Cardiovascular Disease Prevention in India

Shifalika Goenka
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:**
- Communicable, maternal, neonatal: 37.9%
- NCDs: 10.7%
- Injuries: 8.5%
- Communicable, maternal neonatal, nutritional: 53.6%

**2016:**
- Communicable, maternal, neonatal: 61.8%
- NCDs: 27.5%
- Injuries: 10.7%

Population of India 1990: 870 million
Population of India in 2016: 1.3 million

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

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.

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)

- Uttarakhand: Low physical activity 67%, Urban 92%, Rural 58%
- Andhra Pradesh: Low physical activity 68%, Urban 78%, Rural 64%
- Tamil Nadu: Low physical activity 66%, Urban 71%, Rural 62%
- Kerala: Low physical activity 76%, Urban 75%, Rural 79%
- Mizoram: Low physical activity 71%, Urban 63%, Rural 79%
- Maharashtra: Low physical activity 81%, Urban 77%, Rural 86%
- Madhya Pradesh: Low physical activity 42%, Urban 32%, Rural 68%
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.
Deaths caused by traffic accidents is amongst the highest in the world

Pedestrians marginalized
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, Kolkata 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’s population is 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

DEVELOPED COUNTRIES

High density
Walkability increases

Low density
Walkability decreases

INDIA

High density
Walkability increases

Low density
Walkability decreases

VERY Low density

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
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) (for 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

<table>
<thead>
<tr>
<th>Category</th>
<th>Urban (Delhi) (% prevalence)</th>
<th>Rural (Haryana) (% prevalence)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Overweight (BMI ≥ 25)</td>
<td>35.2</td>
<td>47.6</td>
</tr>
<tr>
<td>“Overweight” (BMI ≥ 23)</td>
<td>54.4</td>
<td>64.9</td>
</tr>
<tr>
<td>Central Obesity</td>
<td>71.8</td>
<td>39.5</td>
</tr>
</tbody>
</table>

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

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

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,
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

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

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

Random Sample Cross-Sectional Survey (B) → 1st Follow-up Survey → 2nd Follow-up Survey (B) → 3rd Follow-up Survey → 4th Follow-up Survey (B) → 5th Follow-up Survey → 6th Follow-up Survey

Community Population → Cohort 1 → Random Sample Cross-Sectional Survey (B) → Cohort-2


NHLBI and United Health Groups
Emory university
National Institute of Health, via geohealth
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)
Low Physical Activity Cluster (Coldspot)
Green/open space and physical activity level

Open area

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

450,000 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

<table>
<thead>
<tr>
<th>Time (months)</th>
<th>Patients Screened</th>
<th>Patients diagnosed</th>
<th>OP Clinics</th>
<th>Nurse Coordinators</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>21,000</td>
<td>6600</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

EDSS +EHR

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

<table>
<thead>
<tr>
<th>First Time Detections</th>
<th>Drop in Systolic BP</th>
<th>Drop in Diastolic BP</th>
<th>Drop in Glucose Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>15 mmHg</td>
<td>7 mmHg</td>
<td>50 mg/dl</td>
</tr>
</tbody>
</table>

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
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
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 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
Physical activity lowers mortality and disease

- Coronary Heart Disease
- Diabetes
- Hypertension
- Mortality
- Cancer

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

Mark D. Huffman1,2, Krishna D. Rao3, Andres Pichon-Riviere4,5, Dong Zhao5,6, S. Harikrishnan7, Kaushika Ramaiya8, V. S. Ajay2,3,9, Shitalika Goenka2,3, Juan I. Calcagno4, Joaquin E. Caporale4, Shaoli Niu9, Yara

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

Work-time decrease by > 73%
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
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Programme</th>
<th>Location of IIPH</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Integrated MSc &amp; PhD in Clinical Research* (2+3 years)</td>
<td>Delhi NCR</td>
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<tr>
<td>2</td>
<td>Integrated MSc &amp; PhD in Health Informatics* (2+3 years)</td>
<td>Hyderabad</td>
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<tr>
<td>3</td>
<td>Master of Public Health (MPH)#** (2 years)</td>
<td>Delhi NCR, Gandhinagar &amp; Hyderabad</td>
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<tr>
<td>4</td>
<td>Master of Hospital Administration (MHA)# (2 years)</td>
<td>Gandhinagar</td>
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<tr>
<td>5</td>
<td>Post Graduate Diploma in Public Health Management (PGDPHM)@ (1 year)</td>
<td>Bhubaneswar, Delhi NCR, Gandhinagar &amp; Hyderabad</td>
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<tr>
<td>6</td>
<td>Associate Fellow of Industrial Health (3 months short course)^</td>
<td>Gandhinagar</td>
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<tr>
<td>7</td>
<td>Short Course in Basic Data Analysis for the Health Sciences (3 months short course)</td>
<td>Hyderabad</td>
</tr>
</tbody>
</table>
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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

<table>
<thead>
<tr>
<th>Cycle</th>
<th>State</th>
<th>Cities</th>
<th>Centers</th>
<th>National Experts</th>
<th>Faculty</th>
<th>Observers</th>
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</thead>
<tbody>
<tr>
<td>Cycle I</td>
<td>18</td>
<td>57</td>
<td>100</td>
<td>15</td>
<td>128</td>
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<td>Cycle II</td>
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<td>Cycle III</td>
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<td>73</td>
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<td>15</td>
<td>164</td>
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</table>

Supported by an education fund from
Certificate Course in Evidence Based Diabetes Management

PCPs/GPs trained in CCEBDM

<table>
<thead>
<tr>
<th>Cycle</th>
<th>No of participants</th>
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<td>I</td>
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<tr>
<td>II</td>
<td>1568</td>
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<tr>
<td>III</td>
<td>2306</td>
</tr>
<tr>
<td>IV</td>
<td>2461</td>
</tr>
</tbody>
</table>

International Accolades

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

Geographical coverage of Cycle IV

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

<table>
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<tr>
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<th>Observers</th>
<th>Participants</th>
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<td>55</td>
<td>15</td>
<td>110</td>
<td>25</td>
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<td>Cycle II</td>
<td>15</td>
<td>33</td>
<td>40</td>
<td>15</td>
<td>80</td>
<td>20</td>
<td>928</td>
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<tr>
<td>Cycle III (current cycle)</td>
<td>11</td>
<td>17</td>
<td>20</td>
<td>14</td>
<td>40</td>
<td>20</td>
<td>303, till date</td>
</tr>
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</table>

Supported by an education fund from...
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 Academy 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

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More shaded, dedicated pedestrian paths

Pleasant and comfortable walking
- Less sun
- Lower temperatures
- Lesser accidents

More people walk
- Less Diabetes
- Less high blood pressure
- Less strokes
- Less heart attacks
- Less accidents
- Longer lives
- More productive lives
- Healthy lives

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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.

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
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