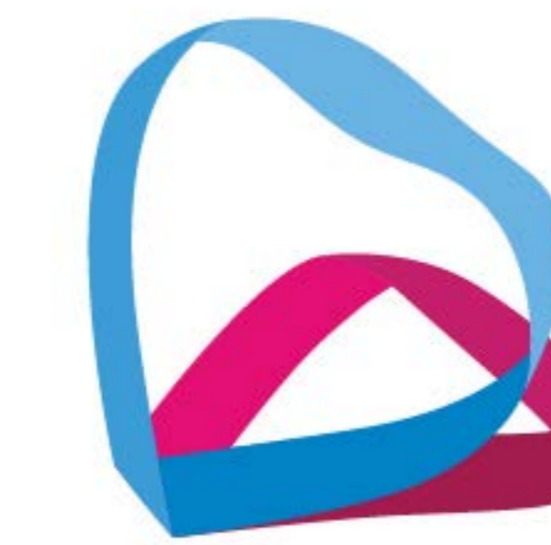


# Assessment of the Role of Genetic and Environmental Factors in The Determination of Left Atrial Parameters



A. Panajotu<sup>1</sup>, J. Karady<sup>1</sup>, G. Szeplaki<sup>1</sup>, T. Horvath<sup>1</sup>, D. L. Tarnoki<sup>2</sup>, A. L. Jermendy<sup>1</sup>, L. Geller<sup>1</sup>, B. Merkely<sup>1</sup>, P. Maurovich-Horvat<sup>1</sup>

(1) Semmelweis University, Heart and Vascular Center, Cardiovascular Imaging Research Group, Budapest, Hungary (2) Semmelweis University, Department of Radiology and Oncotherapy, Budapest, Hungary

## Background

- Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia with a population wide prevalence of 1%
- Its prevalence is growing with age and it is associated with a higher stroke risk and mortality
- Elevated left atrial volume (LAV), which frequently leads to AF was found to be a sensitive marker of mortality and morbidity among patients with existing cardiovascular disease associated with heart failure
- Both environmental and genetic factors are affecting the LAV

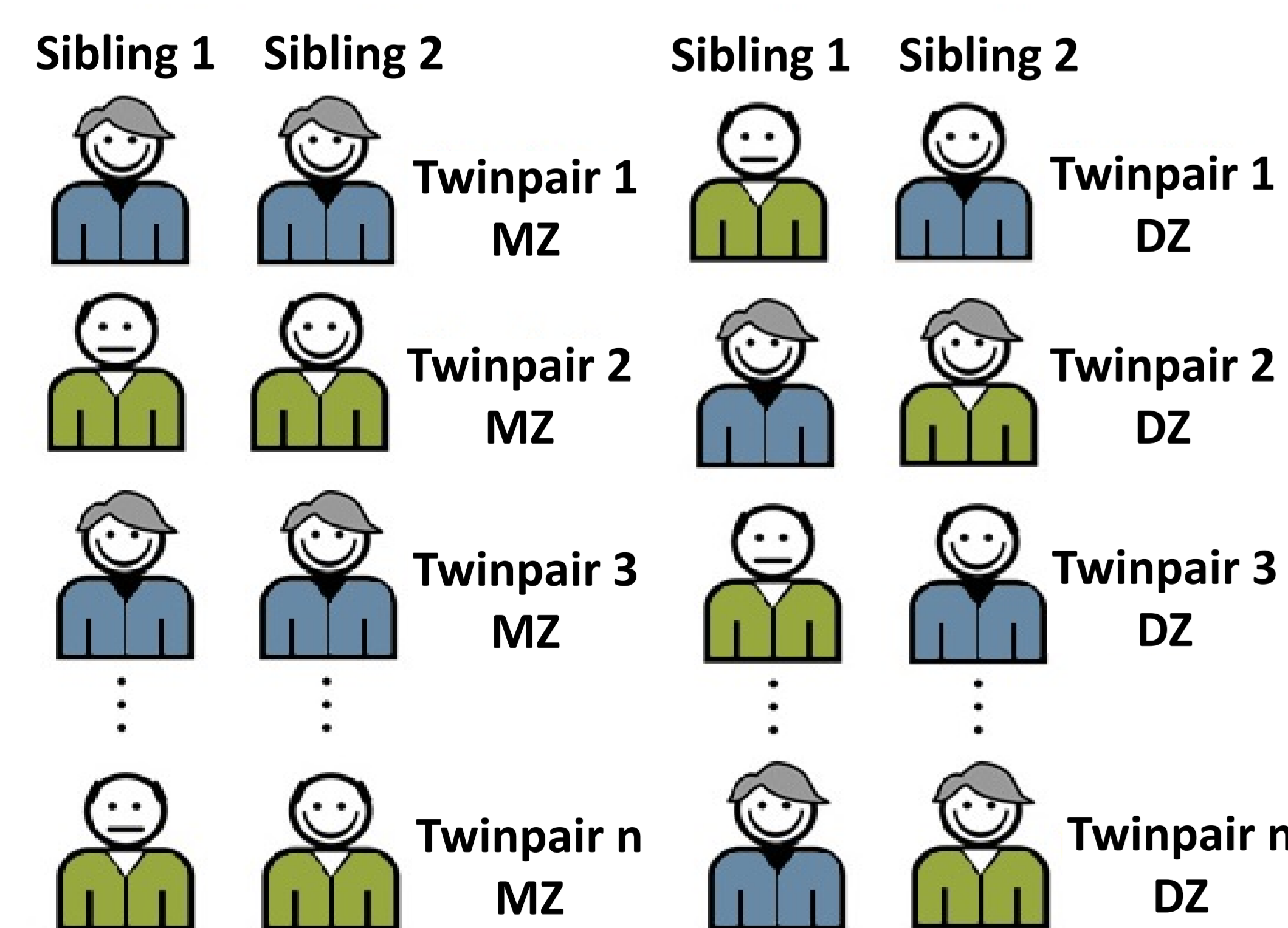
## Aims

- To evaluate the proportion of genetic and environmental factors influencing the left atrial parameters in a cohort of healthy twin pairs.

## Study population

	N = 210 twin subjects		p
	Monozygotic (MZ) (n = 126)	Dizygotic (DZ) (n = 84)	
Age (years)	55.7 ± 9.7	58.1 ± 8.72	0.18
Height (cm)	37.5	33.3	0.62
Weight (kg)	27.9 ± 4.9	27.7 ± 5.5	0.76

## Classical twin study design



Enhancing the correlation:

- Additive genetic factors (A)
- MZ genome 100% concordance
- DZ genome 50% concordance
- Common environment (C)

Weakening the correlation:

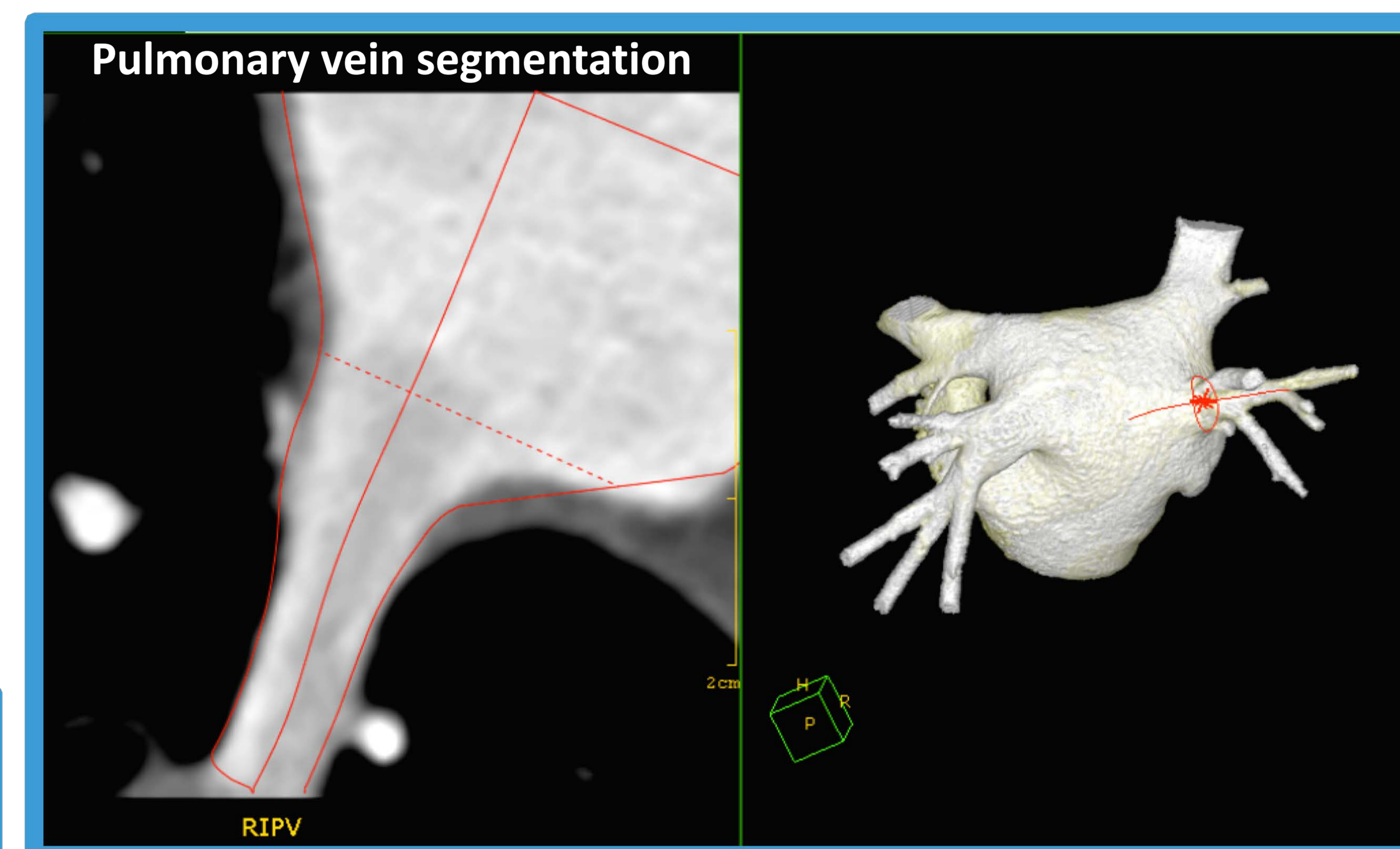
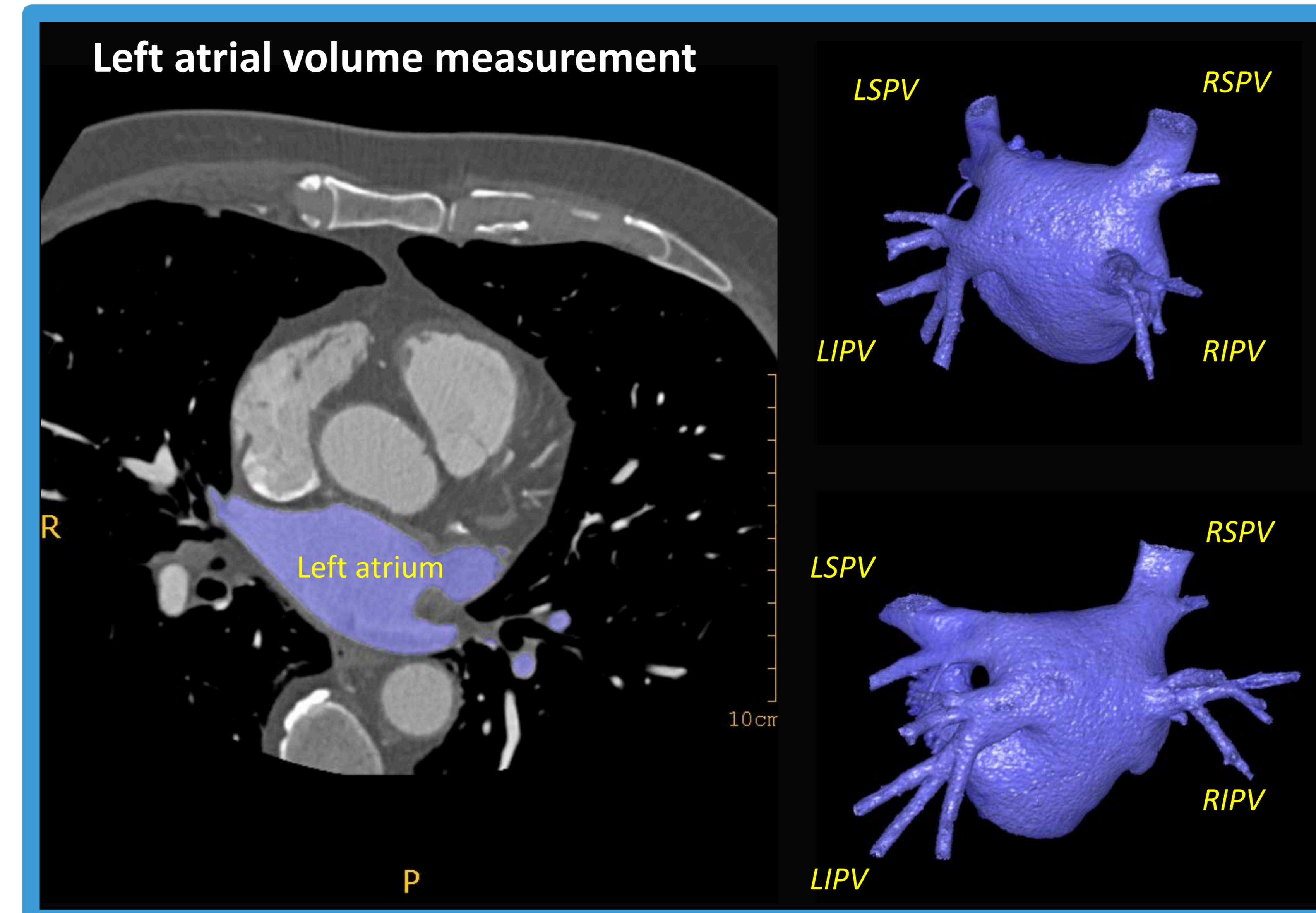
- Unique environment (E)

ACE - model

$r_{MZ} \uparrow$   
 $(r_{MZ} - r_{DZ}) \uparrow$  genetic determination  
 $(r_{MZ} - r_{DZ}) \downarrow$  genetic determination

$r_{DZ} \downarrow$   
 $(r_{MZ} - r_{DZ}) \uparrow$  genetic determination  
 $(r_{MZ} - r_{DZ}) \downarrow$  genetic determination

## Methods

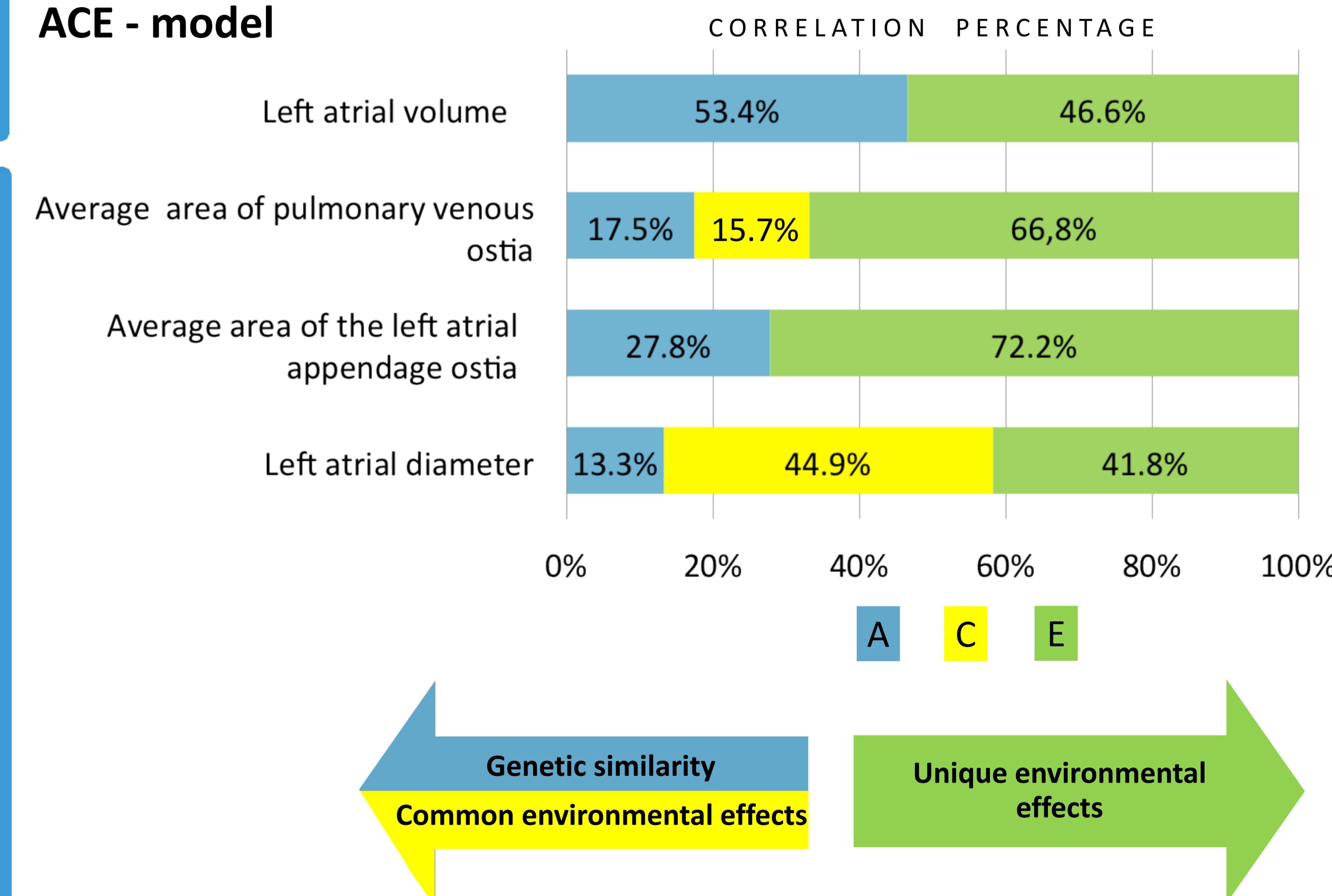


	$r_{MZ} n=126$	$r_{DZ} n=84$
Left atrial volume	0.66	0.40
Average area of pulmonary venous ostia	0.24	0.01
Average area of the left atrial appendage ostia	0.18	0.09
Left atrial appendage volume	0.39	0.21

## Results

	MZ n=126	DZ n=84	p
Left atrial volume (cm <sup>3</sup> )	63.5 ± 21.1	65.3 ± 18.9	0.58
Average area of pulmonary venous ostia (mm <sup>2</sup> )	248.4 ± 78.4	239.7 ± 59.0	0.81
Average area of the left atrial appendage ostia (mm <sup>2</sup> )	297.1 ± 114.2	309.2 ± 110.6	0.53
Left atrial diameter (mm)	37.8 ± 6.3	36.9 ± 5.9	0.55

## ACE - model



## Conclusions

- Our data suggests that the average area of pulmonary venous ostia and average area of the left atrial appendage ostia have a stronger environmental than genetic dependence.
- The left atrial volume showed an approximately equal environmental and genetic determination.
- The assessment of left atrial anatomy may provide opportunities for more precise cardiovascular risk stratification.