



RADIATION EXPOSURE TO MEDICAL STAFF IN NEURORADIOLOGY, LIVER CHEMOEMBOLIZATION AND PEDIATRIC CARDIAC INTERVENTIONAL PROCEDURES

Neuri Lunelli¹, Freddy Davila², Helen Khoury¹, Gustavo Andrade³, Santiago Raul Arrieta³, Luiz Felipe Andrade Lima¹, Richard Kramer¹ and Alejandro Nader⁴

¹Nuclear Energy Department- UFPE, av. Prof Luiz Freire 1000, Recife-Brazil
²Cancer Institute "Dr. Luis Razetti" / Medical Physics Service , Caracas, Venezuela
³IMIP- Institute of Medicine Dr. Fernando Figueira- Recife, PE, Brazil
⁴International Atomic Energy Agency, Vienna, Austria



E-mail: hjkhoury@gmail.com

OBJECTIVE:

The aim of this work is to evaluate the exposure to the medical staff during three types of interventional procedures: neuroradiology, liver chemoembolization and cardiac procedures

INTRODUCTION

In interventional procedures, staff operates near the patient in a non-uniformly scattered radiation field. Depending on the type and the complexity of the interventional procedure the doses to the staff can be significant. In general staff dosimetry studies were performed for cardiac procedures. But there are other types of interventional procedures like liver chemoembolization and neuroradiology that can result in high doses for the workers. This paper evaluate occupational doses due to the three types of interventional procedures.

MATERIALS AND METHODS

Equipment: The x-ray imaging system used in this study is a Siemens Artis Zee unit with a flat panel detector



The equipment had no protective lead screen

Equipment Performance: Relevant technical parameters were tested and found to be in compliance with manufacturer's specifications.

Interventional Procedures

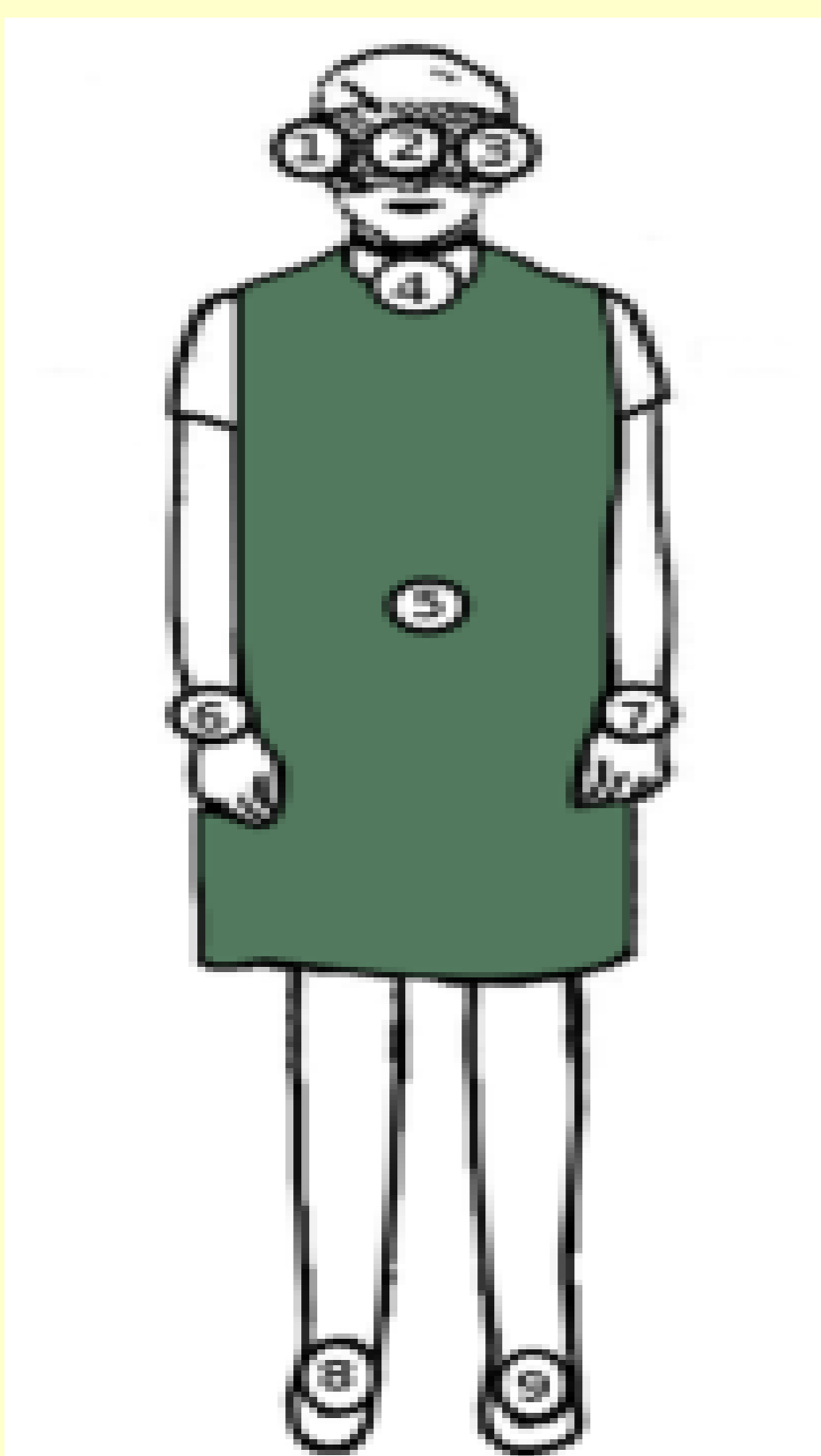
Adult patients

40 for neuroembolization
10 for liver chemoembolization

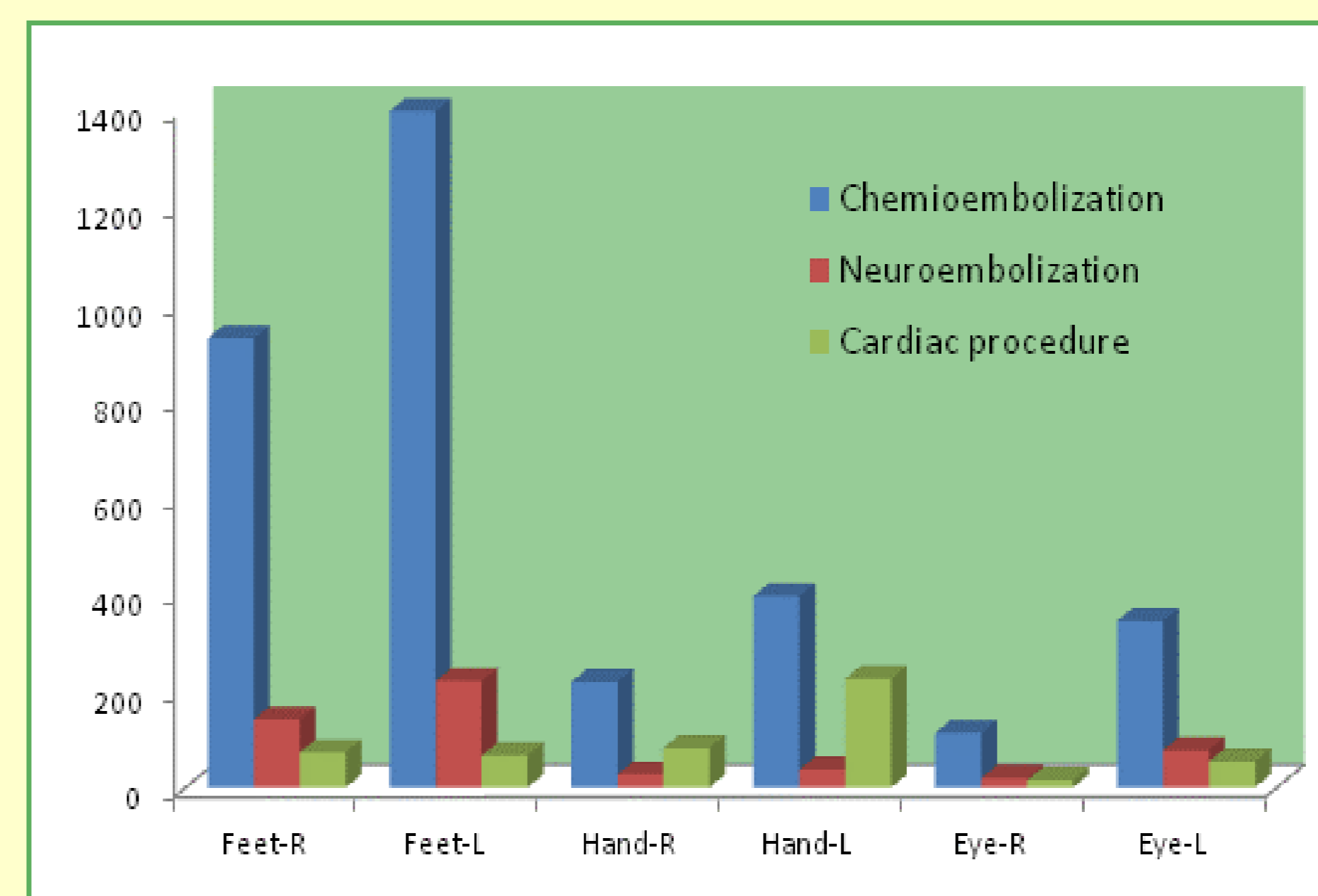
20 cardiac procedures for paediatric patients

Medical Staff Dosimetry :

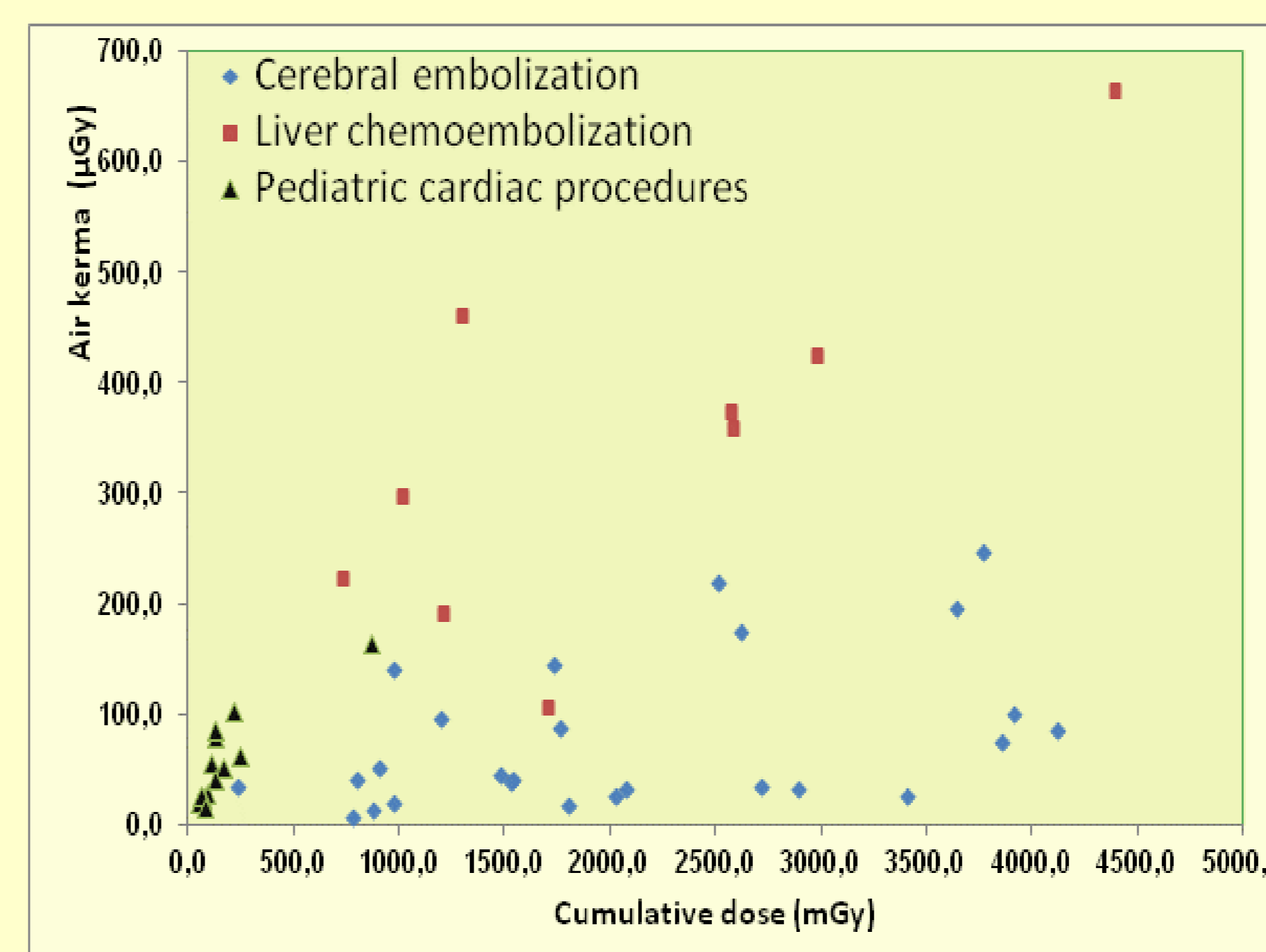
TLD-100 chips attached next to the eyes, close to the thyroid (over apron-collar), on the thorax under the apron, at the hands in the region of the pulse, and at the feet.



RESULTS



Average values of air kerma per procedure of chemoembolization, neuroembolization and Interventional cardiology



Distribution of air kerma values at the left eye in function of the cumulative dose per procedure

Average dose next to the left eyes was 333mGy, 58mGy and 83mGy for liver chemoembolization, paediatric angioplasty and neuroembolization, respectively

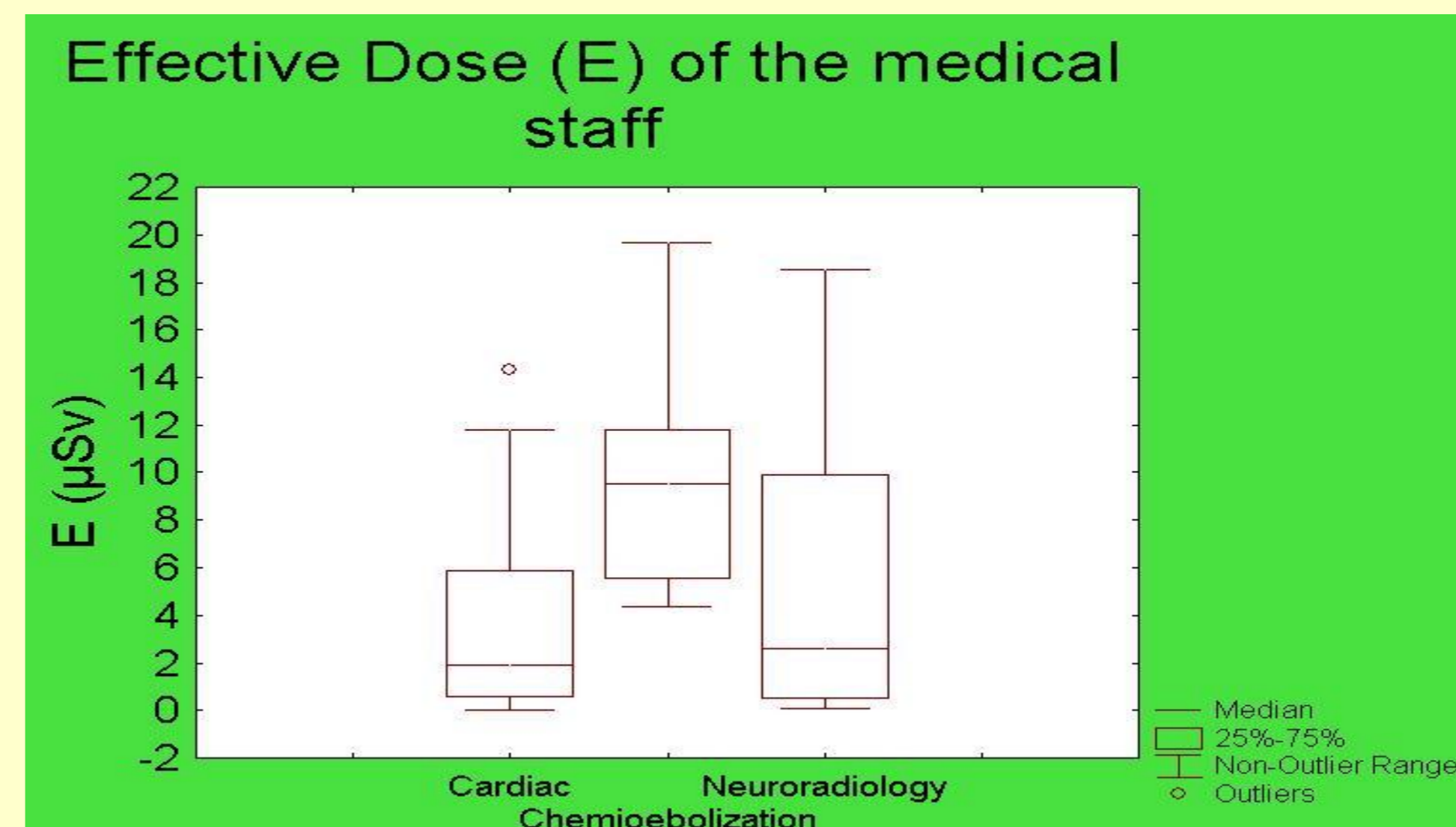
Effective Dose (E)

E was calculated using the Niklason algorithm

$$E = 0.02(H_o - H_u) + H_u$$

where:

H_o is the equivalent dose measured with TLD over apron-collar
 H_u is the equivalent dose measured with TLD under the waist



CONCLUSION: The results show that the highest doses for the physician occur during liver chemoembolization, reaching five times the values found for neuroradiology and interventional paediatric cardiology. Attention of the scientific community is normally focussed on the cardiac interventional procedures, however, the results obtained show that the liver chemoembolization procedure represents more risk for the staff than the cardiac interventional procedure.

Acknowledgements The authors wish to thank the CNPq, FACEPE and the LMRI/DEN-UFPE for financial support.