junior staff, which has helped drive NUT awareness and cultural change.
* **Developing and tailoring test reduction strategies for each clinical program is key to achieving optimal outcomes –** Strategies introduced during the project were developed by clinical leads in each program. Their understanding of their program’s unique clinical environment, patient populations and models of care was key to achieving positive results. For example, the ED program used electronic decision support, signage and flowcharts, whereas the intensive care units implemented a governing practice guideline for daily CXR to guide future practice.
* **Implementing cultural change while relying on VMOs can be challenging –** EasternHealth’s general medicine program relied heavily on VMOs. VMOs often have ingrained ordering habits and work at other organisations where test reduction strategies are not in place, making cultural change in this cohort difficult. VMOs’ expectations of what tests should be ordered can also undermine NUT principles and have a negative impact on the ordering practices of junior staff who may feel obliged to comply with VMOs’ ordering requests. In addition, variation in testing preferences amongst VMOs and other senior staff can result in confusion amongst junior medical staff, leading to a ‘just in case’ testing strategy.
* **Major changes to health service systems can reduce compliance with NUT behaviours –** The Box Hill Hospital ED implemented a new patient management system, which resulted in the loss of NUT decision support tools. During the project, clinicians were also adapting to the introduction of the electronic medical record and a new pathology specimen collection software system. The resulting cognitive overload is thought to have caused many clinicians to revert to pre-NUTs ordering habits. Extra staff education and physical decision support tools were used to address this until the resources could be built into the new system.