# Optimization of Laboratory Testing in Dialysis: Reducing Unnecessary Blood Tests

**Site:** Warszawski Uniwersytet Medyczny (WUM), Warsaw, Poland.

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# Why did you start?

## Problem Description

In the dialysis unit, monthly laboratory panels included both mandatory tests (as required by the national healthcare fund) and a range of additional analyses. Several of these tests are of limited or no clinical value when performed routinely in stable dialysis patients. This led to redundant investigations, unnecessary blood draws, and increased laboratory workload.

## Specific Aims

Following the **SMART Goals** framework, the project aimed to:

**Specific -** Streamline monthly laboratory panels in the dialysis unit by removing duplicate and non-essential tests (e.g., routine CRP, duplicate glucose, monthly full coagulation profile, lipid profile).

**Measurable -** Reduce the number of blood collection tubes by at least one tube per month per patient (≈90 tubes monthly for the entire unit).

**Achievable -** Implement the change by updating electronic order panels with the IT department and providing clear communication to staff.

**Relevant -** Improve clinical relevance of testing, reduce patient discomfort, lower laboratory workload, and decrease environmental impact.

**Time-bound -** Complete panel revision and implementation within 1 month, with impact evaluation after 3 months.



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## What did you do?

### Context

The optimization was implemented in the dialysis unit of a university hospital, which provides care for approximately 90 patients on chronic hemodialysis.

### Intervention

This change project involved the review and optimisation of routine laboratory testing within the dialysis unit through a structured process of assessment, implementation, and monitoring.

**Assessment and preparation**

All laboratory tests included in the monthly dialysis panels were reviewed, distinguishing between mandatory (NFZ-required) and additional analyses. Low-value or redundant tests were identified, including duplicate glucose measurements, routine CRP, monthly full coagulation profiles, and lipid panels. Proposed changes were discussed with the head of the dialysis unit to confirm clinical safety and feasibility. Baseline data were collected on the number of blood collection tubes used per patient per month.

**Implementation**

Electronic laboratory panels were updated in collaboration with the IT department to remove unnecessary tests and ensure that only clinically relevant investigations



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remained available as default options. Changes were communicated to all medical staff to support consistent adoption.

**Monitoring and Evaluation**

Following implementation, laboratory test ordering patterns and blood collection tube use were monitored over a three-month period. Informal staff feedback was collected, and results were reviewed with the head of the dialysis unit to ensure sustained clinical safety and identify any need for further adjustments. Changes were communicated throughout this process, including the clinical, economic, and environmental rationale, to reinforce understanding and adherence.

## Measures

*Patient Outcomes*

Unplanned test re-orders were monitored.

*Environmental sustainability*

The number and type of tests ordered were tracked through electronic health records to quantify the monthly totals of tubes and tests per patient. Three months of data was collected before the changes and three months of data after panel revision.

Environmental impact was estimated using a proxy life cycle assessment approach, as site-specific emission factors for individual laboratory tests were not available. Published emission factors from a Canadian study applying PAS2050 methodology were used to approximate the carbon footprint of laboratory testing components.

*Economic sustainability*:



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Cost savings were estimated from the reduced use of laboratory reagents and processing as well as the cost of blood collection tubes.

*Social Sustainability:*

Staff feedback on workflow efficiency was collected through informal conversations. Patient acceptability of reducing the frequency of blood tests was explored through focus groups with European Kidney Patients' Federation (EKPF) representatives.

## What did you find?

### Results

*Patient outcomes*

Blood draws decreased by one tube per patient per month. Reduced blood draw volume improved patient comfort. No negative clinical effects observed.

*Environmental sustainability*

The number of blood collection tubes used was reduced by approximately 90 per month. In addition, removal of redundant or low-value analyses—including C-reactive protein (CRP), duplicate glucose measurements, lipid panels, and coagulation profiles—resulted in a reduction of approximately 360 unnecessary tests per month, equivalent to around 4,300 tests annually. This corresponds to approximately 12 tubes and 48 tests avoided per patient annually.

Based on published estimates for laboratory consumables and testing, the intervention was associated with an estimated reduction of approximately 250-350 kg $CO_2$e annually (around 3 kg $CO_2$e per patient per year).



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*Economic sustainability*

Savings from reduced analyses are estimated at approximately 2,800 to 4,100 PLN per month (equivalent to €640 to €940 per month), based on a reduction of around 360 tests and typical unit costs. This corresponds to an estimated 34,000 to 49,000 PLN annually (equivalent to €7,800 to €11,300 per year).

Additional savings were achieved through reduced use of blood collection tubes, estimated at approximately 1,080 PLN per year (equivalent to €250 per year).

*Social sustainability*:

Laboratory staff observed reduced workload. Increased staff awareness of evidence-based testing and sustainable practice.

Focus group participants highlighted the importance of clear communication and evidence when reducing routine testing. Changes were considered acceptable when clinically justified and tailored to individual patient needs. The intervention was implemented in line with clinical guidance and no concerns were identified during implementation.

## What does this mean?



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## Summary

Removing low-value tests from the monthly panel reduced blood tubes, prevented 360 unnecessary tests/month, and generated meaningful cost and waste reductions - all without compromising patient safety.

## References

Spoyalo K, Lalande A, Rizan C, et al. Patient, hospital and environmental costs of unnecessary bloodwork: capturing the triple bottom line of inappropriate care in general surgery patients. BMJ Open Qual. 2023;12(3):e002316. doi:10.1136/bmjoq-2023-002316



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