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ESTIMATE OF CUMULATIVE EXPOSURE DUE RADON INHAHALATION USING *IN VIVO* MEASUREMENTS

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1) **Introduction** - The incidence of lung cancer as a function of radon progeny exposure is very well documented, mainly from uranium mining experience. An accurately estimate of cumulative exposure is necessary in order to calculate the dose to the lung from the inhalation of radon and its progeny. In this paper, the content of ^{210}Pb in the skeleton is used to obtain that integrated exposure. Scintillation measurements of ^{210}Pb have been made *in vivo* for individuals, who live in homes having greater than average concentrations of radon. These cumulative exposures are used to calculate lung doses that are compared to those obtained using conventional exposure estimates from NCRP and ICRP models.

2) **Materials and Methods** - Measurements of skull content of ^{210}Pb of 38 exposed individuals were made *in vivo* in the whole body counter at the NYMC/NIEM, using three "phoswich" detectors in a reproducible geometry surrounding the individual's head. The calibration factor is the geometric mean obtained from measurements performed in two phantom skull, in the same position relative to detectors as the subject since the activity is assumed to be distributed homogeneously in the bone volume.

3) **Results** - Nineteen of the 38 individuals had measurable level of ^{210}Pb . The measured skeletal ^{210}Pb are now corrected for the contribution of ^{210}Pb ingested directly from other natural sources. Using these results and a methodology that has been developed, lung dose to each individual was calculated. Doses obtained by this methodology are higher than those obtained by ICRP model and are lower than those obtained by NCRP model.

4 - **Conclusion** - Skeleton ^{210}Pb burdens are valid estimators of cumulative exposures due to inhalation of radon progeny, and may be used to estimate lung dose. The range of lung dose estimates using the ^{210}Pb results is much wider than that obtained from conventional estimate of radon exposure used either NCRP or ICRP models. The results obtained are from a limited population, and the range may be even larger with a larger measured population and lower detection limits.

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MATHEMATICAL PHANTOM OF BRAZILIAN MAN FOR INTERNAL DOSIMETRY CALCULATION

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1) **Introduction** - The present paper is a continuation of the research about the Mathematical Phantom of Brazilian Man for internal dosimetry purpose. It has been done due to the fact of the differences among South Americans, Europeans and North Americans concerning anatomy, race, customs and in consequence their anatomical and physiological parameters are different. This difference is much bigger in our Country once there are different kinds of colonization such as: European, African, Asiatic, oriental and native. After a statistical raising of mass and length the Brazilian Reference Man was determined for all the Country, but it has been verified that there are big differences between food consumption, and life quality in the several regions throughout the Country. Therefore, there is a change in mass and length of the people from these places. Then, the Country has been separated into two specific regions has been so calculated two Reference Men, who are better adapted in the Brazilian reality.

2) **Methods** - The mass of organs was measured through autopsy cases and the masses and length of the total body were calculated, the table done in 1975 at the Instituto Brasileiro de Geografia e Estatística (IBGE).

3) **Results** - The Reference Man for all the Country presents a mass of 62000g and a length of 168cm and the break age used was 20-40 years. The Reference Man from the Region A (which covers the following Brazilian States: RJ, SP, PR, SC, RS, MG, ES, DF) has a mass of 64000g and a length of 169cm. The Region B (which covers the following Brazilian States: RD, AC, AM, RR, PA, AP, MT, GO, MA PI, CE, RN, PB, PE, AL, SE e BA) has a mass of 60000g and a length of 165cm. The break age used in these new Reference Men was 20-50 years.

4) **Conclusion** - Practically, all the parameters (dimensions, shape, mass, etc.) from the organs of the Brazilian Men are concluded and the internal dosimetry calculations and the alteration of the mathematical code used in this work, are still being done.