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Early-Stage Investigator Lecture

Cardiometabolic Health and Cardiovascular Prevention in Latino Population

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Cardiometabolic Health and Cardiovascular Prevention in Latino Population

Rodrigo M Carrillo-Larco, MD, PhD Early-Stage Investigator Lecture (ESIL) June 7th, 2023



Disclosures

- No conflict of interests.
- Work primarily funded by **Wellcome Trust** (UK).
- Thanks to all members and steering committees of CC-LAC and NCD-RisC.

Cardiovascular risk factors

- Unfavourable trends.
- Diversity or heterogeneity.



Age-standardized mean systolic blood pressure, men, 18+ years.



Cardiovascular risk factors

- Diversity or heterogeneity.
- Unfavourable trends.



Age-standardized prevalence hypertension control, men, 35-79 years.



Cardiovascular risk factors



• Diversity or heterogeneity.

Change age-standardized mean total cholesterol between 1980-2018, women (A) and men (B), 18+ years

• Mostly little change.

Need instruments to promote good lipids.

Cardiovascular outcomes

- Deaths rates for CVDs have decreased through the world.
- In the Americas it has stagnated over the last ~10 years.
- Need further push to keep the decreasing trend.

Variables	N⁰ studies	Pooled incidence per 100,000 person-years					Heterogeneit (I ²)
Study type							
Cohort	4	610 (95% CI: 290 – 931)	1	i 	-		- 89.1%
Registry	11	224 (95% CI: 192 – 257)	-	+ -			99.2%
Diagnosis				ili			
WHO method	12	247 (95% CI: 211 – 283)	-	- -			99.1%
Other methods	3	266 (95% CI: 21- 510)			-		99.8%
Scope							
National	4	303 (95% CI: 226 – 381)	-	¦ ↓			99.3%
Sub-national	11	210 (95% CI: 185 – 235)	-	-i i -			97.7%
Risk of bias							
Low risk	13	267 (95% CI: 224 – 310)	-	+++			99.4%
High risk	2	201 (95% CI: 163 – 240)	-				92.6%
Age							
35+ years	9	209 (95% CI: 163 – 255)		-∔ i			99.4%
Sex							
Men	11	261 (95% CI: 222 – 301)	-	+-1			98.7%
Women	11	218 (95% CI: 185 – 259)	-				98.5%
			0 3	200 400	600	800	1000
			Pooled inci	dence of stroke	(per 100.	000 perso	n-year)



Potential solutions

- CVDs can be effectively prevented (delayed) with population-based and risk-based interventions.
- Complementary approaches.





Data pooling

- Cohorts Consortium of Latin America and the Caribbean (CC-LAC).
- Risk estimates for disease burden metrics.
- Cardiovascular risk score.



Risk estimates



Lancet Reg Health Am 2021;4:None.

Risk estimates



Cardiometabolic risk factors ASCVDs



Lancet Reg Health Am 2021;4:None.

Cardiometabolic risk factors ASCVDs



Cardiometabolic risk factors ASCVDs



Cardiovascular risk score (1 of 2)

- Not a recent invention.
 - 1967 first Framingham version
 - 1991 and 1998 most used versions of Framingham
 - 2003 SCORE 1
 - 2014 Pooled Cohorts Equation
 - 2015 Globorisk
 - 2017 QRISK 3
 - 2019 WHO Cardiovascular Risk Charts
 - 2021 SCORE 2
- 363 predictions models (2013).
- No risk score for Latin America and the Caribbean:
 - Why? Needed?



ublications

Framingham Heart Study

Three Generations of Dedication

QRISK[®]3-2018 risk calculator https://qrisk.org/three

dy have a diagnosis of coronary heart disease (including angina or heart attack) or stroke

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Welcome to the QRISK[®]3-2018 risk calculator



Algorithm

Cardiovascular risk score for LAC – Development

- New cardiovascular risk score for LAC: Globorisk-LAC.
- Two models:
 - Laboratory-based (total cholesterol)
 - Office-based (body mass index)

Predictors (unit/reference group)	Globorisk-LAC	
	Laboratory-based model	HR
SBP (per 10 mmHg)	0.4189 (0.2562; 0.5815)	1.227
Interaction between SBP and age (per 10 mmHg for 1 year)	-0.0034 (-0.0058; -0.0009)	
Total cholesterol (per 1 mmol/l)	0.1203 (0.0743; 0.1662)	1.128
Interaction between total cholesterol and age (per 1 mmol/l for 1 year)		
Diabetes	0.6691 (0.5080; 0.8303)	1.952
Interaction between diabetes and age		
Interaction between diabetes and sex (female)	0.1024 (-0.2857; 0.5825)	1.108
Smoker (current)	0.3268 (0.2014; 0.4521)	1.387
Interaction between smoker and age		
Interaction between smoker and sex (female)	0.1469 (-0.2887; 0.5825)	1.158

Cardiovascular risk score for LAC – Internal validation

C-statistic (95% CI)	Calibration	Calibration regression slope (95% CI)				
	Men	Women				
	Laboratory-based					
71% (67—75%)	1.020 (0.826–1.214)	0.406 (0.217-0.596)				
73% (69—77%)	0.973 (0.838—1.109)	1.371 (0.672–2.070)				
73% (69—76%)	0.890 (0.742–1.039)	0.840 (0.610-1.070)				
74% (70—78%)	1.078 (0.548—1.608)	0.559 (0.371-0.747)				
69% (64—73%)	1.067 (0.782—1. 523)	0.747 (0.588–0.907)				
72% (70—74%)	0.994 (0.934—1.055)	0.852 (0.761-0.942)				
	C-statistic (95% Cl) 71% (67–75%) 73% (69–77%) 73% (69–76%) 74% (70–78%) 69% (64–73%) 72% (70–74%)	C-statistic (95% Calibrator Men Men Laboratory-based 1020 (0.826-1.214) 71% (67-75%) 0.973 (0.838-1.109) 73% (69-77%) 0.973 (0.838-1.109) 73% (69-76%) 0.890 (0.742-1.039) 74% (70-78%) 1.078 (0.548-1.608) 69% (64-73%) 0.994 (0.934-1.523) 72% (70-74%) 0.994 (0.934-1.055)	C-statistic (95> // Calibration slope (95% Cl) Men Women Laboratory-based Women 71% (67-75%) 1.020 (0.826-1.214) 0.406 (0.217-0.596) 73% (69-77%) 0.973 (0.838-1.109) 1.371 (0.672-2.070) 73% (69-76%) 0.890 (0.742-1.039) 0.840 (0.610-1.070) 74% (70-78%) 1.078 (0.548-1.608) 0.559 (0.371-0.747) 69% (64-73%) 1.067 (0.782-1.523) 0.747 (0.588-0.907) 72% (70-74%) 0.994 (0.934-1.055) 0.852 (0.761-0.942)			



Discrimination: how well it separated positive vs negative. [random chosen two people, the one with the outcome will have higher risk]. Calibration: agreement between observed and predicted risk.

Cardiovascular risk score for LAC – Comparisons

- Globorisk-LAC had adequate discrimination (>70%) and calibration (a).
- Better calibration than original Globorisk (b) and 2019 WHO Cardiovascular Risk Charts (c).







Cardiovascular risk score (2012

- Two models:
 - Laboratory-based (total cholesterol)
 - Office-based (body mass index)
- Recalibration for 31 countries
 - Risk charts
- Available as a package for R.

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Treatment coverage

- Cardiovascular risk scores have clear use at the individual level.
- Can inform about the prevalence of high cardiovascular risk and treatment coverage and gap.
- Few countries, <25% antihypertensive treatment coverage and men disadvantage.



New challenges

- Population-based phenotypes.
- Digital biomarkers for population-based surveillance.
 - Leveraging "new" data sources.
- SDGs.







Conclusions

- Latin America is an heterogenous region (between-countries, within-regions); same applied to people from this region.
- Still missing "simple" and standard tools for risk stratification clinical practice and disease surveillance.
- Large data pooling consortia is feasible and provide valuable scientific evidence and actionable tools.
- Emerging approaches offer new opportunities.

I am happy to take any questions



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