



# Veterinary uses of nuclear medicine and the implications for returning animals to their owners

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# Hyperthyroidism is in Cats

- Hyperthyroidism in Cats
- Incidence of Hyperthyroidism in Cats
- Treatment of Hyperthyroidism
- What Criteria for sending cats home
- Other uses

# Hyperthyroidism in Cats

Excess of thyroid hormone

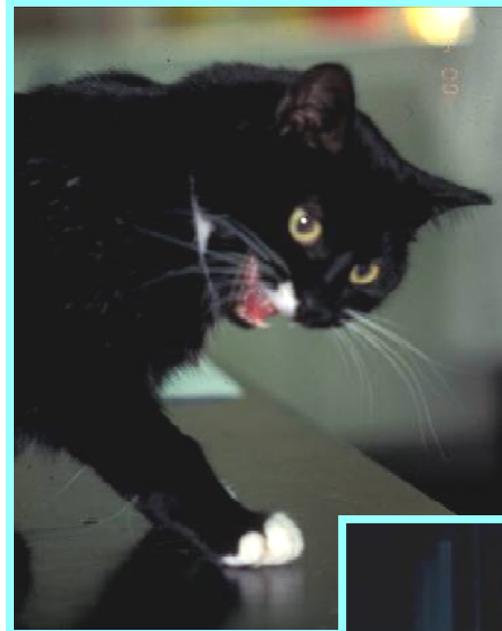
- Any cat
- 8 years
- Gradual onset



# Hyperthyroidism in Cats

## The symptoms

- Weight loss
- Heart problems
- Vomiting
- Diarrhoea
- Behavioural Problems



# Hyperthyroidism in Cats

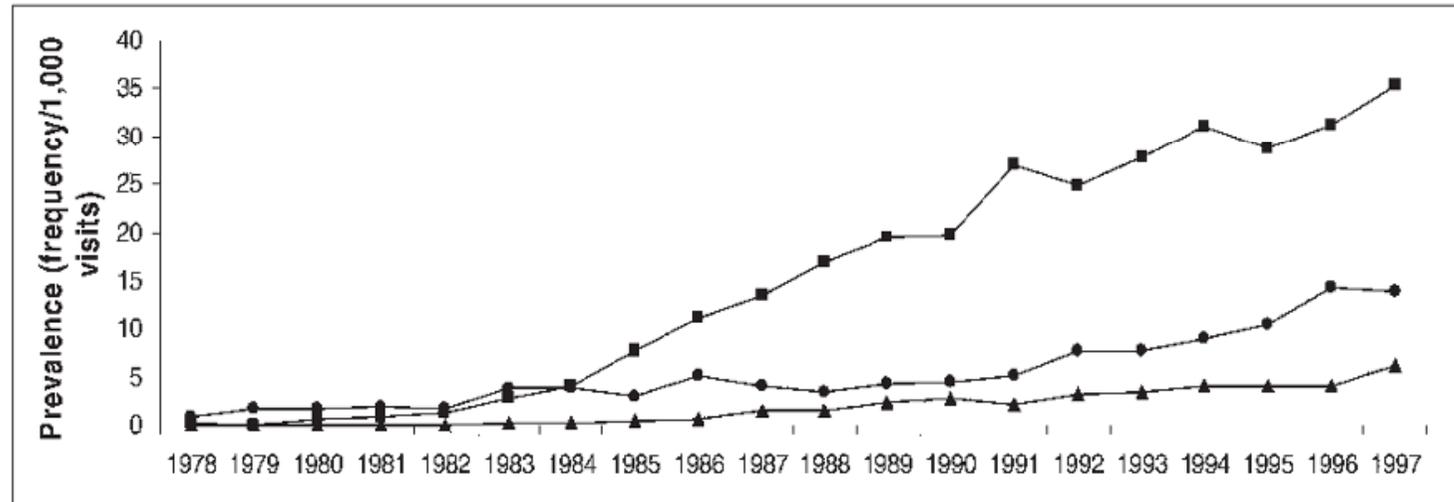


Figure 2—Hospital prevalence of hyperthyroidism (squares), diabetes mellitus (circles), and renal insufficiency (triangles) at 9 veterinary teaching hospitals from 1978 to 1997. Trends are significant ( $P < 0.001$ ).

Edinboro and others (2004) *JAVMA* **224** : 879-886

# Incidence of Hyperthyroidism

- Prevalence
  - Most common medical disorder of cats in UK
- Recent disease
  - Probably started in 1970s
- Geographic variation
  - HIGH: N.Europe, USA, Australia and New Zealand
  - LOW: Spain, Italy, Hong Kong and South Africa

# Incidence of Hyperthyroidism

- Cause is unknown
  - Possibly cats living longer
    - Canned food
    - Litter trays
    - Flea protection
    - Less common in siamese cats
  - Better detection
  - Genetics

# Treatment of Hyperthyroidism

- Medical
- Surgical
- Radiotherapy



# Treatment of Hyperthyroidism

## Radioiodine

- Single dose of I-131
- Typically 100-150MBq
- No anaesthesia needed
- Effective
  - 95% on first injection,
  - 100% on second
  - Nodules destroyed
  - average of 4 years increased life expectancy



# Treatment of Hyperthyroidism

- Period of Isolation
  - How long ?



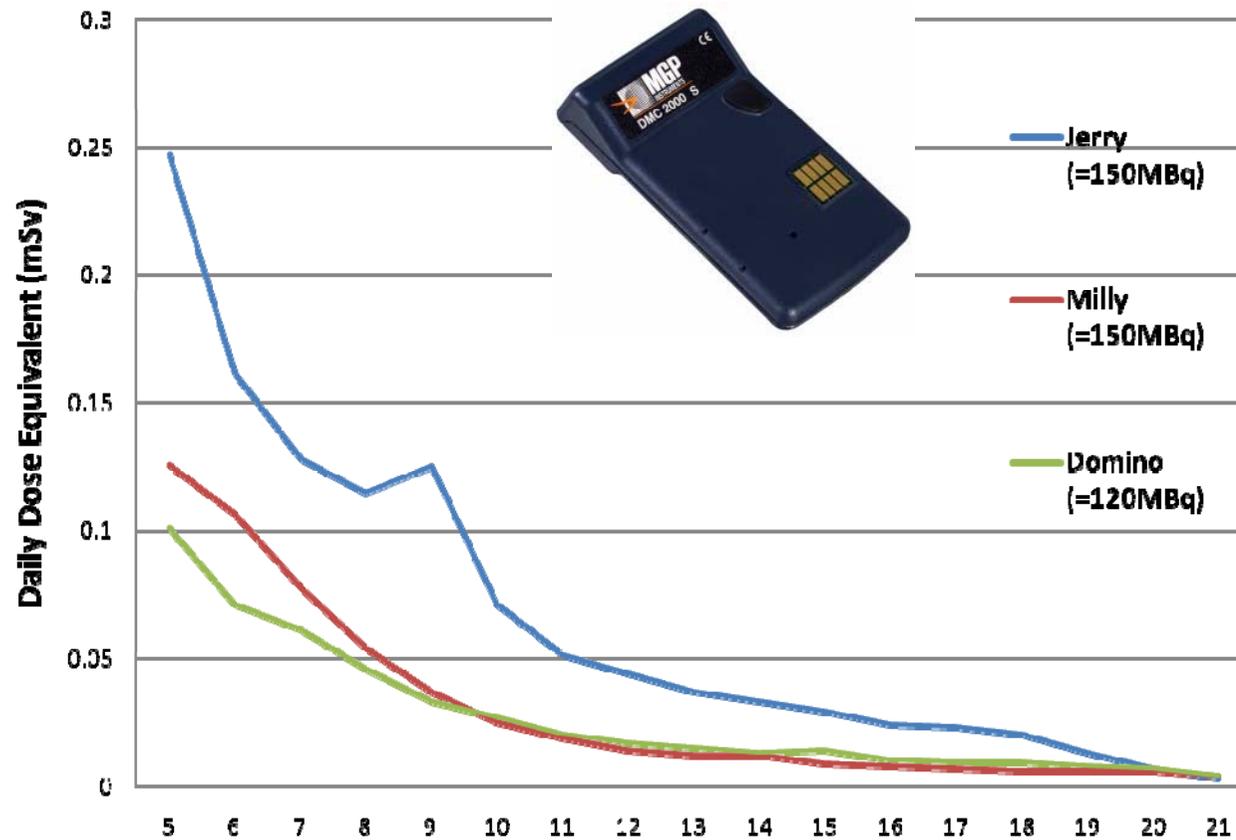
# What criteria for sending the cat home ?

- Dose rates ?
  - <300 dose constraint or 20  $\mu\text{Sv}/\text{yr}$  whole body dose
  - committed dose from the ingestion of urine
  - Calculated dose rates ( $\mu\text{Sv}/\text{hr}$ ) from 150MBq and 2.6 Effective Half Life (Uni of Glasgow)

Days after injection	Dose Rate @ 10 cm	Dose Rate @ 30 cm	Dose Rate @ 100 cm
1	755	84	8
7	153	17	2
14	24	3	<1

# What criteria for sending the cat home ?

- Dosimetry Measurements at 30cm



Gunn (2012) data being collected

# What criteria for sending the cat home ?

- Waste disposal
  - Activities measured in waste faeces and urine
  - Variability noted between cats
  - After 1 week 20kBq/g
  - After 2 weeks 1kBq/g
  - After 3 weeks <100 Bq/g
- Exempt levels of waste would be 400kBq /0.1m<sup>3</sup>

## What criteria for sending the cat home?

- 1-2 or even 4 weeks after treatment ?
- May be longer period if there are children, infants at home
- Use of flushable litter or decay store
- Keep cats indoors
- Limit direct contact time with cats
- Extra hygiene care
  
- Provide consistent guidance

## What criteria for sending a cat home ?

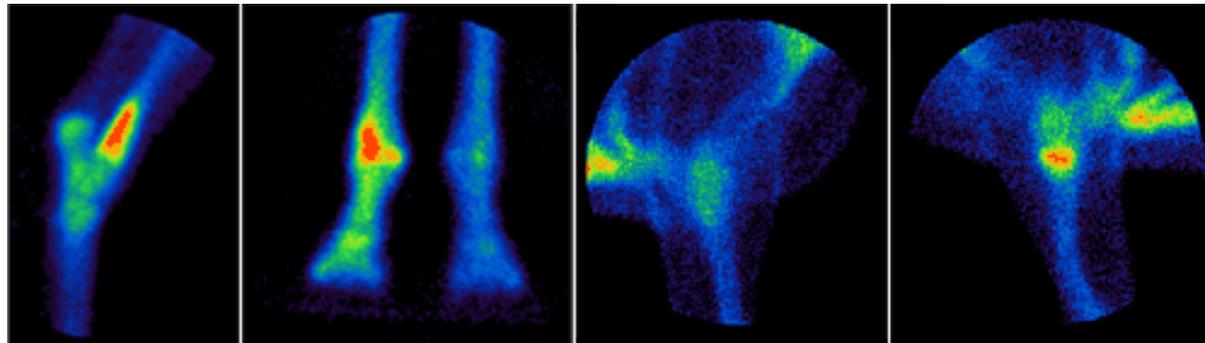
- Humans – upto 800MBq as an outpatient
  - No close contact with children for 14 days
  - No more than 15 mins at 1 arms length
    - pregnant women & under 3 for further 27 days
    - 3-5 for further 22 days
    - 5-16 for further 16 days
  - When travelling stay as far away from other passengers
  - Don't go to places such as cinema's until 1 day after the treatment

## Other Uses

- Feline Thyroid Carcinoma
  - 1 GBq I-131
  - Lower treatment numbers
  - Would require longer stay
  - Could use the same criteria for going home

## Other Uses

- Scintigraphy in Horses
  - Use of Tc-99m for diagnostic for purposes
  - Typically 5-7 GBq per dose



## Other Uses

- Scintigraphy in Horses
  - Held for upto 48 hours in stable
  - Excretion rate estimated to be between 70-90%
  - Dose rate after 48 hours from horse  $<0.5\mu\text{Sv/hr}$
  - Large volumes of solid waste generated
  - Decay store then disposal to composting/spreading on land
  - Tc-99 issues considered to be very small

**Any questions ?**

