Addressing the Growing Burden of **Non-Communicable Diseases** in an Urbanising, Heat-Stressed **Karnataka**



SELCO Foundation

This document examines how Karnataka can address its growing disease burden through a three-pronged lens:

1



Understanding the **Non-Communicable Disease burden** in **Karnataka**

2



Recognizing how **climate change** exacerbates these burdens, **creating a perfect storm** of health risks.

3



Exploring innovative, **portable medical technologies for last-mile** healthcare delivery

Karnataka's Context and Climate







Karnataka is India's **sixth-largest state** by area, spanning about 750 km from north to south and about 400 km from east to west

28 of 30 districts have **populations above 10 Lakhs**

It has a **diverse geography** - coastal plains, mountains, plains and plateaus

Karnataka's Context and Climate



It is **highly urbanised** with 80 cities under the national urban health mission. The rural counterpart is also large, reaching 3.7 Cr people.



Temperatures range from **over 40°C during summer** to below 20°C during winter



Karnataka faces **climate risks, such as floods and droughts**. A recent study identified 15 districts vulnerable to these extremes.

Source: Outlook Planet

Karnataka's Growing Health & System Stress

Rising Disease Burden

Non-Communicable Diseases (NCDs) now dominate (65% of disease burden), alongside Communicable, Maternal, Neonatal and Nutritional Diseases (CMNNDs, 21%). Deaths from cardiovascular disease are nearly five times higher than COVID-19 deaths, revealing a dual burden of chronic and infectious illness.

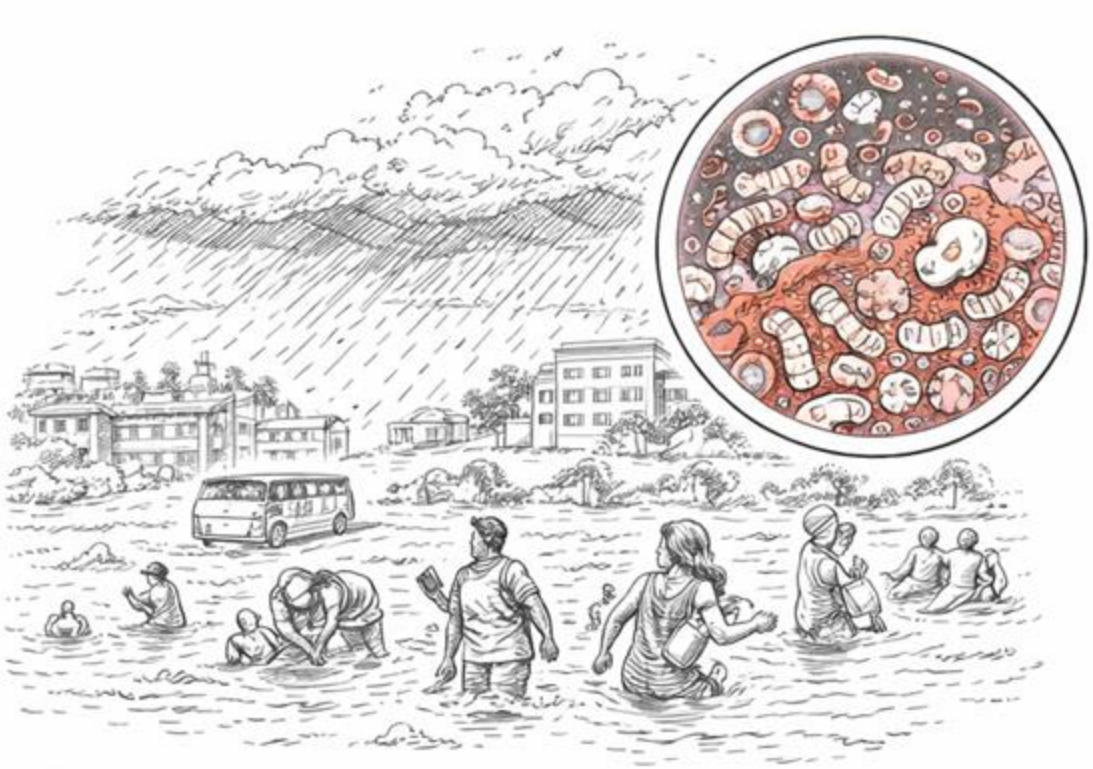
Source: NHSRC Health Dossier 2021



Karnataka's Growing Health & System Stress

Climate Intensifying Health Risks

Rising heat, erratic rainfall, flooding and air pollution are accelerating dengue (1,186 cases by April 2025), diarrheal diseases, respiratory infections and tuberculosis (TB) vulnerability, placing growing strain on already fragile health systems

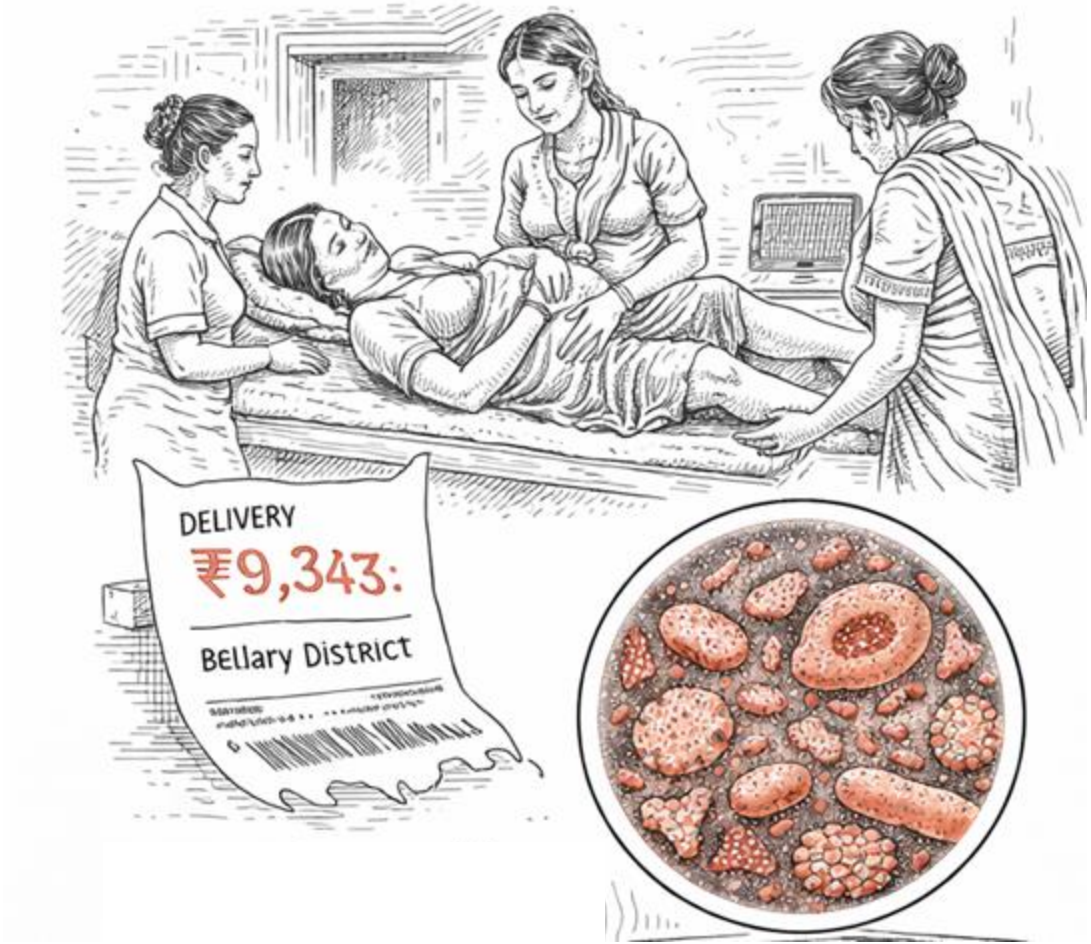


Karnataka's Growing Health & System Stress

Fragile Health System & Equity Gaps

Despite a 41% reduction in Maternal Mortality Ratio (MMR), Karnataka continues to face persistent nutrition and health-system challenges. NFHS-6 (2023–24) shows that 18.7% of children under five are wasted, 26.5% are stunted, and 27.8% are underweight; only 18.3% of children aged 6–23 months receive an adequate diet. While postnatal care within two days of delivery has improved to 93.6%, the state's caesarean-section rate has risen sharply to 45.7%, with 63.8% of private-facility births delivered by C-section. These pressures coexist with a shrinking Primary Health Centre (PHC) workforce (11.7% decline), difficult geographic access, and rising Out-of-Pocket Expenditure (OOPE), including a ₹9,343 increase in delivery costs in Bellary district.*

Source: NHSRC Health Dossier 2021
NFHS-6



Common non-communicable diseases (NCDs) represent the greatest health burden in Karnataka



Karnataka shows **higher hypertension risk** than the national average for both women (**14.8% vs 12.4%**) and men (**17.2% vs 15.7%**).

CVDs: Leading cause of death in age groups **40-69 (37.2%) and 70+ (36.8%)** years; major contributor to DALYs (Ischemic heart disease).



Tobacco use among men is much lower in Karnataka (**27.1%**) compared to India (**38%**), though still a major risk.

COPD: major cause of DALYs; **chronic cough prevalence 2.5%, chronic phlegm 1.2% in Mysore district**; tobacco smoking major risk factor.



High blood sugar remains significant in Karnataka (**5.7% women; 6.6% men**), only slightly lower than India.

Diabetes Mellitus Type II: 30.18% diagnosed diabetes; **36.21% prediabetes** among screened individuals; higher prevalence in **40-64 age group.**



Alcohol consumption in Karnataka mirrors national levels for both men and women.

Cancers: Karnataka contributes to about 6.2% of India's cancer cases, with a steady increase in incidence, especially in urban areas like Bengaluru due to lifestyle and environmental factors.

Source: NHSRC Health Dossier 2021

Climate Change exacerbates the burden of NCDs in Karnataka



Rising temperatures increase risk of heat stress and ischemic heart disease, especially among **elderly** (40–70+ age group most affected by CVDs).



Heat stress is rising **significantly in the North Interior districts** (**Bidar, Kalaburgi, Yadgir, Raichur, Ballari, Vijayapura**) thus increasing the risks for CVDs.



Studies link heat exposure to increased **cardiovascular mortality.**



Climate change worsens **air quality (ozone, PM2.5 levels)**, especially in urban centers like **Bengaluru**.



Aggravates **COPD and chronic phlegm** (notably high in **Mysore**).



Asthma cases in Bengaluru have risen by 25% over the past five years, with **children** comprising 19.4% of cases.

Karnataka's government has launched a **multi-pronged strategy to address the rising burden of NCDs,** focusing on prevention, **early detection, and integrated care**



NPCDCS/NP-NCD (National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke)

- Establishment of NCD Cells at state and district levels, and NCD clinics at district hospitals and CHCs
- Free diagnostics, essential medicines, and follow-up for major NCDs
- Cardiac Care Units for emergency cardiac care and specialized cancer centers (e.g., Kidwai Cancer Hospital)

Gruha Arogya Yojana

Door-to door NCD screening and follow up at the community level

Within the existing government programs, certain technologies can enhance program delivery. They would facilitate timely referrals, lower mortality rates, and improve treatment outcomes by ensuring early intervention and continuous care.

Screening

Portable devices would play an important role in supporting initiatives that aim at door-to-door health delivery.



Digital BP Devices (Battery, Solar, Wearables) Used for monitoring blood pressure to detect and manage hypertension early.



Glucometers (Pin-prick, Non-invasive, Continuous Monitoring) Tracks blood glucose levels to screen for and manage diabetes.



Fundus Cameras + AI (Diabetic Retinopathy) Screens for diabetic eye complications, preventing vision loss.



Vision Screening Devices Assesses visual acuity and detects early signs of eye-related NCD complications.

Innovative and portable screening devices for breast, cervical, and oral cancers enable early detection and triage, particularly in low-resource settings.



Thermal Imaging for Breast Cancer Non-invasive early detection of breast lumps using temperature differences.
Piezoelectric Scanning Mechanical sensing for detecting breast masses (palpation-like method).



Portable Digital Colposcopy with VIA + AI/Telemedicine (also listed under diagnosis) Visual inspection of the cervix for identifying precancerous lesions.
HG–CIN Screening Device (High Grade–Cervical Intraepithelial Neoplasia) Specialized tool for detecting advanced cervical cell changes.



Intra-Oral Camera with/without Fluorescence + AI/Telemedicine Used for early detection of oral lesions or abnormalities.
Smartphone Camera for Oral Screening Visual identification of oral cancer signs during outreach.

Inadequate specialists at the last mile can be met with Health kiosks/teleconsultation services, etc.

Diagnosis



Portable Colposcopy with VIA + AI Used to assess cervical abnormalities with AI support for better accuracy.



Telemedicine Support for Image Review Expert review of oral and cervical images to confirm pre-cancer or cancer.



ECG Devices (12-lead, touch-based, Tele-ECG) Diagnosis cardiac arrhythmias and other heart conditions.



Chemistry & Hematology Analyzers Used to diagnose diabetes, kidney function issues, and blood disorders.



AI Microscopy (Peripheral Smears) Supports diagnosis of blood abnormalities (e.g., anemia) using AI-enhanced slide analysis.

Follow-Up



AI/Telemedicine Platforms (Image Review, Referral Advice) Used to confirm screening /diagnostic findings and guide referrals or treatment



Health ATMs/Kiosks Allow patients to access basic health checks like BP/glucose monitoring in community settings.



Self-service BP/Glucose Wearables Enables patients to continuously monitor and manage chronic conditions at home.

Strengthening Urban Health Resilience

JP Nagar's Climate-Responsive UPHC



The installation of easy-to-access IEC rack and a number of PoC tests has saved time of the community and also helped in better patient management

Dr Geetha, Medical Officer in-charge

JP Nagar Urban Primary Health Centre (UPHC), serving 88,000 people, lacked pathology services, forcing 30% of diagnostic samples (smears) to be referred weekly, delaying treatment; staff also lacked skills to detect heart murmurs in children and could not conduct TSH, HbA1c, and full ANC profiling.

SELCO Foundation strengthened the facility with hybrid solar power, improved ventilation, and deployed point-of-care diagnostics including hematology analyzer, digital microscope, digital & tele-stethoscope, kidney, liver and heart PoCT devices, TSH and UTI test kits.

These upgrades enabled in-house diagnostics and tele-pathology, sharply reducing referrals and waiting time.

As a result, patient management improved, staff productivity increased, and the centre strengthened preventive and primary care for NCDs and infections.

Why the Last Mile Matters

The rising burden at the last mile will remain unaddressed without early detection and diagnosis.



To reduce the **care burden** at higher facilities, as well as **mortality and morbidity rates.**



Floods, heatwaves, and seasonal outbreaks repeatedly disrupt care, forcing communities to travel long distances for basic diagnosis and treatment.



Addressing rising disease burden requires bringing resilient, **portable healthcare closer to people—where systems are weakest and risks are highest.**

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Please get in touch for more information:

info@selcofoundation.org
www.selcofoundation.org

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This document is part of a wider series on state level public health burdens -

- Addressing **Communicable Diseases** in the Face of Climate Change in **Odisha**
- Addressing **Maternal and Child Care** in the Face of Climate Change in **Assam**