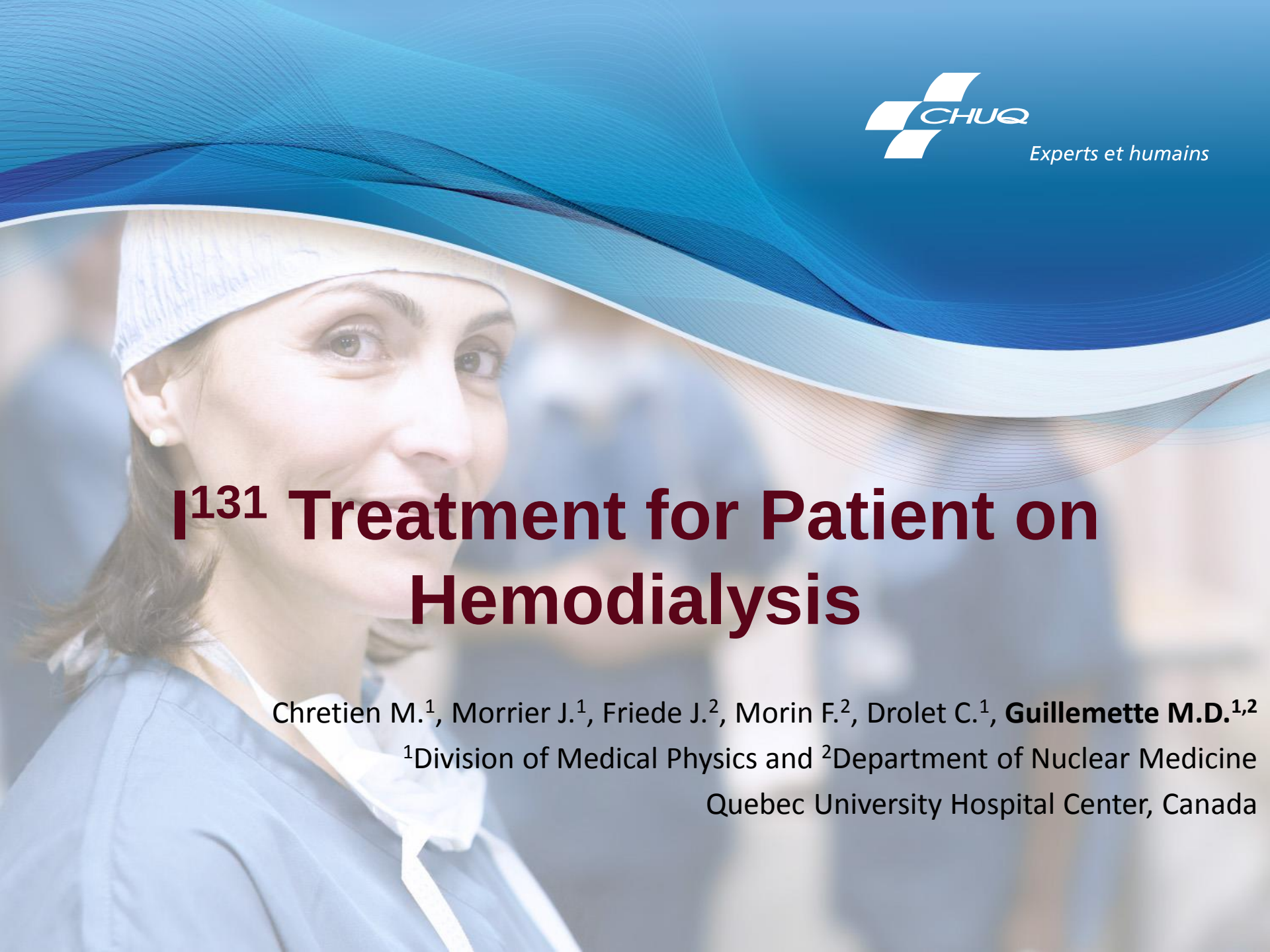

^{131}I Treatment for Patient on Hemodialysis

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Problem

- Thyroid cancer patients with end-stage renal failure on hemodialysis
- Iodine can’t be eliminated through the kidney
- Treatment with I-131 following thyroidectomy
- Hemodialysis problems include:
  - Close contacts with the patient
  - Contamination with radioactive blood
  - Internal contamination of the machine

Rational

As those cases are very infrequent and few reports could be found in the literature, we evaluated radiation safety and I-131 decay for two hemodialysed patients following complete thyroidectomy

Patient #1

62yo female with diabetic nephropathy, progressed to end-stage renal failure, on hemodialysis. Diagnosed with thyroid carcinoma, treated with I-131 following thyroidectomy.

Received 1.85GBq (50mCi) of I-131 following hemodialysis, then isolated for 48h until the next hemodialysis session.

Patient #2

61yo male with obstructive uropathy, atonic bladder, progressed to end-stage renal failure, on hemodialysis. Diagnosed with thyroid carcinoma, treated with I-131 following thyroidectomy.

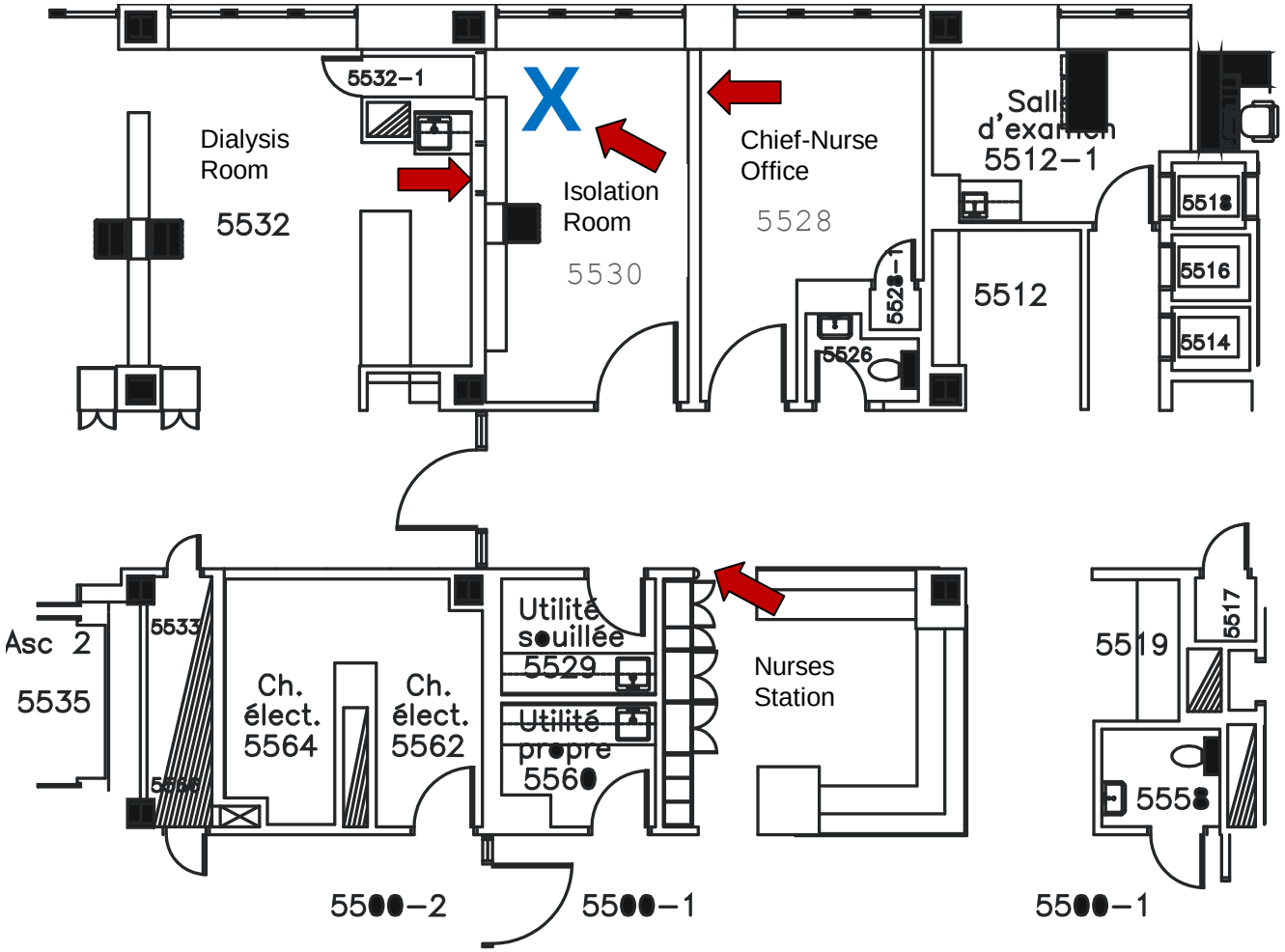
Received 1.85GBq (50mCi) of I-131 following hemodialysis, then isolated for 48h until the next hemodialysis session.

Radiation Safety

- Meet with the hemodialysis team
- Evaluate probable exposition
- Plan the treatment
- Prepare the room
- Measure patient activity
- Measure neighbouring rooms activity

Radiation Safety

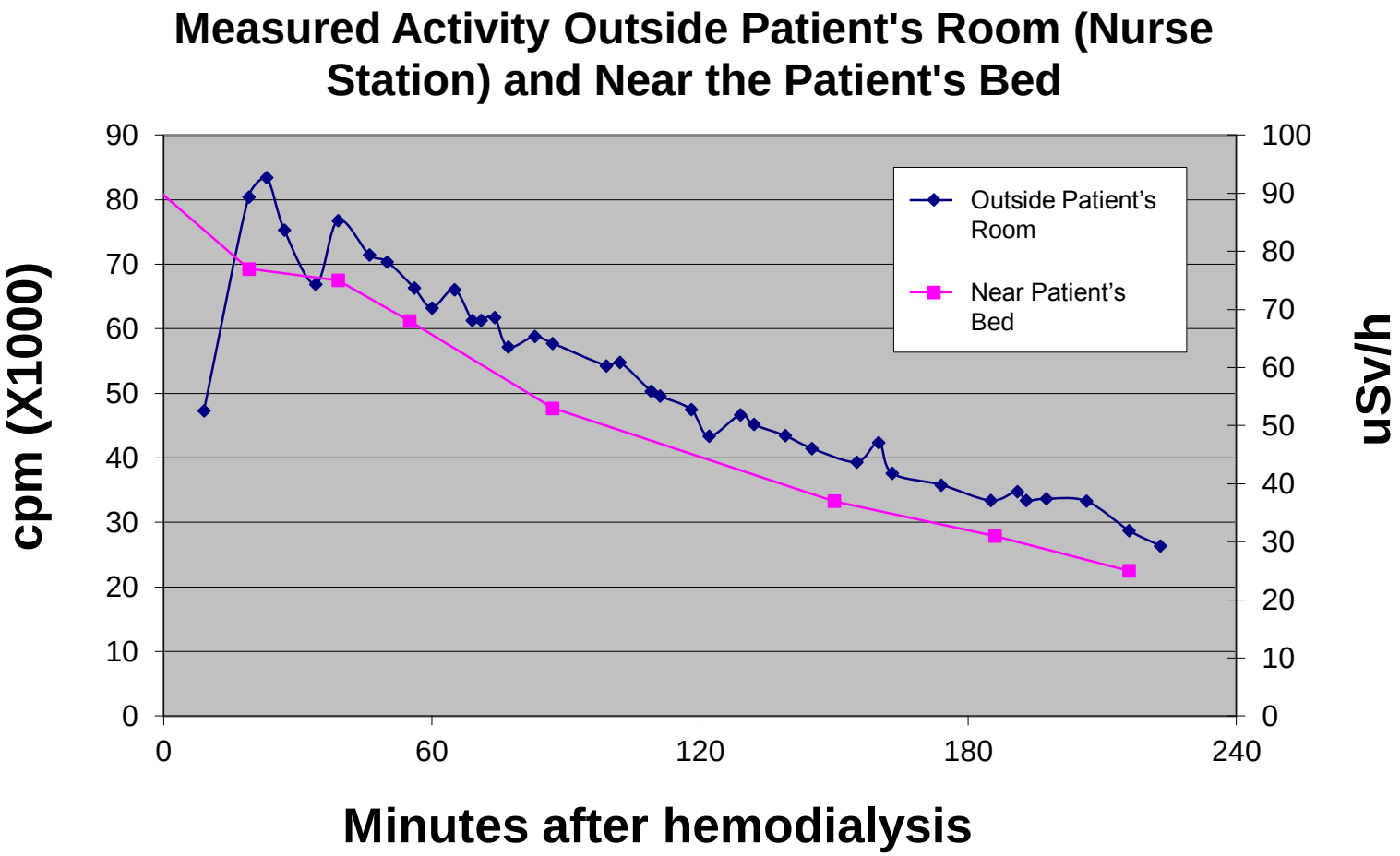
Radiation Safety



Results

- The patient's activity before the hemodialysis treatment (48h after I-131 ingestion) was 84% of the initial activity, which is equal to I-131 radioactive decay (without biological half-life).
- The measured activity following hemodialysis was 25%.
- Both patients left the hospital after their hemodialysis session (6µSv/h @ 2m).

Results


Measured Activity Outside Patient's Room (Nurse Station) and Near the Patient's Bed
cpm (X1000)
uSv/h
Minutes after hemodialysis
Outside Patient's Room
Near Patient's Bed
0
10
20
30
40
50
60
70
80
90
100
0
60
120
180
240

Results

- Chief-Nurse office : 1µSv/h
  - 1 treatment/day to reach 1mSv
- Neighbour room: 0.5µSv/h
- Nurse next to the patient for the entire procedure: 30µSv
  - 33 patients/year to reach 1mSv
- Machine: Minimal contamination (1µSv/h) following the rinse cycles (water, acetic acid and bleach). No possibilities of contaminating the next patient.

Discussion

- I-131 is eliminated almost exclusively trough the kidney.
- Administered dose of I-131 must be calculated to account for the absence of elimination in hemodialysed patients.
- Radiation safety measures have to be carefully explain to the personnel.
- Risks associated with this procedure are minimal.