

ALGORITHM FOR ASSESSMENT OF MEAN ANNUAL GONAD DOSE AND GENETICALLY  
SIGNIFICANT DOSE FROM THE DATA OF PERSONAL DOSIMETRY

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During one year more than 40000 items of information on radiation exposure of personnel involved in the handling of radiation sources as well more than 5,000,000 items of information on irradiation of other people are collected in our laboratory.

Considerable progress in assessment of mean annual gonad dose and genetically significant dose has been attained by means of an algorithm for a personal computer.

This simple and inexpensive system has led to a higher accuracy in the application of protective measures.

#### Introduction

Investigations of the population with regard to the irradiation induced by application of radiation sources for medical purposes have been carried out ever since the technique was first applied. We have based our studies on the assessment of mean annual gonad dose and mean annual genetically significant dose.

The model of Penfil and Brown [1] has usually been applied for the evaluation of these values.

These values have not been directly recommended by ICRP publication 26 but they could conveniently be applied for radiation risk assessment purposes. The model involves a great amount of information thereby resulting in difficulties in calculations as well as in time-consuming evaluation of the data. Using computers even the most simple characteristics could be of great help in gaining the needed data in a way that is quicker, easier and more reliable.

#### Methodology

For a Commodore 64 personal computer (that could obviously also be used for other purposes in a personal dosimetry laboratory) a simple algorithm has been elaborated for assessment of the mean annual gonad dose and genetically significant dose in the population of the Serbian Socialist Republic.

The algorithm for GSD assessment is presented in Fig. 1.

As the modern investigations on the population irradiation are being more and more based on the assessment of radiation risk the present algorithm has been adopted for the assessment of the genetic risk in the population under investigation having applied the reference value of weighting factor for gonad ( $W$ ) and factor of risk ( $F_R$ ).

The algorithm for assessment of genetic radiation risk is presented

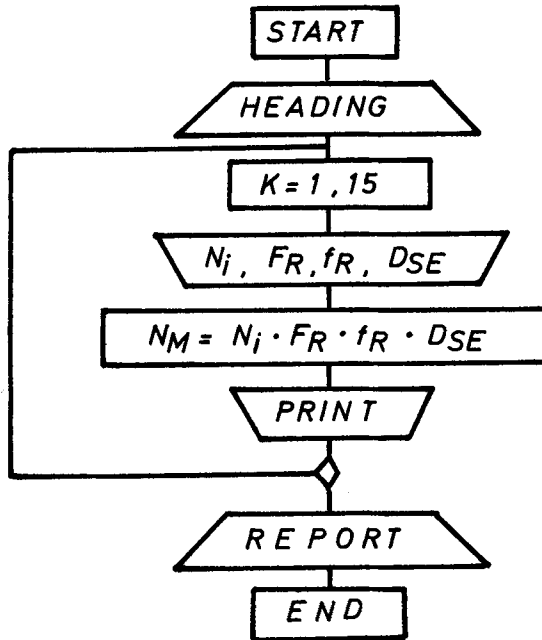


Fig. 3

#### References

1. R.L. Penfil, M.L. Brown, Genetically Significant Dose to the United States Population from Diagnostic Medical Roentgenology 1964. *Radiology* Vol.90, No.2, 209-216, 1968.
2. M. Tomásević, Jelena Simonović, R. Radovanović, Radionuclides in medical diagnostics in the Serbian Socialist Republic and somatic radiation risk. (in Serbo-Croat) *Zbornik radova XIII Jugosl. simpozij zaštite od zračenja*, Pula 1985.
3. ICRP Publication No. 26, Recommendations of the International Commission on Radiological Protection. *Annals of ICRP* Vol.1, No.3, 1977.