# Secondary prevention medications for CVD in 628 communities from 17 high, middle and low income countries

The Prospective Urban Rural Epidemiologic (PURE) study

Salim Yusuf on behalf of the PURE investigators

# Duality of Interests

None to declare with regards this presentation

# Background

- Antiplatelet drugs, betablockers, ACE-I/ARBs and statins reduce MI, stroke and death in CHD; and these interventions and  BP lowering reduces stroke after a cerbro-vascular event.

- Most studies regarding the use of these drugs are hospital based or among patients followed by physicians, but not from the ***community***.

- Little information from low and middle income countries, where >80% of global CVD occurs.

# Aims

- To document the rates of use of proven secondary prevention medications in the ***community*** in high, mid and low income countries.

- To describe the variations in drug use by societal ( economic level of countries and urban vs rural) and individual ( gender, age, SES, other conditions) factors.

# Design of PURE

- Unbiased *population sample* from 628 urban and rural communities in 17 countries involving >390,000 people (154,000 are >35 to 70 yrs; surveyed in 2003-2010.

- Documentation of the characteristics of the community, the household and individual (lifestyles, conditions, and drug use).

- Long term follow-up ongoing.

# Countries in PURE
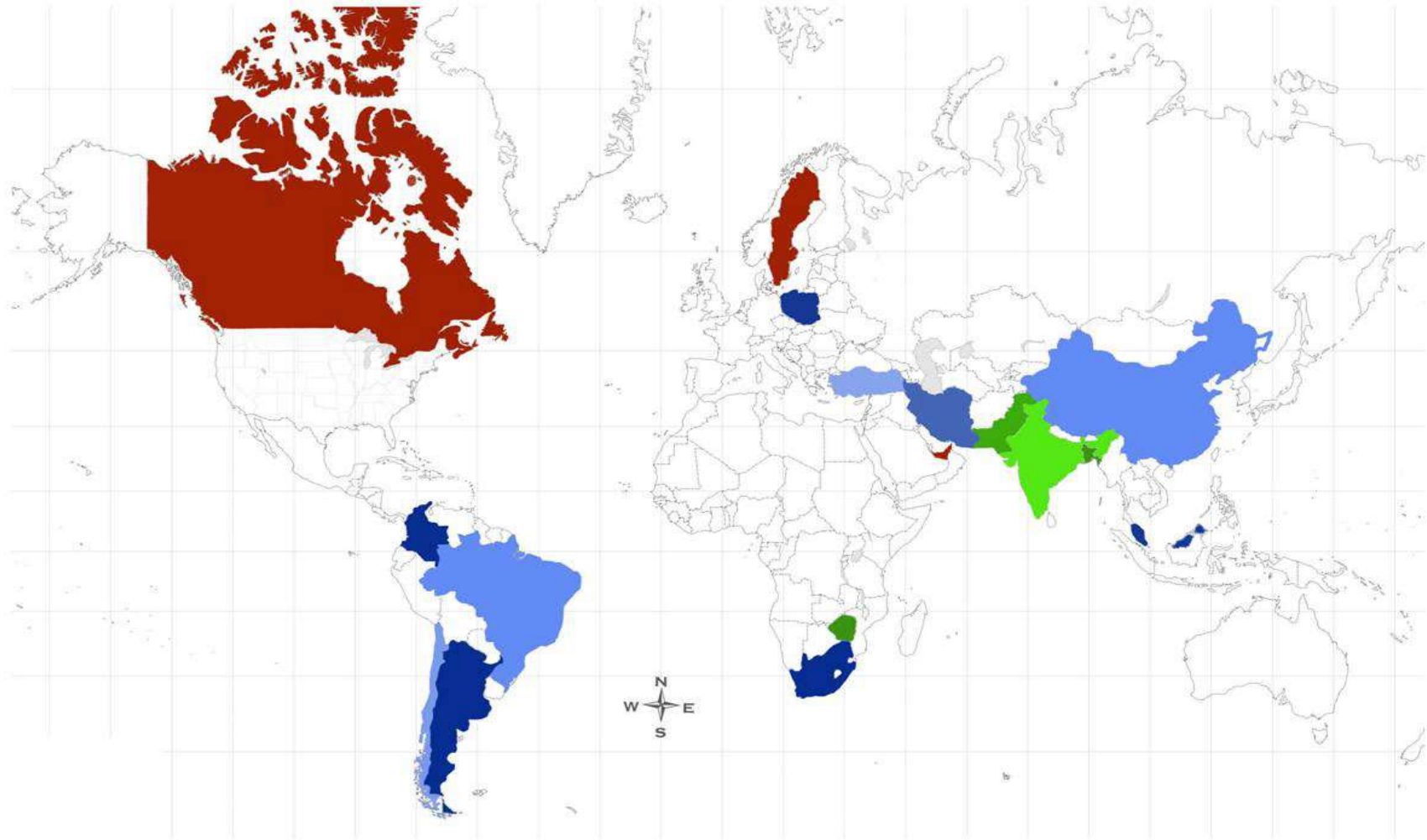


High Income Countries | Middle Income Countries | Low Income Countries

# Classification of countries

Based on World Bank classifications at the beginning of the study( 2003 – 2007):

**HIC**: Canada,Sweden & UAE.

- **UMIC**: Argentina,Brasil,Chile,Poland,Turkey, S Africa,Malaysia.

- **LMIC**: Colombia,Iran,China .

- **LIC**: India,Bangladesh,Pakistan,Zimbabwe.

# Key Characteristics of Eligible vs Enrolled

|  | Eligible | Enrolled |
| --- | --- | --- |
| No. | 197,332 | 153,662 |
| Mean age (years) | 50.2 | 50.7 |
| % Females | 53.0 | 55.6 |
| % Current Smokers | 22.1 | 21.2 |
| % Low education | 41.7 | 42.3 |
| % H/O Hypertension | 13.3 | 14.7 |
| % H/O Diabetes | 5.2 | 5.3 |
| % H/O Stroke | 1.2 | 1.3 |
| % H/O CHD | 3.5 | 3.9 |
| % H/O Cancer | 1.3 | 1.2 |

# Use of Key Drugs in the Overall Study among those with CHD vs Stroke

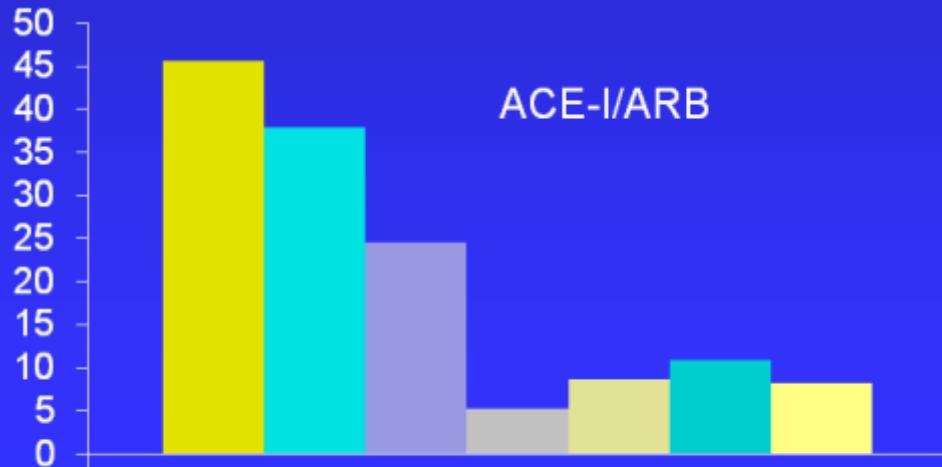|  | CHD | Stroke |
|---|---|---|
| No. | 5650 | 2292 |
|  | % | |
| *Antiplatelets* | 25.8 | 24.3 |
| Beta-blockers | 20.4 | 9.4 |
| *ACE-I/ARB* | 20.0 | 18.6 |
| Diuretics | 13.6 | 15.2 |
| CCB | 13.3 | 14.4 |
| BP lowering | 43.0 | 40.0 |
| *Statins* | 16.7 | 9.0 |

# Drugs

Antiplatelet Agents

Beta Blockers
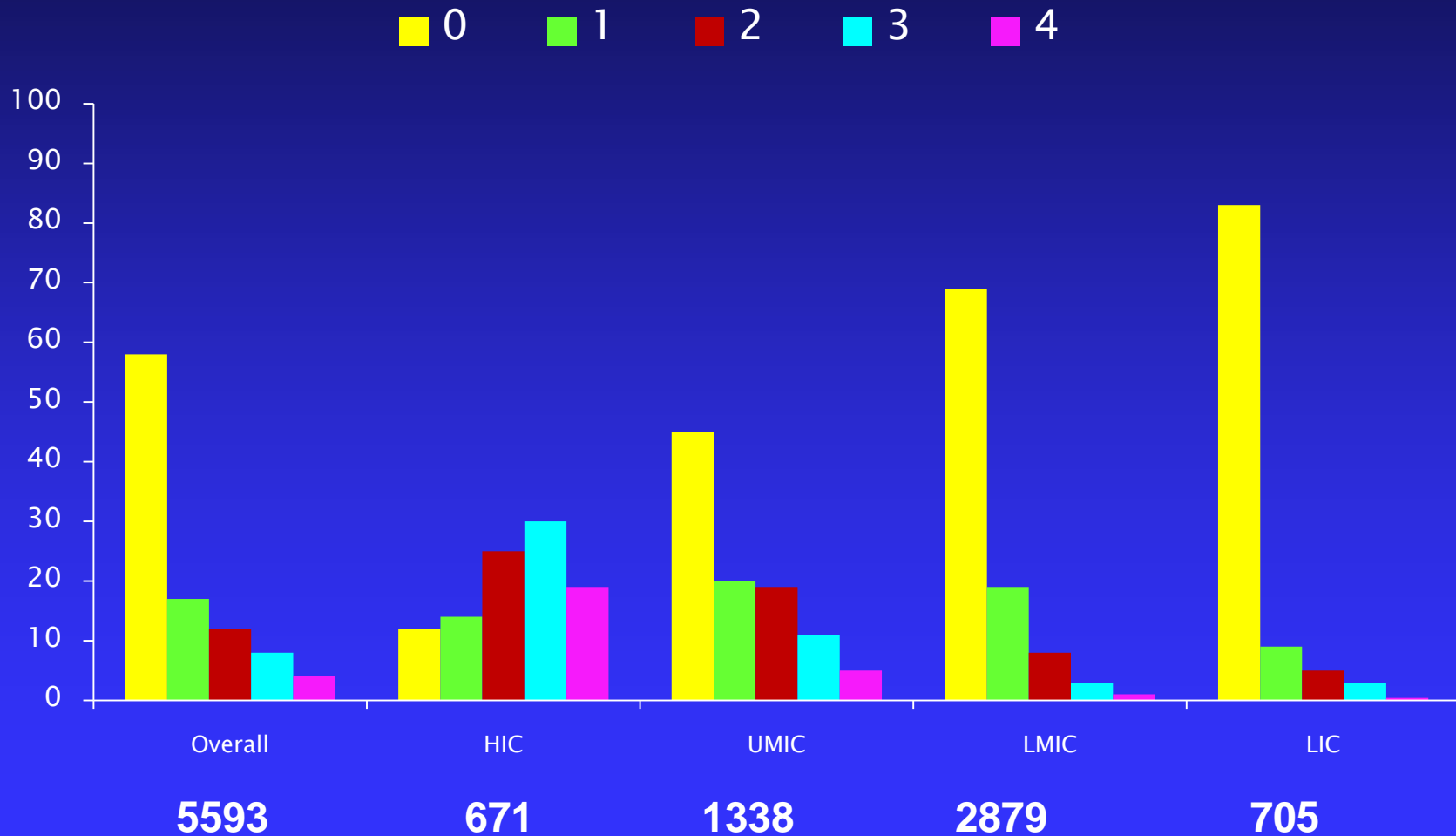
Urban

Rural
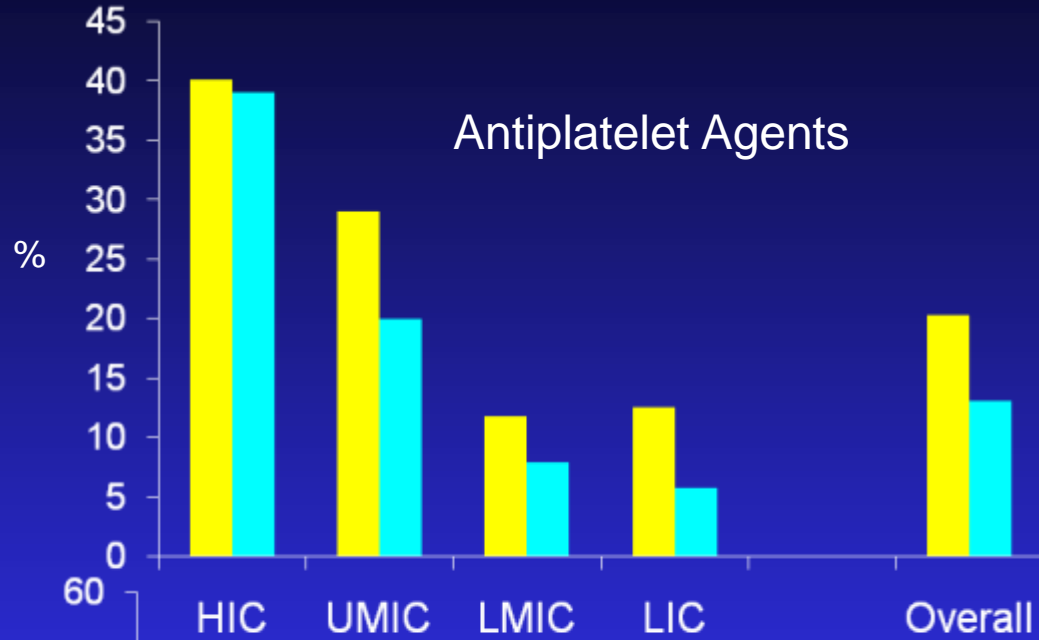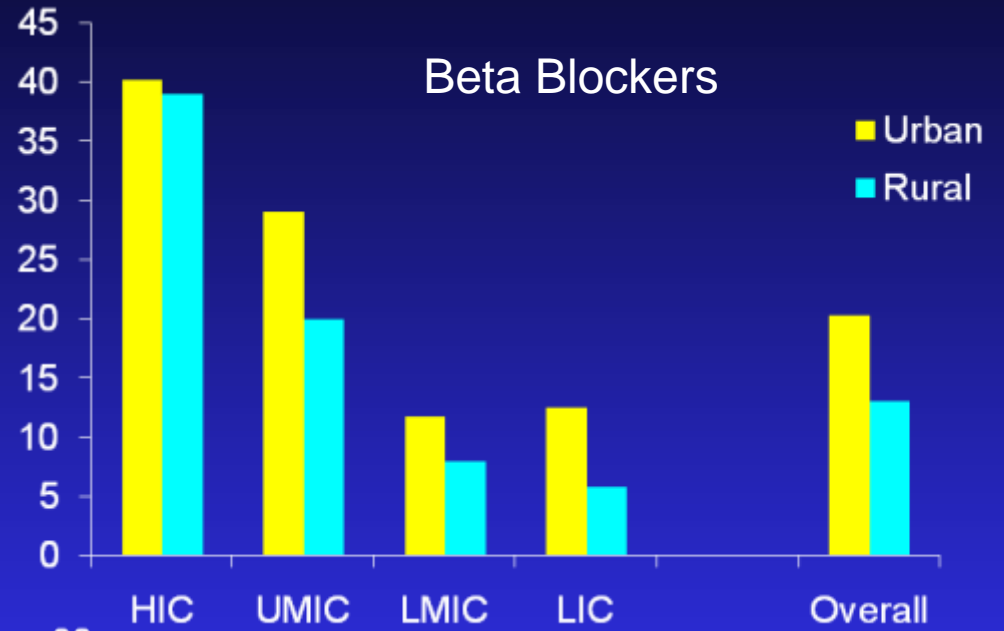
ACE Inhibitors or ARBs
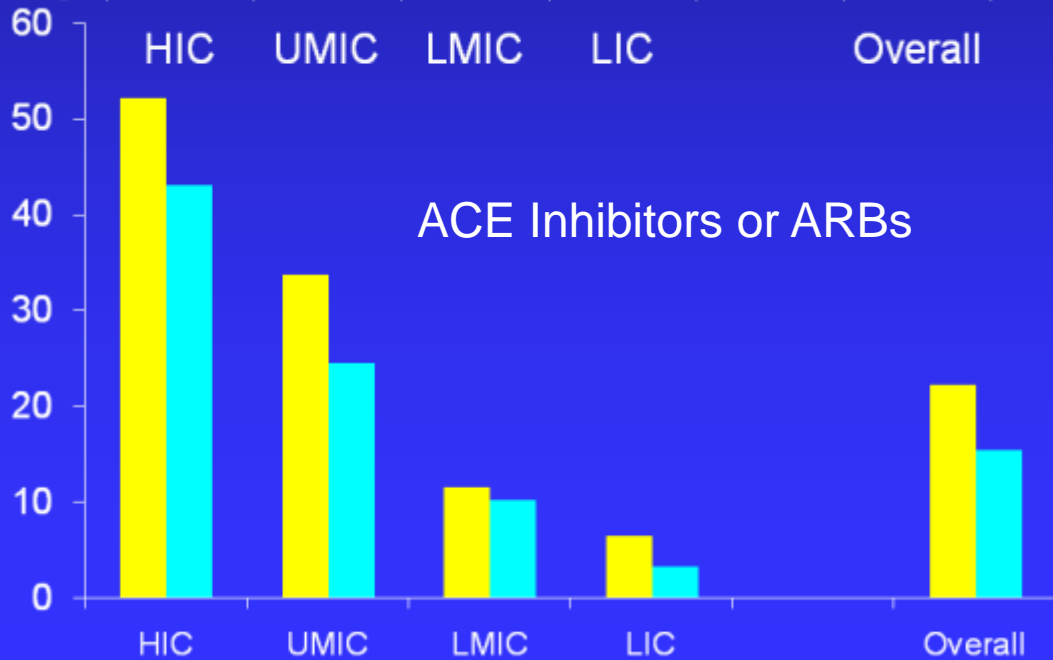
Statins
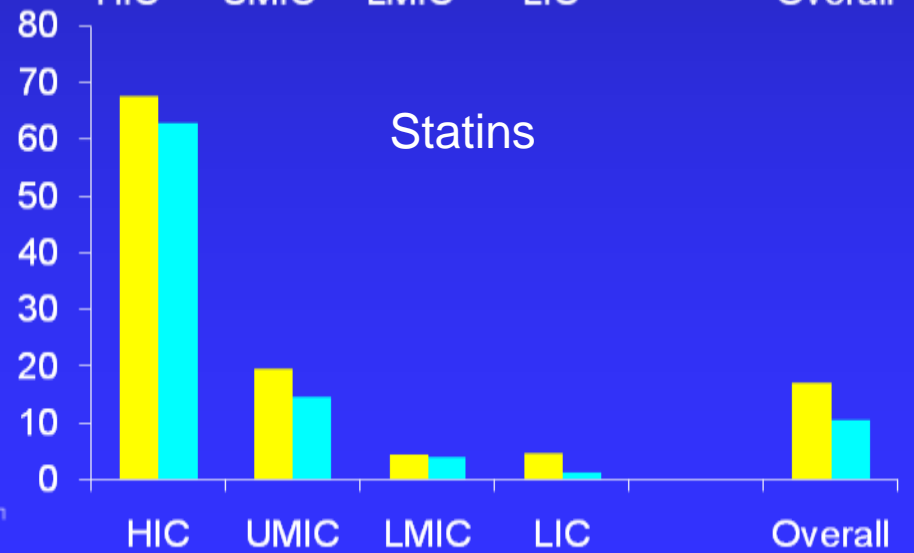
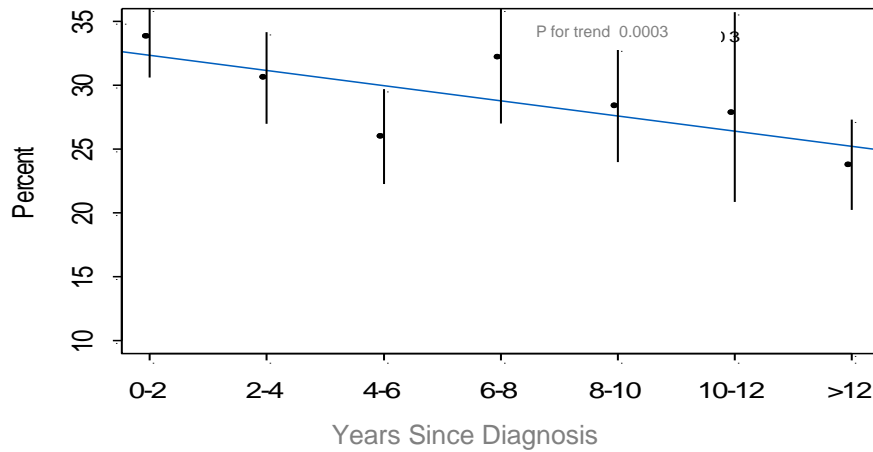# BP Lowering Drugs
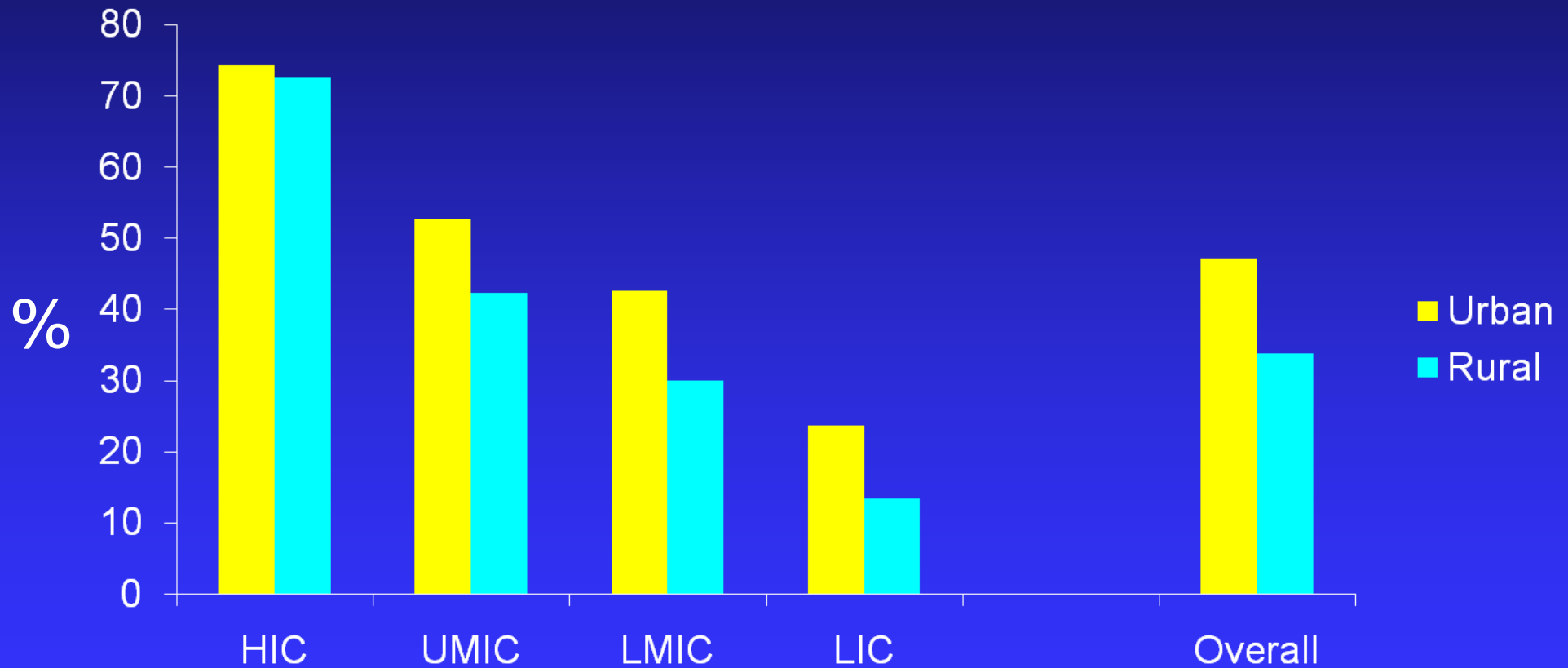
# Drugs by Regions
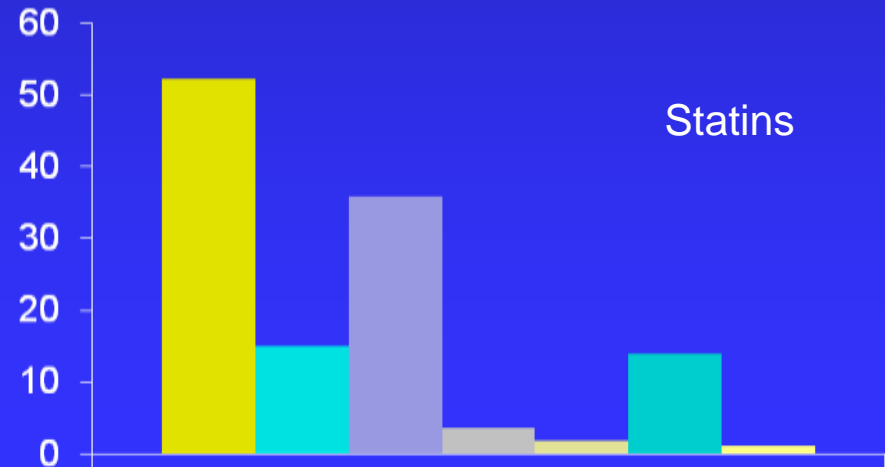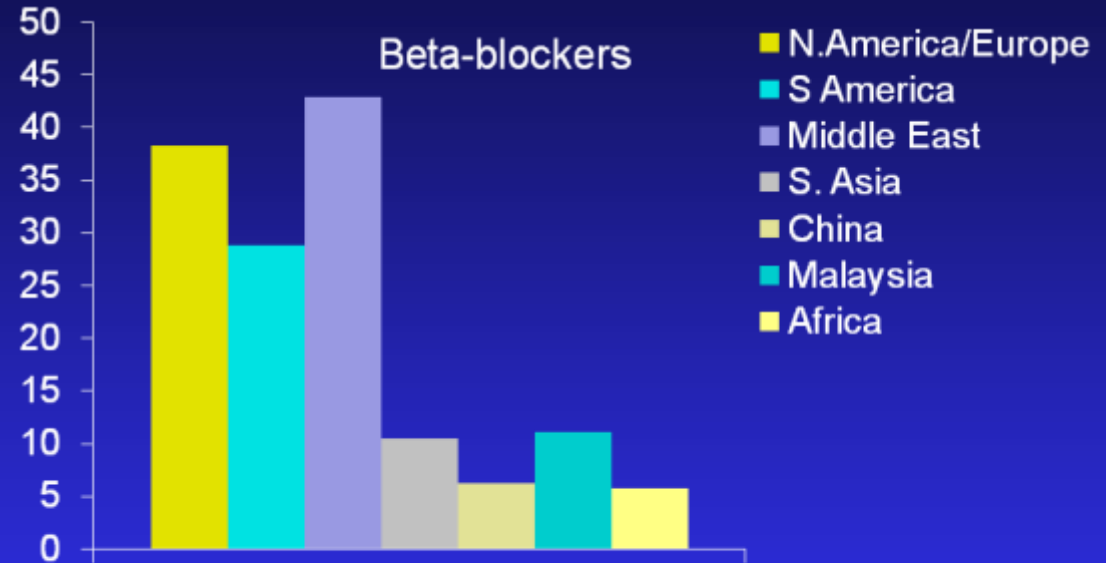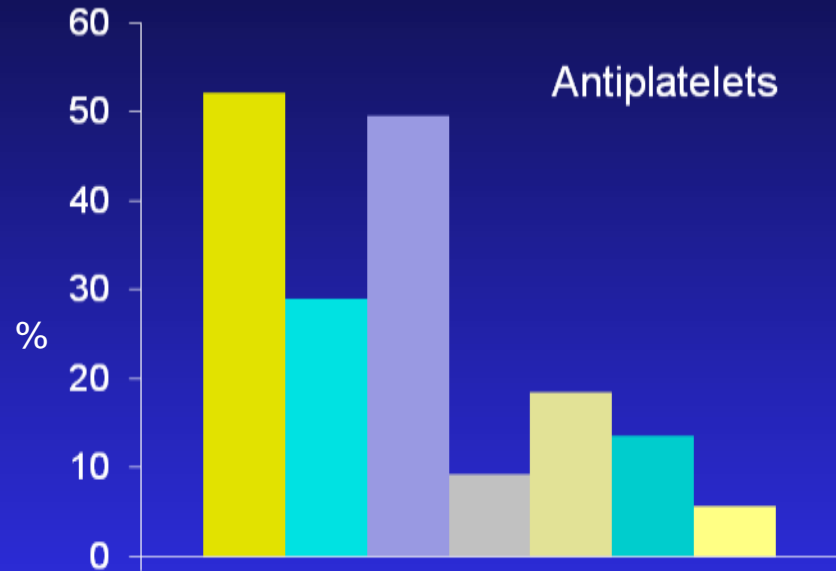
% receiving proven medications in CAD (154,000 people from 17 countries:PURE)

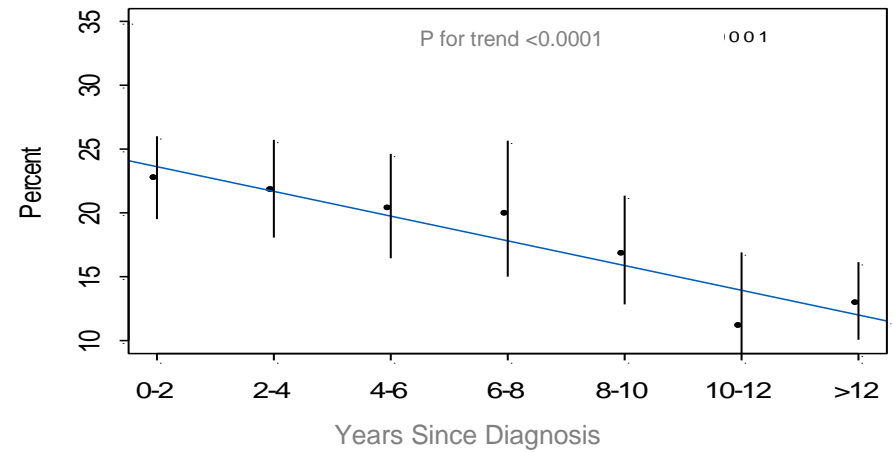# Medications by the Number of Years since Diagnosis
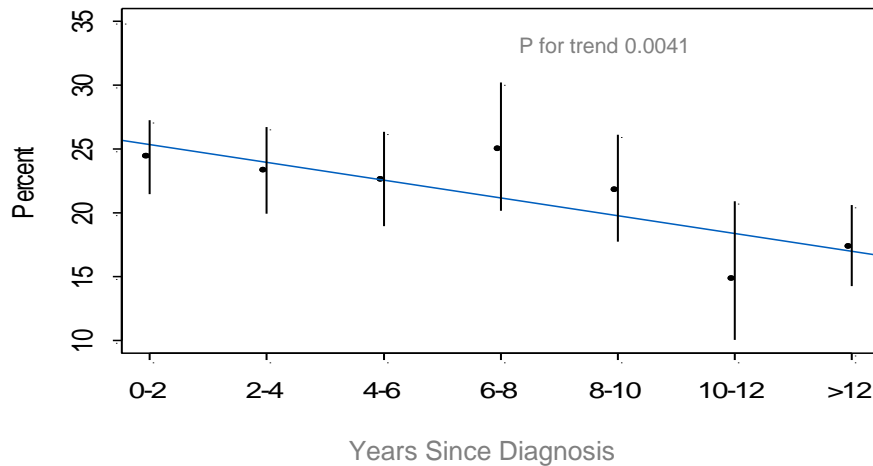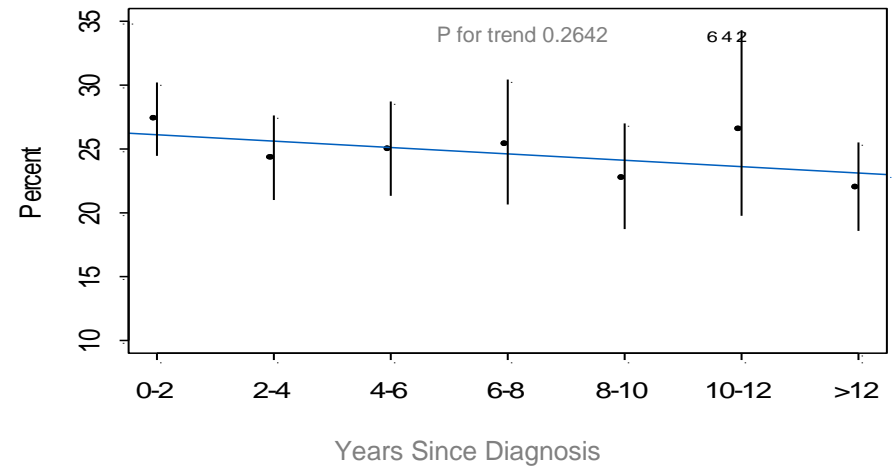


CHD: Antiplatelet — P for trend 0.0003

CHD: Statin — P for trend <0.0001

CHD: ACE-I/ARB — P for trend 0.0041

CHD: Beta Blocker — P for trend 0.2642

# Medication in those with CHD or Stroke* Age and Sex
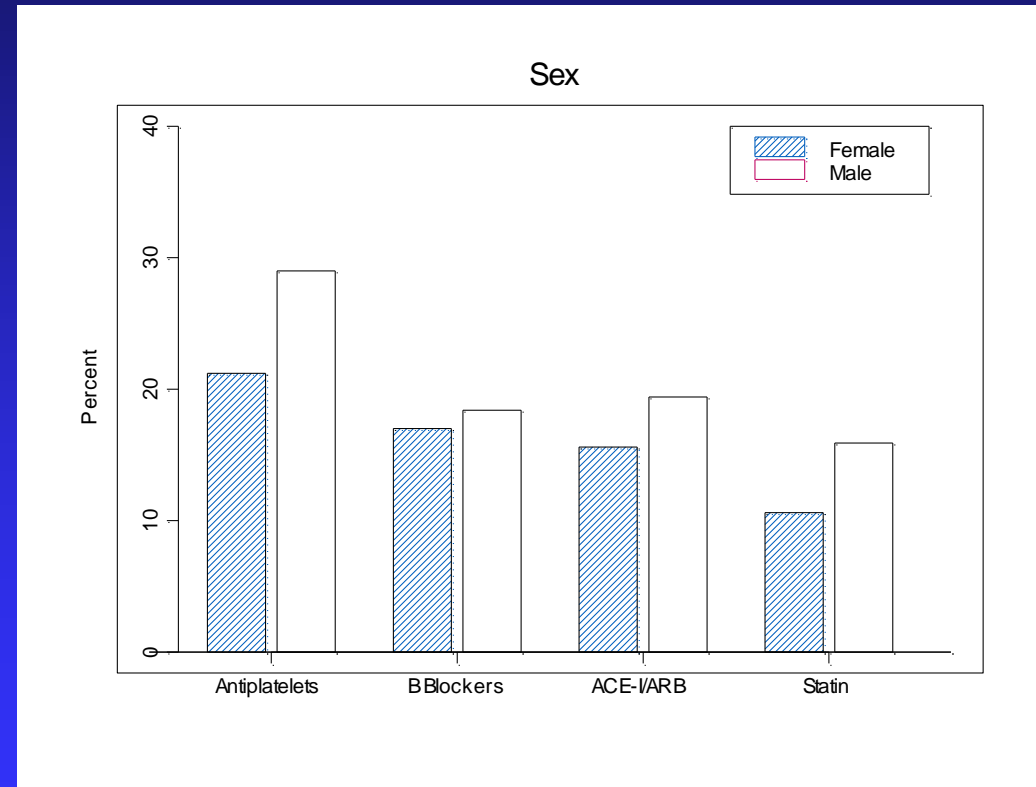


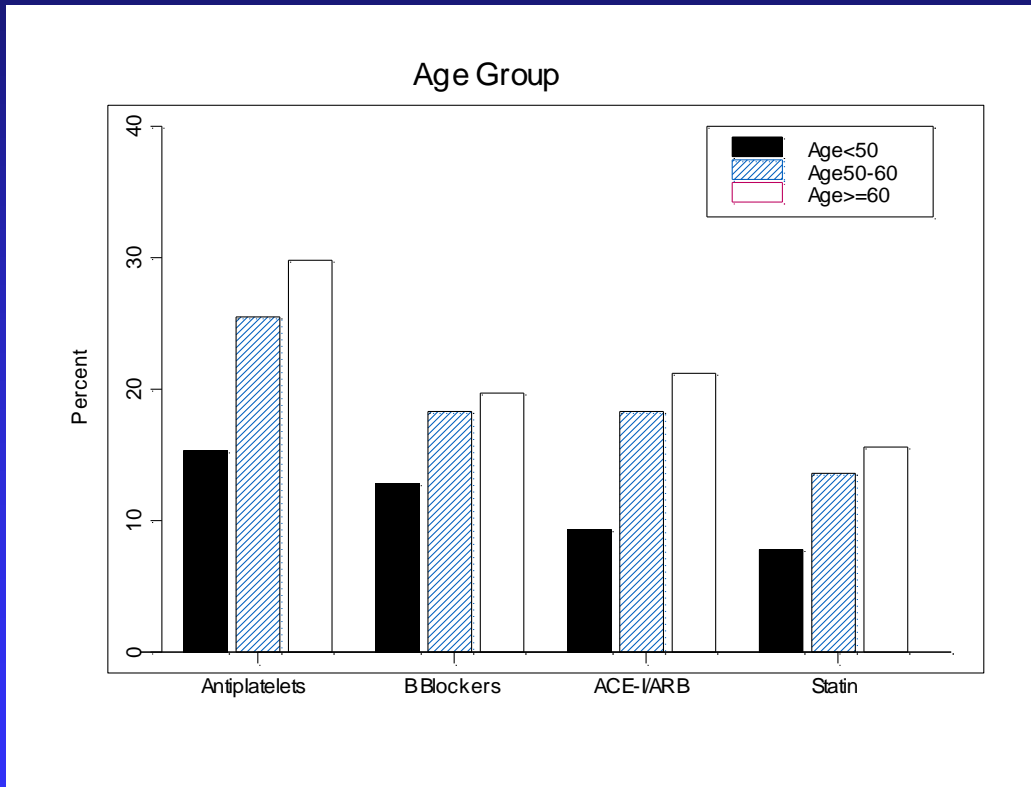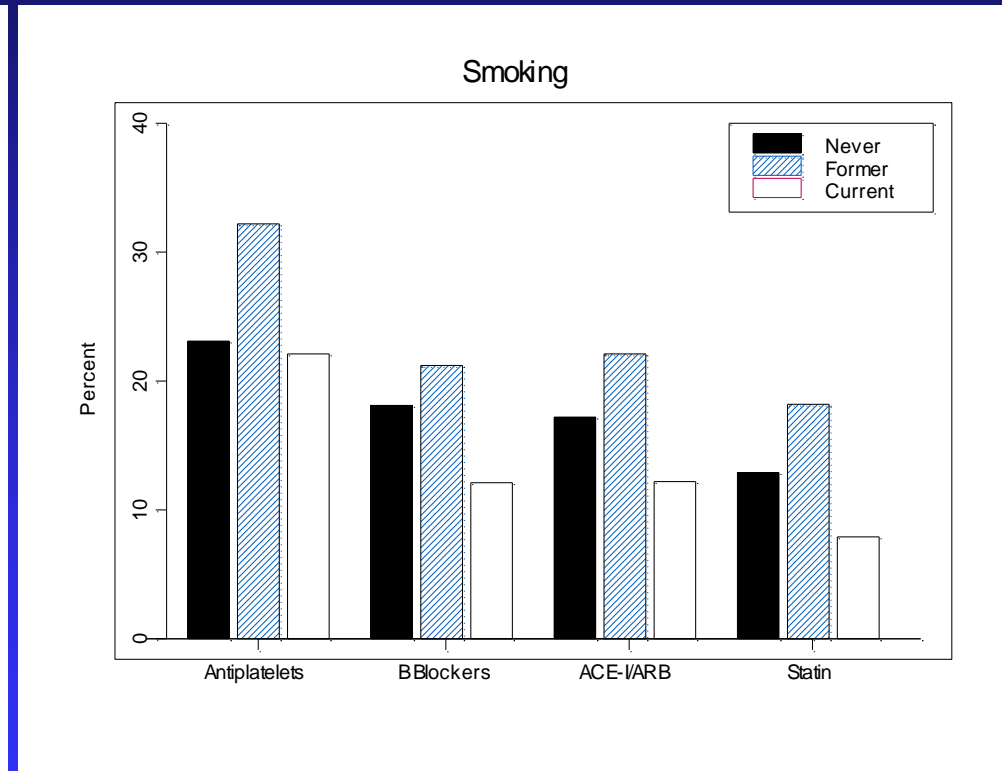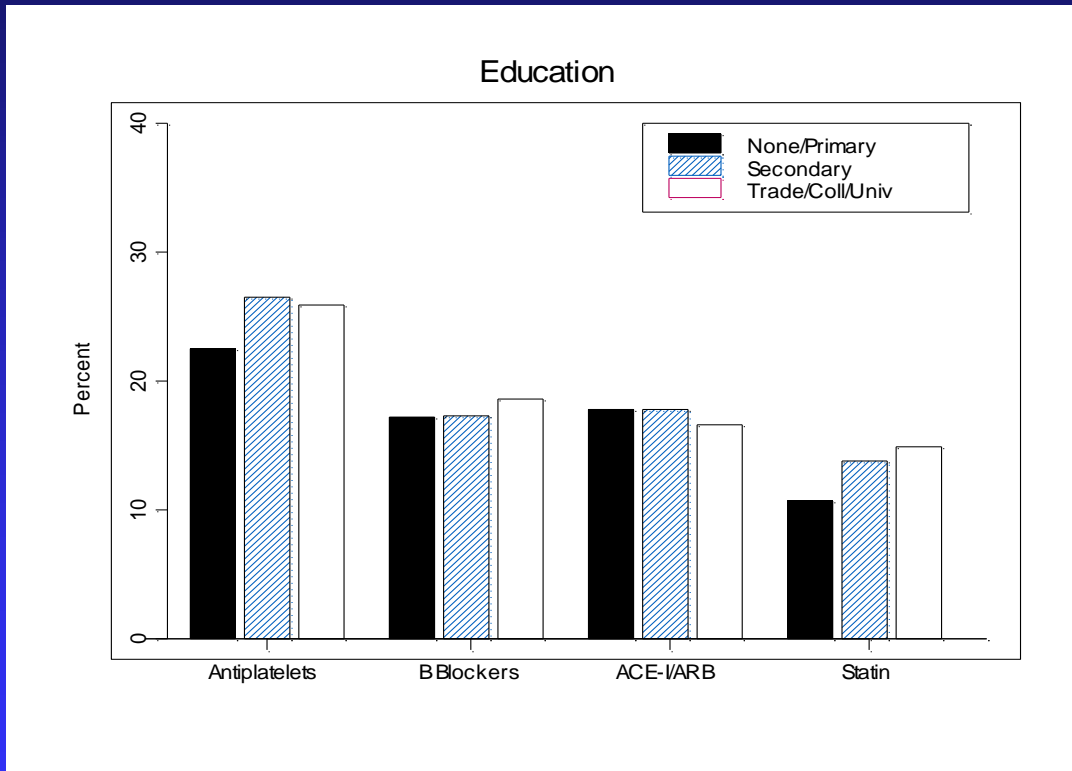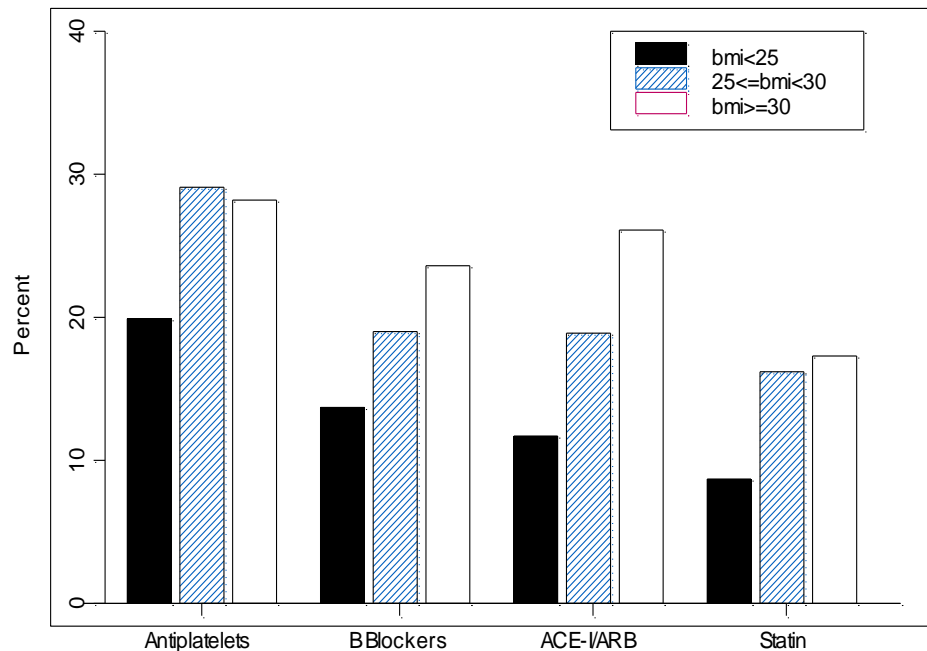*Age, sex, mutual adjustment

# Medication in those with CHD or Stroke Education & Smoking*
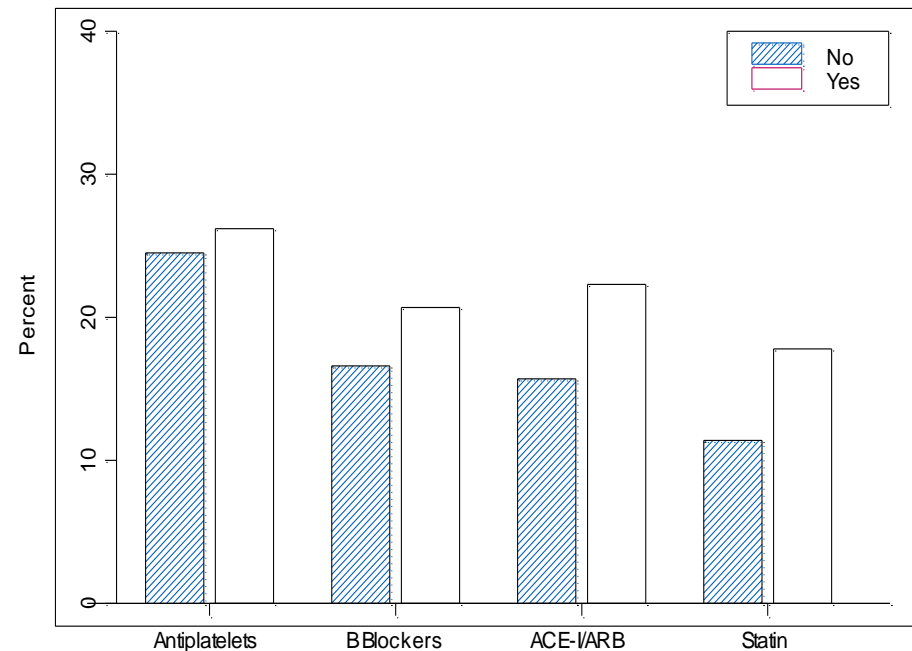


*Age, sex adjusted

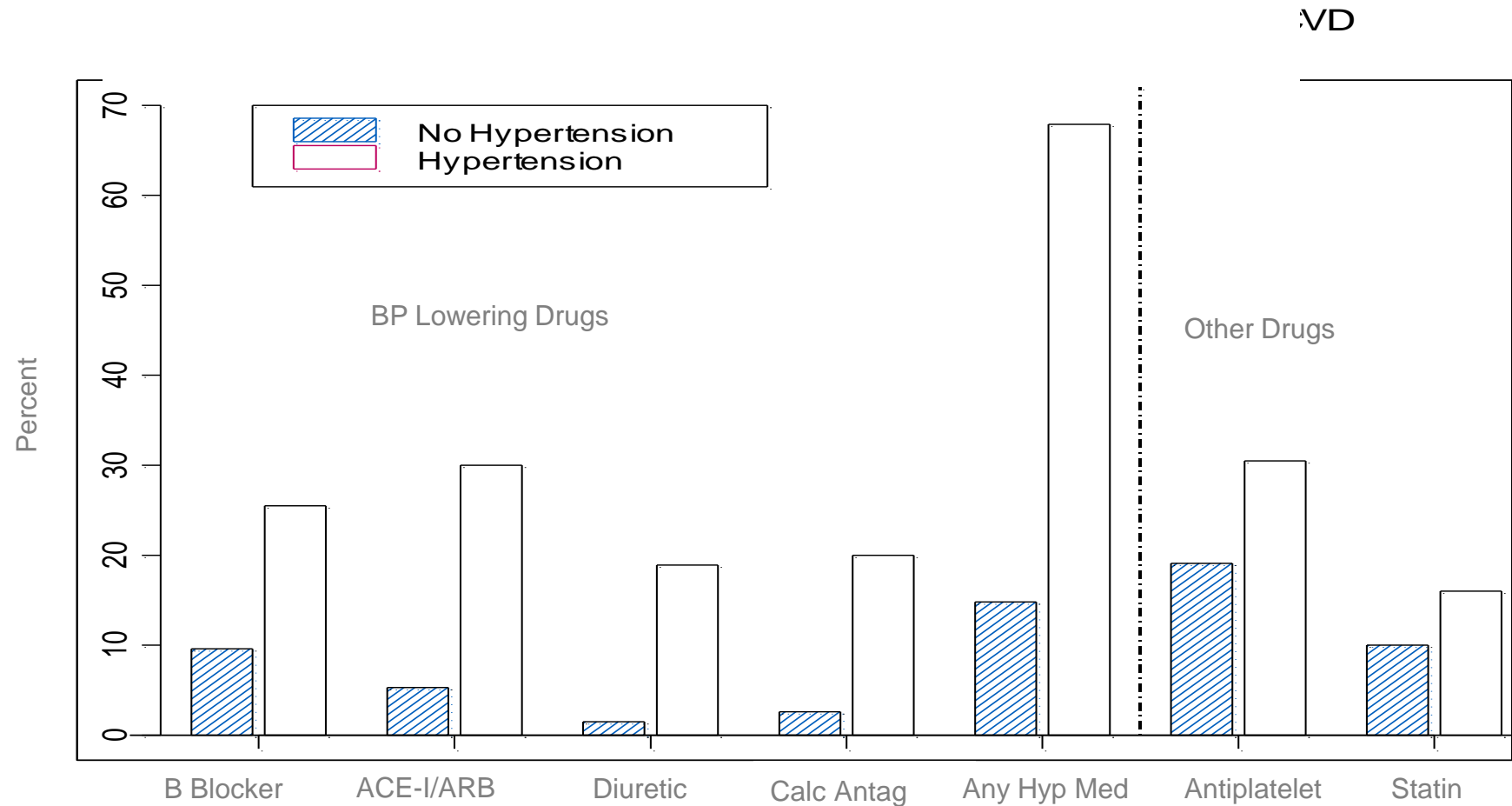# Medication in those with CHD or Stroke BMI and Diabetes*



*Age, sex adjusted

# Drug Use by Hypertension in people with CVD

# Per-Capita Health Expenditure vs Percentage the use of medications
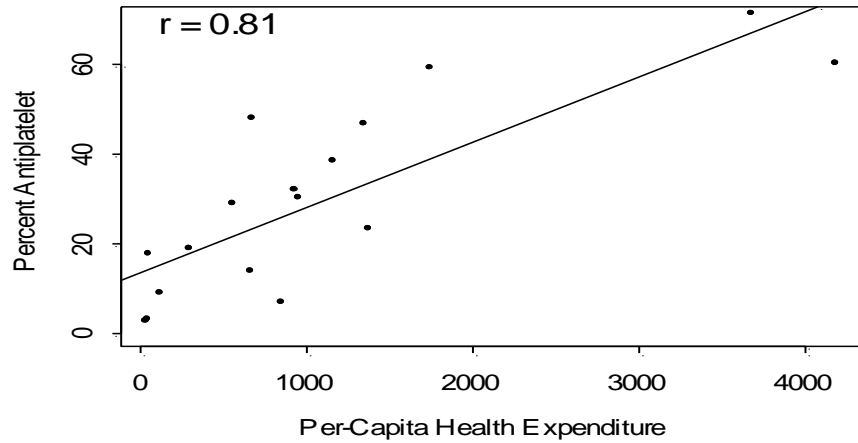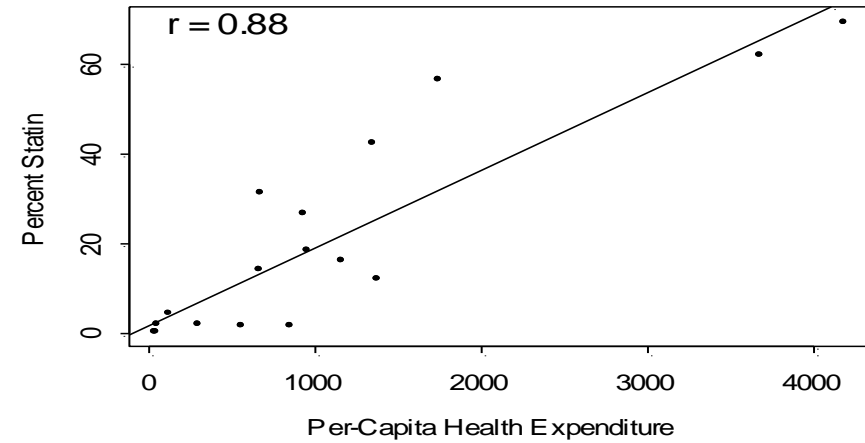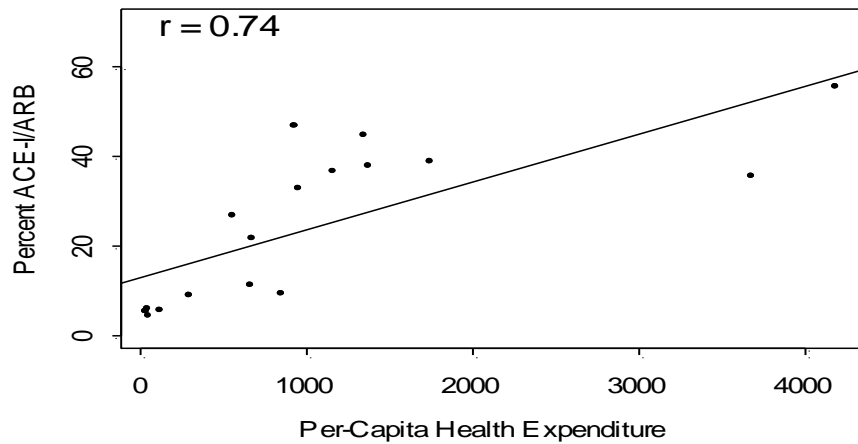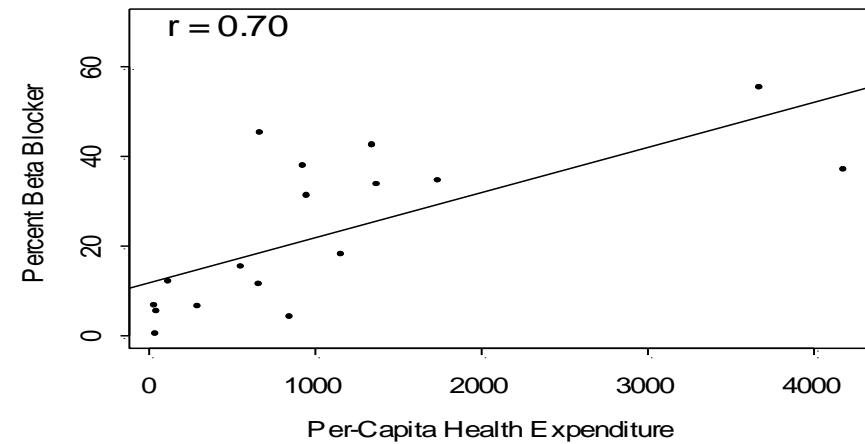
# Country (between country) & individual level (within country) variances

| Medication | Between Country Variance (%) | Within Country Variance (%) |
|---|---|---|
| Antiplatelet | 60.0 | 40.0 |
| Beta-blocker | 59.8 | 41.2 |
| ACE-I/ARB | 54.8 | 45.2 |
| Statin | 79.4 | 20.6 |
| Any one of the above | 68.4 | 31.6 |

# Conclusions

- Substantial underutilization of proven, inexpensive secondary prevention medications in the community worldwide, but the gap is worse in MIC & LIC.

- Less use of medications in rural compared to urban communities, especially in LIC and MIC, in young, females, less educated, smokers, non-obese,& non-DM individuals.

# Conclusions

- Marked differences in use of BB, ACE-I/ARB, diuretics & CCB in those with hypertension + CVD vs those without hypertension & CVD: *Do physicians treat risk factors rather than risk?*

- Inter-country variability twice as large as between subject variability: *national policies & structured health systems are more important.*

***The large global gap in use of proven, inexpensive and safe strategies that could be readily dealt with that can benefit millions of individuals each year.***

# Lancet, August 28, 2011

Use of secondary prevention drugs for cardiovascular disease in the community in high-income, middle-income, and low-income countries (the PURE Study): a prospective epidemiological survey

Salim Yusuf, Shofiqul Islam, Clara K Chow, Sumathy Rangarajan, Gilles Dagenais, Rafael Diaz, Rajeev Gupta, Roya Kelishadi, Romaina Iqbal, Alvaro Avezum, Annamarie Kruger, Raman Kutty, Fernando Lanas, Liu Lisheng, Li Wei, Patricio Lopez-Jaramillo, Aytekin Oguz, Omar Rahman, Hany Swidan, Khalid Yusoff, Witold Zatonski, Annika Rosengren, Koon K Teo, on behalf of the Prospective Urban Rural Epidemiology (PURE) Study Investigators