A Tale of Two Legs
INTRODUCTION

- Collaborative study between:
  - Canada - HML
  - France - IRSN
  - Germany - HMGU
  - Spain - CIEMAT
  - USA – PNNL, USTUR
The PHANTOMS

Commercial Activity synthetically added

USTUR-102 Activity metabolized
Activity Issue

France identified problems in the stated activity of the USTUR phantom

Published Value: 991 Bq
Corrected Value: 1191 Bq
Ref. Date: (1 Jan 2007)
RESULTS

- HML
- HMGU #1
- HMGU #2
- CIEMAT

Eff (cnt/photon) vs Distance (cm)

Commercial
RESULTS

Graph showing the relationship between Eff (cnt/photon) and Distance (cm) for different samples:

- HML
- HMGU
- CIEMAT

The graph is labeled "USTUR."
RESULTS

\[ \text{Eff (cnt/photon)} \]

\[ \text{Distance (cm)} \]
CONCLUSION

• The two phantoms are not similar
  – The USTUR phantom is a result of metabolized $^{241}$Am.
  – The commercial phantom had the activity added to the synthetic bone material.
  – There is a factor of 0.6 in an activity estimate depending which efficiency is used.
  – Using the maximum efficiency from the commercial phantom instead factor of 0.35.
• These differences likely due to:
  – different distribution of $^{241}$Am in the bone surface and/or volume
  – variations between bones,
  – different bone/patella anatomy.
• The artificial phantom inadequately simulates the outcome of a person’s metabolic processes.
THE

END