

Optimal use of laboratory tests

Serum protein electrophoresis

TARGET USERS

Health professionals involved in ordering laboratory tests.

OBJECTIVE OF THE TOOL

To support health professionals in the judicious use of clinical laboratory testing.

This clinical tool is provided for informational purposes only and does not replace the clinician's judgment in the exercise of activities reserved to them by law and regulation.

❌ SERUM PROTEIN ELECTROPHORESIS (SPE) IS NOT INDICATED:

- in asymptomatic individuals;
- as part of routine evaluations (e.g. fatigue workup or inflammatory panel);
- initially in individuals with hypercalcemia, renal insufficiency, anemia, or bone pain, if the most apparent causes have not been ruled out.

INDICATIONS FOR SERUM PROTEIN ELECTROPHORESIS

SPE may be indicated:

- for the diagnosis or monitoring (see repeat interval limits below) of a plasma cell dyscrasia;
- in individuals with unexplained neuropathy (e.g., not attributable to alcoholism or diabetes).

❌ HOWEVER, SPE SHOULD NOT BE REPEATED AT INTERVALS CLOSER THAN¹:

- 1 year for patients with stable, low progression-risk monoclonal gammopathy of undetermined significance (MGUS);
- 3 months for untreated individuals under follow-up for plasma cell dyscrasia^{2,3};
- 21 days for acute conditions or for patients undergoing treatment for a plasma cell dyscrasia³.

1. The appropriateness of repeating the test should be evaluated in advance; **the minimum intervals listed do not constitute a recommendation to repeat the test.**

2. Plasma cell dyscrasia include MGUS, multiple myeloma, solitary plasmacytoma, Waldenström's disease, and amyloidosis.

3. More frequent SPE testing may be considered in certain situations, such as according to the treatment cycle, for patients with high-risk plasma cell dyscrasia, or during post-treatment follow-up.

OTHER CONSIDERATIONS

- Repeat SPE tests may be spaced at longer intervals in individuals with MGUS who have low paraprotein concentrations compared with those with higher concentrations.
- A normal SPE result does not exclude a plasma cell dyscrasia.
- SPE is not a sensitive test for detecting inflammation.
- SPE should not be confused with hemoglobin electrophoresis, as these are separate tests evaluating different conditions.

RELEVANCE ISSUES

- Between 25% and 50% of SPE requests are estimated to be inappropriate.
- SPE is labor-intensive due to technical complexity and the expertise required; unnecessary requests can delay results for clinically relevant tests.
- Monoclonal antibody therapy may falsely suggest the presence of MGUS. Acute inflammation may also influence SPE test results.
- Detecting MGUS via SPE can trigger a cascade of further investigations (including serum light chain assay, immunoglobulin quantification, immunofixation), hematology consultation, and long-term specialty follow-up.
- MGUS is common and generally benign in individuals aged 80 years and older.
- MGUS typically carries a low risk of malignant transformation (approximately 1% per year), and its detection may cause unnecessary patient anxiety.

INFORMATION ON THE TEST

- SPE is a protein fractionation technique used to detect paraproteins (monoclonal proteins of different immunoglobulin classes).
- Serum immunofixation is performed to confirm the presence of paraproteins identified by SPE and to identify their specific types.

EPIDEMIOLOGICAL DATA

In Canada, it is estimated that:

- 4,100 individuals are diagnosed with multiple myeloma each year;
- 150 individuals are newly diagnosed with Waldenström's macroglobulinemia annually and 1,500 people currently living with the disease.

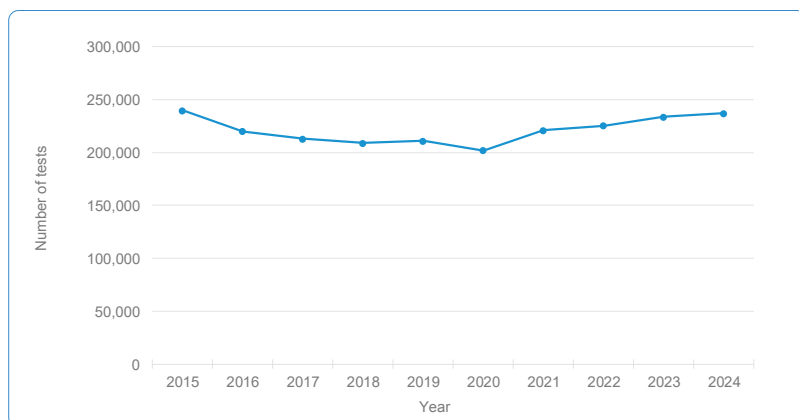
Prevalence of Monoclonal Gammopathy of Undetermined Significance



50 years and older: **3.2%**
80 years and older: **6.6%**

ADDITIONAL CONSIDERATIONS

Evolution of the number of tests performed in Quebec between 2015 and 2024



1.1%

Decrease in the number of tests performed between 2015 and 2024



\$8.20 / capillary SPE test (2024)*

\$11.30 / gel SPE test (2024)*

In 2024, **237,058** SPE tests were performed in Quebec. These tests represent an estimated cost of **\$2,141,000** for the same period.

* The cost reflects a weighted value that accounts for the human and material resources required to perform the test. It excludes costs related to infrastructure and clinical and medical staff salaries. For more details, see the [methodology](#).



Avoiding ordering low-value laboratory tests helps **optimize** the use of **human resources within the healthcare system**, **while also reducing the carbon footprint** by:

- Reducing the use of medical supplies
- Reducing energy consumption
- Limiting patient travel

The recommendations were developed using a systematic approach and are supported by the scientific literature as well as the knowledge and experience of Quebec clinicians from diverse specialties and areas of expertise. For more details, see insss.qc.ca.

For more details, including references, refer to the [associated report](#).

For any questions relating to clinical tools, write to info-outils.cliniques@insss.qc.ca.

