

# Regulating Liquid Discharges from Hospitals

Isabelle Watson

# Regulating Radioactive Discharges from Hospitals

- Permitting discharges
- Assessment of Dose
- Patient Excretion Rates

# Permitting Discharges

UK radioactive discharges are controlled by :

- Radioactive Substances Act 1993 (Scotland and Northern Ireland)
- Environmental Permitting Regulations 2010 (England and Wales)

# Permitting Discharges

- In both cases a permit is required to dispose of radioactive waste above certain exempt limits
- Environment Agencies
- Liquid wastes are permitted for disposal to
  - Sewage treatment Works
  - Sea
  - River



# Permitting Discharges

- Limits are set on the activity that can be discharged based on
  - what is required
  - assessment of dose
  - public dose limit (1mSv)
  - below dose constraints (300 $\mu$ Sv per site)

# Assessment of Dose

## Staged approach

- Stage 1 simple and cautious assessment of the critical group
  - Effective dose  $< 20\mu\text{Sv}$  no further action
  - Effective dose  $> 20\mu\text{Sv}$  = Stage 2
- Stage 2 - use of more realistic data

# Assessment of Dose

## Use of various models

- Currently using one based on Dose Per Unit Released (DPUR)
- DPUR values for radionuclides
- 4 discharge scenarios and 4 age groups
- Scaling factors



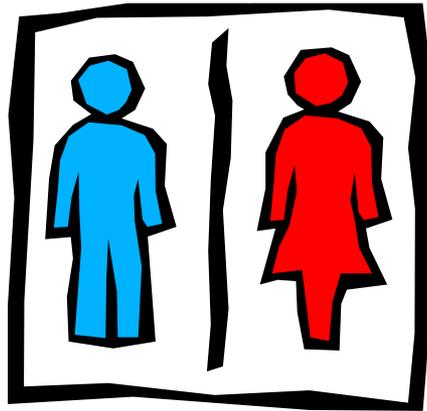
# Assessment of Dose

- Assessment of non human species
  - ERICA tool
  - Assessment of radiological risk to terrestrial, freshwater and marine biota
  - Tier 1 assessment

# Assessment of Dose

- Future Developments
  - New model based on DPUR model
  - Looking at collective doses at STW
- Environmental Monitoring
  - Sewage sludge
  - Sediments
  - Mussels

# Patient Excretion Factors



# Patient Excretion Rates

- Historically assumed 100% of what was administered to patients went as liquid waste from premises
  - Overly pessimistic
  - No consideration of half life
  - No consideration of biological retention

# Patient Excretion Rates

Radiopharmaceutical	Administration	Liquid Waste
I-131	Ablation therapy	100%
I-131	Thyrotoxicosis	50% (inpatient) 30% (out patient)
Tc-99m	Overall for all scans	30%
I-123	MIBG	60%

# Patient Excretion Factors

- % used to calculate release from hospitals
- % x standard administered dose or actual
- Demonstrate compliance with limits
- Used to report to OSPAR

# Patient Excretion Factors

## Need for Review

- New radionuclides
- What should be included in the excretion factor?
  - How much is actually excreted at the hospital ?
  - Movement between hospitals?
  - Patients returning home ?

# Patient Excretion Rates

- New set of agreed factors ?
  - E(hosp) - legally enforceable limit against the hospitals permitted limit ?
  - E(total) - considering radiological impact, and reporting to OSPAR ?

- What approach do you take ?