

PediRhythm VII, Thessaloniki

Zero- or low-fluoroscopy during ablation of AVNRT

Joel A. Kirsh, MD, FRCPC, CEPS

Cardiology and Critical Care, Hospital for Sick Children

Associate Professor of Pediatrics, University of Toronto



I.

I have received (a) research grant(s) / in kind support

A

... from current sponsor(s)

YES

NO

B

... from any institution

YES

NO

II.

I have been a speaker or participant in accredited CME/CPD ...

A

... from current sponsor(s)

YES

NO

B

... from any institution

YES

NO

III.

I have been a consultant / strategic advisor etc. ...

A

... for current sponsor(s)

YES

NO

B

... for any institution

YES

NO

IV.

I am a holder of (a) patent / shares / stocks or ownership...

A

... related to presentation

YES

NO

B

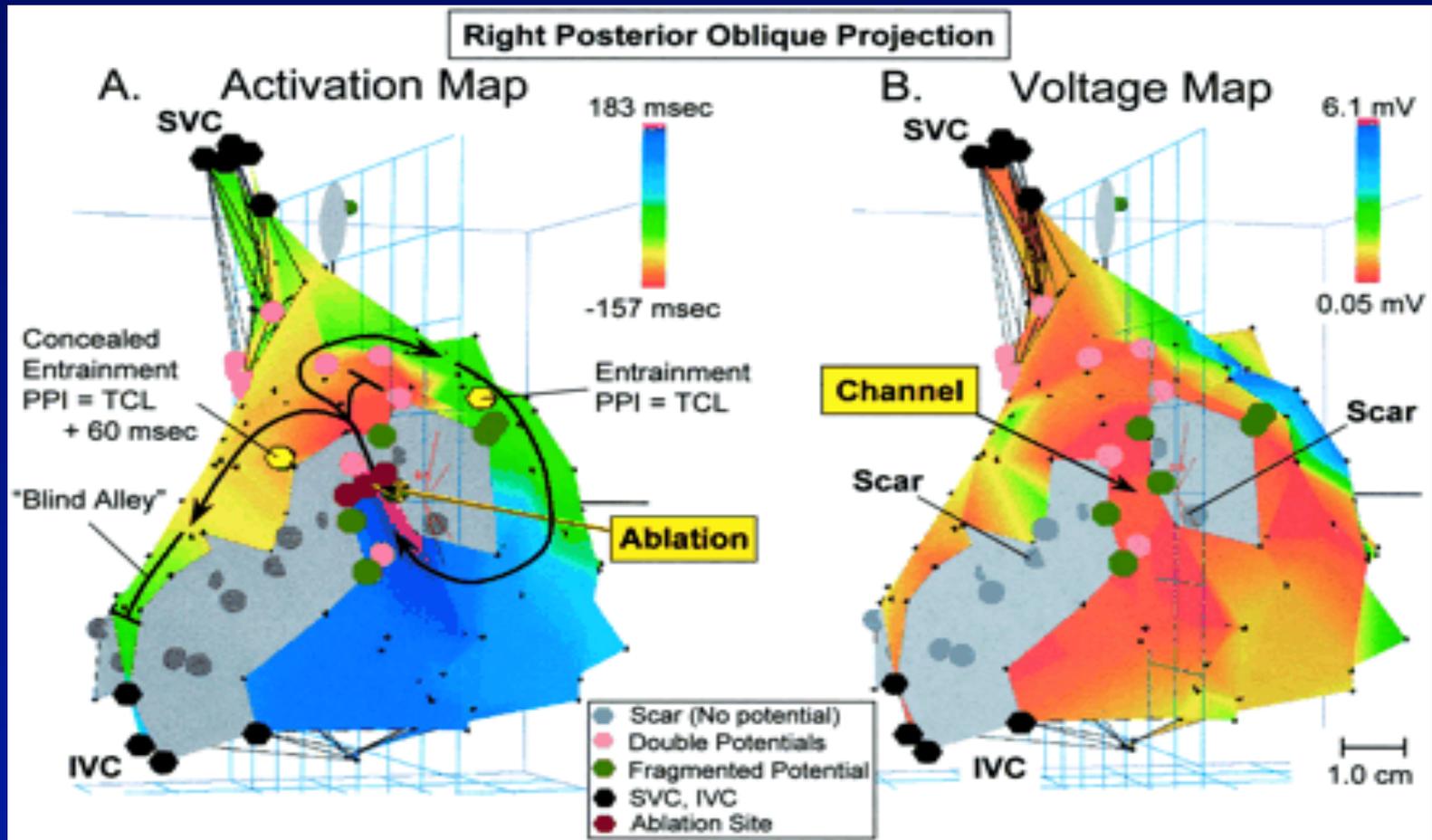
... not related to presentation

YES

NO

SCORE: 0

Early uses of 3D mapping



Nakagawa Circulation 2001;103:699-709

A Fluoroscopic History . . .

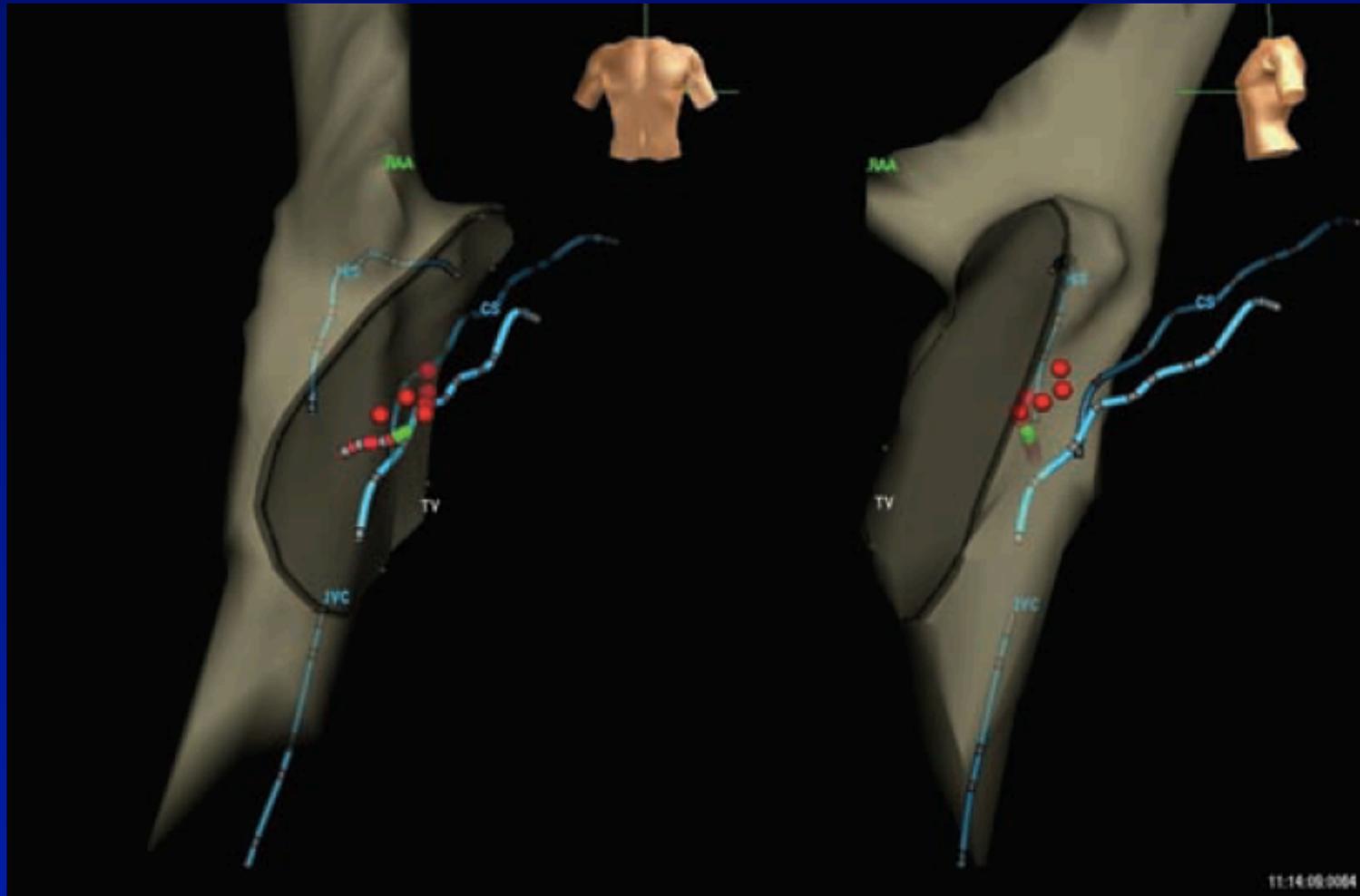
- 8 November 1895 **Wilhelm Röntgen** discovered X-rays.
- 1898 Fluoroscope invented by Thomas Edison.
- 1913 Coolidge Tube (Vacuum Tube)
- 1950s Development of X-ray Image Intensifier and Television Camera.
- 1980s onward: widespread use of digital fluoroscopy

Risks of ionizing radiation

- Patients:
 - Overall 0.01-0.1% risk per fluoro hour
- Operators:
 - May be as high as 0.3% for busy volume
- Difficult to discern given background rate of 10-20% lifetime risk of cancer

Elimination of fluoroscopy use in a Pediatric EP Laboratory

Smith G, Clark JM PACE 2007;30:510-518

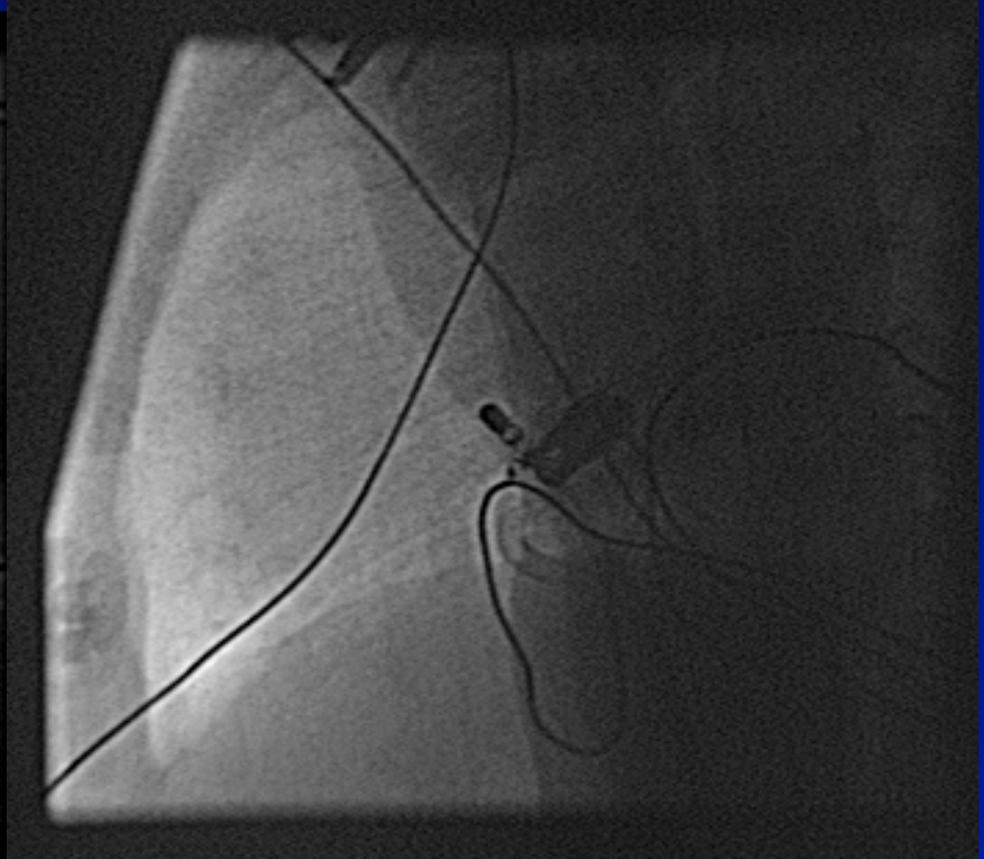
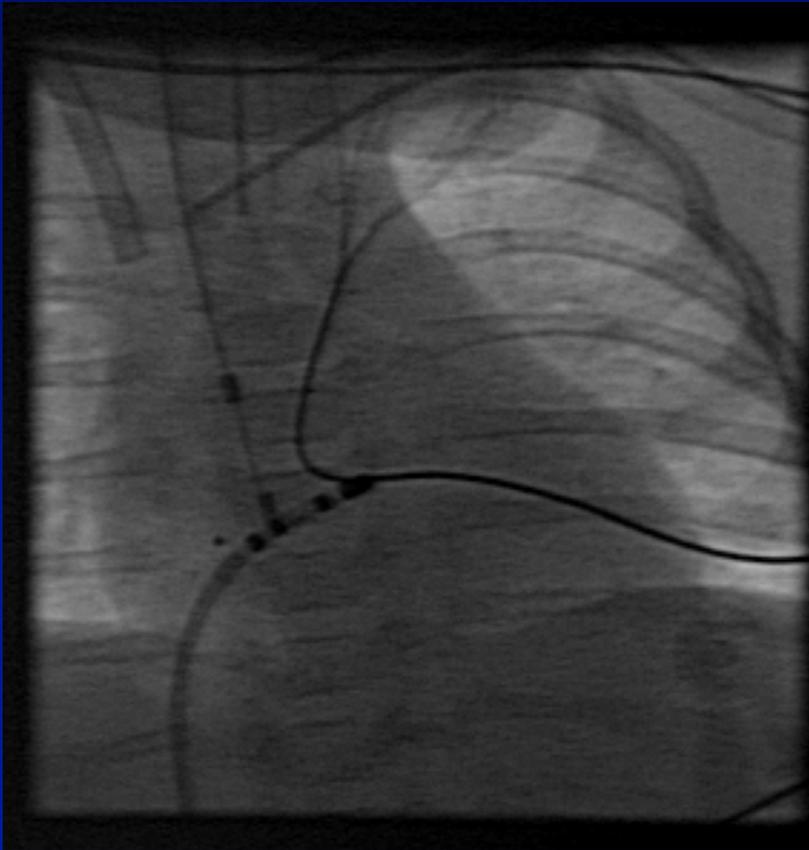


Fluoroscopy for ablation:

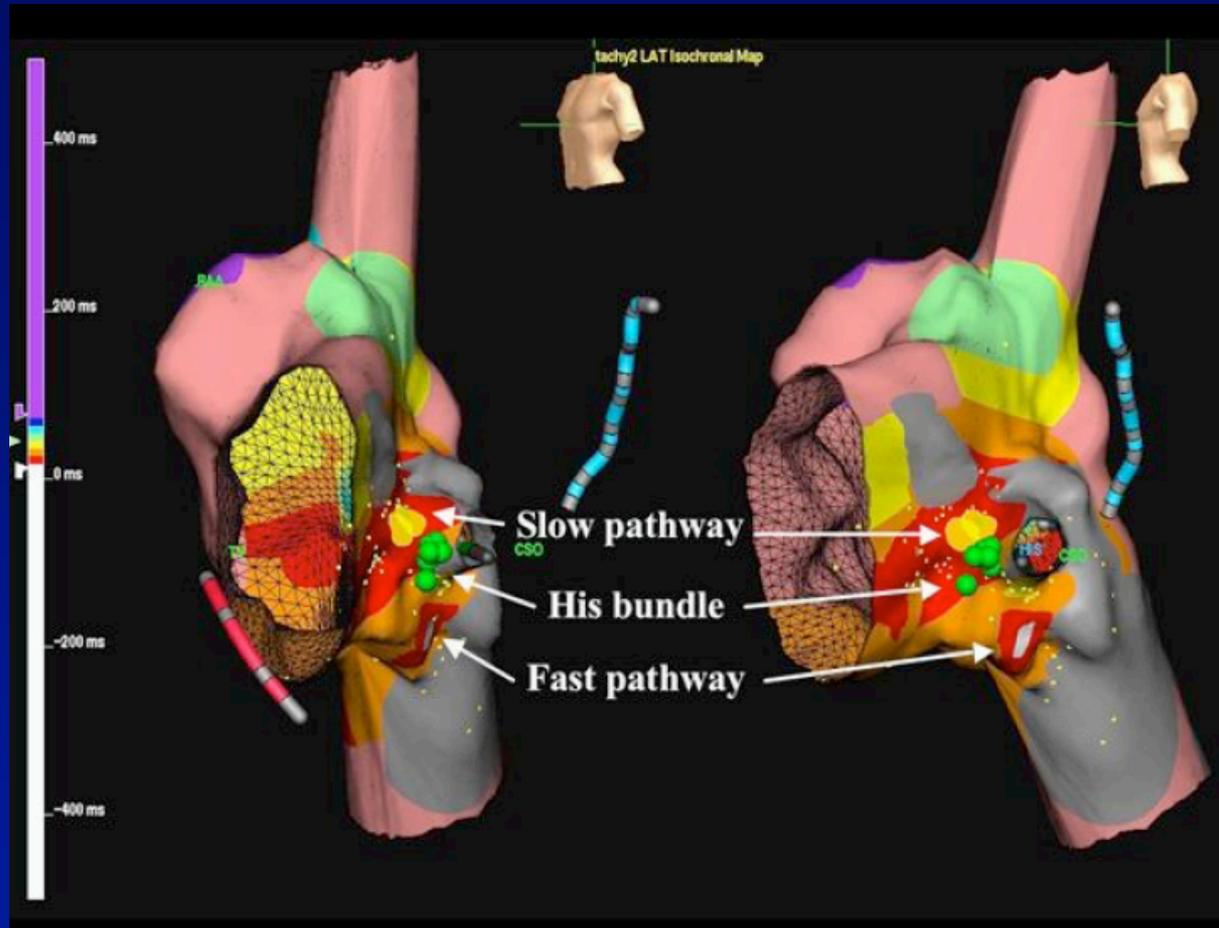
Early . . . and late.

- Kugler, NEJM 1994
- Pediatric EP Society
- LFW 59 ± 43 min
- RFW 80 ± 51
- RAS 61 ± 34
- RPS 60 ± 41
- AVNRT 46 ± 34
- Tuzcu, PACE 2007
- Clark, PACE 2008
- LFW 0 min
- RFW 0
- RAS 0
- RPS 0
- AVNRT 0

AET on ECMO



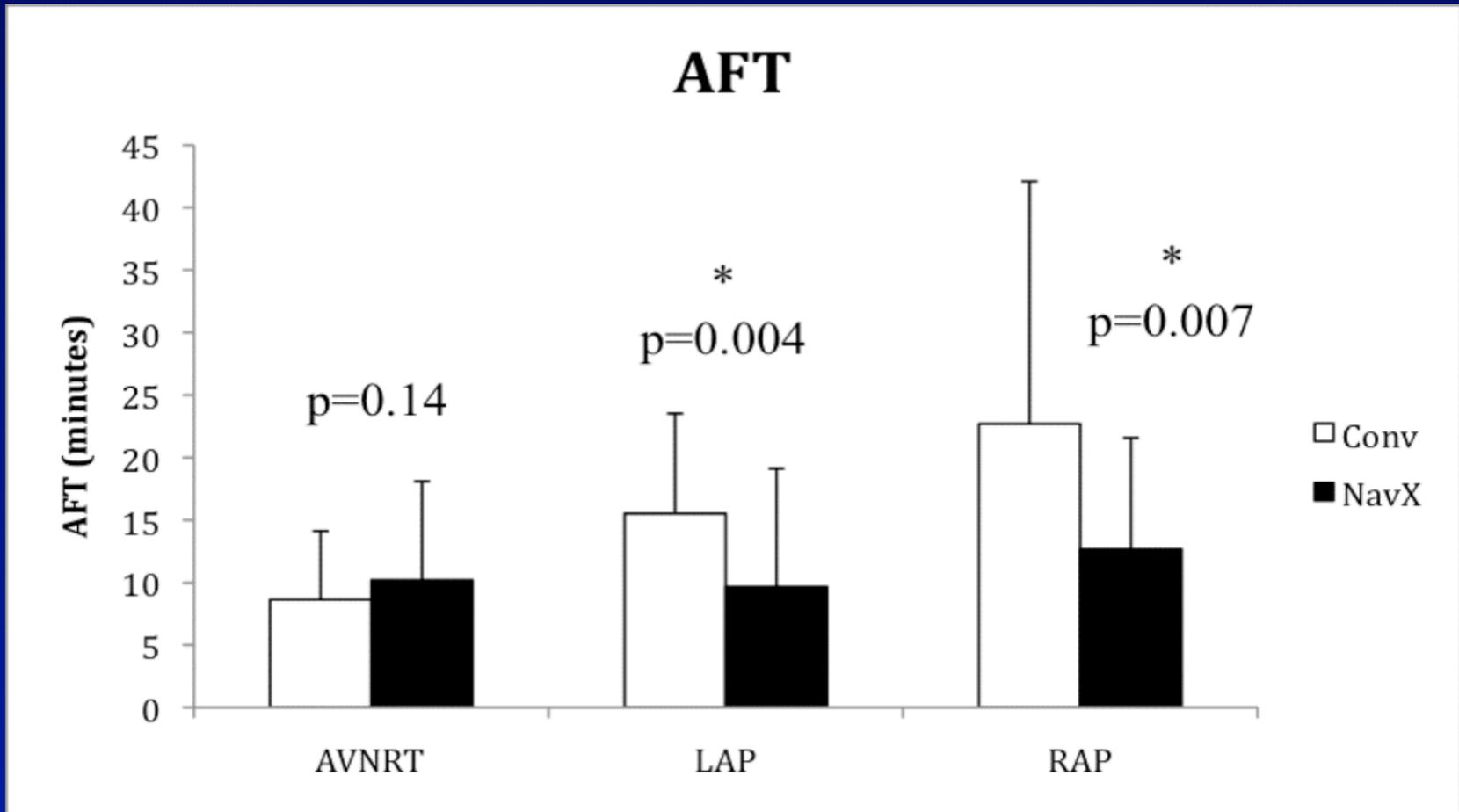
Ablation of AVNRT in AVSD



Khairy et al, HRJ 2007

Ablation fluoro times

Neilson, 2006 & Kwong, 2011

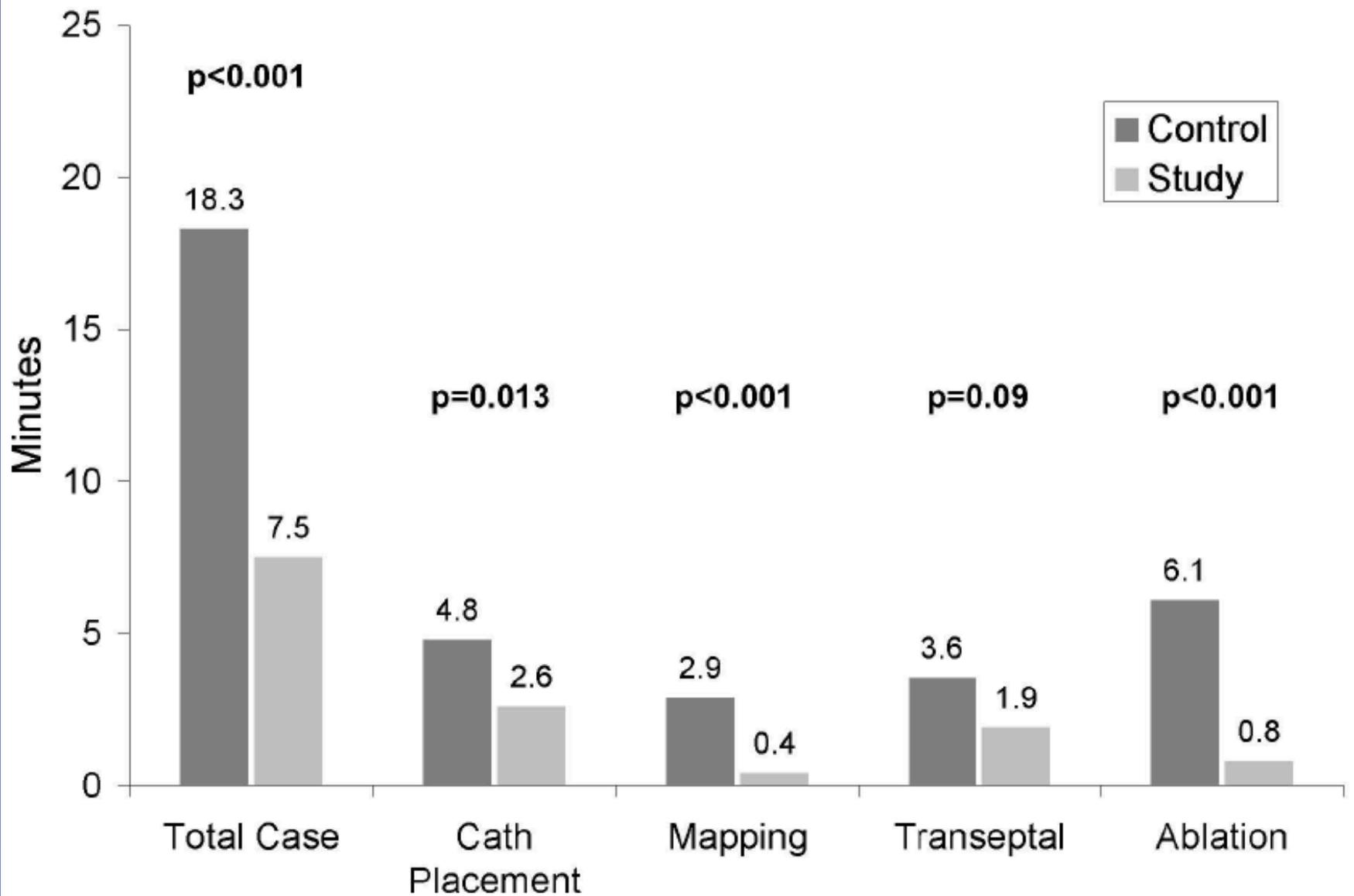


Ablation success 95.7 vs 95.9%, p = NS

NavX in Athens

Papagiannis et al, PACE 2006;29:971-8

	Group A	Group B	P-Value
CL (ms)	307 ± 53.5 220–460	313.6 ± 56.5 220–460	0.629
Fluoroscopy time (minute)	10.4 ± 6.1	24.9 ± 16.0	<0.0001
mean ± SD			
Range	3.1–28.8	4.4–82.0	
Procedure duration (minute)	170 ± 68.5	218 ± 69.3	<0.0001
mean ± SD			
Range	90–420	90–360	
Lesion number, mean ± SD	9.2 ± 10.0	10.3 ± 9.5	0.613
Range	1–49	1–37	
Success rate	40 (95%)	40 (100%)	0.494



Miyake et al, HRJ 2010

Table 3 Univariate and multivariate associations with fluoroscopy time and radiation exposure

	Fluoroscopy time	Radiation exposure
Univariate Analysis		
Nonfluoroscopic imaging	<.001	<.001
Diagnosis of AVNRT	.005	.014
Weight	NS	.004
Body mass index	NS	.004
Chest depth	NS	.007
Case difficulty	NS	NS
Calendar quarter	NS	NS
Attending physician	NS	NS
Fellow	NS	NS
Multivariate Analysis		
Nonfluoroscopic imaging	<.001	<.001
Diagnosis of AVNRT	.002	—
Attending physician	.16	.017
Body mass index	—	<.001

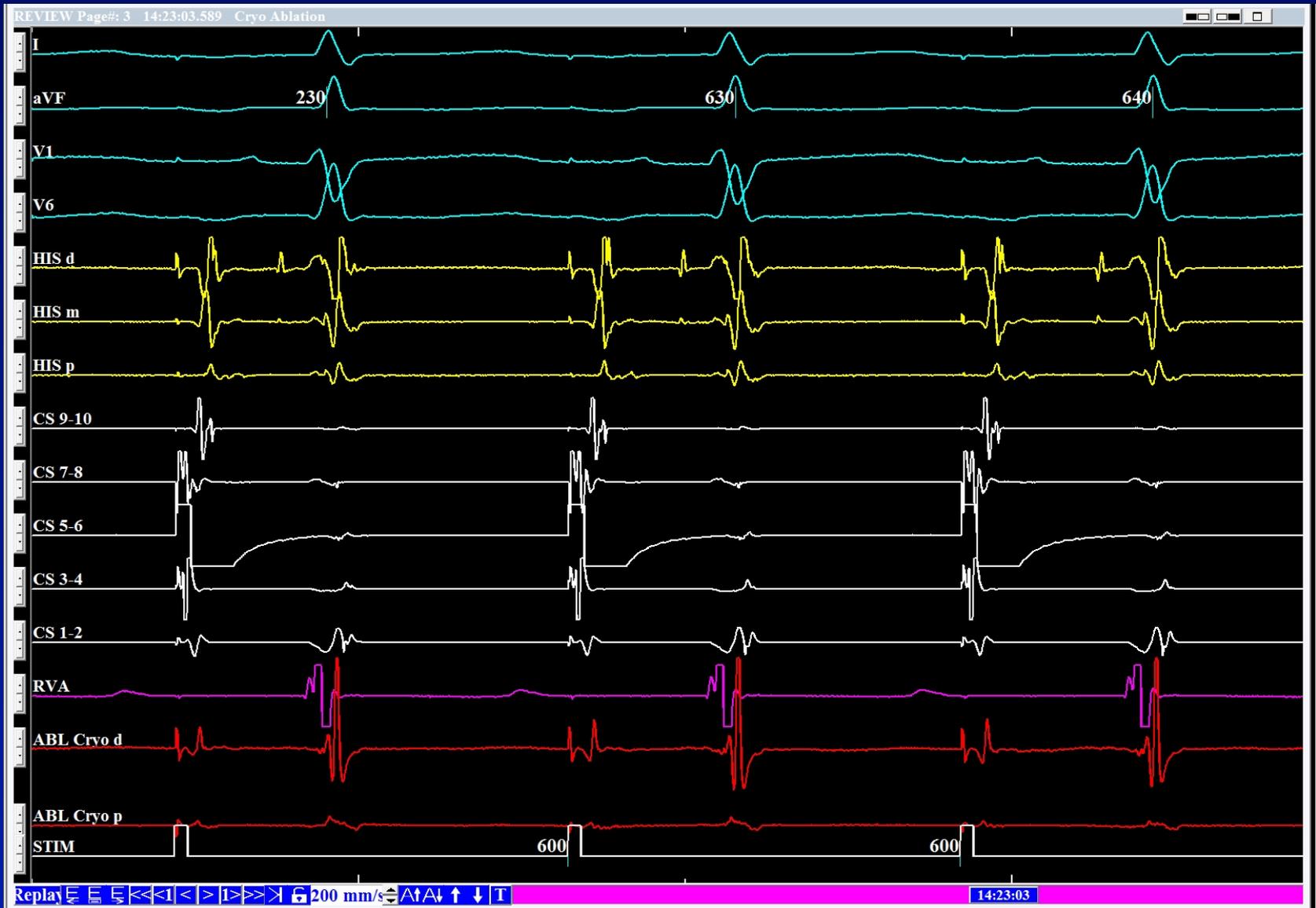
AVNRT = atrioventricular nodal reentrant tachycardia.

Near zero fluoroscopic exposure during catheter ablation of supraventricular arrhythmias: the NO-PARTY trial

Casella et al, Europace 2016;18:1565-1572

- 262 pts (6 centres) conventional vs low-fluoro
- No difference: success, complications recurrence
- Significant reduction in:
 - Total fluoroscopy time (0 vs 14 min)
 - Patient radiation dose (0 vs 8.9 mSv)
 - Operator radiation dose (1.6 vs 25.3 uSv)
- 96% reduction in lifetime attributable risk

Challenging cryoablation of SP



Being an EP is a pain in the neck . . .

Prevalence and Risk Factors for Cervical and Lumbar Spondylosis in Interventional Electrophysiologists

DAVID BIRNIE, M.B., Ch.B., M.D.,* JEFF S. HEALEY, M.D., M.Sc.,†
ANDREW D. KRAHN, M.D.,‡ KAMRAN AHMAD, M.D.,§ EUGENE CRYSTAL, M.D.,¶
YAARIV KHAYKIN, M.D.,** VIJAY CHAUHAN, M.D.,†† FRANCOIS PHILIPPON, M.D.,‡‡
DEREK EXNER, M.D.,§§ BERNARD THIBAUT, M.D.,¶¶
TOMASCZ HRUCZKOWSKI, M.D., M.Sc.,*** PABLO NERY, M.D.,* ARIEH KEREN, M.D.,*
and DAMIAN REDFEARN, M.B., Ch.B., M.D.†††

- Cervical spondylosis 21% (controls 6%)
- Lumbar spondylosis 26% (controls 17%)
- Longer career associated with higher risk

Other Health Benefits

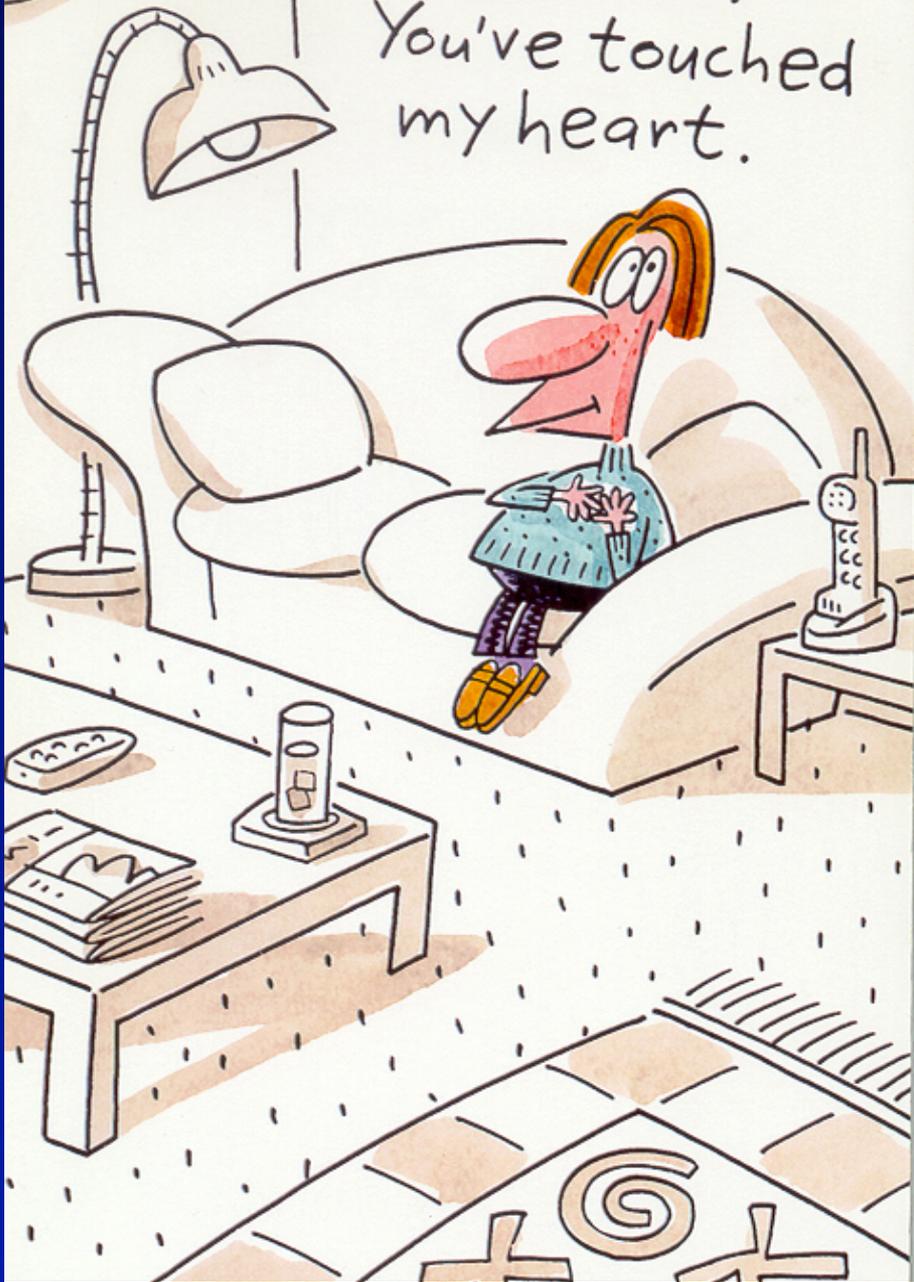


Summary:

Zero or low-fluoro for AVNRT

- Achievable with equivalent outcomes
- Suitable for “special cases” (eg CHD)
- Helpful in challenging cases
- Reduced risks to participants:
 - Patients – ionizing radiation
 - EPs – radiation & musculoskeletal

Thanks!
You've touched
my heart.



I hope
your hands
were clean.



Alice Mills

PediRhythm VII, Thessaloniki

Zero- or low-fluoroscopy during ablation of AVNRT

Joel A. Kirsh, MD, FRCPC, CEPS

Cardiology and Critical Care, Hospital for Sick Children

Associate Professor of Pediatrics, University of Toronto

