



**A CALIBRATION  
OF THE FRAMINGHAM  
CORONARY RISK  
FUNCTION ADAPTED  
TO THE CHARACTERISTICS  
OF SPANISH  
HIV-INFECTED PATIENTS**

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# Background

- **AR treatments that have chronified the disease of HIV infected patients:**
  - ✓ Have expanded their life expectancy,
  - ✓ Have worsened the cardiovascular risk profile over their life-span,
  - ✓ Have increased their coronary artery disease incidence as compared to general population
  - ✓ Have led to recognize that general population cardiovascular risk functions underestimate HIV patients actual risk



# Keynotes on cardiovascular diseases

- ❑ **Atherosclerosis is its common etiology**
- ❑ **There three main expressions of the atherosclerosis**
  - ✓ Coronary artery disease (CAD) (30% occur as sudden deaths)
  - ✓ Ischaemic stroke
  - ✓ Peripheral artery disease (lower limbs, Aorta, carotid arteries) & other arteries (mesenteric, kidney...)
- ❑ **CAD yields the heaviest burden and the one that is best predicted with cardiovascular risk functions**
- ❑ **The most accurate existing functions involve CAD risk**



# Objective

- To calibrate the Framingham function to the CHD incidence and cardiovascular risk factor prevalence characteristics of VIH-IP in Spain.**



# Methods

- The CAD Framingham function was calibrated with previously tested methods in population aged 35 to 74 years.
- Cox model in which general population 10-year CAD incidence (4.9% in men and 2.2% in women), risk factor prevalences were replaced by those of a Spanish VIH-IP cohort (4.96%, and 2.23%, respectively).
- Proportion of CAD incidence of women extrapolated from general population to ensure model stability.
- Risk classified in four 10-year categories : <5% (low), 5-<10 moderate, 10-<15 high, and  $\geq 15$  very high.



# Results: Risk factor coefficients in original Framingham function

Risk factors	Coefficients	
	Men	Women
Age	0.04826	0.33766
Age squared	---	-0.00268
Total Cholesterol (mg/dL)		
<160	-0.65945	-0.26138
160 - <200	0	0
200 - <240	0.17692	0.20771
240 - <280	0.50539	0.24385
≥280	0.65713	0.53513
HDL- Cholesterol (mg/dL)		
<35	0.49744	0.84312
35 - <45	0.2431	0.37796
45 - <50	0	0.19785
50 - <60	-0.05107	0
≥60	-0.4866	-0.42951
Blood pressure mmHg (Systolic/Diastolic)		
<120 / <80	-0.00226	-0.53363
120 - <130 / 80 - <85	0	0
130 - <140 / 85 - <90	0.2832	-0.06773
140 - <160 / 90 - 100	0.52168	0.26288
≥160 / ≥100	0.61859	0.46573
Diabetes	0.42839	0.59626
Smoker	0.52337	0.29246



# Results: Cardiovascular risk factors prevalence in HIV infected patients & Spanish General population

Risk factors	Spanish general population		Spanish HIV patients*	
	Men	Women	Men	Women
N	<b>13,425</b>	<b>15,462</b>	<b>479</b>	<b>162</b>
Age (years)	53.8	53.4	44.4	41.9
Total Cholesterol (mg/dL)				
<160	7.35%	6.35%	25.9%	27.8%
160 - <200	29.6%	29.9%	32.2%	29.0%
200 - <240	39.5%	39.0%	25.5%	22.2%
240 - <280	18.3%	19.6%	10.6%	16.7%
≥280	5.20%	5.17%	5.85%	4.32%
HDL- Cholesterol (mg/dL)				
<35	7.54%	1.75%	15.9%	8.64%
35 - <45	32.4%	13.4%	32.2%	23.5%
45 - <50	20.4%	14.7%	17.5%	13.0%
50 - <60	25.4%	32.4%	20.5%	27.8%
≥60	14.3%	37.9%	14.0%	27.2%
Blood pressure mmHg				
<120 / <80	18.3%	35.7%	41.3%	59.9%
120 - <130 / 80 - <85	20.8%	18.7%	29.6%	21.0%
130 - <140 / 85 - <90	20.8%	16.3%	15.9%	11.7%
140 - <160 / 90 - 100	28.2%	21.2%	9.60%	4.94%
≥160 / ≥100	11.9%	8.20%	3.55%	2.47%
Diabetes	17.1%	11.8%	4.80%	4.94%
Smoker	33.0%	19.6%	65.6%	72.2%



# Results: 10-year CAD incidence in a HIV infected patients Spanish cohort

	Mean age (years)	% Men	# CAD events	Person/year (py) or median follow-up (y)	10-y CAD incidence
<b>HOPS</b> (n = 2,392)	42	75%	139*	6.5 y	~8.9%
<b>NA ACCORD</b> (n = 25,094)	~36	81%	490**	100,975 py	4.9%
<b>PHCS-HIV</b> (n = 2,270)	46	62%	125**	6.3 y	8.7%
<b>D.A.D</b> (n = 32,663)	39	74%	702*	186,365 py	3.8%
<b>CORIS (Spain)</b> (n = 5,185)	36	80%	17***	13,306 py	1.3%
<b>H del Mar (Spain) (641)</b>	~43	81%	20***	10,2 y	3.7%
<b>H del Mar (Spain) Men (479)</b>	44	100%	20***	10.2 y	4.96%
<b>H del Mar (Spain) Women (162)</b>	42	0%	****	10.2 y	2.23%****

\* Angina, acute myocardial infarction (AMI), CABG, PCI; \*\* AMI; \*\*\* AMI or angina \*\*\*\* Mean survival extrapolated from the proportion in General Population





# Comparative charts of coronary artery disease risk

General population

HIV-infected patients

## Mujeres

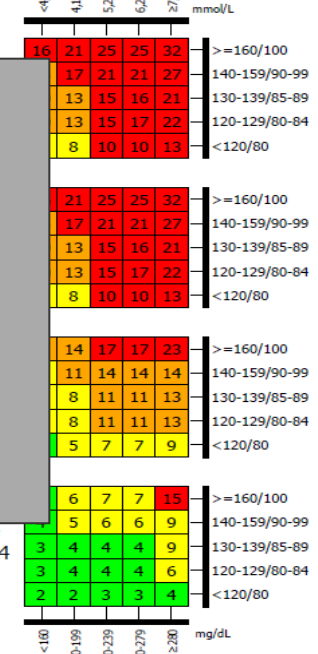
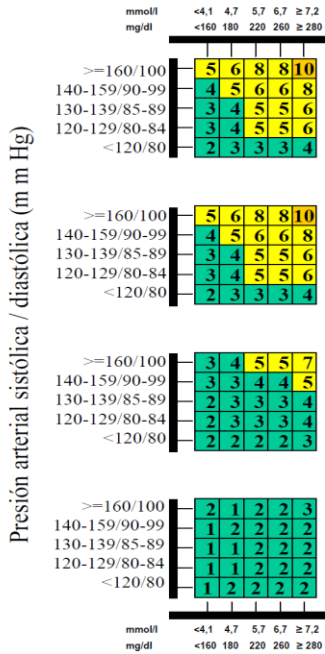
## Women

### No Fumadoras

### Fumadoras

### Non-smokers

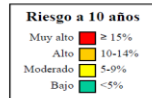
### Smokers



**Coronary artery disease risk:**

Low  
Intermediate  
High  
Very High

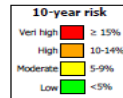
< 5%  
5-9,9%  
10-14,9%  
≥ 15%



### Colesterol

### Colesterol

Si el colesterol HDL < 35 mg/dL: riesgo real ≈ riesgo x 1,5  
Si el colesterol HDL ≥ 60 mg/dL: riesgo real ≈ riesgo x 0,5



### Cholesterol

### Cholesterol

If HDL cholesterol < 35 mg/dL: actual risk ≈ risk x 1,5  
If the HDL cholesterol HDL ≥ 60 mg/dL: actual risk ≈ risk x 0,5



## An example of use

A non-diabetic HIV-infected male aged 46 years with a total and high-density lipoprotein cholesterol of 245 mg/dL and 43 mg/dL, blood pressure of 142/88 mmHg, smoker has a 10-year CHD risk of **8.1% with the general population function**, and **14.2% with the HIV-IP calibrated function**. The former would represent low risk, while the calibrated would imply high risk.