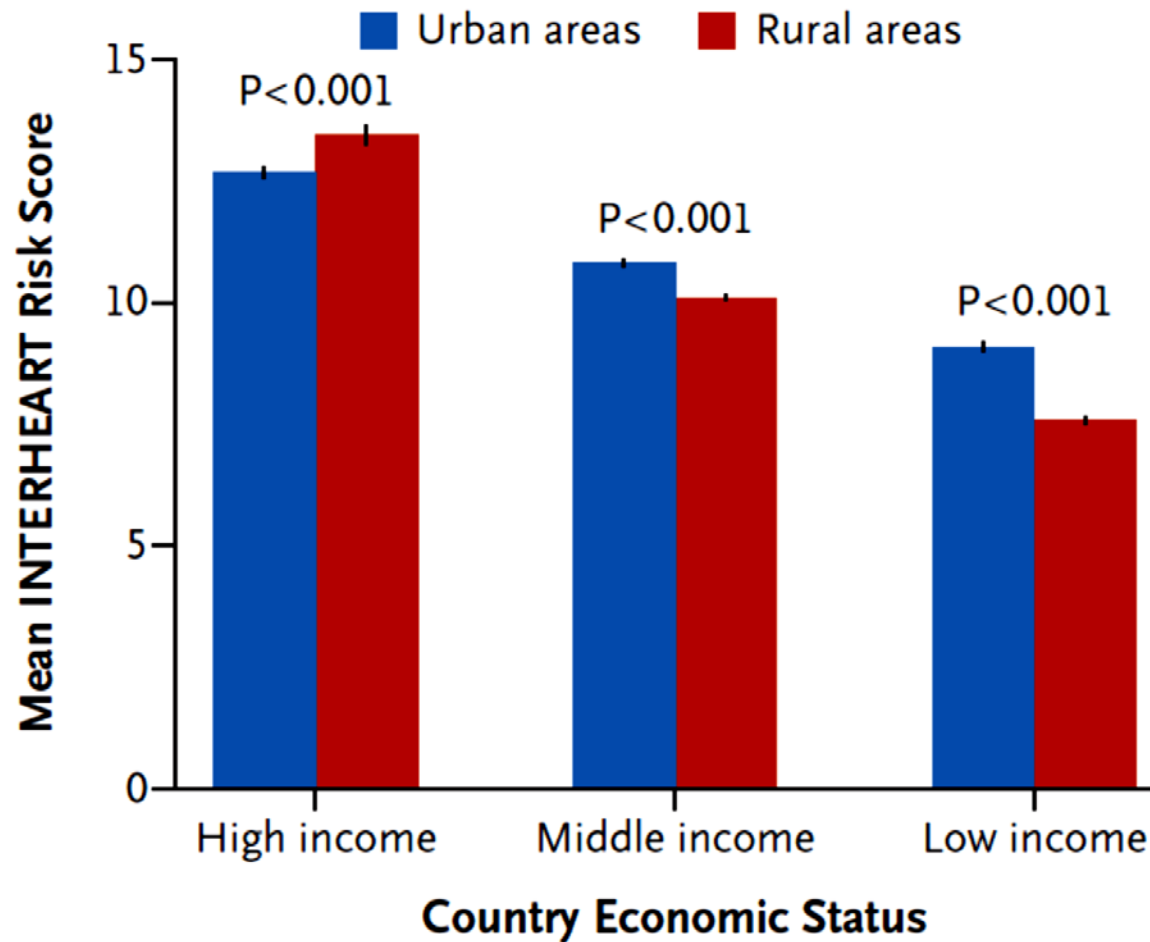
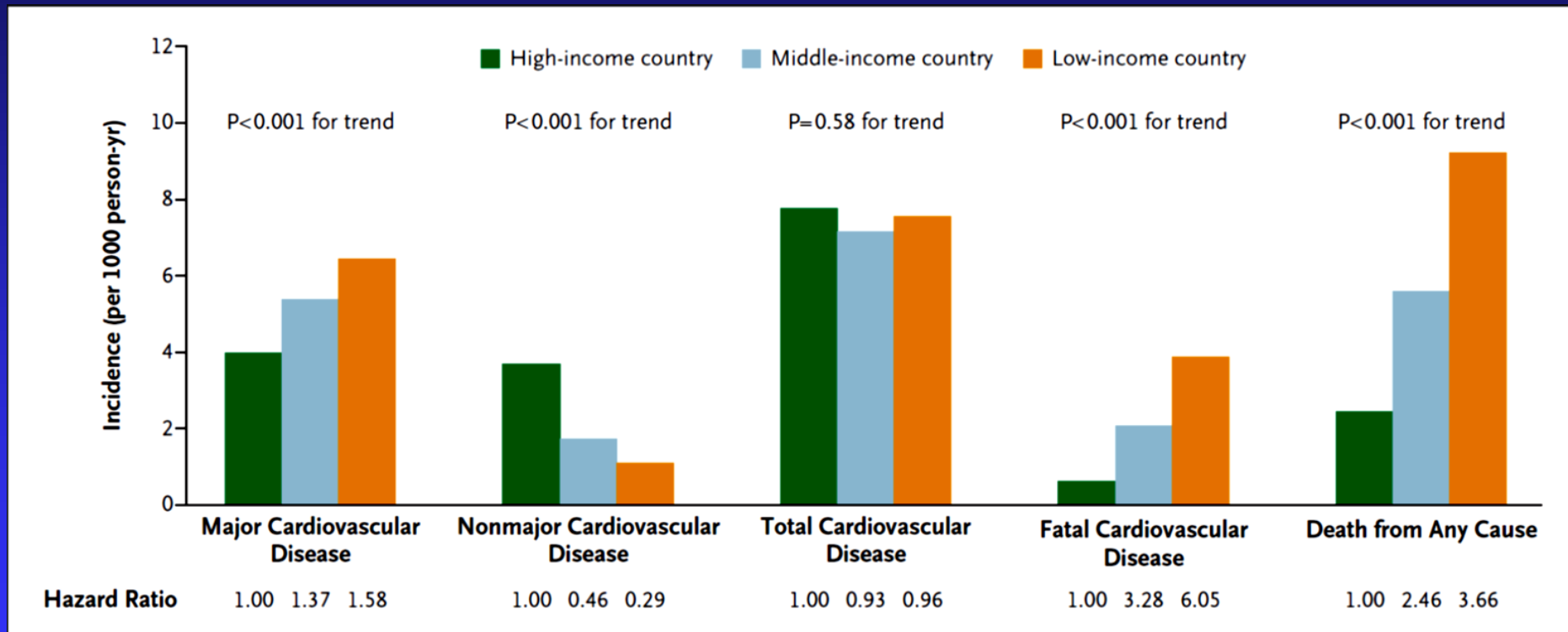


# Mean INTERHEART Risk Score (IHRS)



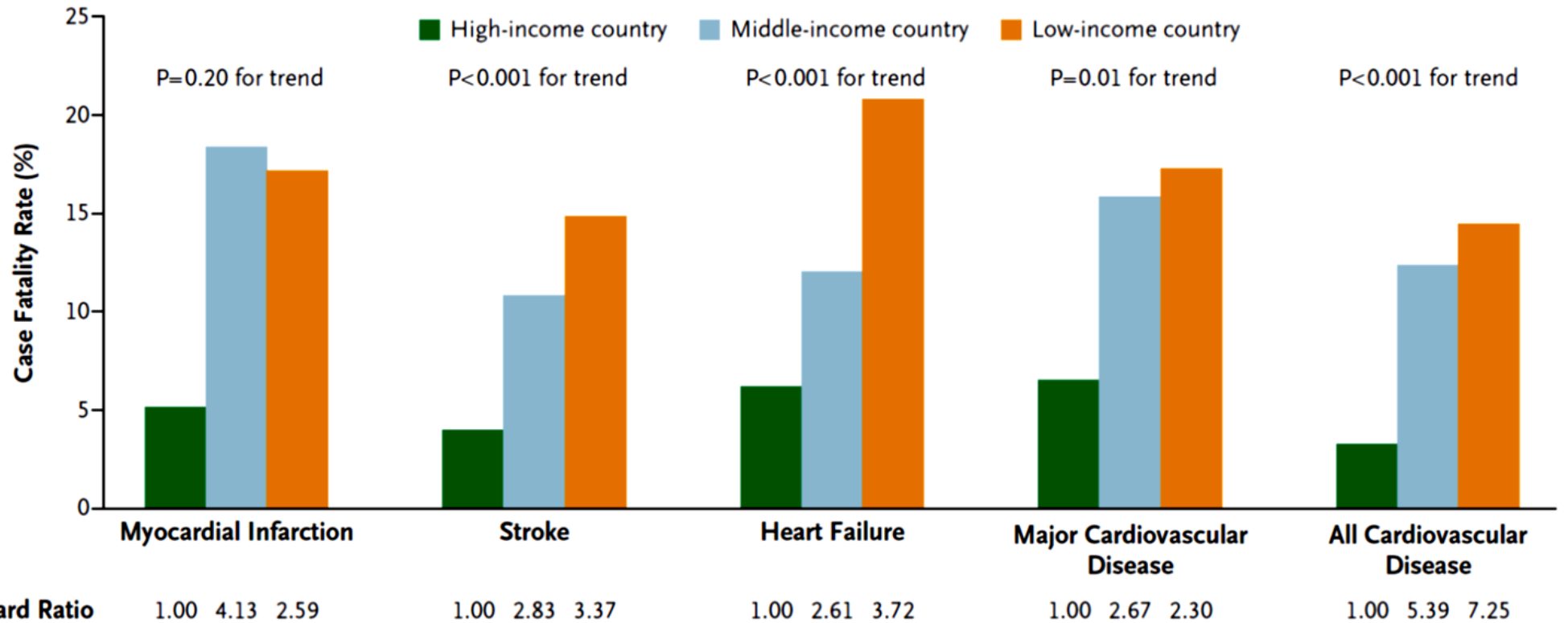
# CVD Event Rates



Major CVD = death from CV causes, stroke, MI and HF

Non major CVD = all other CVD events that led to hospitalization

# Annualized Case Fatality Rates after Specific CV Events



# Management of Total CVD Risk

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Resource sensitive management of:

1. Acute CVD events
2. Secondary Prevention
3. Primary Prevention

# Resource Sensitive Management of Acute CVD: Cardiac Events

## 1. Acute Coronary Syndromes:

### a) Organization of care

- Early recognition of ACS

- By Patient

- Rapid transportation to centers with appropriate facilities

- ECG & biomarkers

- CCUs with monitoring, defibrillation & pacemakers

### b) Reperfusion pharmacotherapies (SK, tPA\*, tnK\*) or Primary PCI\*

### c) Antiplatelet drugs (ASA, clopidogrel), beta-blockers and ACE-inhibitors, nitrates, anti-thrombotics

### d) Morphine

# Resource Sensitive Management of Acute CVD: Cardiac Events

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## 2. Acute heart failure:

a) Organization of care: CCU/ICU

b) Investigations : CXR, Electrolytes, Echo\*

c) Treatments: Loop diuretics, other diuretics, ACE-inhibitors, beta-blockers, digoxin

## 3. Complete heart block & prolonged sinus pauses:

Pacemakers (temporary, VVI, re-used)

## 4. Defibrillators

# Resource Sensitive Management of Acute CVD: Acute Stroke

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1. Early recognition, rapid hospitalization
2. Neuroimaging\*
3. Admission to stroke units
4. Early reperfusion therapy\*, antiplatelet agents in ischemic strokes
5. Stroke rehabilitation

# Secondary Prevention after Vascular Events

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- a) Smoking cessation
- b) ↑Physical activity, “improved” diet
- c) ASA + clopidogrel, ACE-inhibitors, statins and beta-blockers
- d) Added BP lowering drugs
- e) Revascularization for 3VD + L main disease\*

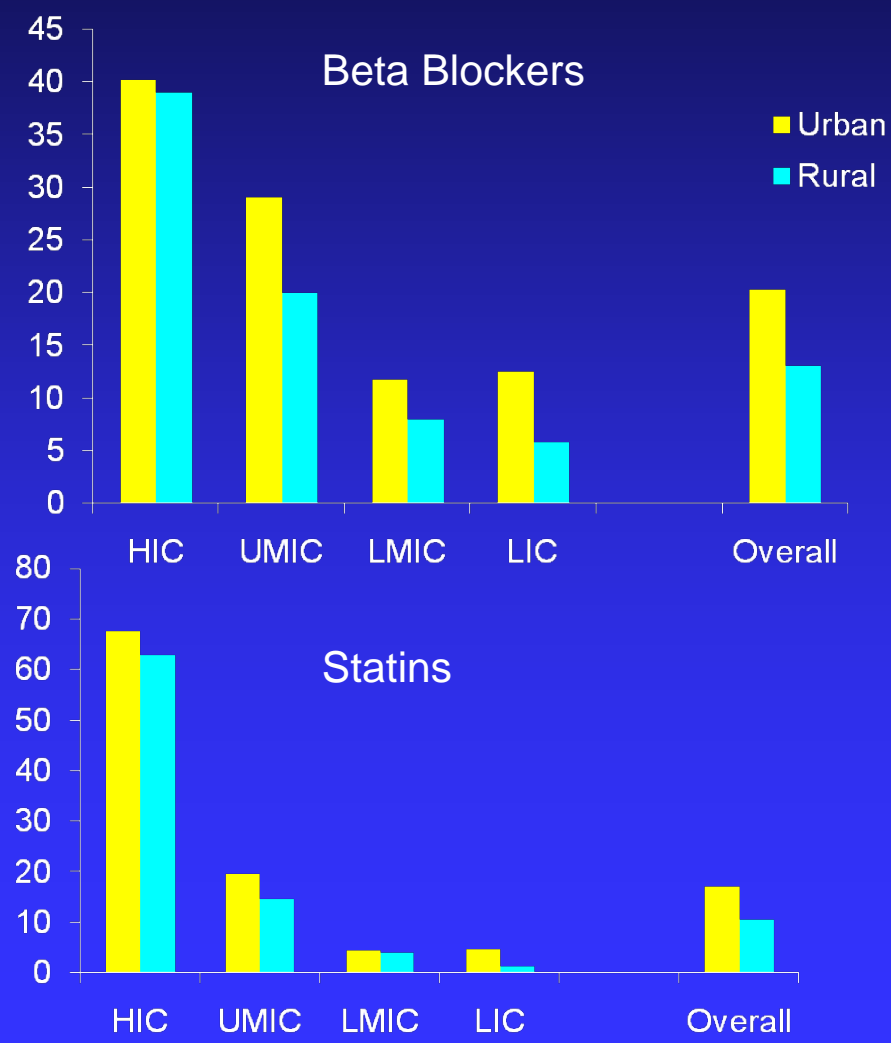
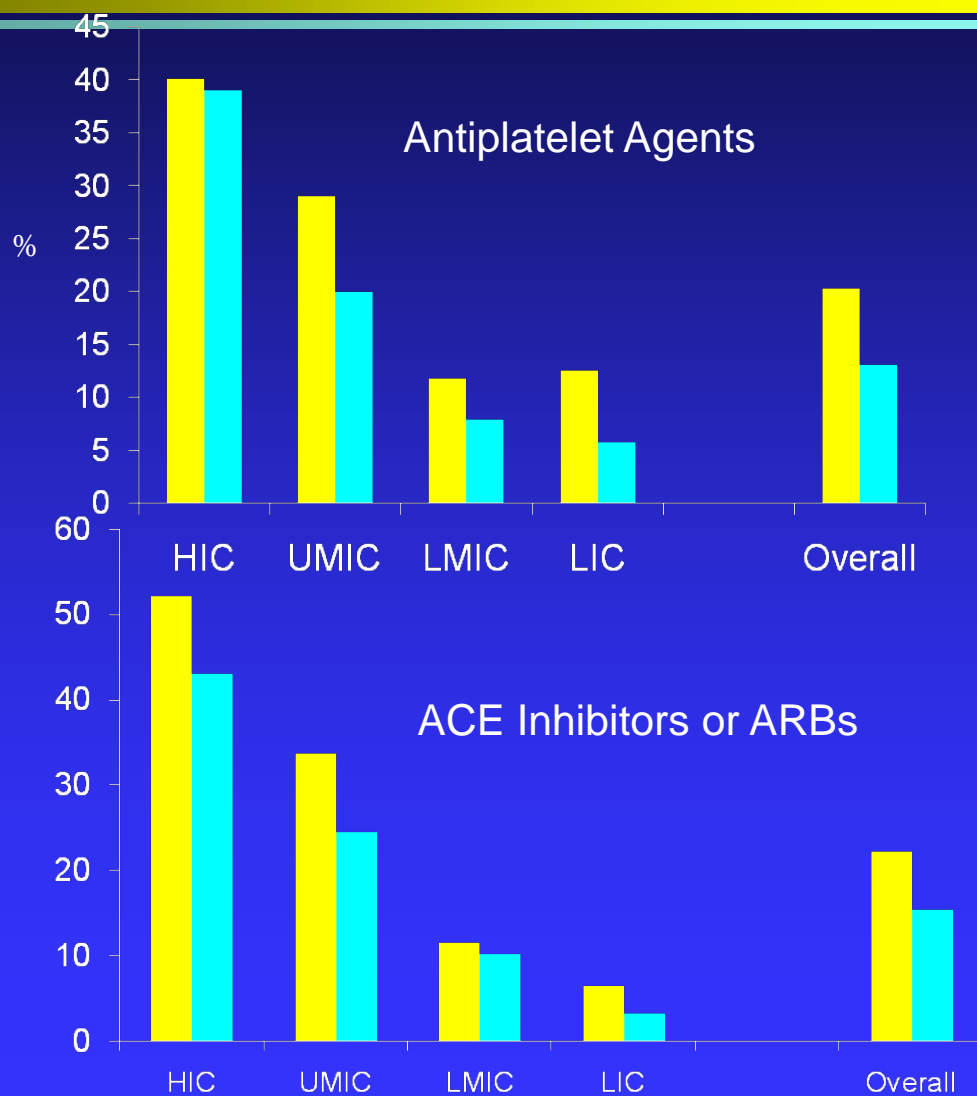


# Potential Cumulative Impact of 4 Simple Secondary Prevention Treatments

	RRR	Event rate
None		8%
ASA	25%	6%
$\beta$ -Blockers	25%	4.5%
Lipid lowering	30%	3.0%
ACE-inhibitors	25%	2.3%

CUMULATIVE BENEFITS ARE LIKELY TO BE IN EXCESS OF  
75% RRR, WHICH IS SUBSTANTIAL

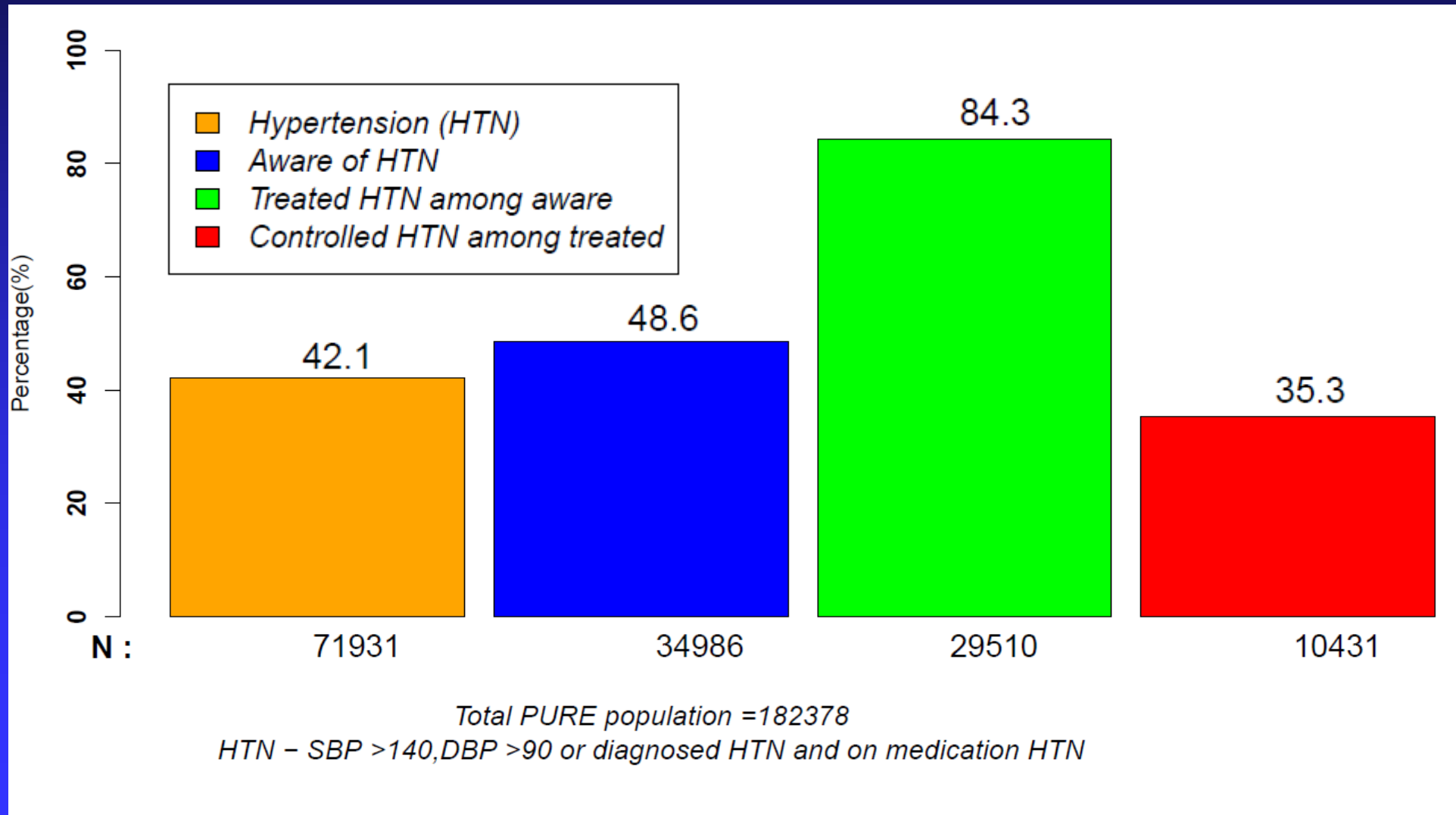
# Proven Drugs in Secondary Prevention



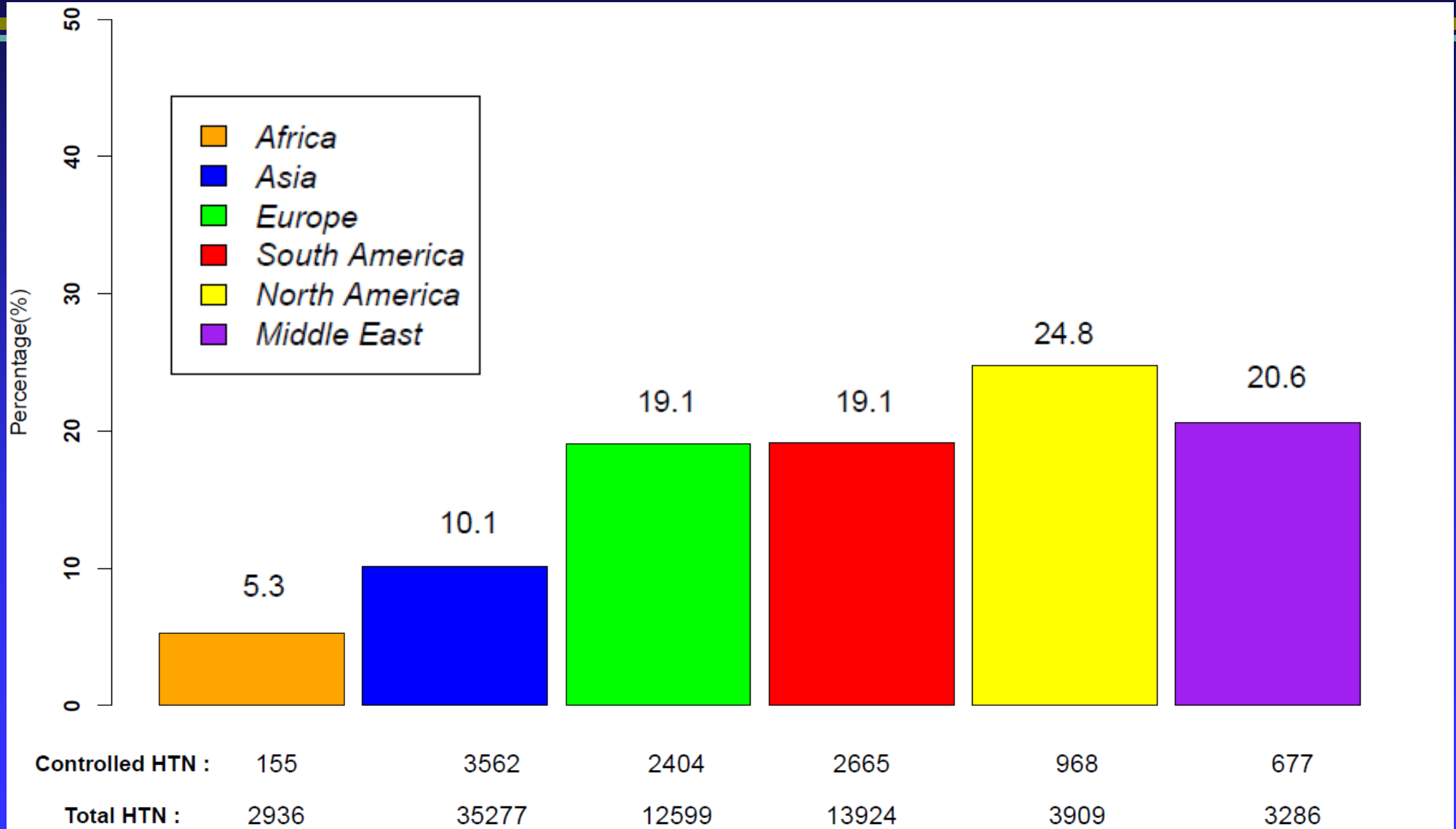
# Primary Prevention

- a) Population wide strategies: Avoiding tobacco (implementing FCTC), increase physical activity, “Mediterranean type” diet patterns
- b) Individualized strategies:
  - All: Counsel smoking cessation  
Regular BP checks
  - Targetted: Stage 2 + hypertension  
Stage 1 hypertension + other markers of risk\*  
Diabetes (BP & lipid lowering + glycemic control)

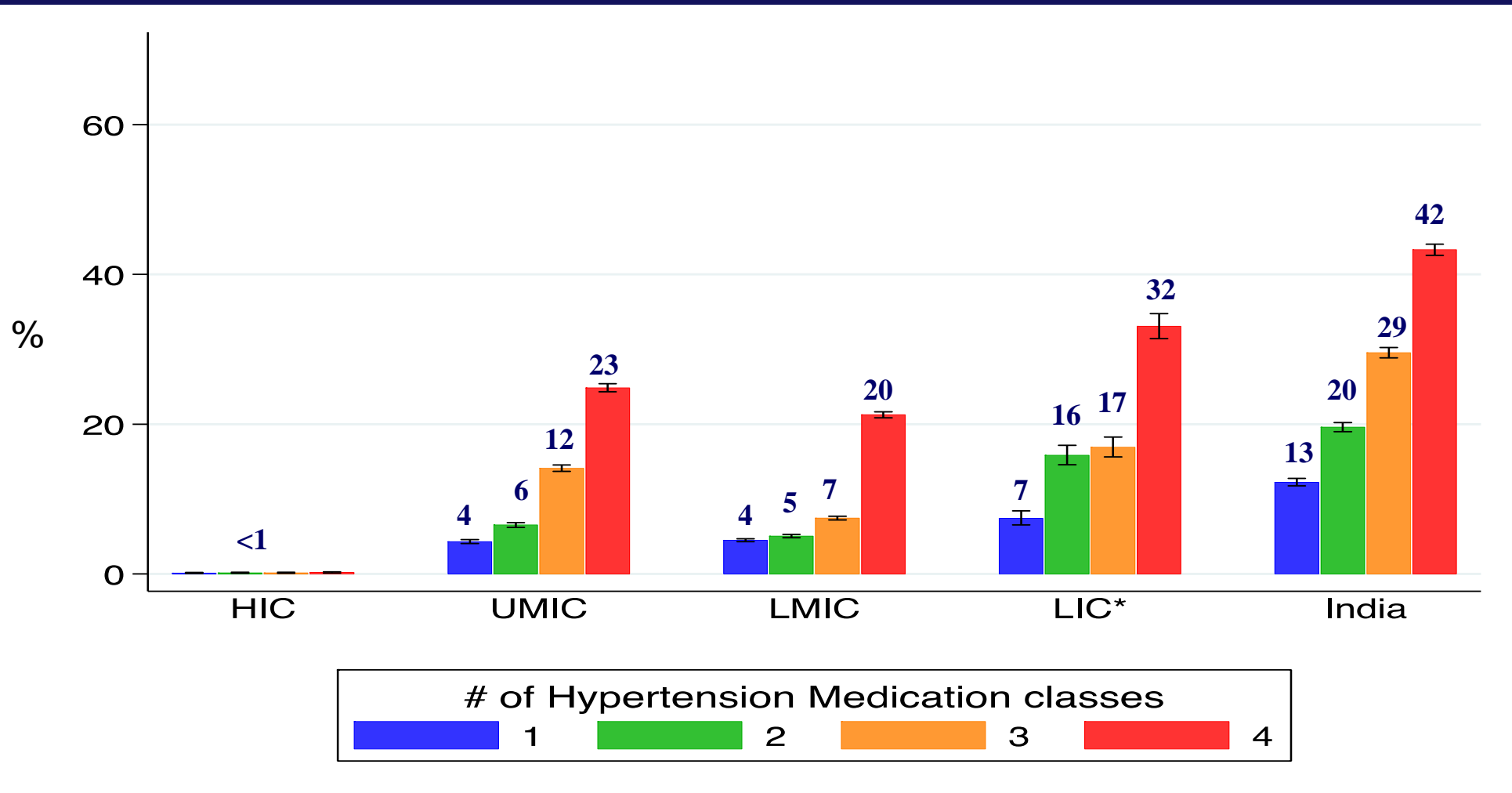
# Hypertension in 21 countries



# Controlled Hypertension as a Percent of All with Hypertension



# Proportion of households unable to afford hypertension medications



Unaffordable if medications cost >20% of capacity-to-pay

PURE STUDY: UNPUBLISHED DATA

# Barriers to hypertension control and secondary prevention

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- Reluctance to use combo drugs (physicians).
- Reluctance to take drugs when BP is controlled.
- High costs of drugs, consultations, travel, time off work, elderly do house work or look after grand children.
- Drug stock outs, limited supplies (eg one week), when govts provide them, or hi personal costs
- Substandard drugs
  
- ***SOLUTION: CARE AT THE HOME /COMMUNITY BY NPHW***

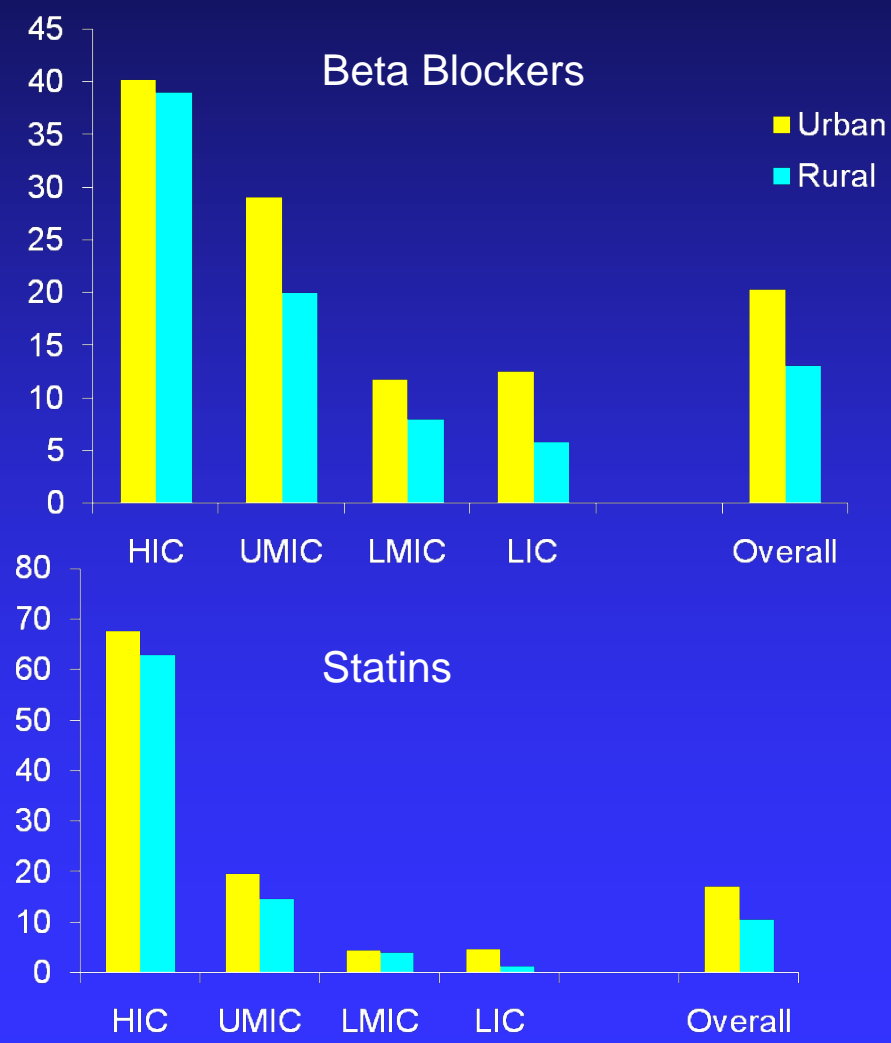
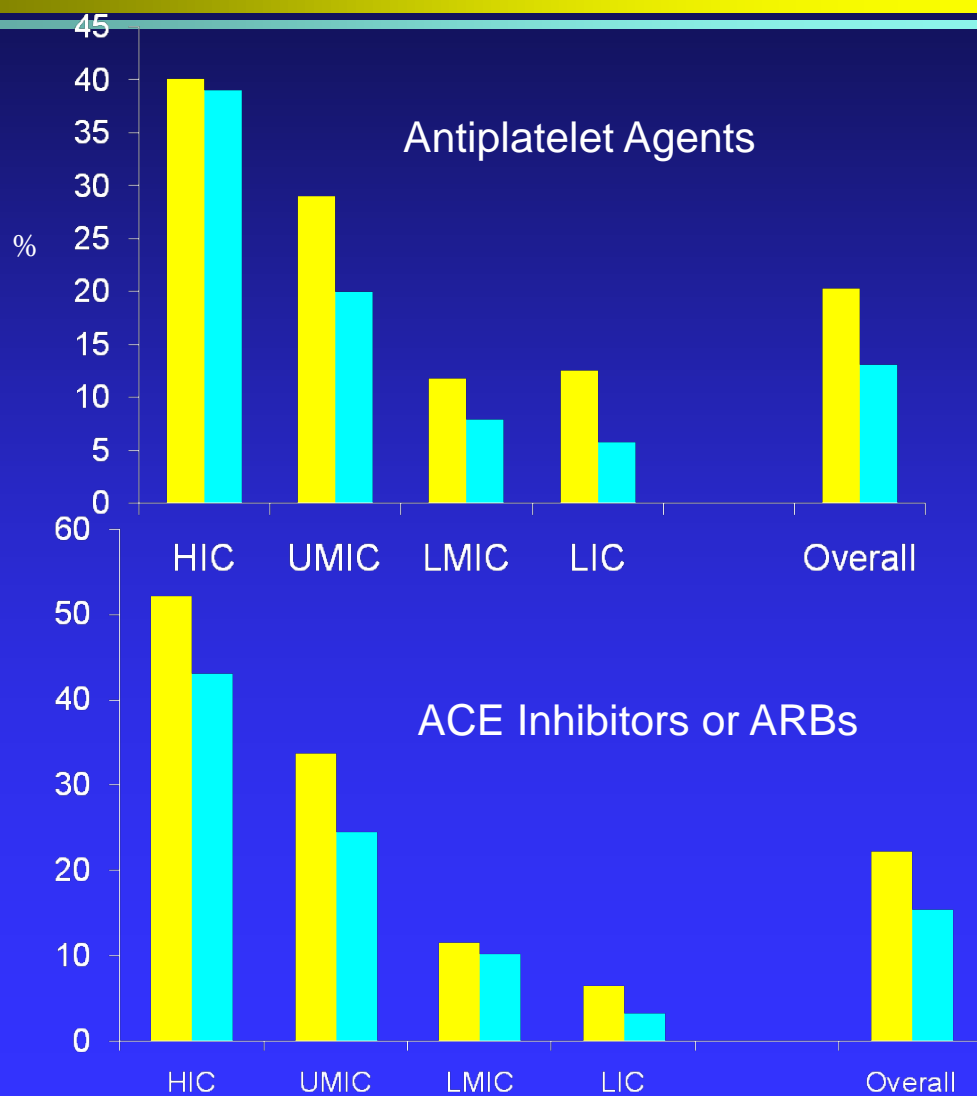
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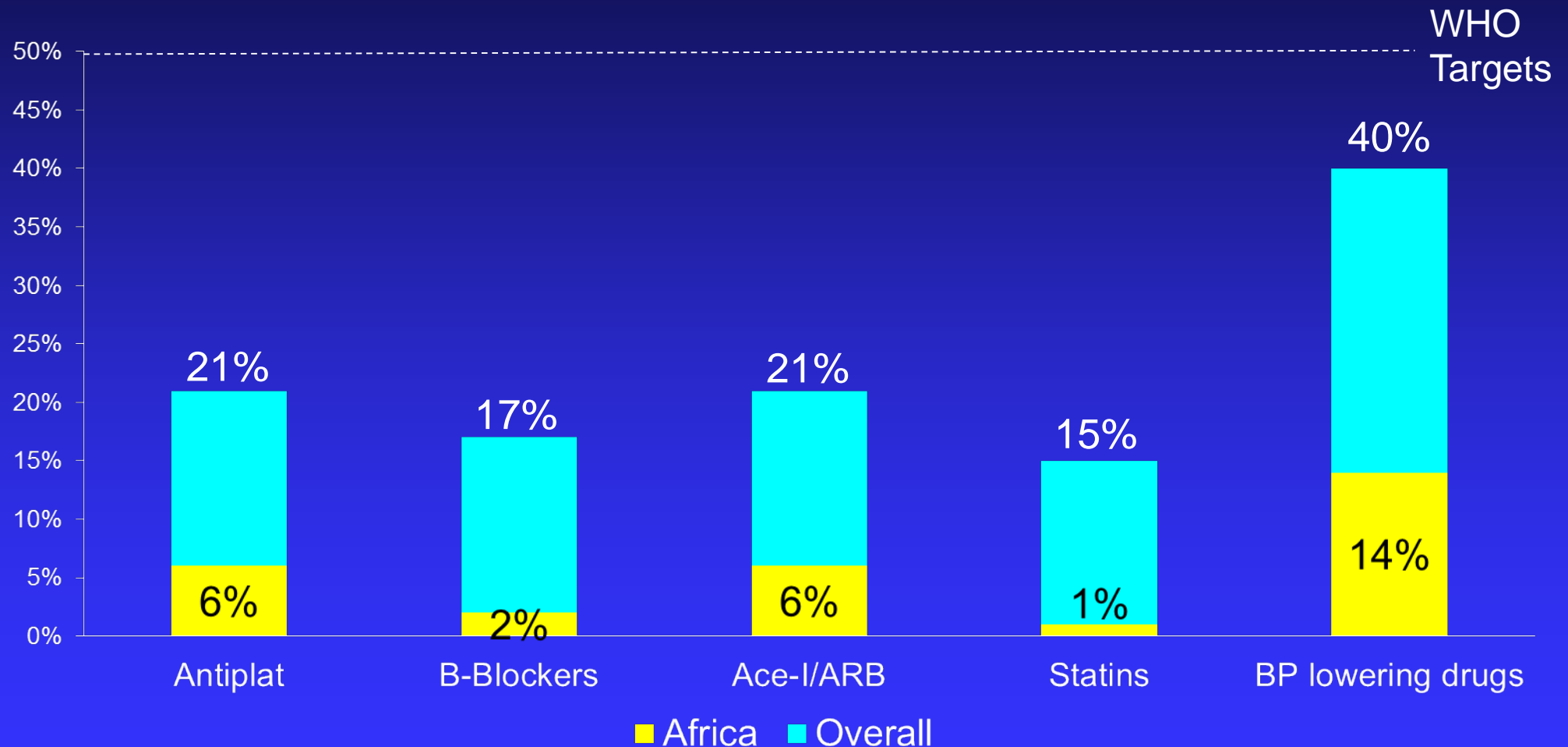
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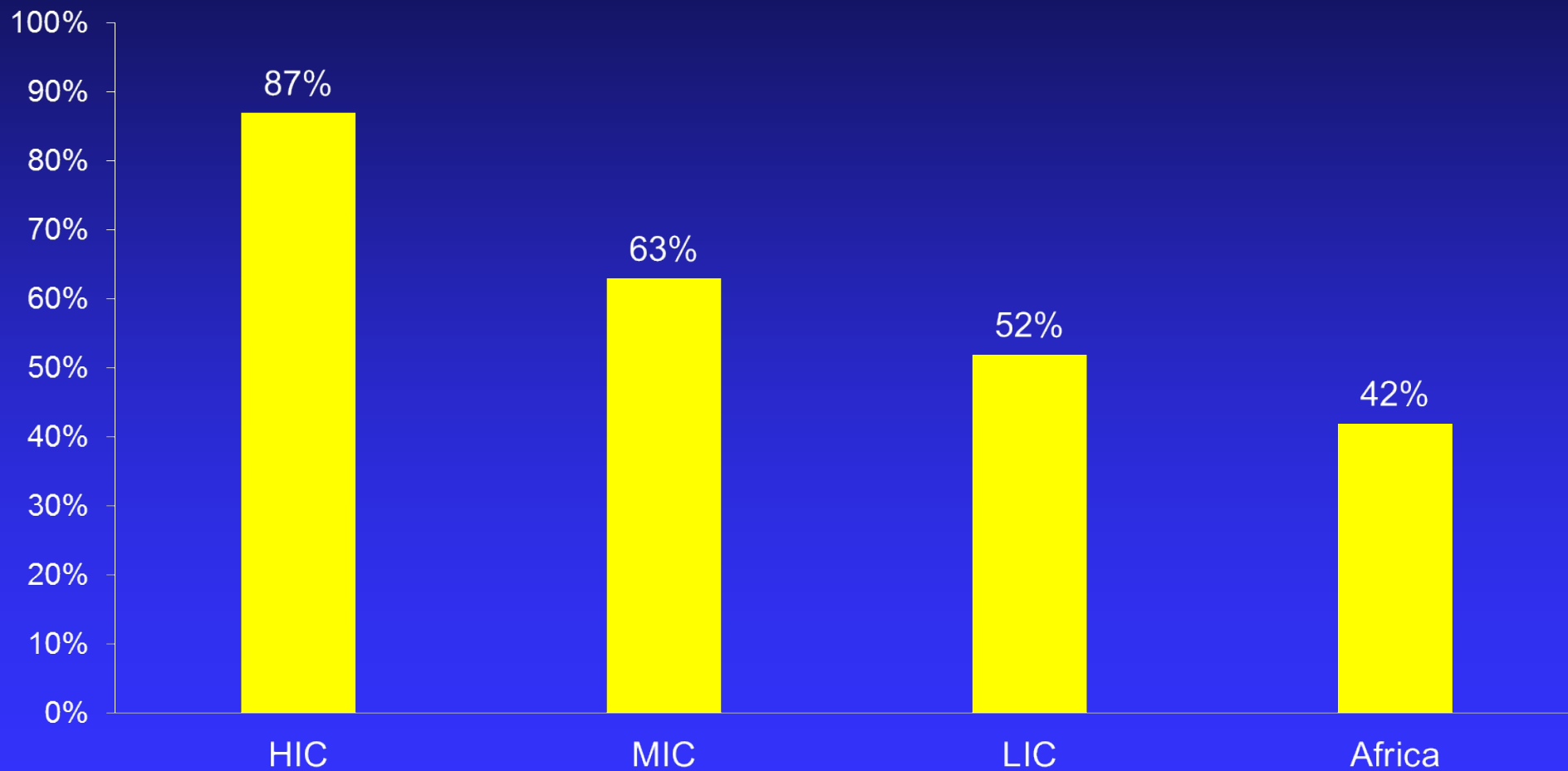
# Proven Drugs in Secondary Prevention



# Use of Proven Drugs in Those with Prevalent CVD Overall & in Africa



# % Hospitalized for Incident Stroke or MI



# INTERSTROKE: Stroke presentation and treatments

Country by Income	High	Upper middle	Lower middle
No people (countries)	2576 (10)	3859 (11)	3907 (7)
Age	66	63	59
Low education	17	66	59
No comorbidity	28	32	37
ICH	10	28	32
Red conscious	7	28	32
M Rankin(>severe)	20	35	52
Antiplatelets	91	87	85
Thrombolytics	20	4	3
Stroke specialist	96	88	62
Rehab unit	92	37	31

# INTERSTROKE: Treatments vs Alive without dependency

	Univariate OR (CI)	Multivariate OR (CI)
Antiplatelets	1.84(1.62-2.10)	1.29(1.89-1.53)
Thrombolytics	1.13 (0.91-1.41)	1.06(0.80-1.39)
Stroke Unit	1.25 (1.14-1.36)	1.42 (1.27-1.59)
Stroke rehab	1.55(1.43-1.70)	1.37 (1.20-1.57)

# CREATE: ACS Registry in India (n=4181)

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## Transportation

Ambulance	5.0%
Taxi/car	62.7%
Public	32.2%

## Method of Payment

Solely Patient	77.3%
Solely Insurance/govts/free	13.3%
Mixed	9.5%

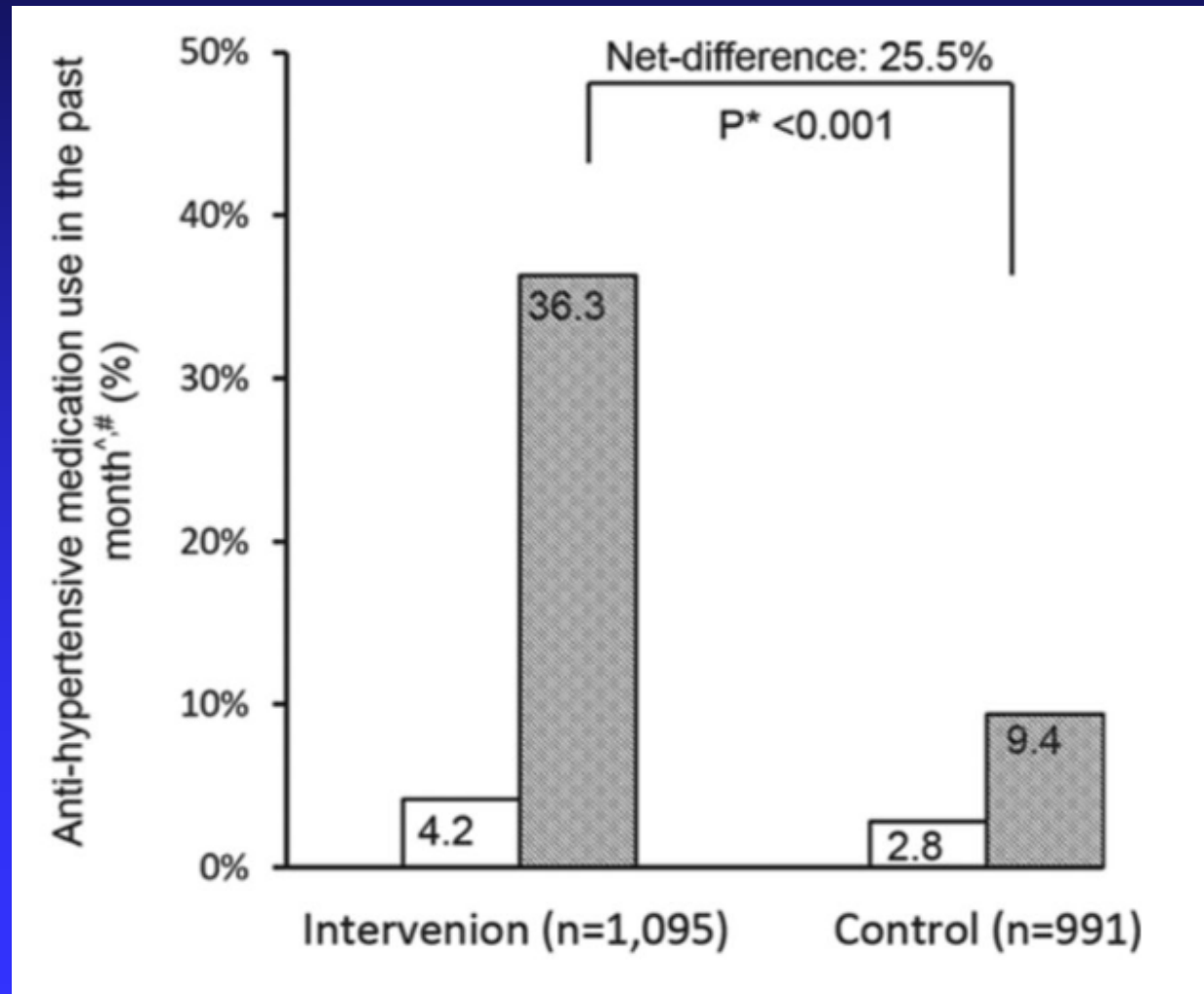
# OSCAIL: Organized Stroke Care Across Income Levels

- Question: *Can we implement key components of stroke unit in LMIC?*
- *2 phase pilot study*:
  - Develop interventions & evaluate feasibility (stepped wedge design).
- Centre criteria:
  - No established organized stroke unit
  - >50 stroke admissions/year
  - Champion in each country and each site
- 2 sites each in Rwanda (N=33), S Africa (N=37) and India (start Nov)
- Each site: 70 pts in observation phase; 70 pts in intervention phase

If you are interested in participating, please contact Jackie Bosch

***(jackie.bosch@phri.ca)***

# Effect of the Simplified Management Program on the Primary Outcome among High-Risk Individuals





# Effect of the Simplified Cardiovascular Management Program on Secondary Outcomes

Secondary Outcomes, Mean SD or %	Net Difference	P Value
Use of aspirin in the past month, %	17.1	<0.001
Mean SBP, mmHg	-2.7	0.04
Current smoker, %	2.0	0.42
Awareness of harms of high-salt diet, %	-8.2	0.06
Receiving monthly follow-up, %	16.0	<0.001
Hospitalization during the past year, %	-3.9	0.09

# SPREAD: Outcomes at 1 year

	Intervention N=375	Standard N=375	Differn	P value
SBP	124.4 (13.5)	128 (15.9)	-3.59	0.0009
DBP	78.7 (8.7)	79.6 (8.8)	-0.85	0.185
Heart rate	74.61	75.97	-1.36	0.020
BMI	24.4 (3.2)	25.0 (3.8)	-0.6	0.038
Chnge Wt Kg	-2.03	-0.20	-1.83	<0.0001
Waist males	90.60	92.58	-1.97	0.0009
Waist female	92.98	90.17	2.81	0.246

# SPREAD: Outcomes at 1 year

Outcome	Intervention Group N=375	Standard Care N=375	P value
<b>Tobacco</b> n (%)			
Stopped (181/267 smokers)	110 (85.3)	71 (51.5)	<0.0001
<b>Alcohol Use</b>			
Current n (%)	11 (2.9)	28 (7.5)	0.007
<b>Physical Activity</b>			
Modr to intense n (%)	333 (88.8)	226 (60.3)	<0.0001
<b>Diet</b>			
Diet score Med (IQR)	5 (3 – 5)	3 (3 – 5)	<0.0001

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# HOPE 4

- Randomize 25 communities( 2500 people) in Columbia and Malaysia to an NPHW based vs routine( physician based) control of hypertension , improve secondary prevention, prevention in diabetes,
- NPHW screen house to house and initiate counselling ( tobacco, diet , PA + combo drugs + statins for HTN, diabetes and secondary prevention. Followup by NPHW.
- Outcome : One yr control of BP and overall

# African Research agenda to facilitate Implementation & reduce CVD by 50% in a generation

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- Identify *treatment gaps* : Periodic registries in many countries (eg “one month in the life of Africa”----- rotate between different disease eg RHD, valve, hypertension, AMI, stroke, HF, AF).
- *Simple population based longitudinal cohort studies* of 10,000 + per country--- “know your norms & risks”
- Develop *sentinel monitoring of households* (eg 2% of population) for deaths and hospitalizations by cause every 5 years (using “*tro-hoc*” designs).

*Build capacity for clinical, population and health  
systems research*

# Conclusions: Management of patients with or at hi risk of CVD

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1. Organization of the health care systems: Patient education, pre-, in- and post hospital mgmt, adequate number of CCUs & stroke units.
2. Increased use of NPHW for secondary prevention, tobacco cessation and hypertension control.
3. Widespread access to affordable, proven and simple interventions : Polypill, drugs for AMI , stroke and HF, Penicillin, pacemakers
4. A few specialized centers in each region /country for angiography, PCI, CABG & valve surgery, ICD, etc
5. Universal health care can improve above of all the above.

*Increase in govt health care funding to about 5% of GDP*