ASSESSMENT OF DOSE TO THE NURSING INFANT FROM RADIONUCLIDES IN BREAST MILK

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Introduction

- Software package DANI (Dose Assessment for Nursing Infant) was developed to estimate dose to infant from intake of radionuclides in breast milk
- Estimates based on measured activity in mother's total body and/or excreta
- Builds on general approach of ICRP Pub. 95, but in contrast to Pub. 95:
  - All systemic biokinetic models depict realistic transfer paths from mother's body burden into breast milk
  - Allows virtually any intake scenario for the mother
  - A somewhat different set of elements is addressed

Software modules

- Three main modules:
  - Computational module, driven by a user interface
  - Library of biokinetic files
  - Library of dose coefficients for ingestion by infant
- Biokinetic library
  - Current ICRP respiratory and GI models
  - Systemic models include some current ICRP models and some updates
- Infant dose coefficients from ICRP Pub. 72

Systemic Biokinetic Models

- Build on current ICRP recycling models
- Software includes model solver
- Biokinetic model library can be expanded without modifying computational module
- Current library addresses isotopes of H, P, Fe, Co, Sr, Ru, Rh, Pd, I, Cs, Pm, Eu, Gd, Tm, Yb, Ir, Po, Ra, U, Pu, Am, Cm, Cf

Example

```
DANI:    Dose Assessment of Nursing Infant Dose: (based on maternal bioassay)
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Output will be written in G:\CODEDEV\NIDMAT\OUTPUT.

Mother: Mary Cesium

Mother experienced an inhalation intake of Cs-137 (Type F/AMAD 1um) on 12/01/2012
prior to pregnancy. Infant was born on 01/01/2013 and nursed until 02/28/2013.

        Radionuclide: Cs-137 T1/2 = 1.102E+04 d
        Intake mode:  Inhalation - Type F AMAD = 1 um
        Bioassay: Urine
        Intake: Mother - 1.00E+05 Bq
                Infant - 1.97E+03 Bq
        Infant effective dose = 4.13E-05 Sv


Would you like to view the output files (y/[n])? n
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