

Reducing Unnecessary Blood Testing in Intensive Care

Project lead

Dr Callum Mackay (Academic Junior Doctor)

Project Contributors

Dr John Glen (Consultant in Intensive Care Medicine and Anaesthesia),

Dr Ffyon Davies (Junior Clinical Fellow)

Betsi Cadwaladr University Health Board

Background

Ysbyty Glan Clwyd's ICU currently samples multiple bottles of blood from each patient every day. While there are good reasons to repeat blood tests frequently in critically ill patients, our current practice of 10 – 11 standard blood tests requiring 4 blood bottles as performed each morning results in lots of tests that do not give us useful information or help guide treatment.

Blood tests are not completely without risks and harms, for example, increasing amounts of blood taken correlates well with both how many of our patients become anaemic and how many blood transfusions we administer each year.

These risks must be considered against the need for close monitoring, and ideally, each patient should have the blood tests they require each day considered on a case-by-case basis, to maximise benefit and prevent unnecessary harm.

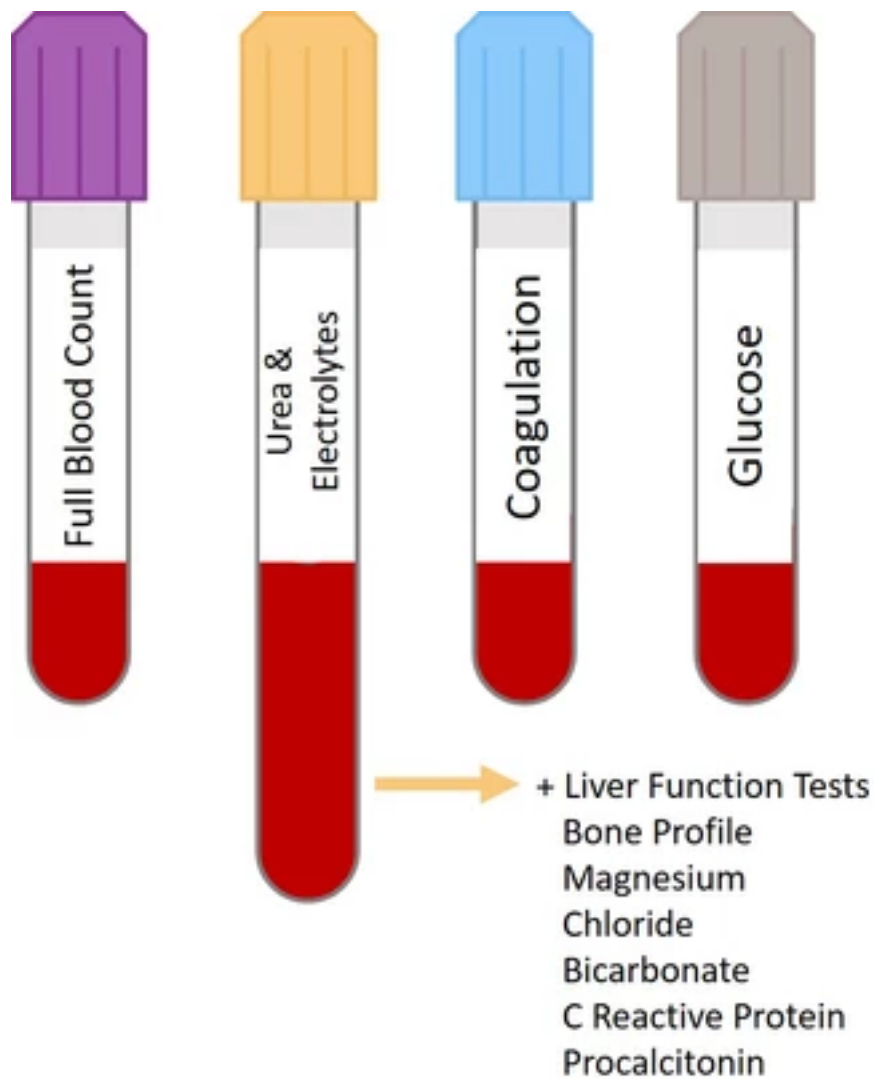


Figure 1

Four test tubes, each labelled:

- a- Full blood count
- b- Urea and electrolytes
- c- Coagulation
- d- Glucose

B – Urea and electrolytes has an annotation reading 'plus Liver Function Tests, Bone Profile, Magnesium, Chloride, Bicarbonate, C Reactive Protein, Procalcitonin

End of description

Project Aims

The primary aim of our project was to eliminate 'standard' blood tests orders and prompt all clinicians to consider the tests each patient requires each day.

THINK



The blood tests a patient requires each day are considered on ward round

REQUEST



Decisions are communicated to nursing staff to allow the correct blood tests to be ordered and taken

TEST



Nurses are prompted to draw the minimum volume of blood required for the tests that are ordered

Figure 2

Three large words each accompanied by a line of text.

Think

- The blood tests a patient requires each day are considered on ward round

Request

- Decisions are communicated to nursing staff to allow the correct blood tests to be ordered and taken

Test

Nurses are prompted to draw the minimum volume of blood required for the tests that are ordered

End of description

With this system in place, we hope to see:

- Reduced rates of anaemia and improved patient outcomes.
- Reduced usage of blood transfusions.
- Reduced usage of consumable products and waste from unnecessary blood draws.
- Reduced costs of blood tests incurred by our blood sciences laboratory.
- Reduced need for painful, repeated blood tests and increased patient wellbeing.

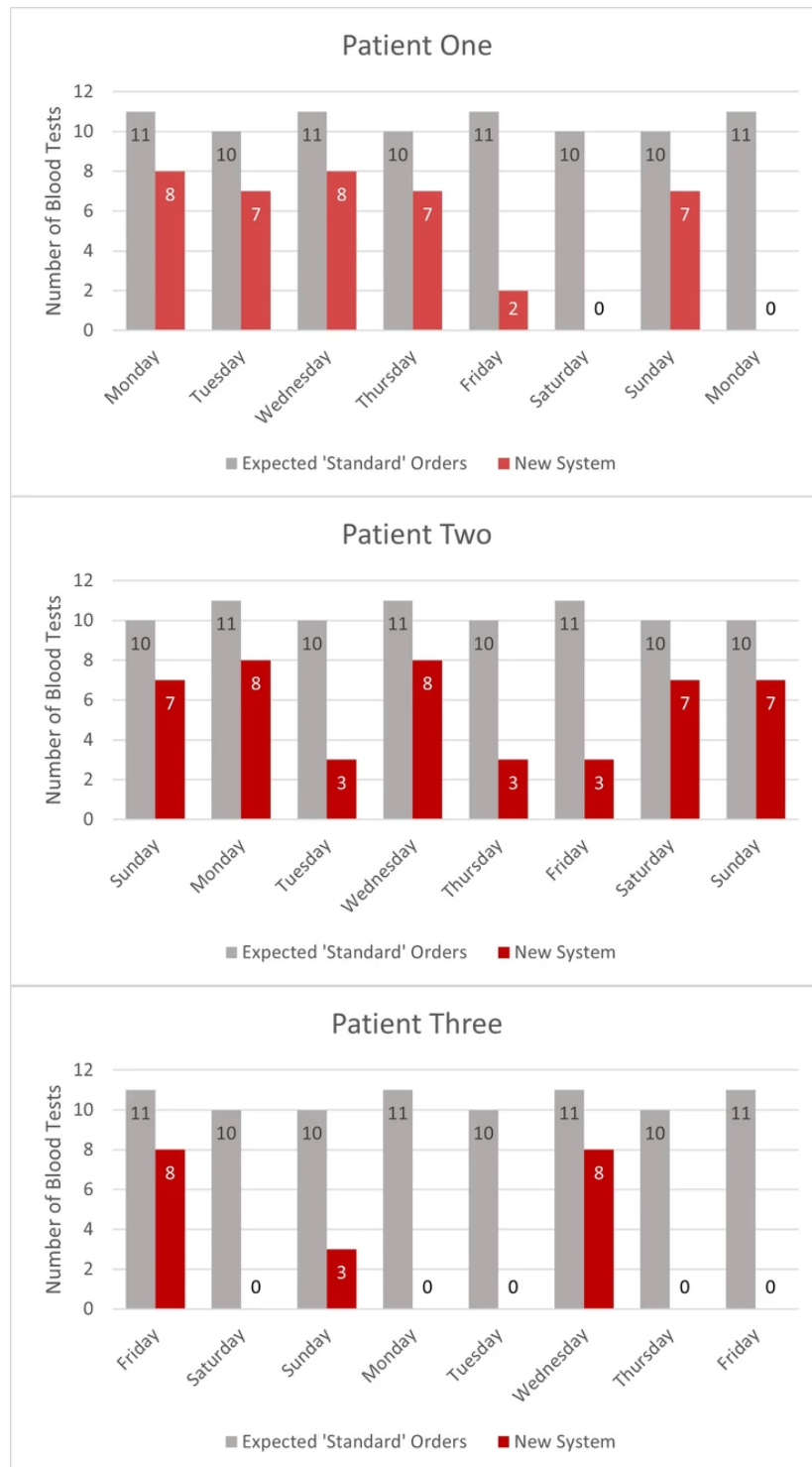
Challenges

COVID 19 has presented huge challenges to Intensive care units all over the world, and ours was no exception. Changing how we practice in the context, however prudent and necessary, was always going to be difficult.

The biggest hurdle to implementing this system has been in educating our large number of staff and maintaining their engagement with the new system. For patient safety, staff are instructed to order the full 'standard' set of blood tests if unsure or if no blood tests have been specified, so it's vital everyone involved has access to training to ensure we continue only taking the blood tests we require.

Key Outcomes

At time of writing, our system is freshly introduced into our ICU and detailed data collection is ongoing, but initial results are encouraging, and we'd like to share some examples of the new system in action, each graph below shows the number of blood tests ordered for each patient next to the 'expected' ordering under the old routine system.



Figures 3 to 5

Three bar graphs titled Patient One, Patient Two and Patient Three. On each bar graph, the vertical axis is Numbers of Blood Tests. The horizontal axis is day of the week. Each day of the

week has two values measures; Expected 'Standard' Orders and New Systems.

Patient One

Monday

- Expected 'Standard' Orders: 11
- New Systems: 8

Tuesday

- Expected 'Standard' Orders: 10
- New Systems: 7

Wednesday

- Expected 'Standard' Orders: 11
- New Systems: 8

Thursday

- Expected 'Standard' Orders: 10
- New Systems: 7

Friday

- Expected 'Standard' Orders: 11
- New Systems: 2

Saturday

- Expected 'Standard' Orders: 10
- New Systems: 0

Sunday

- Expected 'Standard' Orders: 10
- New Systems: 7

Monday

- Expected 'Standard' Orders: 11
- New Systems: 0

Patient Two

Sunday

- Expected 'Standard' Orders: 10
- New Systems: 7

Monday

- Expected 'Standard' Orders: 11
- New Systems: 8

Tuesday

- Expected 'Standard' Orders: 10
- New Systems: 3

Wednesday

- Expected 'Standard' Orders: 11
- New Systems: 8

Thursday

- Expected 'Standard' Orders: 10
- New Systems: 3

Friday

- Expected 'Standard' Orders: 11
- New Systems: 3

Saturday

- Expected 'Standard' Orders: 10
- New Systems: 7

Sunday

- Expected 'Standard' Orders: 10
- New Systems: 7

Patient Three

Friday

- Expected 'Standard' Orders: 11
- New Systems: 8

Saturday

- Expected 'Standard' Orders: 10
- New Systems: 0

Sunday

- Expected 'Standard' Orders: 10
- New Systems: 3

Monday

- Expected 'Standard' Orders: 11
- New Systems: 0

Tuesday

- Expected 'Standard' Orders: 10
- New Systems: 0

Wednesday

- Expected 'Standard' Orders: 11
- New Systems: 8

Thursday

- Expected 'Standard' Orders: 10
- New Systems: 0

Friday

- Expected 'Standard' Orders: 11

- New Systems: 0

End of description

Patient One

Patient One was admitted extremely unwell, and initially required multiple antibiotics and surgeries to control a life-threatening infection, we're extremely pleased with his ongoing recovery now, and the blood tests ordered for him each day demonstrate more frequent, comprehensive testing as he was critically unwell, reducing as time and recovery progress.

Patient Two

Patient Two was admitted following a surgery that had resulted in complications, while he made a swift initial recovery, he went on to develop an infection and became increasingly unwell. His blood tests demonstrate how the new system allows us to respond to improving patients by reducing our monitoring of blood tests, and increase their intensity if needed.

Patient Three

Patient Three is clinically stable, but she must remain in intensive care for advanced respiratory care. Her blood tests demonstrate how safe, periodic blood testing is used to reduce the burden of repeated blood tests over weeks and sometimes months.

During the review process, it was identified that three of the eleven standard order blood tests were often redundant or did not frequently change our clinical management, these three tests are now performed very infrequently.

Because of this change alone, we know that:

- We will order up to 11,000 fewer blood tests in the coming 12 months.
- This will lead to an approximate cost saving of £44,000 in laboratory consumables alone.

Next Steps

We need to continue educating and supporting staff in the use of the new system as time goes on, to ensure that all opportunities to reduce the impact we have on our patients are captured.

We may also need to adapt the system, listen to feedback on its implementation and produce something that works well for all members of staff and allows easy adoption by other intensive care units.

Over the coming months, we plan to collect more data to answer the following questions:

- Can we quantify the average reduction in the volume of each blood draw?
- Can we more accurately quantify reduction in both blood tests and associated costs?
- Have we reduced our rate of blood transfusion?
- Have we had a negative or positive impact on staff workload and patient experience?

Our Exemplar Experience

The Bevan Commission helped us understand and manage the process of changing our practice in a productive and inclusive manner.

Contact

callum.mackay@wales.nhs.uk