ANALYSIS OF CALIBRATION DISCREPANCIES IN LUTETIUM-177 RADIOPHARMACEUTICALS IN RADIOPHARMACY

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Introduction :

Lutetium-177 radiopharmaceuticals are used in targeted radionuclide therapies such as the treatment of metastatic castration-resistant prostate cancer and metastatic gastroenteropancreatic neuroendocrine tumors.
Although doses are calibrated with a ±10% tolerance, discrepancies between declared and measured activities are frequently observed.

Aim :

Evaluate calibration discrepancies in ^{177}Lu radiopharmaceutical doses between laboratory-reported and measured values

Methods :

- Analyze doses of 177lutetium-based radiopharmaceuticals of 8 radiopharmacies between January and December 2024
- Comparison between measured activity (in MBq) and certificate reference activity
- Data collection:
  - date/time of calibration
  - date/time of measurement
  - day of delivery
  - date of production
  - production site

Results :

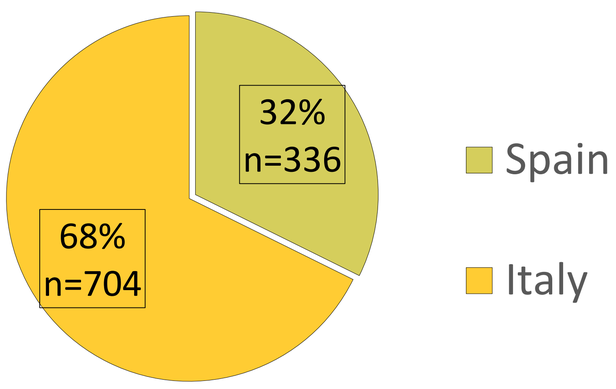
N = 1040 vials

- ^{177}Lu-PSMA n=754
- ^{177}Lu-oxodotreotide n=286

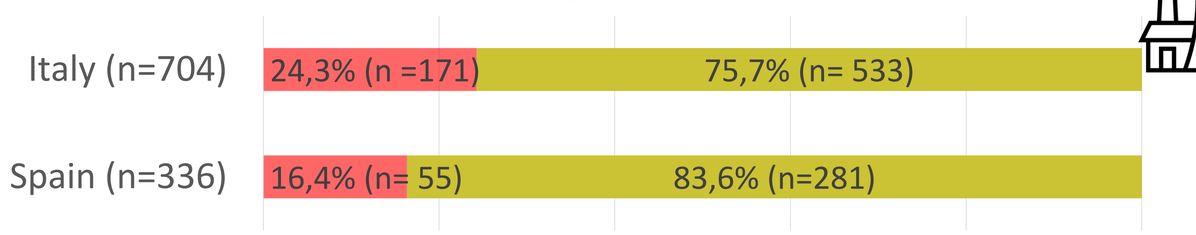
Mean deviation : **–7.2%** ± 2,9

- **21.7% vials calibrated** beyond tolerance of ± 10%
- 73.8% vials exceeded 5% of deviation

Vial production site



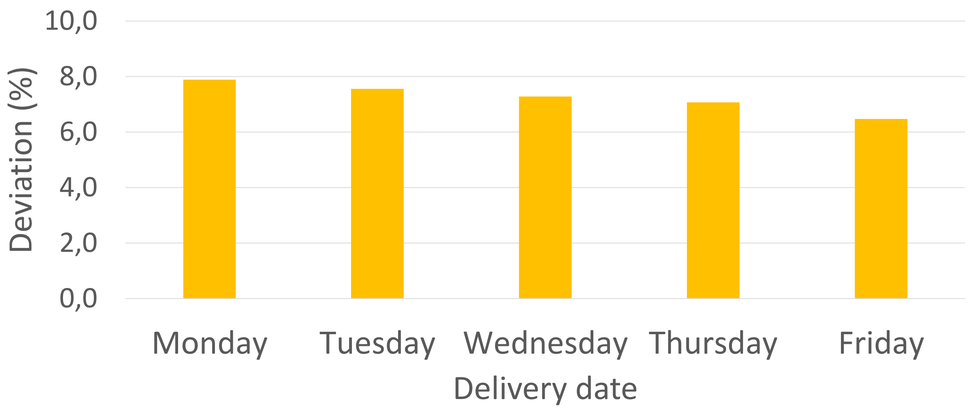
>10% Deviation according to production site



	Spain (n=336)	Italy (n=704)
% vials non compliant	16,4%	24,3%
% vials compliant	83,6%	75,7%

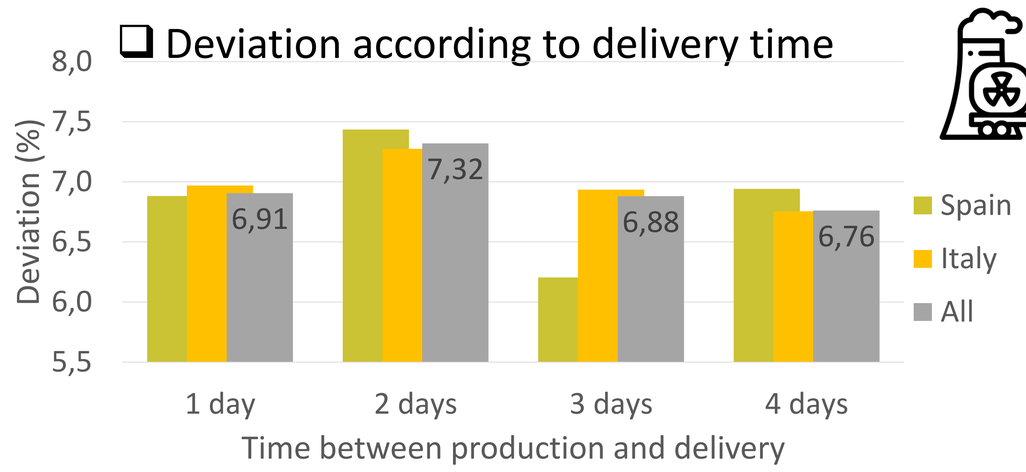
→ More over, 75.7% of vials showing a deviation of more than 10% came from Italy

Deviation according to delivery schedules



→Higher deviation observed for Monday deliveries

Deviation according to delivery time



→No difference in activity deviation observed according to delivery delay (1–4 days)

Conclusion :

- Most doses remained within ±10% tolerance, but a **significant proportion** of ^{177}Lu doses showed **deviations greater than –5%**
- Both **origin** and **delivery** schedule influenced deviations
- **Harmonization** of calibration procedures is needed at the European level

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