PLAN FOR ACTION

ACTION

Reduce unnecessary pathology test ordering through clinical resource led stewardship

WHAT IS THE PROBLEM

The global movement 'Choosing Wisely' arose from conversations about appropriate clinician-led resource stewardship.[1] Clinical resource stewardship encompasses multiple aspects including: financial, environmental/waste, time for patients, and clinicians' cognitive load.

Healthcare is an expensive and carbon-intensive sector, generating 7% of the national carbon emissions in Australia.[2] Although the carbon footprints of individual pathology tests are small,[3] millions of tests are performed each year in Australia,[1] and reducing unnecessary testing will be the most effective approach to reducing the carbon footprint of pathology.

Environmental sustainability can be summarised in a hierarchy of waste reduction - Avoid / Reduce / Reuse / Recycle. For pathology test ordering the opportunities for Reuse and Recycle are limited because of infection prevention. **Reducing unnecessary test ordering can both improve care and improve environmental stewardship.[4]**

As many as half of all pathology tests may not be clinically indicated and some may even be harmful.[5] They contribute significantly to the development of anaemia, which affects over 90% of ICU patients by day 3 of admission.[6] Almost half of all critical care patients receive red blood cell transfusions during their stay, with up to one-third of all transfusions attributed to this so-called anaemia of chronic investigation.[7]

Pathology tests are costly, amounting to 12% of the overall Medicare spending in Australia.[8] Additionally, considerable time is spent performing, processing and interpreting tests.

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WHAT IS THE ACTION	**To reduce unnecessary blood loss (harm), economic cost and environmental impact, we propose four steps for action:** 1. Audit - Examine local test ordering practice and decision algorithms 2. Define - Develop clear guidelines for rational pathology test ordering 3. Educate - Design/implement an education intervention to support change where appropriate based on your audit 4. Measure - Audit the outcomes and feedback **Step 1: Audit - Local practice and algorithms** • Partner with your pathology service to access the data • Local practice should be examined to determine the number and type of tests ordered • Importantly, ask why are tests ordered? • Estimate the total financial cost of each category of test • Estimate the total environmental cost (CO2e) of each category of test (outlined in McAlister paper below) **Step 2: Define - Pathology test ordering & re-testing guidelines** • Define what makes a test unnecessary. This requires delineating acceptable and unacceptable reasons for each test to assist in developing a guideline for your clinical setting. • Most reductions in unnecessary pathology test ordering (especially for inpatients) involve reducing repeat test ordering - *so guidelines should specifically address when re-testing is indicated.* **Step 3: Educate - Design an education intervention including:** • Present the audit data to stakeholders • Facilitate stakeholder discussion regarding rationalisation of pathology test ordering • Assemble a multidisciplinary team of champions and educators • Propose an intervention • Implement a clinical guideline describing acceptable and unacceptable indications for tests • Utilise academic detailing to deliver the changes **Step 4: Measure the outcome and feedback:** • Repeat the audit • Feedback to stakeholders
MEASURE	The number of tests performed and their indications must be re-examined after the intervention, to determine whether unnecessary tests have been reduced. Reasons for ordering tests can be investigated through use of a survey. Relevant patient outcomes such as mortality, haemoglobin levels and number of transfusions should be analysed in conjunction with this. Importantly, the outcomes should be assessed regularly in order to confirm a sustained change in practice.

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SUCCESS STORY

The Arterial blood gas (ABG) is the most commonly ordered pathology test in the ICU setting, often without a specific indication.[9] Ordering patterns appear to be primarily driven by cultural factors such as testing a certain number of times per shift, at arbitrary time intervals, and before or after any changes in management.[10] A 58-bed Level III ICU in Sydney performed 66,000 ABGs annually prior to an education intervention (which included the implementation of a clinical guideline) with more than half of these deemed inappropriate.[11] The intervention resulted in a 31% bed-day adjusted decrease in ABGs (4.6 vs 3.1 per bed-day) without a demonstrable difference in patient outcomes. A repeat survey of reasons for testing showed that the proportion of inappropriate ABGs per bed-day decreased by over 70% (2.8 vs 0.8). This corresponds to annual savings of AUD $770,000, over 100 litres of blood, and one full-time equivalent staff member in labour costs. In addition, the reduction in carbon dioxide equivalent emissions of 49g per ABG[3] resulted in a total reduction of 1038kg CO2e; the equivalent of driving 6,782km in a standard Australian car. The 58 ICU beds at this centre represent 2.4% of all ICU beds in Australia and New Zealand. Notwithstanding the variety in clinical practice and costs across the two countries, if a proportional 30% reduction in ABGs could be achieved across all sites this would result in annual savings of up to AUD $33 million, 4,400 litres of blood, 40 full-time equivalent staff (73 000 hours of labour) and over 43,000kg CO_2e or the equivalent of driving 282,000km.

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SUPPORTING INFO/ RESOURCES

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3. McAlister S, Barratt AL, Bell KJ, McGain F. The carbon footprint of pathology testing. Med J Aust 2020;212:377-82.
4. Wiser Carbon Neutral. Available at: https://www.wiserhealthcare.org.au/wiser-carbon-neutral/
5. Hooper KP, Anstey MH, Litton E. Safety and efficacy of routine diagnostic test reduction interventions in patients admitted to the intensive care unit: A systematic review and meta-analysis. Anaesth Intens Care 2021;49:23-34.
6. Rodriguez RM, Corwin HL, Gettinger A, Corwin MJ, Gubler D, Pearl RG. Nutritional deficiencies and blunted erythropoietin response as causes of the Anemia of critical illness. J Crit Care 2001;16:36-41.
7. Corwin HL, Gettinger A, Pearl RG, et al. The CRIT Study: anemia and blood transfusion in the critically ill—current clinical practice in the United States. Crit Care Med 2004;32:39-52.
8. Medicare Group Reports by MBS category processed from July 2018 to June 2019. Available at: http://medicarestatistics.humanservices.gov.au/statistics/mbs_group.jsp.
9. Ullman AJ, Keogh S, Coyer F, Long DA, New K, Rickard CM. 'True Blood' The Critical Care Story: An audit of blood sampling practice across three adult, paediatric and neonatal intensive care settings. Aust Crit Care 2016;29:90-5.
10. Merlani P, Garnerin P, Diby M, Ferring M, Ricou B. Linking guideline to regular feedback to increase appropriate requests for clinical tests: blood gas analysis in intensive care. BMJ 2001;323:620-4.
11. Walsh OM, Davis K, Gatward J. Reducing inappropriate arterial blood gas testing in a level iii intensive care unit: A before-and-after observational study. Crit Care Resus 2020;22:370-7.

MOST IMPORTANT LESSONS

Walsh et al found that the majority of intensive care staff are interested in minimising unnecessary costs to our patients and our healthcare system as a whole.[11] When they were empowered with a clinical guideline stating that best practice was to not perform routine ABGs (for example, at regular time intervals) they found that most doctors and nurses were enthusiastic in changing their previously ingrained behaviour to follow this advice.

Having a small group of passionate "champions" (mostly nursing educators) was key to implementing change in the ICU.

AUTHORS

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