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Eidgenössisches Departement des Innern EDI
Bundesamt für Gesundheit BAG
Direktionsbereich Verbraucherschutz

Mobile PET-CT unit in Switzerland

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Main topics

- Number of PET/CT in Switzerland
- Mobile PET/CT
- License procedure
- Layout and conditions to be fulfilled
- Doserate measurements made by the regulatory body
- Audit on PET/CT made by the regulatory body
- Perspective for the future

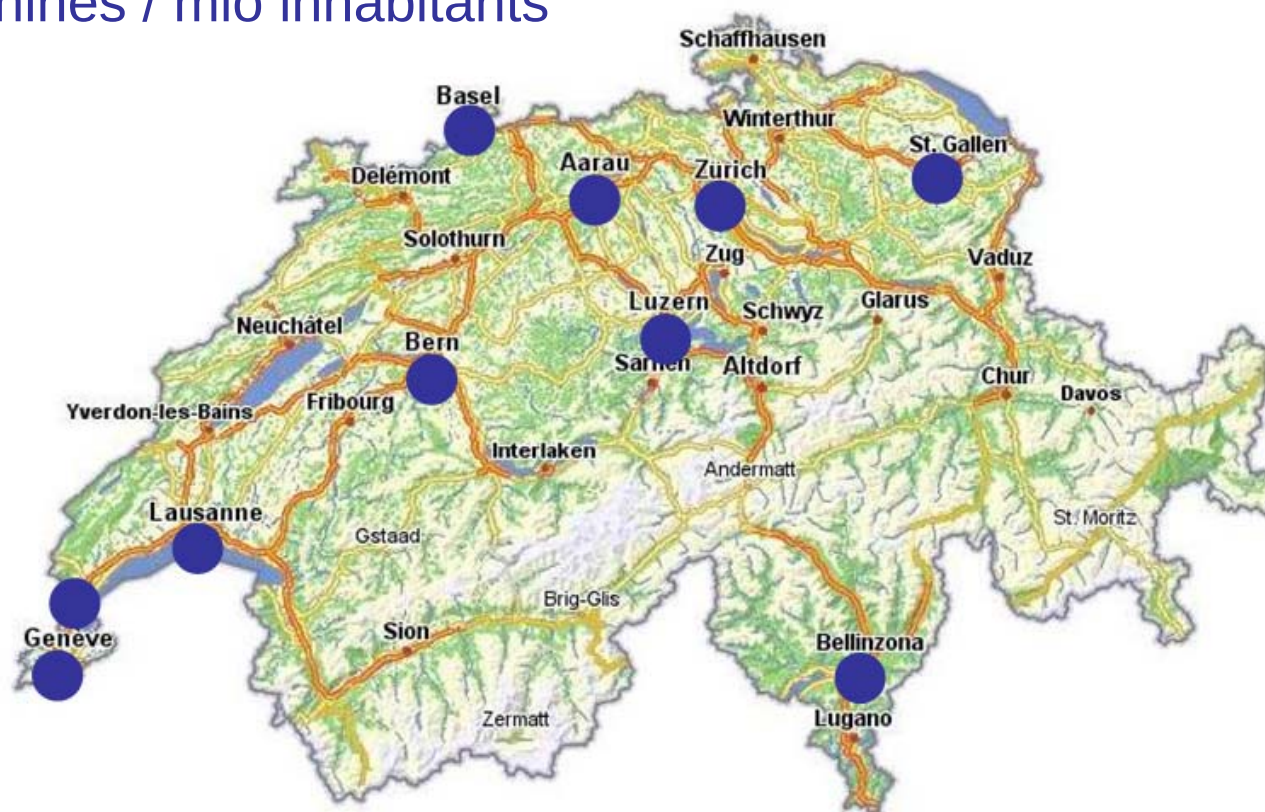


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PET-CT systems in CH – fixed installations

15 fixed PET-CT machines on 10 sites for 7 million inhabitants
2 machines / mio inhabitants





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Mobile unit (trailer)

Commissioned by the Nuclear medicine department
Geneva University Hospital (HUG)

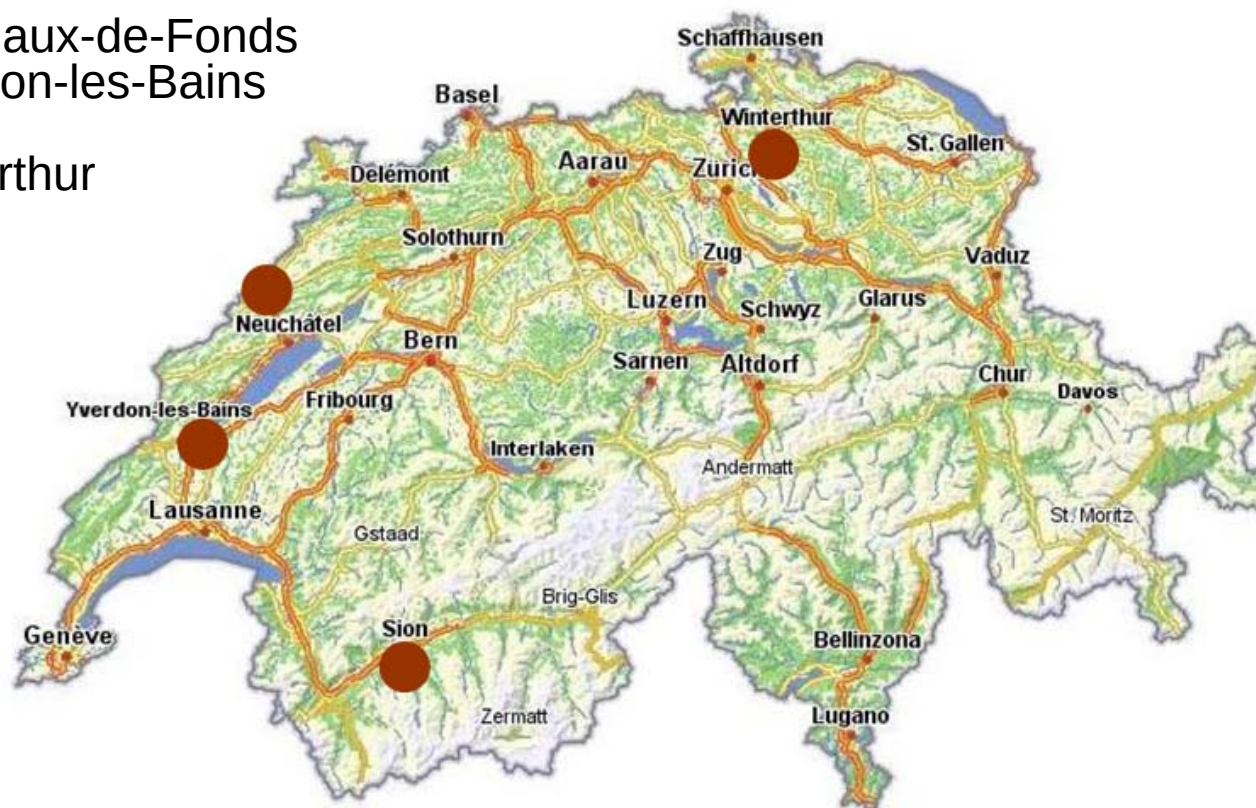




Where the mobile PET-CT unit is being used

The unit moves from one place to another during night

1. La Chaux-de-Fonds
2. Yverdon-les-Bains
3. Sion
4. Winterthur

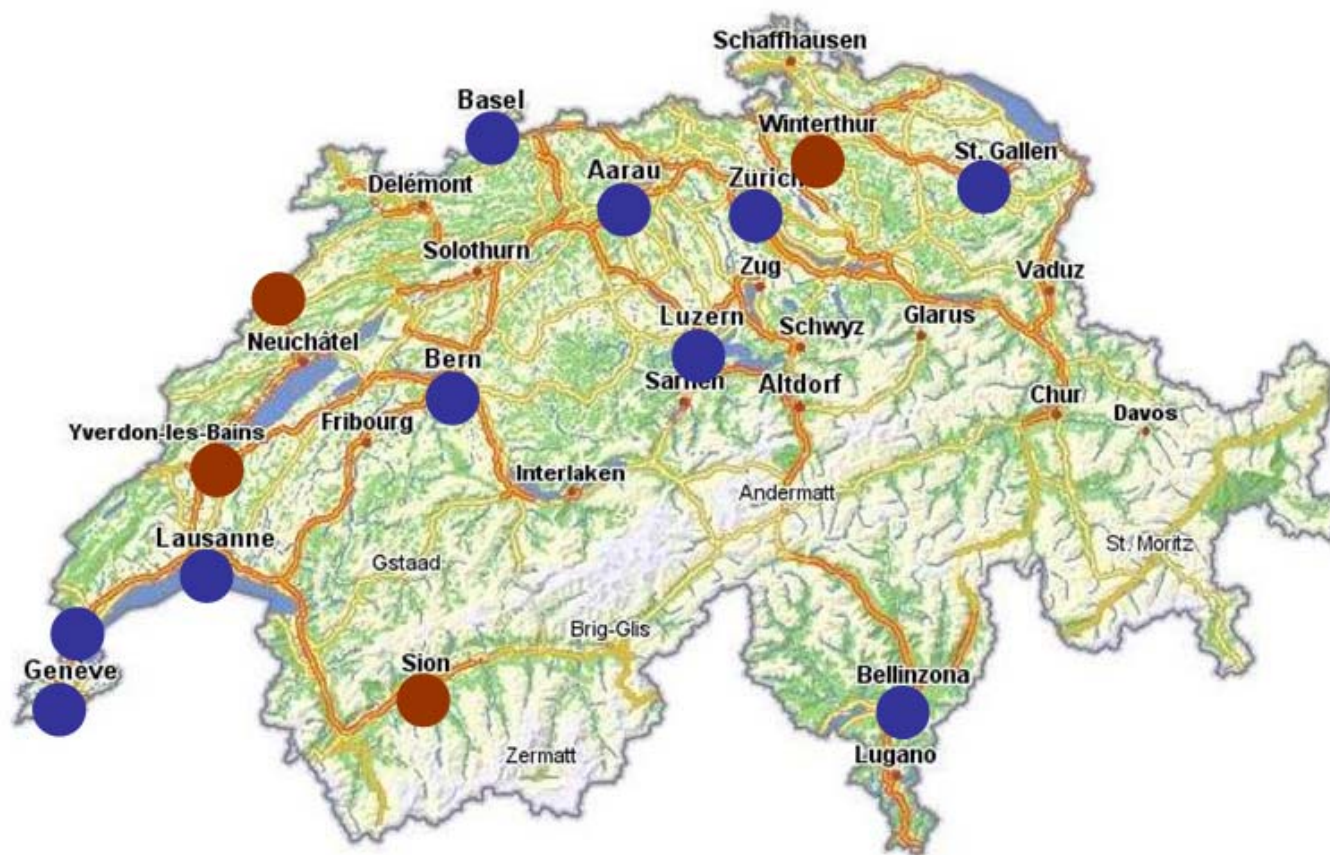




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Sites where PET-CT modality is available in Switzerland





Formal Licences

2 Licences: 1 for the HUG and 1 for the host site

1) **HUG:**

Responsible for technical aspects

Shielding, QA on PET-CT machines, source management, ...
Internal directives (patient procedure, source management, transport organisation, waste management, QA, ...)

Technical responsibility in authorisation: technician on board of the unit (HUG staff)

Specimen contract between HUG and host site

2) **Host site:**

Responsible for application to humans

Physician who is a specialist in nuclear medicine and in radiology



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Timelines

September 2007:	First plans submitted from HUG team
November 2007:	Meeting with HUG project team clarification of doserate limits in laboratory shielding of toilets maximum number of patients
January 2008:	Revised plan submitted from HUG
March 2008:	Authorisation HUG (technical)
April 2008:	Audit + authorisation application to humans (La Chaux-de-Fonds)
July 2008:	Doserate measurements



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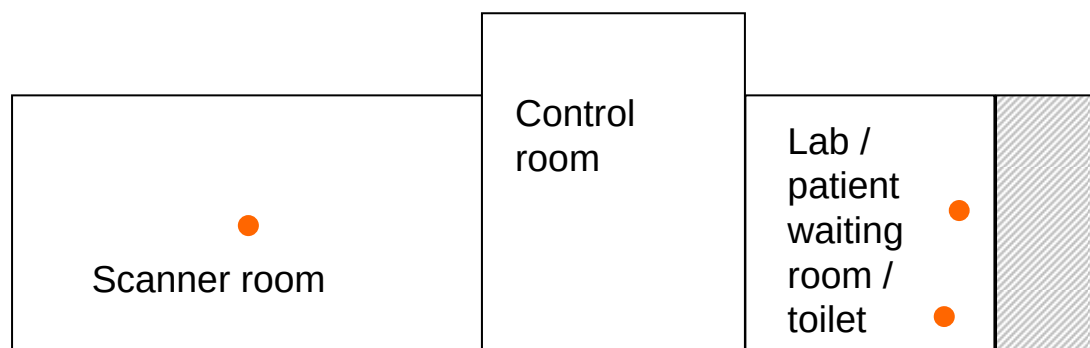
Mobil units installed in La Chaud-De-Fond



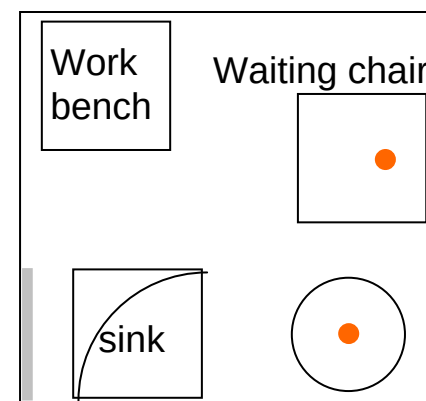


Mobil unit layout

Inside the truck



Inside the lab



- Location of radioactive sources to be considered



Conditions to be fulfilled for the license

- Never more than 2 patients simultaneously in the trailer
- Maximum of 4 patients per day
- shielding calculations:

Sources to consider:

- patient inside scanner
- patient in waiting corner (armchair)
- Toilets including waste disposal container



Conditions to be fulfilled for the license

Doserate limits:

- 2.5 $\mu\text{Sv/h}$ outside the trailer and inside the control room
- 25 $\mu\text{Sv/h}$ in the patient waiting zone (armchair)
- 10 $\mu\text{Sv/h}$ by the sink
- 5 $\mu\text{Sv/h}$ in the working area (work bench)



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Inside the trailer

Scanner room



Laboratory





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Inside the trailer, toilets



Extra shielding necessary
(Toilets were initially designed for
Tc-99m, not F-18)





Internal directives

- Duties and responsibility of the technician (HUG)
- Presence of a nuclear medicine physician and a radiologist on site (host)
- Radioactive waste management: disposal of urin in the toilets of the host nuclear medicine department
- Regulation of the transport between the different sites
- QA (camera, CT, activimeter)
- Patient procedure



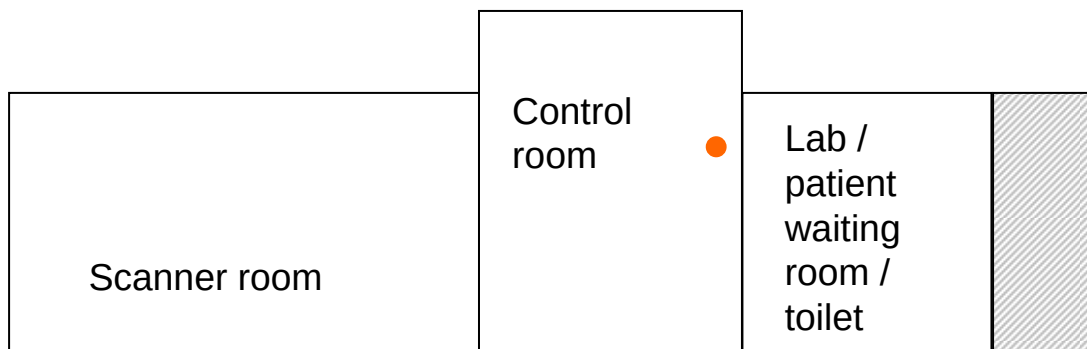
Doserate measurements made by regulatory body

potential issues

- Control room (personal)
 - On laboratory roof, on top of sink (Hospital building)
 - Outside the trailer (parking area, population)
-
- Are the doserate within the limits ?

Doserate measurements made by regulatory body

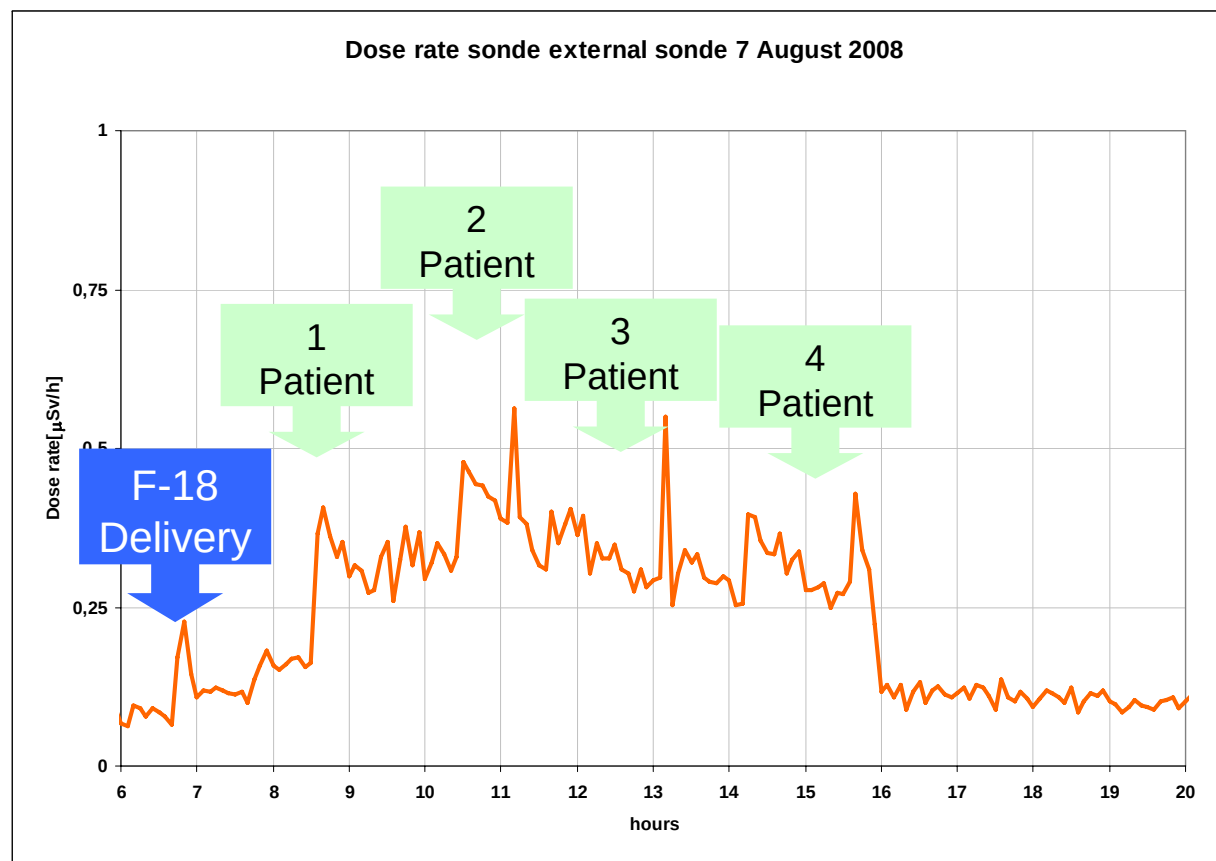
- 1st measurement: Using F-18 source of 370 MBq with a doseratemeter (February 08)
- 2nd measurement: during several days with normal patients with a gamma tracer monitor (July -August 08)



- Doserate value every 10 minutes, mean value, Gamma Tracer, Genitron
- All doserate are within the limits and most doserate peaks could be explained (F-18 delivery, patient leaving, ...)

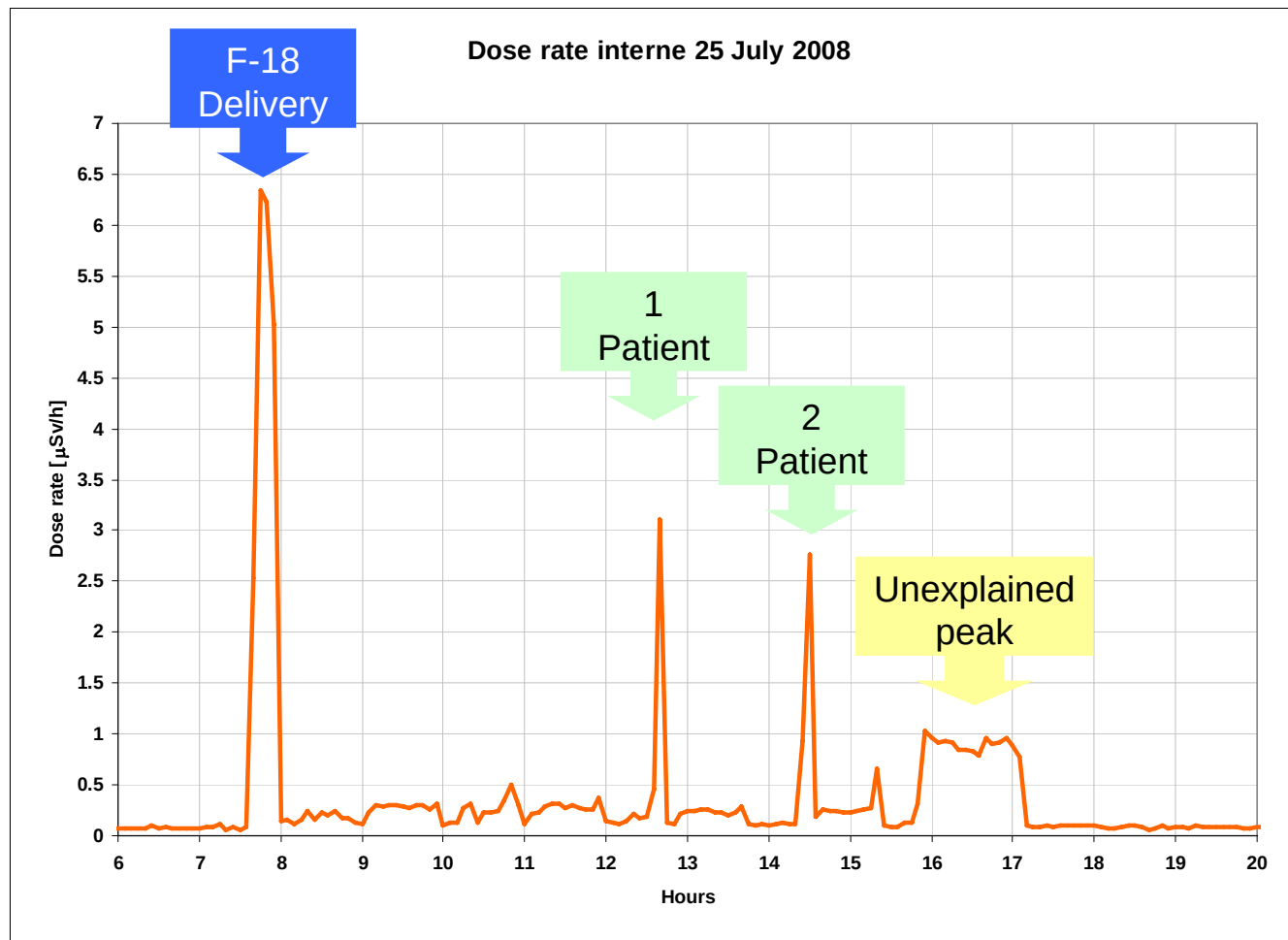


Doserate outside of the trailer on the toilet side



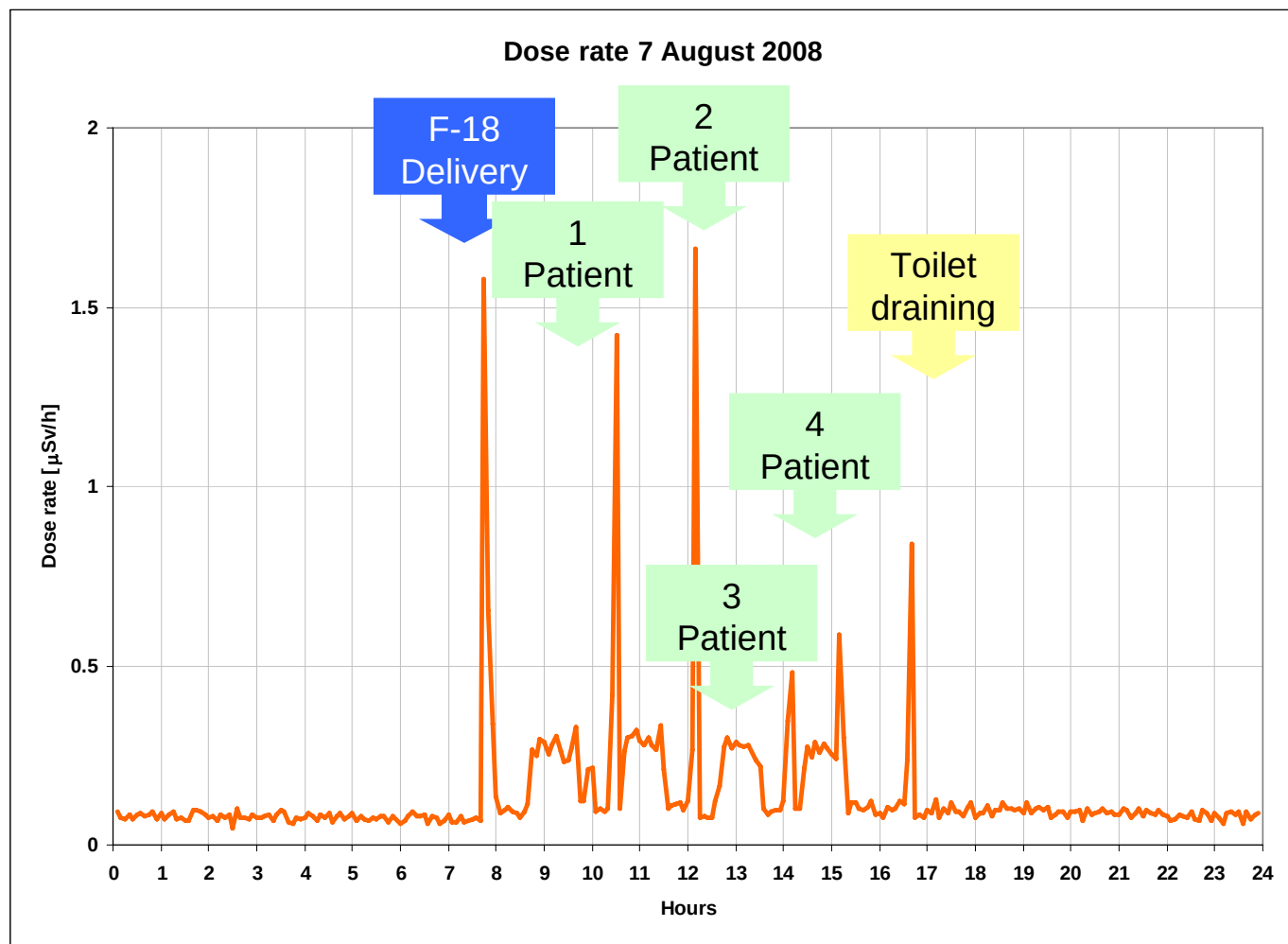


Doserate outside of the trailer on the toilet side





Doserate inside the trailer in the corner of the control room





Audit of PET-CT machine from regulatory body

Audit planed in 2009 for the 15 PET-CT units in Switzerland
and the mobile PET-CT unit

5 already made

Rapport d'audit en radioprotection

Annexe 5: Profil de dose CT diagnostique

Annexe 7: Niveau de référence diagnostique PET



Audit of PET-CT machine from regulatory body

Audit on the following items

- License condition (presence of radiologist and a nuclear medicine physician)
- Indication
- Diagnostic reference level for CT (CTDI, DLP)
- Diagnostic reference level for PET (Activity)
- Dose profile of the CT
- QA CT, periodicity of the test
- QA PET, periodicity of the test
- Utilization of the machine
 - PET
 - Only CT as diagnostic
 - Low dose CT for attenuation coefficient



Perspecticve for the future

2nd PET-CT mobile unit being planned

Working group built to design the unit

Optimisation of the shielding

Number of patient pro day

New machine should be ready in 2010-2011



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Thank you for your attention

