

# REDUCE RADIATION EXPOSURE YOU CAN HAVE AN IMPACT

Interventionalists and their staff are exposed to high amounts of radiation due to the long, complicated procedures performed every day and their proximity to the radiation source.



EVERY DAY HEALTHCARE PROFESSIONALS ARE EXPOSED TO THE HARMFUL EFFECTS OF RADIATION

## 6-fold increase<sup>1</sup>

NEARLY 40% OF THE INCREASED EXPOSURE IS RELATED TO CARDIOVASCULAR IMAGING AND INTERVENTION



## UNDERSTAND THE IMPACT

- 1** Interventional cardiologists have the highest radiation exposure of any medical professional<sup>2</sup>.
- 2** Your risk of cancer increases linearly with increasing doses<sup>3</sup>.
- 3** Your exposure today may not be felt for years to come. Radiation-induced cancers have a biological latency of more than 10 years<sup>4</sup>.

CAREER EXPOSURE (Average 20 year IC career<sup>5</sup>)

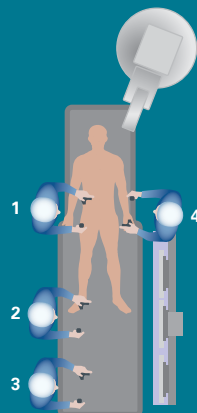
EXPOSURE	HEAD	LOWER BODY
Intensity	1,000 mSv	100 mSv
Equivalence <sup>6</sup>	50,000 Chest x-rays	5,000 Chest x-rays

1,000 mSv correlated to a 5% risk of cancer<sup>7</sup>

### 4 Location matters.

MEAN RADIATION DOSE (per procedure) BY POSITION (μSv)

	1	2	3	4
HEAD LEVEL	18.6	7.86	0.543	73.3
THYROID LEVEL	26.2	12.6	0.746	87.2



## IMPACT EXPOSURE WITH MI-DOSE

**M** MONITOR EXPOSURE:

Wear a dosimeter in the cath lab at all times and leverage real-time dose monitoring when available.

**I** IMAGING QUALITY:

Maximize the image quality and limit the exposure with appropriate table height, fluoroscopy rate (mA) and kV value.

**D** DISTANCE FROM SOURCE:

Distance from the X-ray source should be maximized. As distance doubles, exposure decreases by a factor of 4.

**O** OPTIMAL TECHNIQUE:

Monitor orientation and angulation and if possible avoid LAO cranial (highest scatter). Avoid unnecessary fluoroscopy and use virtual collimation, last image hold, and storage of X-ray fluoroscopy.

**S** SHIELDING:

Use personal protective equipment (PPE) and fixed barriers to reduce scatter radiation.

**E** EXPOSURE TO THE PATIENT:

Include factors such as age, gender, obesity, and previous exposure when choosing an imaging modality. Record key exposure metrics in patient records.\*

Taken from 2011 SCAI Guidelines

\*Recorded by most modern imaging equipment: Total air kerma at reference point (Ka,r), Air kerma-area product (KKA), Peak skin dose (PSD), Fluoroscopic time (FT)

<sup>1</sup> National Council on Radiation Protection & Measurements. Ionizing Radiation Exposure of the Population of the United States. Bethesda, MD: National Council on Radiation Protection and Measurements, (2009) 160.  
<sup>2</sup> Venneri, L et al. Cancer risk from professional exposure in staff working in cardiac catheterization laboratory: Insights from the National Research Council's Biological Effects of Ionizing Radiation VII Report. American Heart Journal, (2009) 157: (1), 118-124  
<sup>3</sup> International Commission on Radiological Protection. The 2007 Recommendations of the International Commission on Radiological Protection. ICRP publication 103. Ann ICRP (2007) 37:1-352.  
<sup>4</sup> Gerber, T et al. Ionizing Radiation in Cardiac Imaging: A Scientific Advisory from the American Heart Association Committee on Cardiac Imaging of the Council on Clinical Cardiology and Committee on Cardiovascular Imaging and Intervention of the Council on Cardiovascular Radiology and Intervention. Circulation (2009) 119: 1056-65  
<sup>5</sup> Picano, E. et al. Cancer and non-cancer brain and eye effects of chronic low-dose ionizing radiation exposure. BMC Cancer, (2012) 2: (1), 157  
<sup>6</sup> International Atomic Energy Agency, Radiation Protection for Patients (RPDP) "X-rays: What Patients Need to Know" www.rpopl.iaea.org.  
<sup>7</sup> National Council on Radiation Protection and Measurements Limitation of Exposure to Ionizing Radiation. Bethesda, MD: National Council on Radiation Protection and Measurements, (1993) 116