

# PROJECTED CANCER RISK FROM MEDICAL IONIZING RADIATION PROCEDURES IN DIALYZED PATIENTS

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## INTRODUCTION

Medical Procedures are associated with increased Ionizing Radiation (IR) Exposure .

The evidence of an association between IRE and cancer risk is:  
 "Strong" for doses >100 mSv  
 "Good" for doses 50-100 mSv  
 "Reasonable" for doses 10-50 mSv.

The projected cancer risk due to IR can be estimated by the Effective and Organ Doses (ED, OD) and applying organ-specific cancer incidence or mortality data, as summarized in the Biological Effects of Ionizing Radiation (BEIR) VII report.

## AIMS

The aims of our retrospective study were to quantify the cumulative ED and OD to relevant organs and to assess the radiation risks of cancer in hemodialysis patients (HDP).

## PATIENTS AND METHODS

- 159 prevalent and incident HDP between 30.06.2007 to 31.12.2012, with follow up >1year (486 patient-years);
- aged 65.3±15.9 years;
- without previous or current diagnosis of neoplasia;

The number and type of radiological procedures and CED and OD were collected and estimated from the Radiology Information System of our Institution.

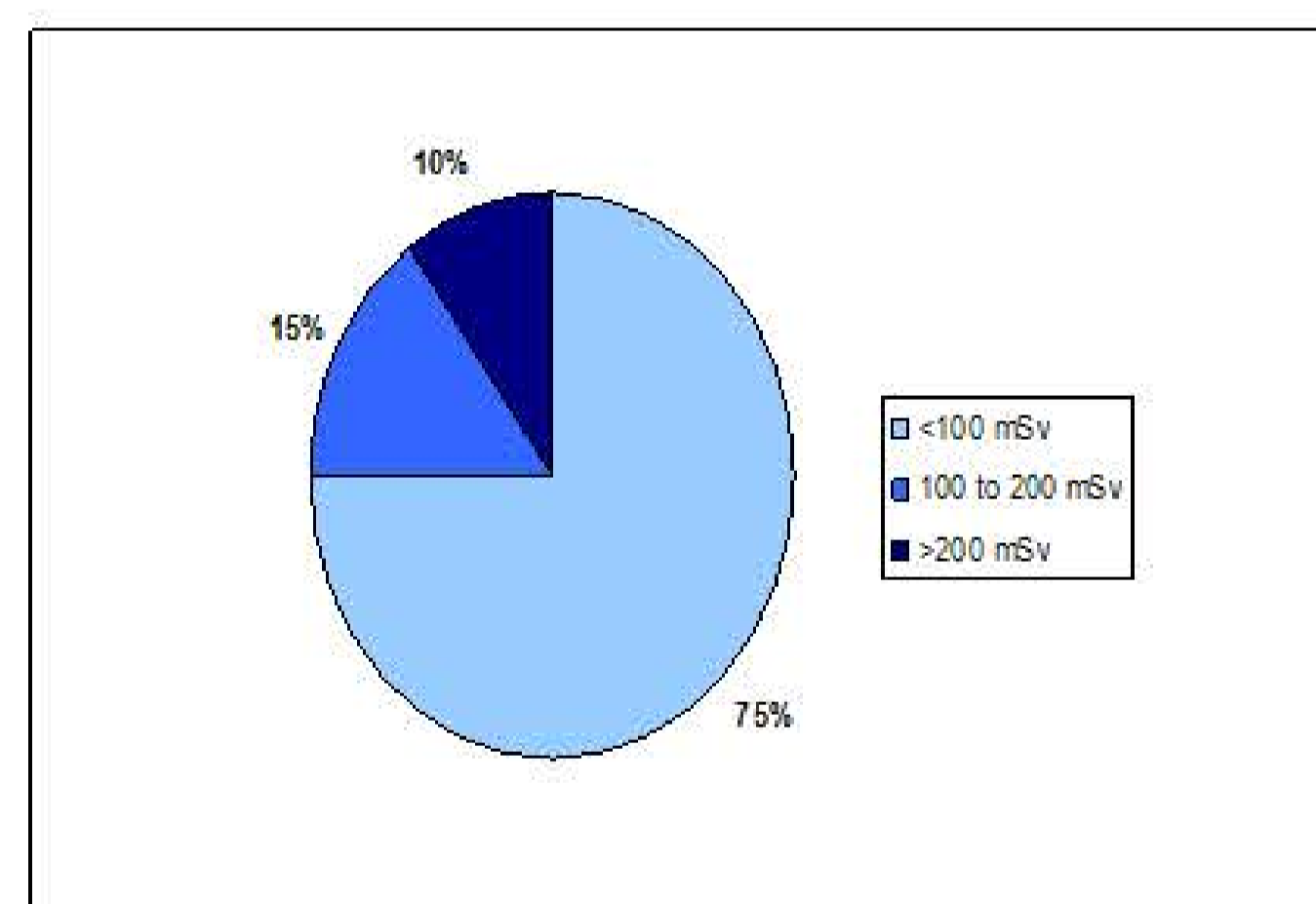
Radiation risk, defined as Risk of Exposure-Induced Death (REID %) was estimated according to the BEIR VII

## RESULTS

Mean (median) total CED: 84 (36) mSv/pts;

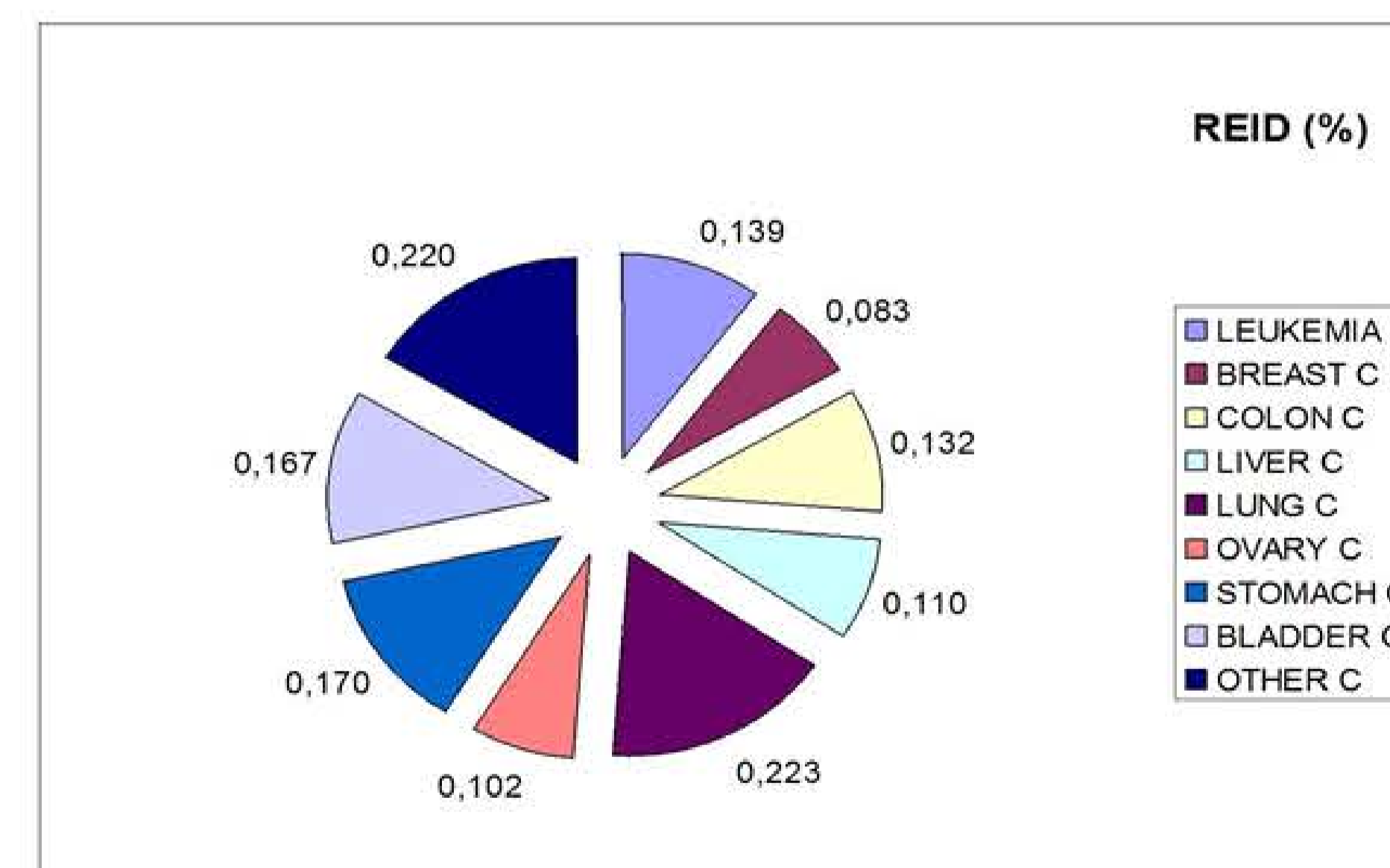
Mean (median) annual CED: 28 (12) mSv/pts/y

Procedure	Number of procedures N (%)	Annual CED (mSv/pts/y) mean ± SD	Total CED mSv (%)
Overall total	2163 (100%)	28.1±44	13393 (100%)
Conventional radiology	1555 (71.9%)	1.9±1.5	835.3 (6.2%)
Computed Tomography	344 (15.9%)	23.1±42.5	11054 (82.5%)
Nuclear Medicine	130 (6%)	1.2±2.2	504 (3.8%)
Interventional	134 (6.4%)	2.0±4.4	1000 (7.5%)



Mean cumulative Organ dose mSv	
Kidney	103
Lung	102
Stomach	100
Liver	99
Colon	77
Bone Marrow	58

Patient characteristics	Total N (%)	YES	NO	p value
		REID (%) (mean±sd)		
	159	0.99±1.14		
Male Sex	101 (63.5%)	0.97±1.24	1.03±0.95	0.17
Diabetes mellitus	52 (32.7%)	0.63±0.89	1.16±1.21	0.05
Ischemic heart disease	61 (38.3%)	0.74±0.83	1.14±1.28	0.53
Kidney Transplant eligible	51 (32.1%)	1.49±1.33	0.76±0.97	0.003
Kidney Transplant	13 (8.2 %)	0.92±0.96	1.00±1.16	0.91
Death	53(33.3%)	1.16±1.17	0.91±1.13	0.09



Mean (median) REID: 0.99 (0.45)%;

Maximum REID: 4.46%.

Young age and being on transplantation waiting list are correlated with a significantly higher REID.

## CONCLUSIONS

- HDP receive high CED and OD from medical imaging.
- The excess cancer risk attributable to IRE is not negligible (about 1% in a few years)
- Particular attention should be paid to young patients and patients who will undergo kidney transplantation

