Centre for Chronic Disease Control (CCDC) is an independent and not-for profit biomedical research organization, based in New Delhi, India. CCDC is driven by a passion to promote and protect human health in India and the world at large.

**Mission**
To address the growing challenge of chronic diseases, in varied settings of developing countries through:
- Knowledge generation, which can inform policies and empower programmes for the prevention and control of chronic diseases
- Knowledge translation intended to operationalize research results by bridging the critical gaps between relevant research and effective implementation, through analytic work, capacity building, advocacy and development of educational resources for enhancing the health of people and empowerment of public health professionals.

**CCDC Milestones**

- **Inception as a Society under Societies Registration Act, 1860** (21 Dec 2000)
- **Scientific Secretariat of IC-Health** (21 Dec 2000)
- **DSIR recognition as a Scientific and Industrial Research Organization** (3 Mar 2009)
- **Functioning as Scientific & Executive Secretariat of CoE-CARRS** (8 Jun 2009)
- **DBT recognition as CoE in Clinical Research** (29 Jan 2013)
- **WHO Collaborating Center for Surveillance, Translational Research and Capacity Building in the South East Asia Region** (16 Jan 2014)

**Clinical Research at CCDC**
CCDC undertakes clinical research in various domains of health care with special emphasis on chronic non-communicable diseases. Within the spectrum of chronic diseases, our main focus areas are: cardiovascular disease, diabetes and metabolic disease, cancers and mental health. In addition, basic science research in diet/nutrition and cardiac biochemistry complete the list.

Within these domains CCDC engages in clinical research, scientific writing, health informatics, data analysis, consultancy, training, policy advocacy and scientific secretarial assistance to international research bodies.
Institute Focus

Research at CCDC focuses on

- Understanding the underlying mechanism of increased risk of cardiovascular disease (CVD) among Indians,
- Developing a model CVD surveillance program in partnership with Public Health Foundation of India,
- Research into developing low cost preventive solutions for secondary prevention of CVD, and
- Innovative use of information technology and traditional methods in the prevention and management of CVD and its risk factors.

CCDC in partnership with Public Health Foundation of India is implementing a cohort modelled surveillance project for cardio-metabolic disease (CMD) and its risk factors which can be adopted for continuing surveillance both within and across countries in South Asia. The first cohort has completed three years of follow up and the second cohort is recruiting participants. Several sub-studies branch out from the surveillance study which includes a wide array of research aspects.

CCDC has led and partnered in many important trials within India and across the globe. Many of them centre on the principle of implementing low-cost, innovative, scalable and sustainable strategies for cardiovascular risk reduction such as the CARRS translation trial, UMPIRE, STITCHES, CORONARY, SIMCARD trial. One of our demonstration projects, the mPOWER heart project involves the use of trained nurses for improving the access to CVD care at primary care and to integrate smartphone-based clinical decision support systems (mDSS) to aid physicians and nurses in practicing evidence based medicine for hypertension/diabetes in order to improve the quality of care.

Results from these studies have produced major insights into the epidemiology, developmental origin and biomarkers of CVD and diabetes in India, translation research in CVDs, and development of low-cost combination drugs for CVD prevention in South Asia.

Schematic view of research at CCDC

- Observational Studies
  - Completed: Rural Andhra Pradesh Cardiovascular Prevention Study.
  - Ongoing: STICHES
- Clinical & Translation Trials
  - Completed: STICH Trial (Surgical treatment for Ischaemic heart failure).
  - Ongoing: ADVANCE Trial, SIMCARD-Simplified Cardiovascular management Study, UMPIRE Trial: Use of a Multidrug Pill in Reducing cardiovascular Events, ZESCA Trial (ZRYAN): An effective smoking cessation aid following ACS.
- The CARRS - Surveillance Study.
- Solar Surveillance Study
- INTER-CIF
- STITCHES
- Prevalence of CVD and its risk factors in urban and rural areas of NCR a repeat Survey
Institute Focus

Capacity Building at CCDC

CCDC is engaged in a plethora of capacity building activities with several collaborating partners. A network of researchers from across the globe has been established to enhance the research capacity for CVD health.

- CCDC as the scientific secretariat of the Initiative for cardiovascular health research in developing countries (IC-Health), established a network of researchers in 24 developing countries, enhancing the research capacity for CVD health research in these nations.

- Under the Millennium Promise Award, CCDC in collaboration with Emory University provides short-term interdisciplinary training on non-communicable diseases (NCDs) with focus on the epidemiology and prevention of NCDs across the life-course and cross-cutting areas.

- Other capacity building programmes include the ASCEND and SHARE projects for NCDs and mental health respectively. The Asian Collaboration for Excellence in Non-Communicable Disease (ASCEND) is a non-communicable disease (NCD) capacity building program of the Asian Non-Communicable Disease Research Network. The South Asian Hub for Advocacy, Research and Education on Mental Health (SHARE) Study SHARE is a training and capacity building project. The broad study aims are to establish a collaborative network of institutions in South Asia for reducing treatment gaps for mental disorders in the region through task-shifting and research capacity building and disseminating evidence to partners and collaborating with other Hubs.

- Serves as an implementing partner for the Fogarty International Clinical Research Training Site at PHFI. The outcome of the training has been highly encouraging. There have been over 50 research publications by the fellows and several grant applications have been approved to generated funding support.

- Organised the 42nd and 47th Annual teaching seminar on CVD Epidemiology and Research Methods conducted by the International Society for Cardiovascular Epidemiology and Prevention in the years 2009 and 2014 respectively.

- Instrumental in organising several seminars on CVD epidemiology, INDO-US Advanced Training Seminar on Nutritional Epidemiology.

Policy Advocacy

CCDC has been a key player in advocacy for framing policy guidelines.

- Assisted the Government of India in developing the National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke.
- Technical assistance to WHO (SEARO) in their capacity strengthening initiative for policy makers and program managers in the SEARO region.
- Helped develop the regional policy note for the World Bank on NCDs.
- Helped formulate a set of standards for various primary care and district level hospitals for the India Public Health Standards (IPHS) under Government of India’s National Program on Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke (NPCDSC).
- Involved in editing journals including a special issue on cardiovascular disease from the Indian Journal of Medical Research, Global Heart and the Disease Control Priorities Network (DCPN); 3rd edition.

Research from CCDC has produced large number of peer reviewed publications in many high impact journals.

- Average impact factor: 9.72
- Policy briefs to World Bank/ WHO/ Government of India
- Translational potential: The work site program has been cited as an example to emulate by Institute of Medicine (Washington) and the World Economic Forum (WEF)
Aortic/brachial pulse wave velocity ratio a better marker of vascular and prognosis stiffness?

The composition of the arterial wall changes from central arteries such as the aorta, where elastin content is high, to peripheral arteries, where collagen content is dominant. Furthermore, the arteries become stiffer with increasing age and with disease. Of note, this increased stiffness with age is more prominent in the central arteries than in the peripheral vessels, and is referred to as aortic-brachial stiffness mismatch. These alterations will enhance the transmission of pulsatile energy into the microcirculation and may increase the risk of microvascular organ damage with increasing age and disease.

An increased arterial stiffness increases pulse wave velocity (PWV), and the carotid-femoral PWV is well recognized as a measure of aortic stiffness. Furthermore, carotid-femoral PWV has been shown to associate independently to cardiovascular morbidity and mortality. This was shown early in patients with end-stage kidney disease and haemodialysis[1], a group of patients attending regular medical care and with progressive atherosclerotic disease and a very high risk of cardiovascular events. Of interest, patients in haemodialysis show no relation between carotid-radial PWV and outcome[2], and an enhanced aortic-brachial stiffness mismatch over time[3], suggesting that the aortic/brachial PWV ratio may provide valuable prognostic information.

Fortier et al now examined the ratio carotid-femoral PWV to radial-femoral PWV (i.e. aortic/brachial PWV ratio) in relation to mortality in 310 patients in dialysis during a median follow-up of 29 months [3]. Mean age was 67 years and 60% were male; diabetes was present in 43%. Almost half of the patients (146; 47%) died during follow-up. The hazard ratio for aortic/brachial PWV ratio for mortality was 1.43 (95% confidence interval 1.24–1.64; P <0.001) per 1 SD, and this remained significant also after adjustment for confounding factors. The associations for carotid-femoral and carotid-radial PWV, augmentation index, pulse pressure amplification, and other markers of arterial stiffness were weaker and no more significant when adjusted for confounding factors.

This is the first study to show that aortic-brachial mismatch assessed by the aortic/brachial PWV ratio is a stronger marker for mortality than currently used indices of vascular stiffness. Although not unexpected, these novel findings are important as they may suggest a way to improve risk stratification by the use