Spiros® and small administration volume: gravimetric control helps limit waste

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Context

- Spiros® connected to a syringe
- Safe administration of cytotoxic drugs for the nurse
- Volume 0.1 mL (= dead volume (DV))
- Production gravimetry controlled – weight +/- 5%
- Significant DV regarding small volume to be administered

Objective

- Compensate the DV with the help of gravimetry

Material and method

- Several series of weighing
- Target volume administered water for injectable preparation (WFIP) = 2 ml ➔ 1.964 g
- Determining DV Spiros® + syringe
- 4 tests are performed :
  - A) Target volume = target weight
  - B) Target Volume + 5% target weight
  - C) Target weight = 1.964 g
  - D) Target weight + weight DV

Student's t test (α = 5%)

Results

Scenario	A)	B)	C)	D)
n	10	10	10	10
Average (g)	1.984	2.081	1.802	1.967
Standard deviation (g)	0.006	0.015	0.029	0.019
Average difference in target weight (%)	**1.01**	5.94	8.25	**0.77**
P value	1.97.10^-6	1.66.10^-9	2.64.10^-8	**0.65**

Spiros® + syringe	Dead volume
n	40
Average (mL)	0.18
Standard deviation (mL)	0.010

- WFIP target weight obtained by series of 0.1 and 0.2 ml weighings

Conclusion/Discussion

- Significant impact of DV
- ↘ target weight ➔ ↗ DV impact
- Weight injection significantly different for situations A), B) and C)
- Automatic DV compensation not possible via Chimio®➔ to make ourselves
- Situation A)
  - Need for double visual check
  - Sampling accuracy < situation D)
  - Cytotoxic accuracy not guaranteed
  - Tolerance +/- 5% respected – same as situation D)

➔ Situation D) selected

➔ Gravimetry : one of the most accurate control methods for preparing a cytotoxic agent