Cardiovascular Disease Prevention in India

Shifalika Goenka

CENTRE FOR CHRONIC DISEASE CONTROL

INDIAN INSTITUTE OF PUBLIC HEALTH DELHI

PUBLIC HEALTH FOUNDATION OF INDIA

India : Demographics, Democracy and Diversity.

The 2nd most populous country

Population: 1.2 billion people
India houses one-sixth of the world's population.

50% of the population is below the age of 25

Rural / Urban break-up:
72.2% rural,
27.8% urban.
Urban in 5,100 towns and cities
Rural - in 638,000 villages

% of population below poverty line: 22%

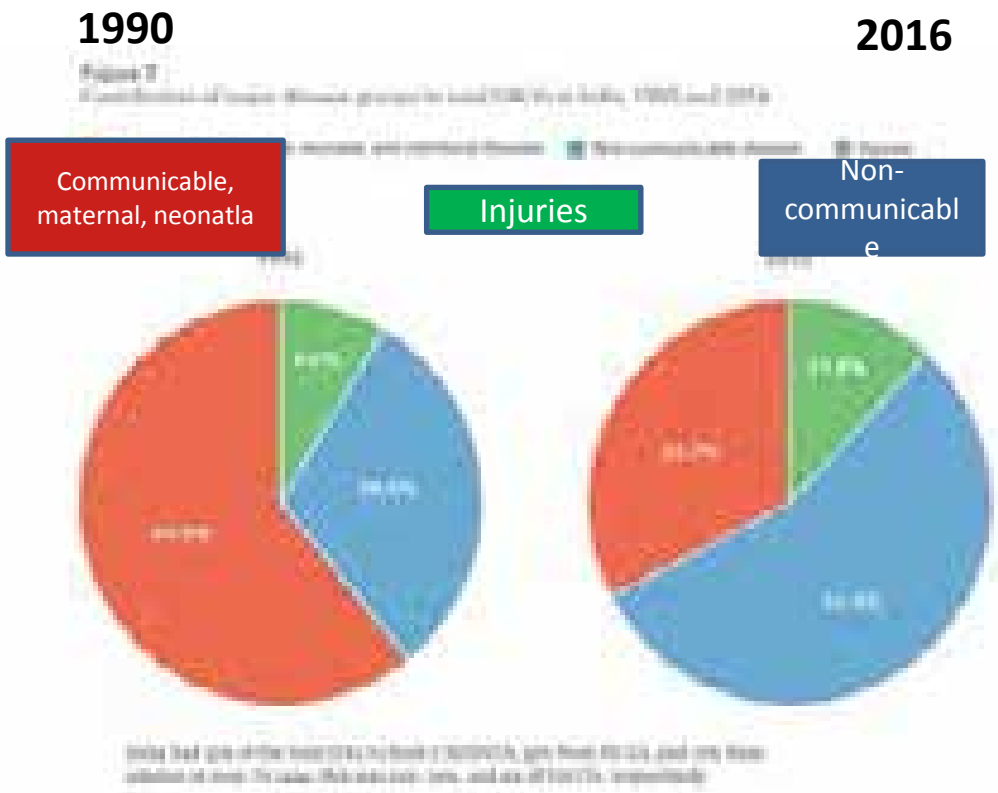
More than 2000 ethnic groups

Religion: every major religion is represented Hindus, Muslims, Jains, Sikhs, . Zoroastrians, Baha'i, Christians

Language: India has 20 languages officially listed in the constitution, 122 major languages, and 1599 'others'

Culture: Cultural diversity is manifested in the lifestyles and customs of people

Contribution of major disease groups to total DALYs in India, 1990, 2016



2016 of total DALYS

33 % from communicable + maternal + neonatal nutritional diseases.

55% for NCDs

12 % injuries

1990 of total DALYS : 61%: communicable + maternal + neonatal nutritional diseases,

30%, NCDs

9% Injuries

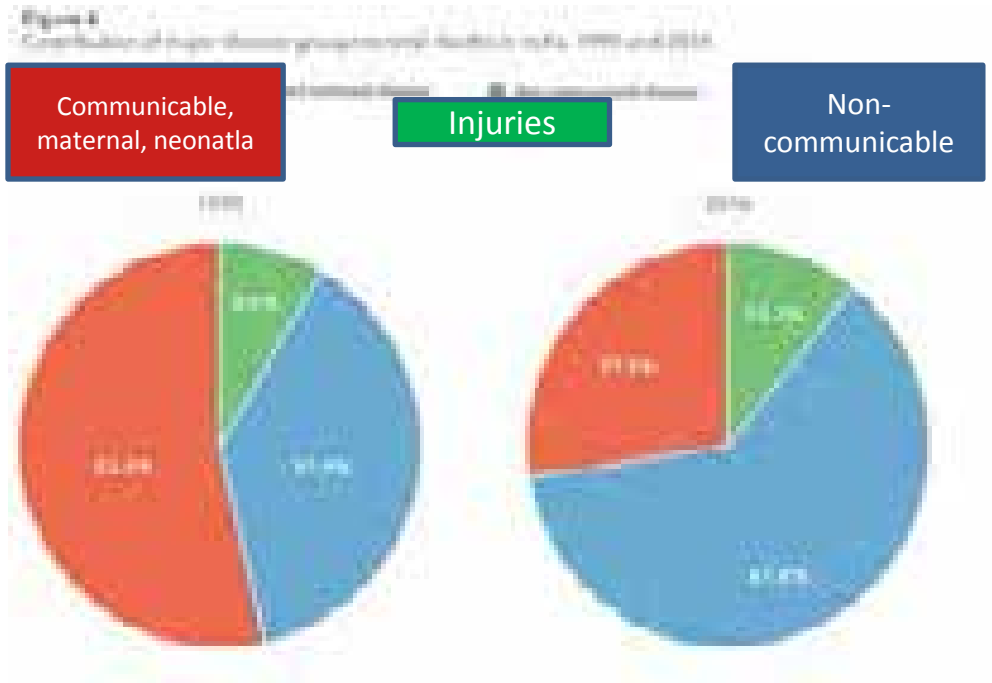
GBD, India country report, 2017, PHFI, ICMR, IHME

Population of India 1990 870 million

Population of India in 2016 1.3 million

Contribution of major disease groups to total Deaths in India, 1990, 2016

1990 **2016**



2016:India has 61.8 % of total deaths from non-communicable .

27. 5% CMNNs

10.7 % injuries

1990: 37. 9 % NCDs.

53.6% Communicable, maternal neonatal, nutritional ,

8.5 % injuries

GBD, India country report, 2017, PHFI, ICMR, IHME

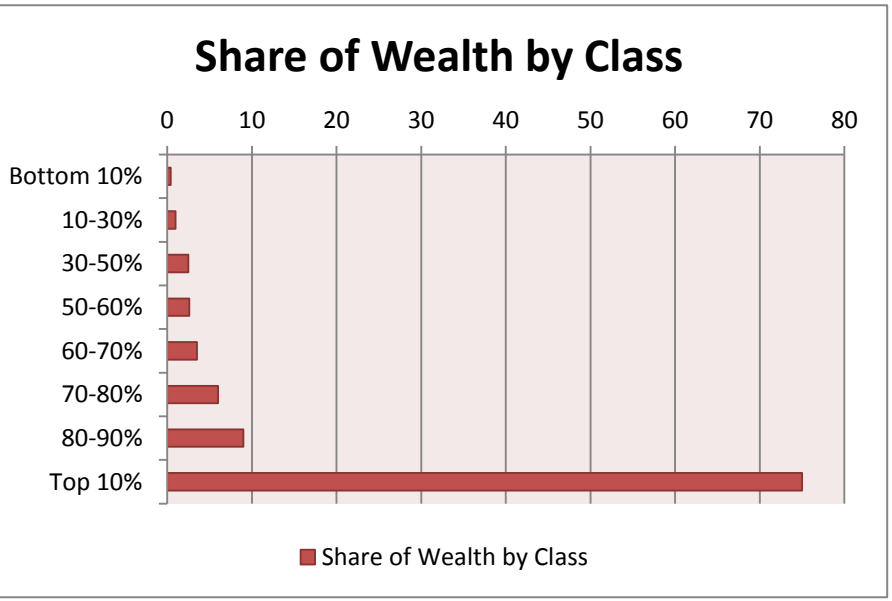
Population of India 1990 870 million

Population of India in 2016 1.3 million

Challenges of research can care in CVD

- No centralized reliable national database
- Migratory population
- Policy makers- reactive as opposed to preventive
- Inadequate doctor/HCP training for chronic diseases
- Majority doctors in urban areas
- Doctors constraint and challenging situations
- Disjointed healthcare system
- Unique Indian context

India's Staggering Income Inequality



Wide socio-economic disparities
Billionaires and below poverty line
India's top 1% holds close to half of the country's total wealth- billionaires

- **301.7 million people live below the poverty line, in India**
- **80.8 million below poverty line people people live in urban areas .**
- **92 % of rural households live under 10, 000 a month (approx 200 usd)**

The richest 10% now hold **three quarters** of the wealth

Sources: Census- India, Economic survey; Quality of Life: India vs. China, Amartya Sen, *The New York Review of Books, May 12, 2011*
wealth gap in five charts, *The Hindu, 8th Dec, 2014*

Unplanned urbanization and migration in distress

Rural to urban migration

• 75,000 people migrate to Delhi every year, and a similar number to other metros

Reasons for migration

• Distress: failure of crops, harassment from authorities, rival ethnic groups

•Opportunities: more job options in cities

Poor Urban Planning

•The migrants and the poor are forced to live in over-crowded areas with **poor sanitation**, poor ventilation and at **high risk** of contracting infectious air and water-borne **diseases**

• Shift to relative inactivity and from traditional high fiber to low fiber diets

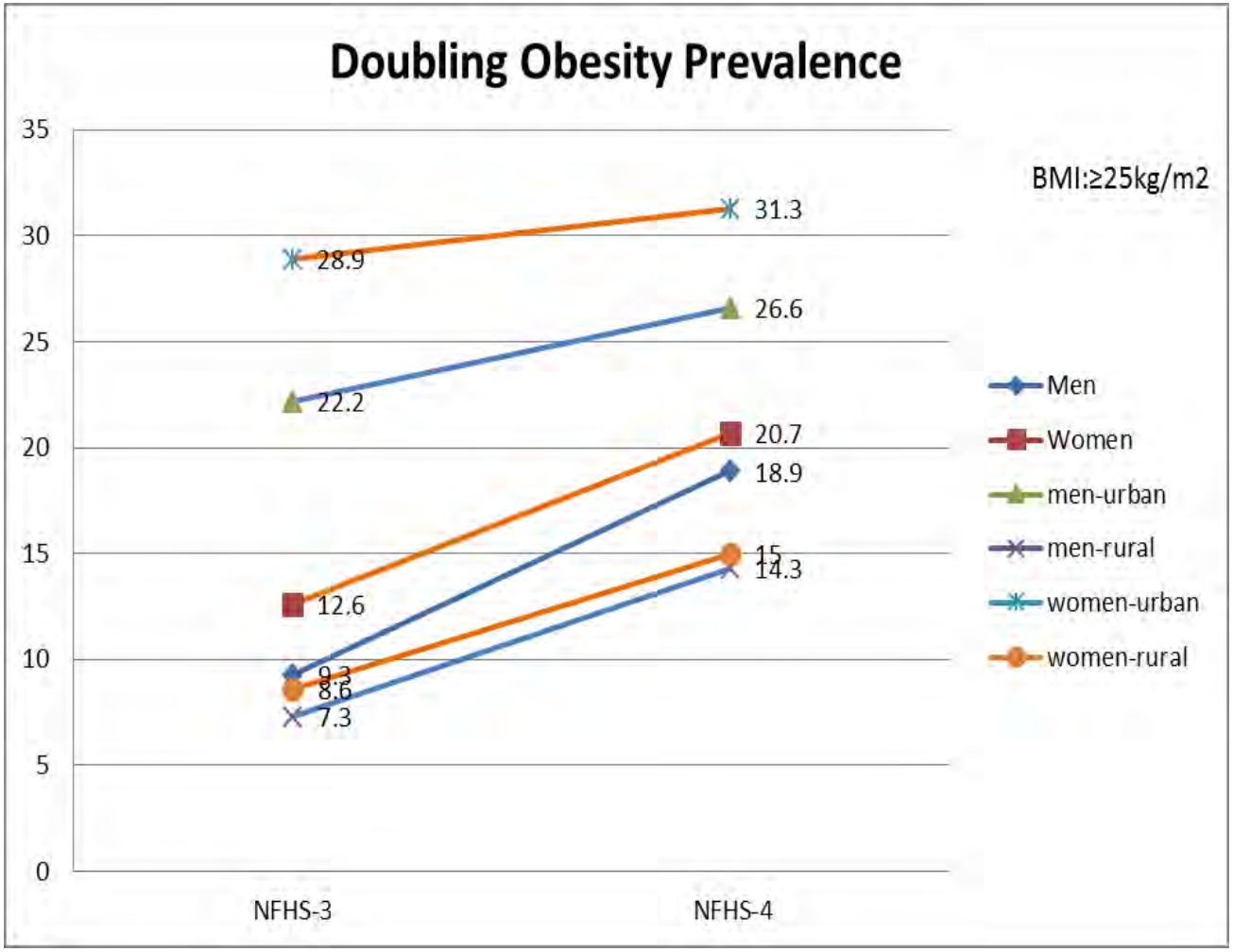
•

India: Third highest number of obese people in the world- 41 million obese
15 million children overweight /obese India.
20-29% of private school children in India obese
10% of overweight/obese children have of dysglycemia.

48 per cent of children(61 million children) **under the age of five, are stunted due to chronic under nutrition, with 70 per cent being anaemic -**

Sources: GBD, 2013, Unicef, Goyal J, 2011; Jagadesan S, 2014
Jain, 2010; Marwah a, 2006

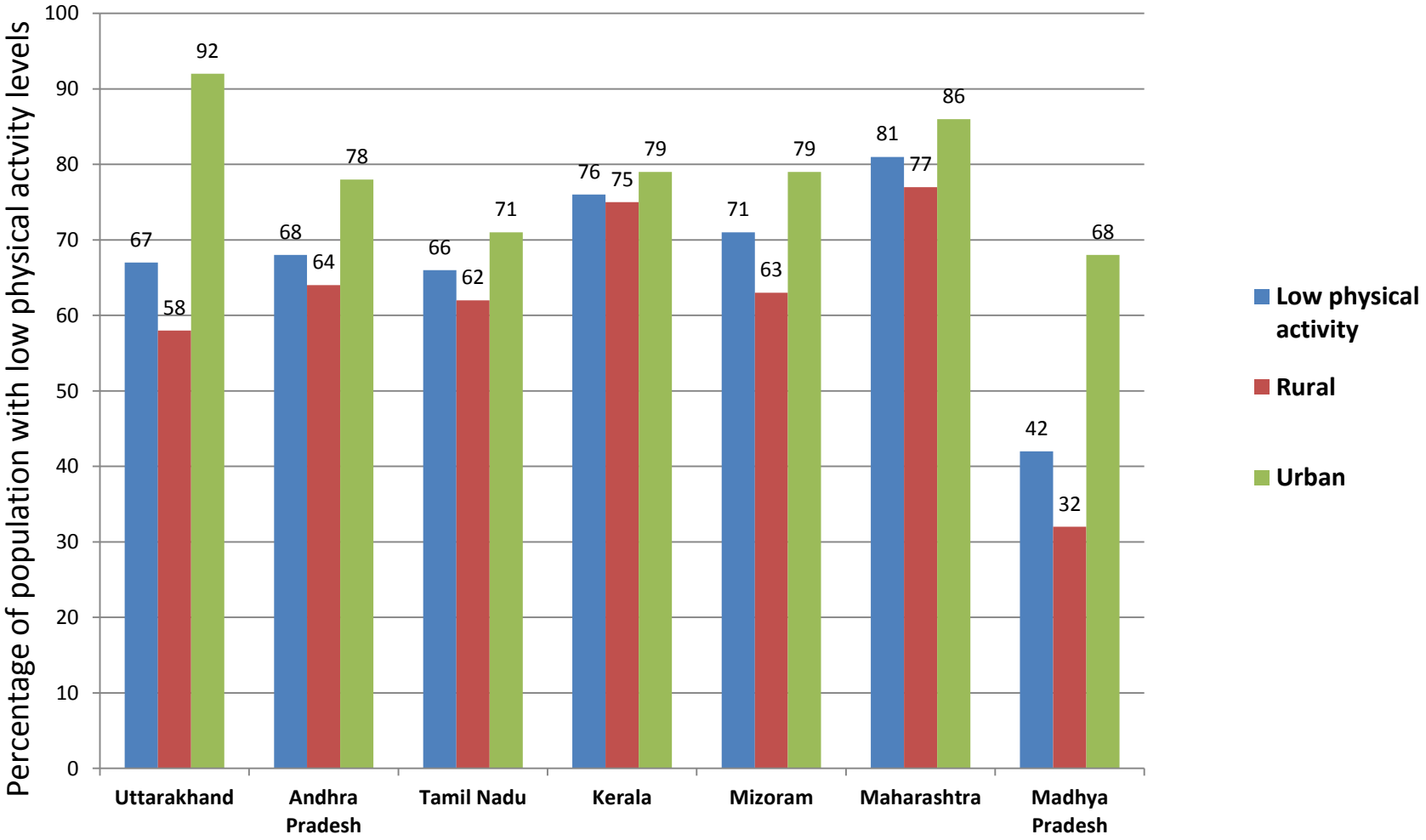
Obesity trends in India 2005-6 to 2015-16



data analysed from the NFHS

http://rchiips.org/NFHS/about.shtml

Percentage of Indian population with Low Physical levels- State wise (IDSP-2007-08, GPAQ)



Difficulties in being physically active

- Built environment- vanishing useable pedestrian paths, narrow, encroached, high, infrequent crossings, absence or cutting of tree conclaves, over construction, over commercialization, vanishing green patches
- High temperatures , high dust levels.
- Inadequate usable, public transport
- Vanishing public places- safe unusable attractive
- Long working hours, sitting in traffic
- Inadequate, mis-aligned, inadequate density public transport.
- Land mafia , increasing the density of built environment, with obliterations of green patches, open areas, irrespective of inadequate civic amenities servicing those areas
- Safety concerns

Roads get widened then people need to walk on roads_ systematic deconstruction of pedestrian paths - as “development” in India.

Pedestrians marginalized

epaper

Walking dead: Pedestrians in Delhi falling prey to fast cars, faulty roads

Deaths caused by traffic accidents is amongst the highest in the world

Disregard for Pedestrians -common examples of encroached pedestrian pathways

Encroached by parking mafia and badly maintained

Challenges of walkability index, how do you capture these features through a GIS based index

No-trees, no walking in summer (37-47 degree Celsius)

Heat is a major deterrent , heat related morbidity and mortality

Increasing density in Indian cities – leading to increased sitting time

Mumbai, Kolkatta and Delhi, are among the most highly populous and dense cities in India and the world

Populous cities in the world

- Mumbai's population is 18.41 million
- Delhi. _ 18.98 million
- Delhi's population has increased by over 21 per cent during the period of 2001-2011.

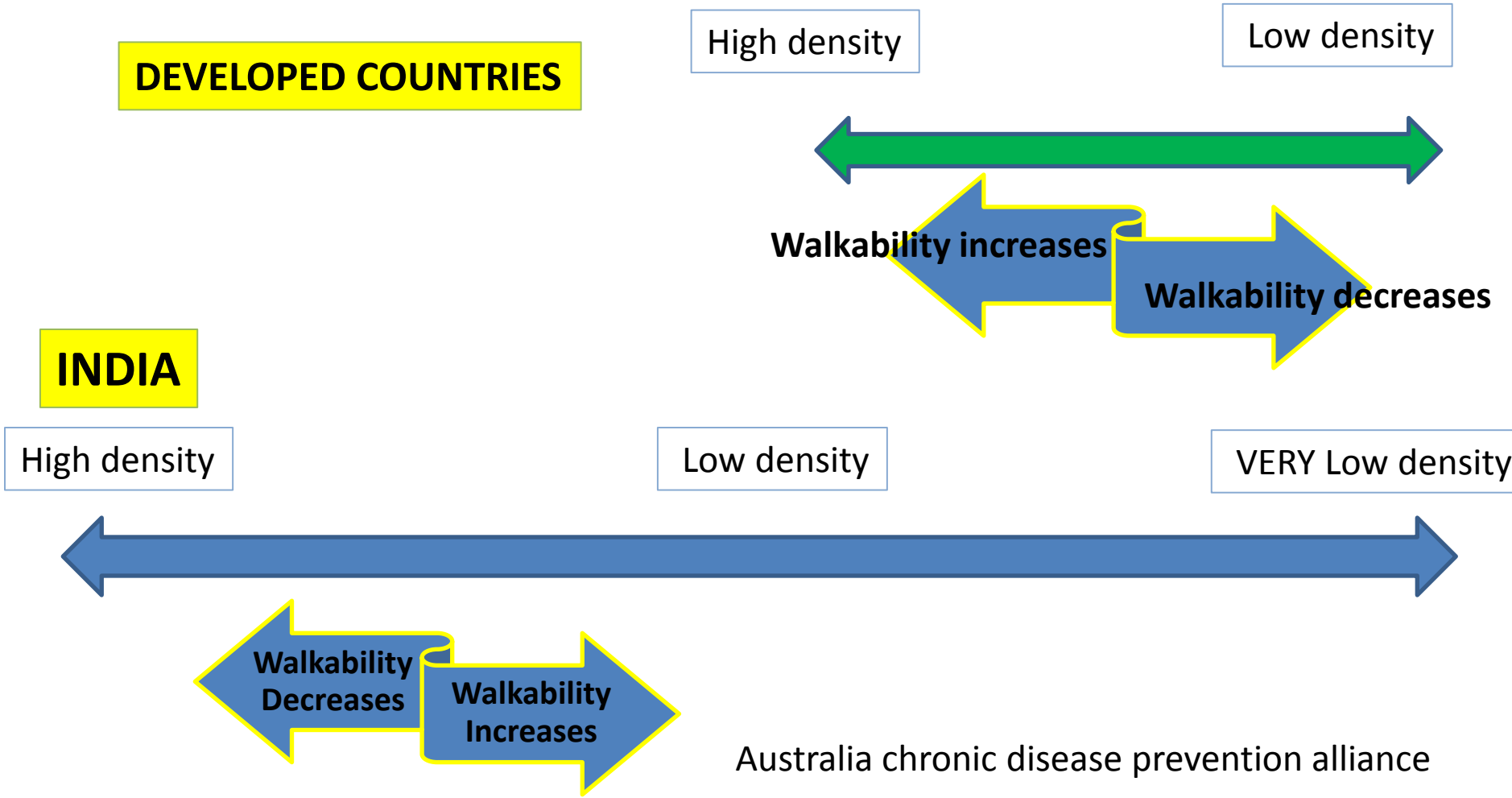
Populous and **dense**

- **Mumbai**, population density is approximately 20, 000 (19,652 average)
- **Delhi** 11,320 people stay per people per sq. km area.
- **Some areas of Mumbai have as many as 101,066 people packed in a single square kilometre.** In such situations, **besides compromised living conditions there is another lurking peril which is less documented and less realized- 'Increased Sitting'.**

Unique context -Bicycles only one of the active transports

Cycling in full traffic– people give up cycling as soon as they move up the socio-economic ladder. People cycle when they have no choice

Density is relative- Differences from developed countries



Australia chronic disease prevention alliance

Overall activities of CCDC

Epidemiological and basic research

Translational Research & Implementation Science

Clinical Research and training

Capacity building

Knowledge synthesis

Integrating into health systems

New Frontiers and innovations

PUBLIC HEALTH FOUNDATION OF INDIA

Centre for Chronic Disease Control (CCDC)

OUR MISSION

Address the growing challenge of chronic diseases, in varied settings of the developing countries through:

- ***Knowledge generation***
  - *to inform policies and empower programmes for the prevention and control of chronic diseases*
- ***Knowledge translation***
  - *through analytic work, capacity building, advocacy and development of educational resources (for enhancing the health of people and empowerment of public health professionals) to bridge the know (research evidence) and do (effective implementation) gap*

Recognitions

- **A Scientific & Industrial Research Organisation (SIRO), recognized by Department of Scientific & Industrial Research (DSIR), Govt of India.**
- **A Centre of Excellence in Clinical Research recognized by the Clinical Development Service Agency (CDSA), Dept of Biotechnology, Govt of India.**
- **Was a WHO Collaborating Centre for Surveillance, Capacity Building and Translational Research in Cardio-Metabolic Diseases.(IND-124) (f r 6 years, just gone in for renewal**
- **Partner in the Global Hearts Initiative to prevent and control cardiovascular diseases**
- **FCRA Clearance till Oct 2021**

Dr Prabhakaran is the Director
Dr KS Reddy is former Director

URBANIZATION: WEIGHT GAIN + BULGING BELLY

100 kilometres away

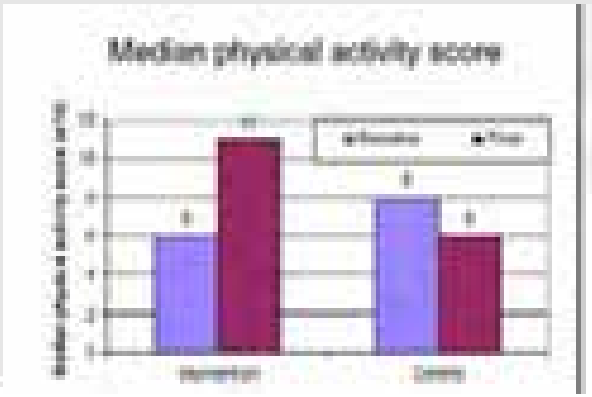
Category	Urban (Delhi) (% prevalence)		Rural (Haryana) (% prevalence)	
	Male	Female	Male	Female
Overweight (BMI ≥ 25)	35.2	47.6	7.8	11.27
"Overweight" (BMI ≥ 23)	54.4	64.9	17.3	18.8
Central Obesity	71.8	39.5	44.9	35.8

Reddy et al, Obesity Reviews (2002)

Prabhakaran D et al, Chronic Illn. 2007;

Worksite CVD Health promotion Project in 10 industrial locations

- Ten Medium-to-large industries, (employing 1500-5000 people) All employees and their family members (10-69 yrs) eligible to be included(10 worksites)
- Detailed data from 800 randomly selected employees and their family member in each industry(age and sex stratified multi-stage random sampling)
- Intervention 2003-2007



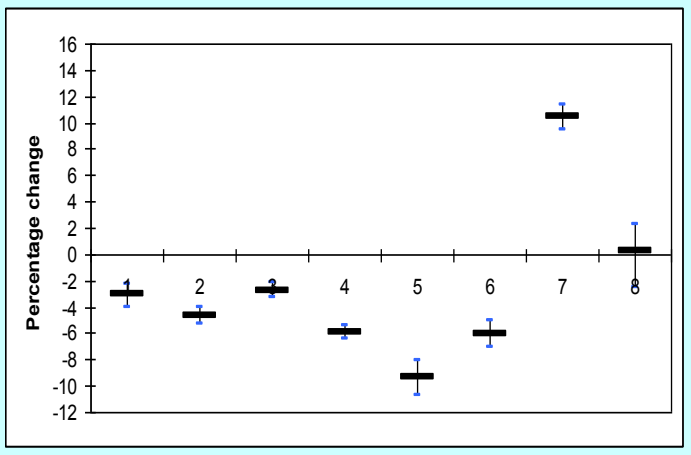
First surveillance system for CM risk factors

Development of PA questionnaire based on Indian lifestyle

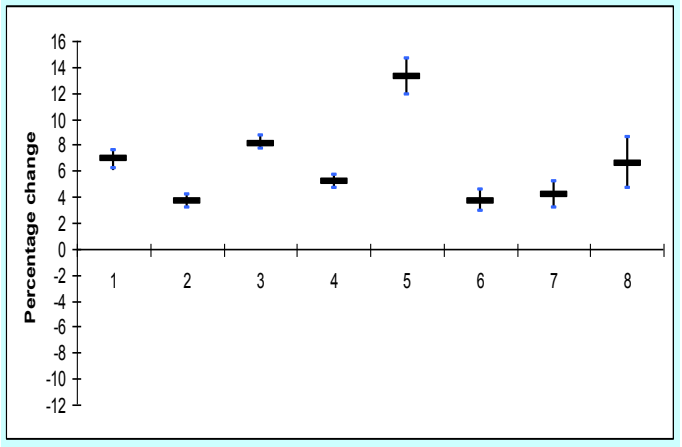
Base line for the first time showed the socio-demographic reversal in chronic diseases

Percentage change in mean risk factors in intervention and control area – post multi-component intervention

Intervention sites



Control site



1=Weight in Kg, 2=Waist Circumference in cm, 3=Systolic Blood Pressure in mm of Hg, 4=Diastolic Blood Pressure in mm of Hg, 5=Plasma Glucose in mg/dl, 6=Total Cholesterol in mg/dl, 7=High Density Lipoprotein Cholesterol in mg/dl, and 8=Serum Triglycerides in mg/dl
Horizontal line for each variable represents the point estimate and the ends of the vertical line represent 95% CI of the point estimate

Source: Prabhakaran D; Jeemon P, Goenka S, et al, JACC, 2008

First international study using a the standardized PA measurement

- Part of the team on the development of and first international study using a the standardized PA measurement : 2003

- Instrument for population based assessment _ IPAQ,

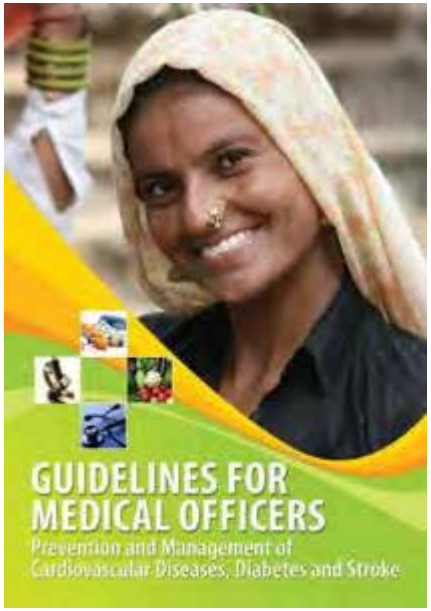

International Journal of Behavioral Nutrition and Physical Activity

The International Prevalence Study on Physical Activity: results from 20 countries

National Program: NPCDCS

- The National Program for Prevention and Control of Diabetes Cardiovascular disease and Stroke was launched Scaled up nationally

https://mohfw.gov.in/about-us/departments/departments-health-a



Available online:
ccdcindia.org/wp-content/uploads/2015/12/Powering_Indias_growth.pdf

Establishment of "Public health Foundation of India- Multi-disciplinary public health

Summary of some key works

	Main Applicant	Collaborative Applicant
Trials	Yoga Trial	Living Trial
	DISHA Trial	CARRS – Trial Phase 2
	mPower Heart Trial	Intertext2Heart Pilot
	ACS-QUIK	
Epidemiology/ Ecological Studies		Delhi & Vellore Cohort follow-up
		INTER-CHF, STITCHES
		Salt Study
Capacity Building	Nutrition Annual Seminar, WHF	
	CoE-CDSA	ACMDC, CCMH, CCWH, CCCS
Health Systems	mPower Heart Model NCD Initiative: Tripura/Mizoram	
	WHF-Roadmap, EL	
	MMM17	
Advocacy	DCP-3, WHO-CC, WHO Consultations	

Dr D Prabhakaran is the Director of the Center and PI on all the trials

Cohorts

- Physical activity and cardio-metabolic health was assessed through three cohort studies –
  - CARRS n=8000 (India- Delhi Chennai) , n=12000 India-Karachi
  - UDAY n= 12, 000 Vizag and Sonepat (rural- urban transitioning cities)
  - Solan n= 40, 000

Huge research platform for young researchers

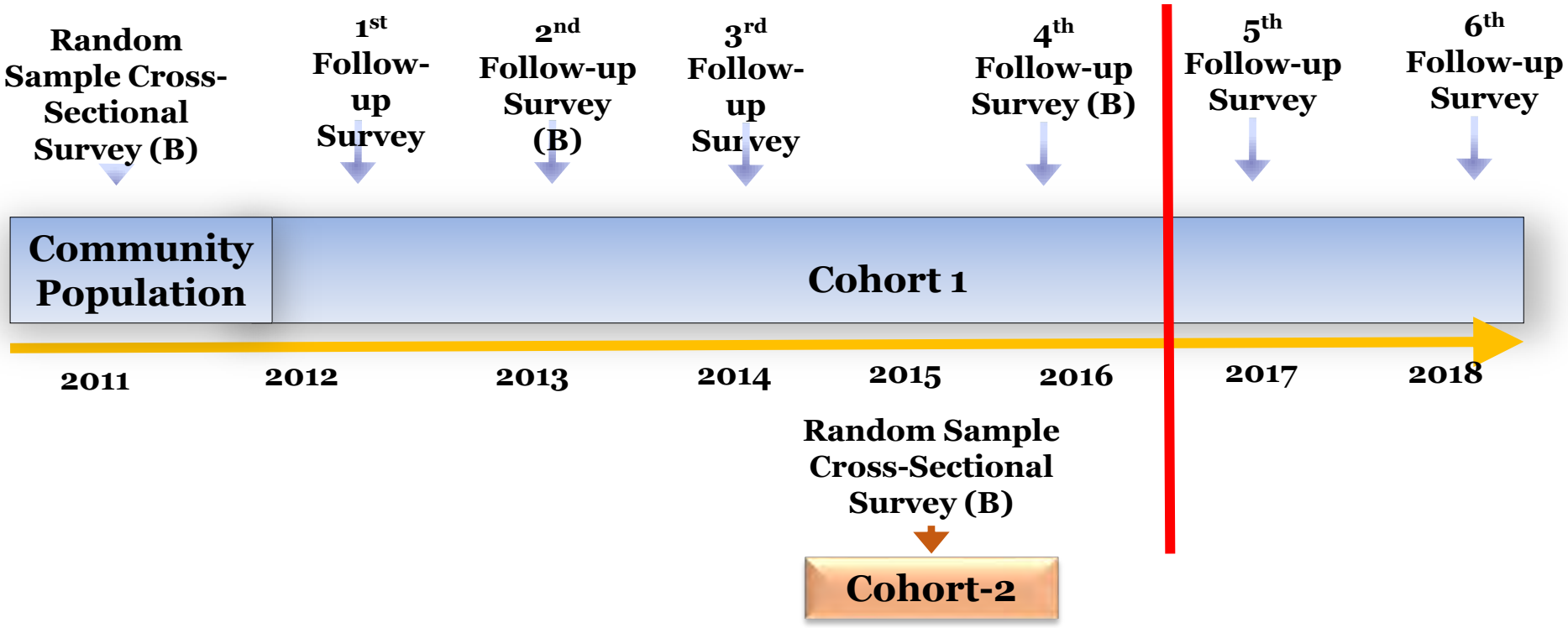
urban , rural and transitioning cities

THE CARRS STUDY- AIMS

1. Establish and retain a cohort
   a. To address lack of incidence data on CMD
   b. To address lack of data on morbidity and mortality

2. Develop model sentinel surveillance system
   a. To address lack of repeated surveys

THE CARRS STUDY- DESIGN



NHLBI and United Health Groups

Emory university

National Institute of Health ,via geohealth

About CARRS

The CARRS (Centre for cArdiometabolic Risk Reduction in South-asia) Surveillance Study,

- Representative cohort of 12,271 adults (> 20 years old) enrolled between 2010-2011 in Delhi and Chennai.
- Annual questionnaire follow-up and alternate year biological sample collection
- Participants fully phenotyped for Cardio-Metabolic Diseases
- Households geocoded and integrated into a GIS database
- Cardio-metabolic events and risk factor data collected for 5 years, with a second 5-year exercise getting underway

Study Partners

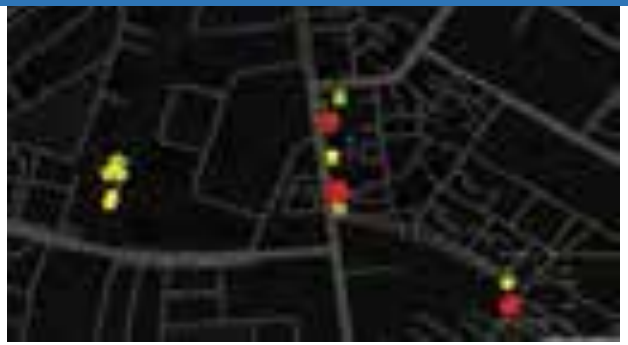
Dr D Prabhakaran, (CCDC, PHFI,) Dr Venkat Narayan (Emory), Dr Nikhil Tandon, (AIIMS)
Dr Richard Cash (Harvard School of Public Health)

31

Low Physical Activity Cluster (Coldspot)

Green/open space and physical activity level

High Blood pressure in people next to busy crossings



Low Physical Activity Cluster = High Fasting Blood Glucose Cluster

Low Physical Activity Neighborhood = High blood pressure neighborhood

Large Bio repository

450000 aliquots of different components of blood, urine saliva and so on in long term storage; DNA extracted for nearly 8000 individuals

- ***Potential to provide Framingham like data***
- ***Understand Social determinants***
- ***Bio repositories that can help in understanding mechanisms of disease***
- ***Huge research platform for young researchers***

mHealth/eHealth for improving quality of CVD & diabetes care

- Formative and effectiveness studies
  - SIMCARD Trial : Community | HTN
  - mPower Heart Project : Primary care | HTN & DM
  - mWellcare Trial : Primary Care | Integrated care of NCDs
  - mPower Heart Trial : Primary care | HTN
  - CARRS Trial : Tertiary care | DM
- Translational Projects – Health system-wide projects
  - Tripura NCD Project : HTN & DM
  - Mizoram NCD project : HTN & DM
  - Maldives mPEN Project : CVD

Collaboration with Who on M active just begun

mPower Heart Project: Sustainable Health care deliver model for management of HT & DM in HP

Vamadevan et al. JAHA 2016

21	21,000	6600	8	6
Time (months)	Patients Screened	Patients diagnosed	OP Clinics	Nurse Coordinators

EDSS +EHR

32 % had HT or DM; ~ 50% newly detected

50%	15 mmHg	7 mmHg	50 mg/dl
First Time Detections	Drop in Systolic BP	Drop in Diastolic BP	Drop in Glucose Levels

To be scaled and implemented across all CHCs of Tripura

Smartphone DSS

Effects of a Yoga-based Cardiac Rehabilitation Programme (Yoga-CaRe) on Cardiovascular Health: A Clinical Trial (India) & Mechanistic Study (UK)

Rationale and Objectives

- Rationale: Yoga improves physical fitness, reduces stress and brings lifestyle changes similar to the conventional cardiac rehabilitation
- Objectives: To study the effectiveness of Yoga based Cardiac Rehabilitation programme (Yoga- CaRe), compared to the enhanced standard care group in patients following acute myocardial infarction on cardiac morbidity and mortality and also on quality of life.

Methodology

- Study sites – 22 Cardiac centres in India
- Sample size – 4024
- Study design – Randomised Controlled clinical Trial
- Trial duration – Aug 2014 - Sep 2018
- Randomization – Variable block, stratified by age, gender and sites
- Primary outcome(s) – Cardiovascular events (Death, Myocardial infarction, stroke and emergency cardiac admissions) & Quality of life

http://ctri.nic.in/Clinicaltrials/showallp.php?mid1=3992&EncHid=&userName=Yoga-CaRe

Dr D Prabhakaran, PI

Effects of a Yoga-based Cardiac Rehabilitation Programme (Yoga-CaRe) on Cardiovascular Health: A Clinical Trial (India) & Mechanistic Study (UK)

Objective: To study the effectiveness of Yoga based Cardiac Rehabilitation programme (Yoga- CaRe), compared to the enhanced standard care group in patients following acute myocardial infarction on cardiac morbidity and mortality and also on quality of life.

Study sites- 16 Cardiac centres in India
Sample size- 4000 patients (250 per site)
Study design- Randomised Controlled Trial
Comparator- Enhanced standard care

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

CENTRE FOR CHRONIC DISEASE CONTROL

MRC Medical Research Council

Diet and Lifestyle Interventions for Hypertension Risk reduction through Anganwadi workers and Accredited Social Activist

DISHA is a cluster randomised controlled trial conducted across 10 sites in 120 clusters

- **Study Objective:** To test effectiveness of 'task shifting' to frontline community health workers for hypertension risk reduction in low resource setting. Intense vs standard IEC interventions on diet and lifestyle modifications delivered by existing community-level health-workers (ASHA or equivalent) on population level blood pressure
- **Do higher physical activity levels protect from hypertension in a high salt consuming active lean tribal rural, semi-urban Indian population**
- **Data being analysed**

A cluster is defined as a small village with 250-300 households and well defined geographical boundaries. 36, 000 participants



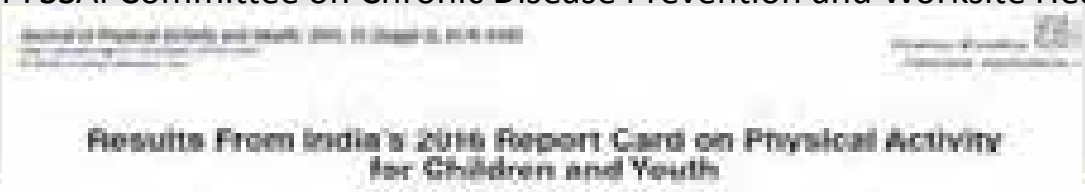


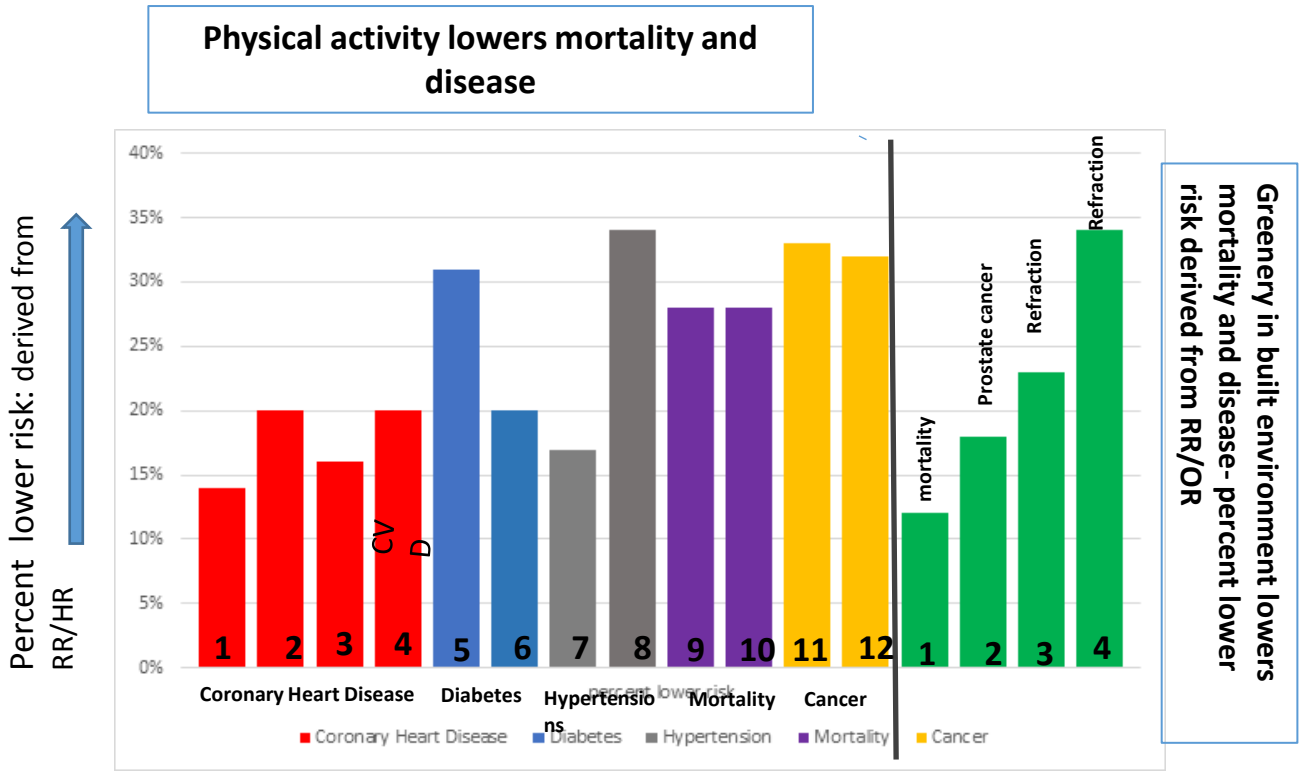

Centre of Excellence in Physical Activity & Health

- Contributed to India's 2016 Report Card on Physical Activity for Children and Youth
- Country lead – "Global Physical Activity Observatory,
- Lancet Physical Activity Series Working Group, 2012
- Lancet Physical Activity Series Working Group, 2016
- Lancet commentary " Urban design, Transport and Health'
- Commissioner, Lancet Commission on Obesity, CCDC recently had the India preview-workshop
- Technical support, Global Scientific committee for the 6th ISPAH
- Education committee of ISPAH
- Manual for policy makers 'Physical activity and Diet' in India .

Used by SEARo for other developing countries

- Part of FSSAI Committee on Chronic Disease Prevention and Worksite Health





Bar : 1, 2 – Sattelmair, J et al, Circulation, 2011, Aug, 1: 150 min. recreational moderate activity per week; 300 minutes recreational moderate activity per week

Bar 3: Lee IM, lancet 2012,

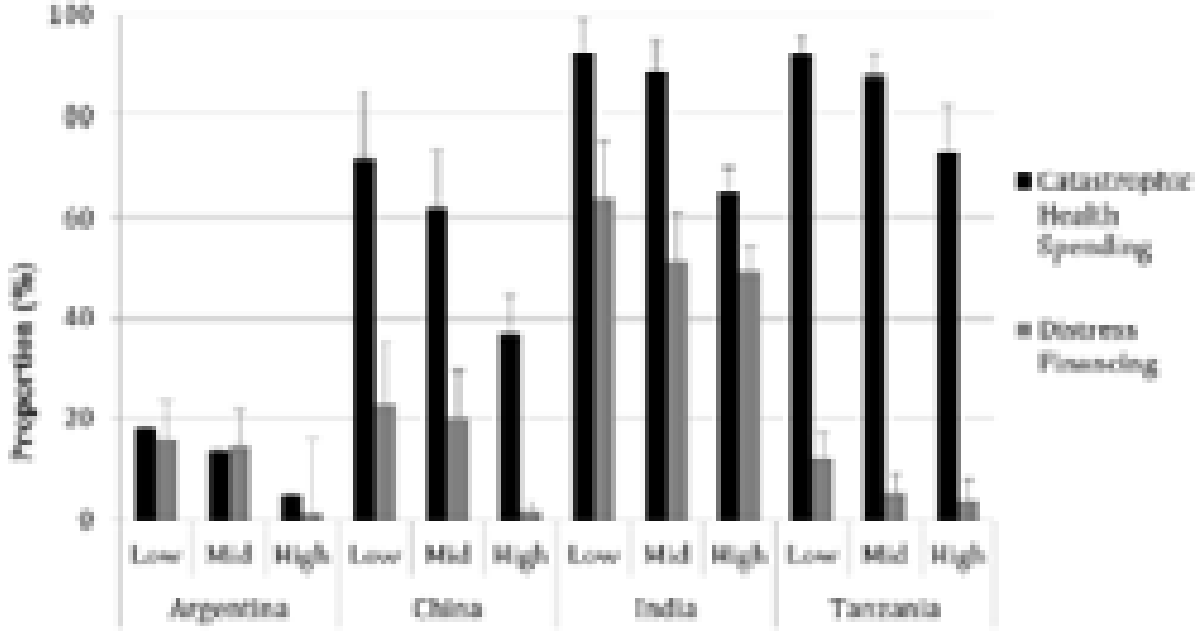
Centre of Excellence in Physical Activity & Health: Objectives

- Promote evidence informed policy making for physical activity and health
- Engage public and health professionals through media and health communication activities
- Conduct policy-relevant research across a range of physical activity and health issues in India
- Establish programs for education and training in physical activity for sports medicine practitioners, community groups and volunteers
- Cultivate a network of partners and collaborators to engage in multi-sectoral, cross-cultural action research, basic research and knowledge synthesis & communication

OPEN ACCESS Freely available online PLOS one

A Cross-Sectional Study of the Microeconomic Impact of Cardiovascular Disease Hospitalization in Four Low- and Middle-Income Countries

Mark D. Huffman[1,2], Krishna D. Rao[3], Andres Pichon-Riviere[4,5], Dong Zhao[5,6], S. Harikrishnan[7], Kaushiki Ramaiya[8], V. S. Ajay[2,3,9], Shifalika Goenka[7,8], Juan I. Caicagno[4], Joaquin E. Caporale[4], Shaoli Niu[5], Yan



Work-time decrease by > 73 %

Proportion of Individuals experiencing a catastrophic health spending, >40 % of non-food expenditure and distress financing following CVD related hospitalization divided by income strata

Yoga-CaRe Trial

- Largest cardiac rehabilitation trial assessing the effects of Yoga based Cardiac Rehabilitation Programme on cardiovascular morbidity and mortality in patients following acute myocardial Infarction.
- Primary outcome: Composite of all-cause mortality, non-fatal myocardial infarction, non-fatal stroke and emergency cardiac hospitalizations, and the patient's quality of life.
- The trial duration is 4 years with a median follow-up of 12 months for each participant (6 months minimum)
- 40000 participants, is expected to be completed by August 2018.
- Collaborator: LSHTM | Funding: ICMR, India and MRC, UK

ACS Quality Improvement in Kerala (ACS QUIK)

Study Design

- To evaluate the effect of a locally-developed, evidence-based health care quality improvement toolkit on 30-day major adverse cardiovascular events (MACE).

Study Design

- Multi-site, Stepped Wedge, Cluster Randomised Trial

Study Population

- Total 15,750 patients presenting with ACS: STEMI and NSTEMI from 63 hospital sites, across 12 districts, in Kerala, India

Study Intervention

- Locally-developed, evidence-based health care quality improvement toolkit compared to usual care

Study Timeline

- From November 2014 till November 2016

PHFI On-Campus Programs

Sr. No.	Name of the Programme	Location of IIPH
1	**Integrated MSc & PhD in Clinical Research* (2+3 years)**	Delhi NCR
2	**Integrated MSc & PhD in Health Informatics* (2+3 years)**	Hyderabad
3	**Master of Public Health (MPH)#** (2 years)**	Delhi NCR, Gandhinagar & Hyderabad
4	**Master of Hospital Administration (MHA) # (2 years)**	Gandhinagar
5	**Post Graduate Diploma in Public Health Management (PGDPHM)@(1 year)**	Bhubaneswar, Delhi NCR, Gandhinagar & Hyderabad
6	**Associate Fellow of Industrial Health (3 months short course)^**	Gandhinagar
7	**Short Course in Basic Data Analysis for the Health Sciences (3 months short course)**	Hyderabad

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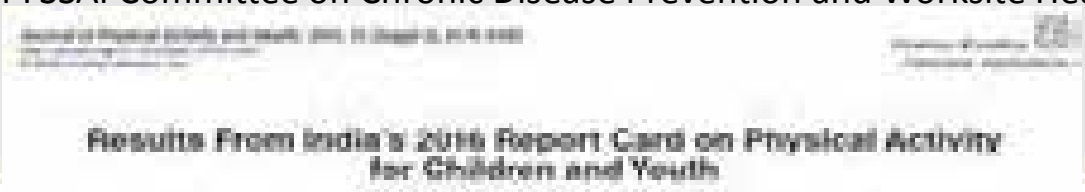


Certificate Course in Evidence Based Diabetes Management

Primary objective

- To enhance knowledge, skills and core competencies of Primary Care Physicians in the management of Diabetes

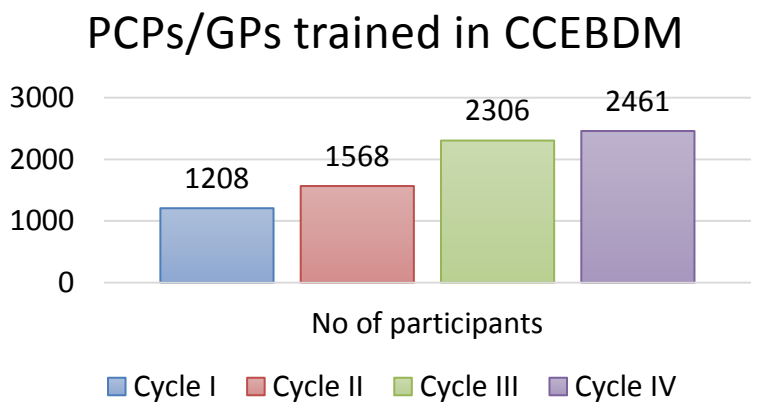
Secondary objectives

- To develop/update a standard teaching protocol and module for evidence based learning on Diabetes
- To build a network of Primary Care Physicians and specialists in the field of diabetes
- Update primary care physicians with the latest advancements in the field of diabetes

Cycle	State	Cities	Centers	National Experts	Faculty	Observers
Cycle I	18	57	100	15	128	61
Cycle II	20	65	119	15	149	84
Cycle III	20	73	134	15	164	84

Supported by an education fund from MSD

Certificate Course in Evidence Based Diabetes Management



States/UT 24, Cities 74
Center 130, Faculty 162

Geographical coverage of Cycle IV

International Accolades

Recognition by national bodies

CCEBDM model accepted by

- NRHM – Govt of Kerala to train their 125 medical officers
- Kolkata Municipal Corporation (KMC) to train 20 medical officers

For more information logon to www.ccebdm.org

Certificate Course in Gestational Diabetes Management

Course objectives

- To develop core skills and need based competencies in Primary care Physicians, Obstetricians and Gynaecologists for the practice of Gestational Diabetes Mellitus
- To establish their networks with existing specialized diabetes care centers, eminent Obstetricians and Gynaecologists for improving patient outcomes in Gestational Diabetes Mellitus

Cycle	State	Cities	Centers	National Experts	Faculty	Observers	Participants
Cycle I	17	39	55	15	110	25	1465
Cycle II	15	33	40	15	80	20	928
Cycle III (current cycle)	11	17	20	14	40	20	303, till date

Supported by an education fund from Johnson & Johnson

Private general practitioner's - role, diabetes, hypertension treatment

- 70-80 % of ambulatory health care
- Every 3rd-4th shop has a doctors 'shop'- in crowded areas
- Walk-in patients like a shop. Fickle clientele
- Patients negotiated rates at the door,
- Stiff unethical competition - undercutting – deprofessionalization, professional isolation
- Patients decided the type and quantum of services,-- slicing finely for 'rock bottom prices: (0.1; 0.2; 0.3. 0.5 USD dollars)

Source: Goenka S : Phd thesis

Poorer care for the poor and richer state-of-art care for the rich

- Barriers to Investigations(poor)/ all investigations(rich).
- Symptomatic approach, sliced fractured diabetes and CVD care(poor) - over- zealous, comprehensive(rich)



PhD thesis, Shifalika Goenka, unpublished

The Public Health Leadership and Implementation Academv for NCDs

AIM: To foster **"in-service public health professionals"** to become 'Public Health Leaders", who then become 'Game Changers', to be able to metamorphose approaches to prevention of NCD in India

Forty six professionals within and outside PHFI would be transformed into Public Health leaders, over five years;

A highly competitive selection process,

Consortium- D-43 (NIH; Fogarty International Center)

Physical Activity the miracle drug

Enhancing Physical Activity in daily living

Individual Approach

Focuses on changing behavior

High risk approach

Population Based Approaches

Structural approach, Legislation, taxation, public policy, ecological, or environmental measures

Green spaces/open spaces - casualties to land sharks
Preservations of Green parks and spaces promotes communities to be active

Encroachment, over construction, over commercialization
Stronger laws that will promote and protect open spaces and green spaces

Author: Shifalika goenka

MORE PEOPLE WALK

- Less Diabetes
- Less High blood pressur
- Less Strokes
- Less Heart attacks
- Less Accidents
- Longer lives
- More productive lives
- Healthy lives

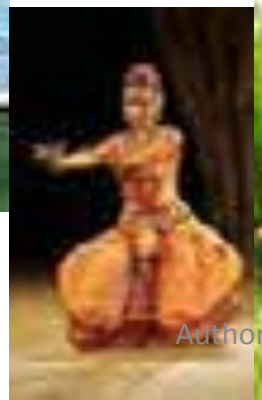
Pleasant and comfort is walking
Less sun + Lower temperatures
Lesser accidents

More shaded, dedicated pedestrians paths

Dedicated Shaded cycling paths will promote physical activity, prevent diseases, save fuel and promote safety of entire communities and populations

Shaded pedestrian paths increases physical activity, promotes health, prevents diseases and decreases accidents

Public Health through physical activity in daily living



Open green spaces promote communities and people of all ages and backgrounds to be physically active

Source Goenka S, Powering India's Growth

Freedom to buy and sell must be balanced by human concerns, by concerns of health and the environment

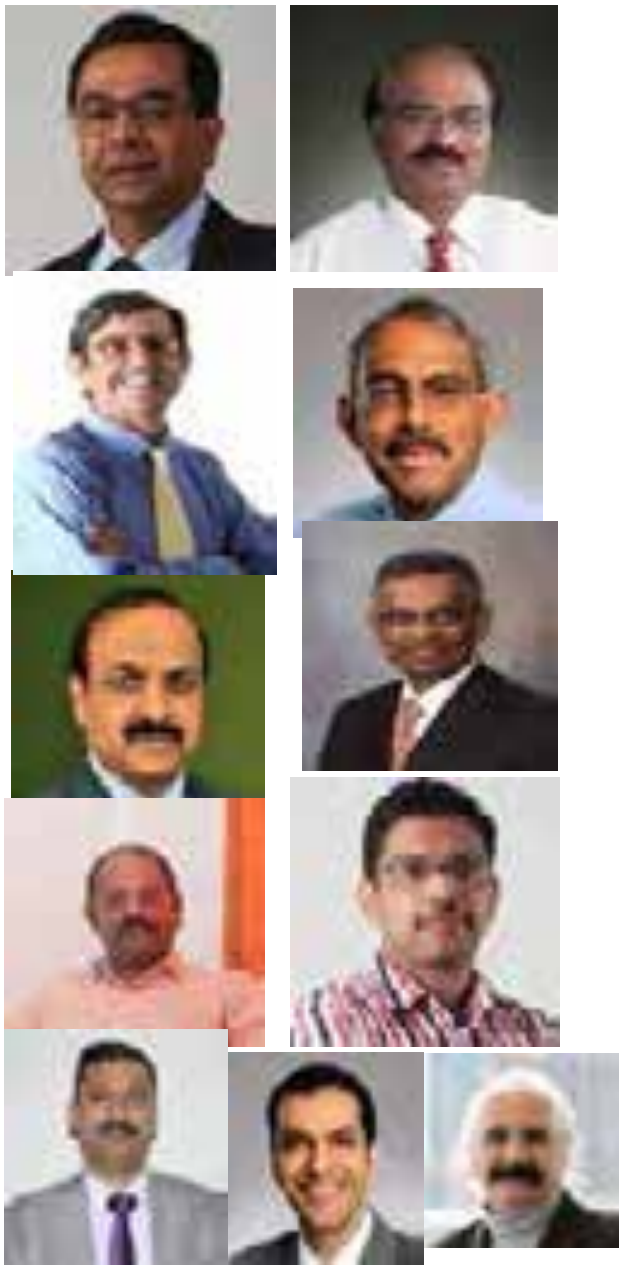
AMARTYA SEN

7 deadly sins

- Commerce without ethics
- Pleasure without conscience
- Politics without principle
- Knowledge without character
- Science without humanity
- Wealth without work
- Worship without sacrifice

Acknowledgements- Mentors and stakeholders

- **Dorairaj Prabhakaran, MD, DM, MSc**
- **KS Reddy, MD, DM, Msc (PHFI, CCCC)**
- **Nikhil Tandon (CCCC, CCDC, AIIMS)**
- **Pankaj Shah (Chair Diabetes- Mayo)**
- **Sanjay Zodpey (IIPHD, PHFI)**
- **Jeemon Panniyammakal (PHFI, CCCC)**
- **Ajay VS (CCCC, CCDC)**
- **Sandeep Bhalla**
- **K. M. Venkat Narayan, MD, MSc, MBA(PI)**
- **Mohammed K. Ali, MBChB, MSc, MBA(Co-PI, PD)**
- **P. Rafael Lozano Ascencio, MD, MSc(Mexico)**



CENTRE FOR CONTROL OF CHRONIC CONDITIONS

Thankyou

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