

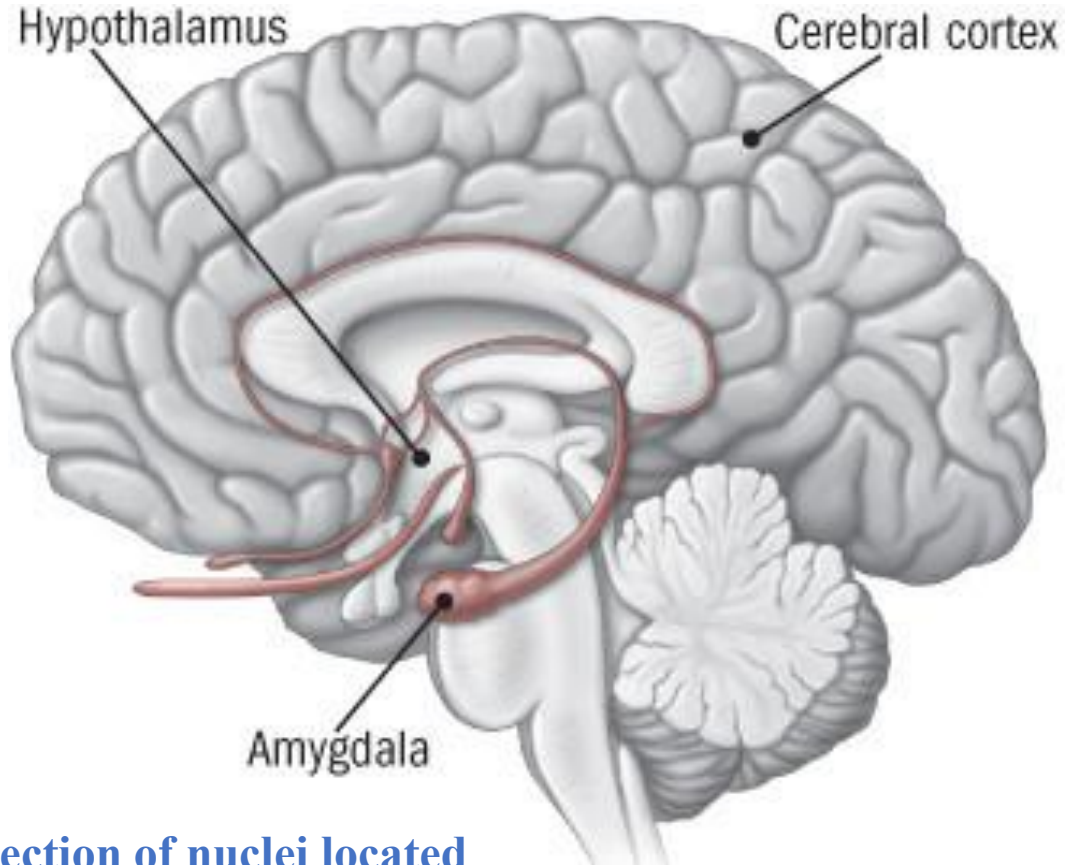
Amygdalar activity, Stress, and Cardiovascular Disease

Nehal N. Mehta, MD MSCE FAHA

Section of Inflammation and Cardiometabolic Disease, NHLBI



Amygdala Background



Collection of nuclei located in the medial temporal lobes, anterior to hippocampus

Roles of the Amygdala

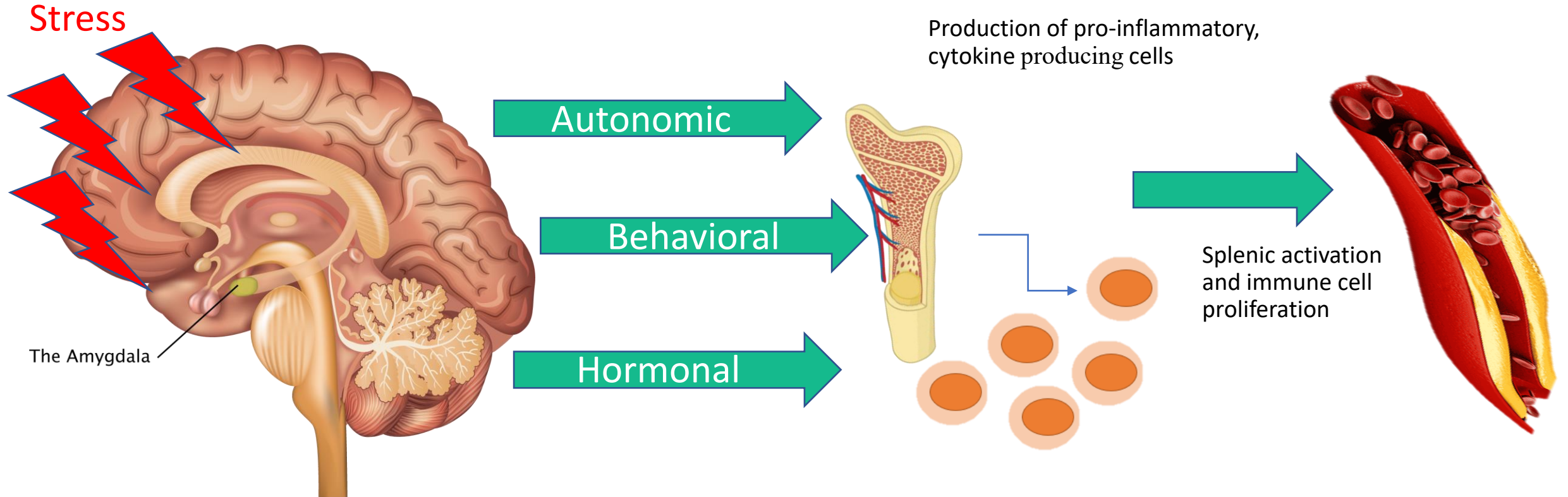
- Emotional processing
 - Limbic system
- Regulating Stress Response
- Memory formation

Susceptible to stressful events

- Functional and volumetric changes in in depression, chronic pain, PTSD, addiction
- Chronic stress → Amygdalar hypertrophy

The Amygdala, Stress and CV disease

- Stress=major CV risk factors (dyslipidemia, HTN, smoking)



Two practical examples: 1. Psoriasis and Subclinical CAD

Chronic Stress-Related Neural Activity Associates with Subclinical Cardiovascular Disease in Psoriasis

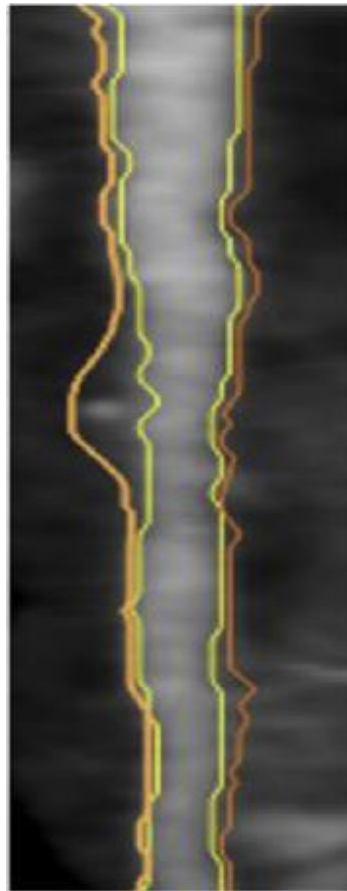
Severe Psoriasis vs. Healthy Volunteers

Severe Psoriasis
Significantly



Amygdalar activity
Total and NCB

Non-calcified
plaque in
LAD of pt
with severe
psoriasis



Amygdalar activity associates with CV risk factors and NCB

Variables	Beta (p-value), (N=164)
Age	0.19 (0.02)
Sex	0.15 (0.05)
Hypertension	0.21 (0.008)
Hyperlipidemia	0.16 (0.05)
Type 2 diabetes mellitus	0.15 (0.05)
Psoriasis area severity index score	0.19 (0.05)
Clinical and lab values	
Body mass index	0.23 (0.003)
Waist-to-hip ratio	0.24 (0.003)
Systolic blood pressure, mm Hg	0.23 (0.003)
Framingham risk score	0.30 (<0.001)
C-reactive protein	0.18 (0.02)
Cardiometabolic parameters	
Total cholesterol	-0.01 (0.86)
HDL cholesterol	-0.17 (0.03)
LDL cholesterol	-0.04 (0.60)
Triglycerides	0.15 (0.05)
HOMA-IR*	0.30 (<0.001)
Cholesterol efflux capacity	-0.15 (0.06)
Coronary artery plaque burden, mm²	
Non-calcified coronary burden	0.27 (<0.001)

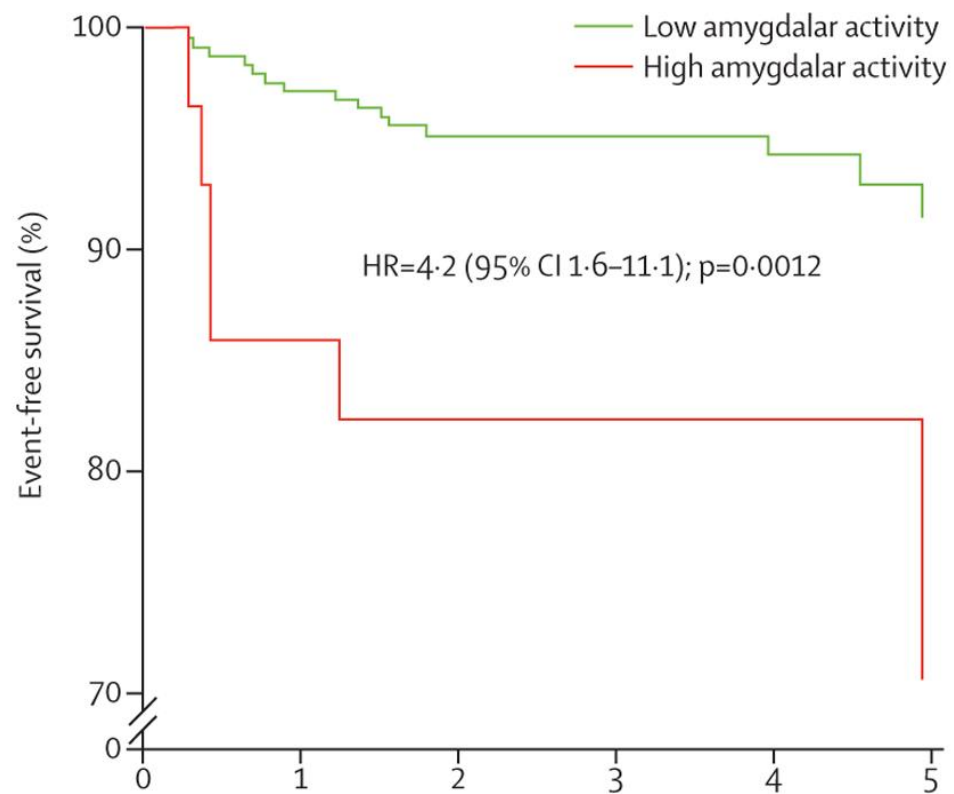
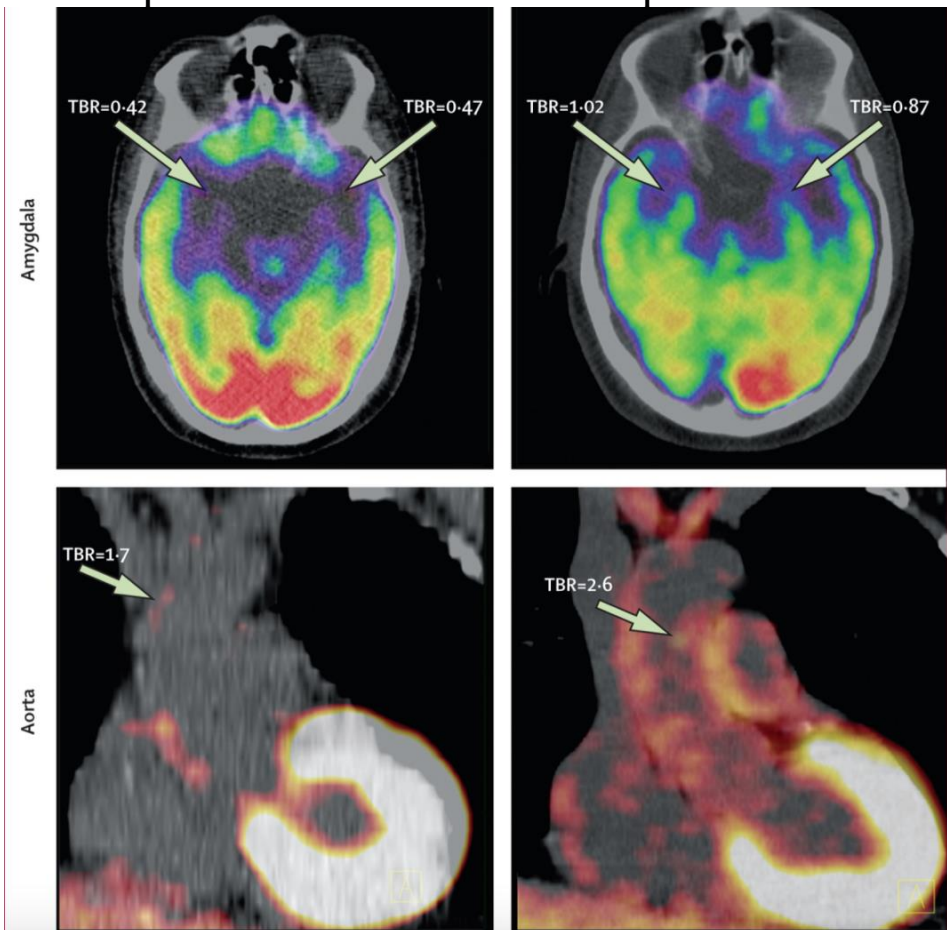
Two practical examples: 2. Amygdala and CV events

293 patients (median age 55 years), 22 of whom had a CVD event

Median follow-up of 3.7 years

Low AmygA & No
Subsequent CV disease

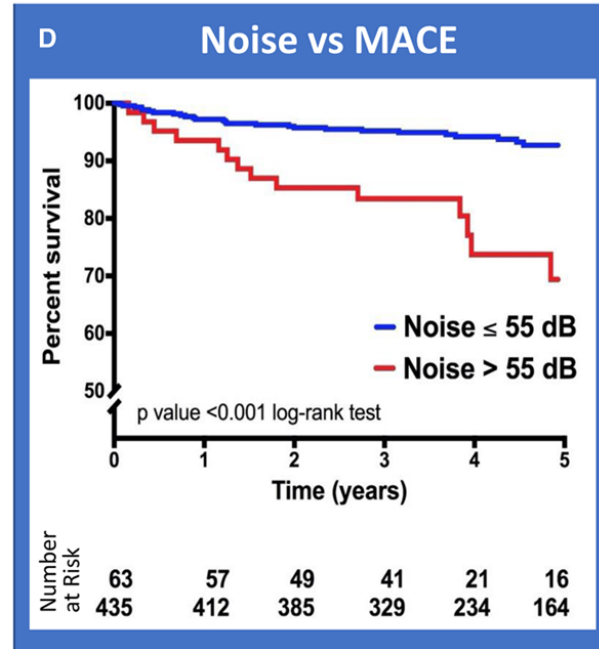
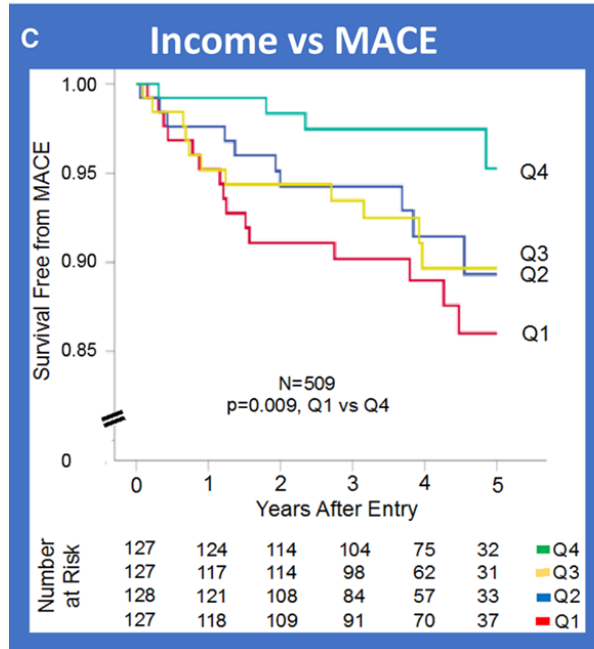
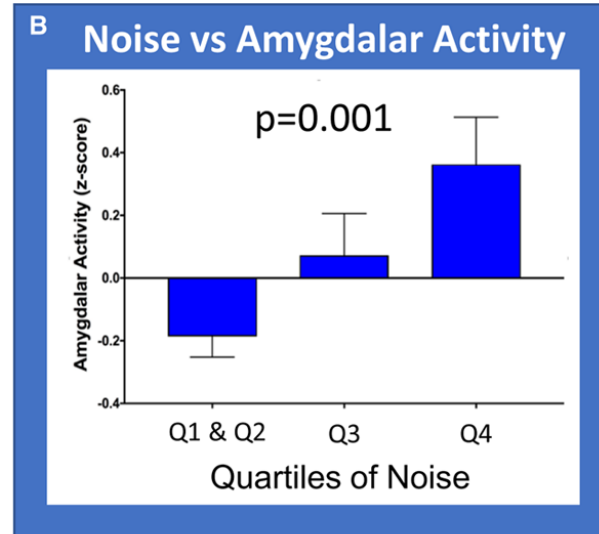
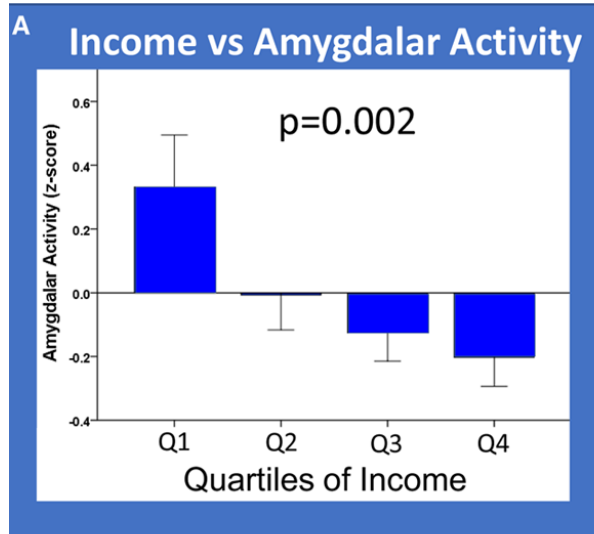
High AmygA &
Subsequent CV disease



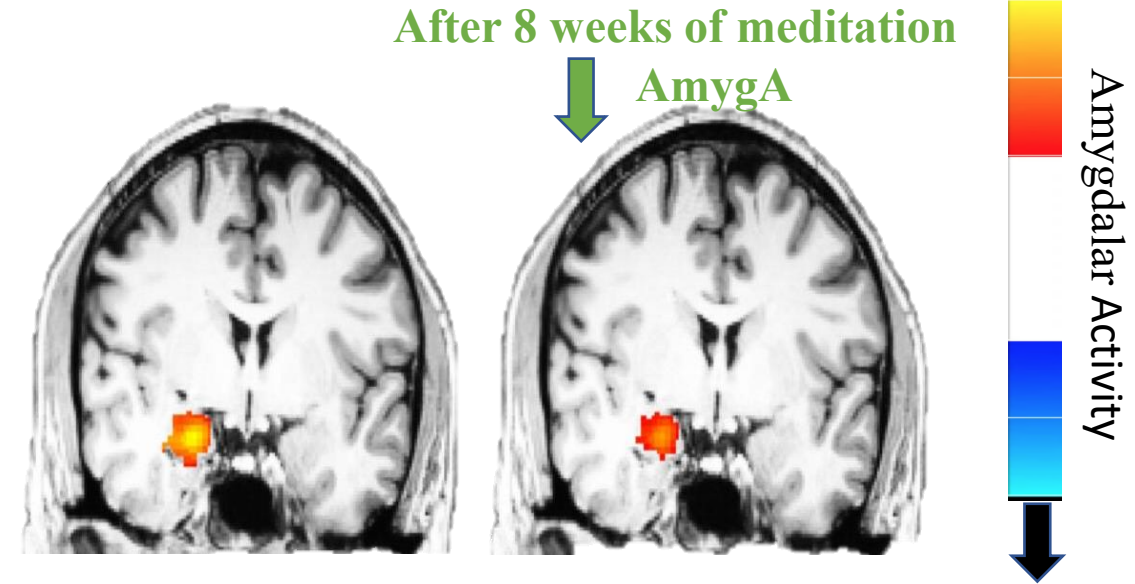
Number at risk

Low activity	263	246	224	183	102	64
High activity	29	24	23	18	13	6

Social and Environmental Stressors and Implications



Mindfulness has been shown to decrease AmygA



- **Mindfulness and stress reduction interventions may reduce risk of CV events**
- **Air pollution, noise and low income have been associated with CV events**
 - **Social interventions in underserved communities may improve heart health**