Government of Tamil Nadu

Health & Family Welfare Department

Strategy for Prevention and Management of Non Communicable Diseases

TNHSRP
Access, Equity, Quality

Tamil Nadu Health System Reform Program
(Program for Results supported by World Bank)

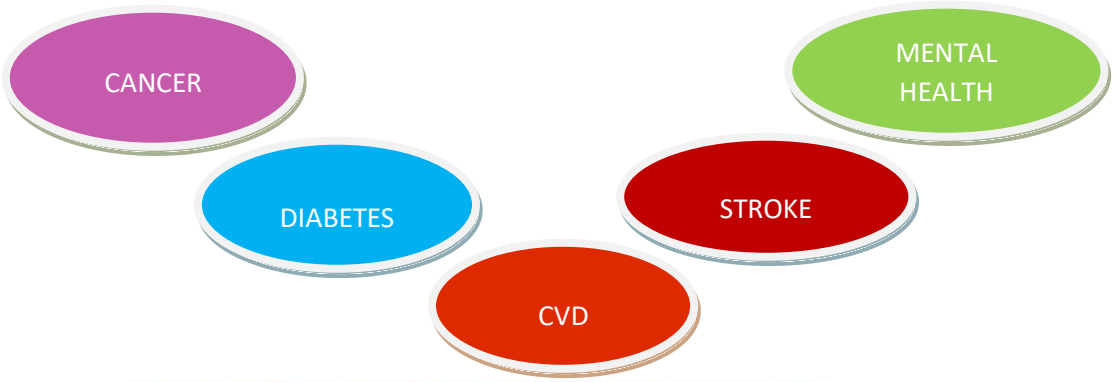
WORLD BANK

Strategy for Prevention and Management

of

Non-Communicable Diseases

Tamil Nadu



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LIST OF ACRONYMS

ASHA	Accredited Social Health Activist
AW	Anganwadi Worker
AYUSH	Ayurveda, Yoga & Naturopathy, Unani, Siddha, Homeopathy
BCC	Behavioral Change Communication
BMI	Body Mass Index
CBE	Clinical Breast Examination
CMCHIS	Chief Minister's Comprehensive Health Insurance Scheme
CME	Continuing Medical Education
CoS	Committee of Secretaries
COTPA	Cigarettes and Other Tobacco Products Act
CVA	Cerebrovascular Accident
CVD	Cardiovascular Diseases
DALY	Disability Adjusted Life Year
DDHS	Deputy Director of Health Services
DM	Diabetes Mellitus
DME	Directorate of Medical Education
DMS	Directorate of Medical Services
DPH	Directorate of Public Health and Preventive Medicine
DPO	District Program Officer
EIA	Environment Impact Assessments
ESIC	Employees' State Insurance Corporation
FCTC	Framework Convention on Tobacco Control
FSSAI	Food Safety and Standards Authority of India
GH	Government Hospital
GST	Goods and Services Tax
HFSS	Foods High in Fats, Salt, and Sugar
HMIS	Health Management Information System
HR	Human Resource
HRMIS	Human Resource Management & Information System
HSC	Health Sub Center
HT	Hypertension
HTA	Health Technology Assessment
HWC	Health and Wellness Centre
ICDS	Integrated Child Development Services
IEC	Information, Education, Communication
IVR	Interactive Voice Response
JD	Joint Director

LMIC	Lower and Middle-Income Countries
LPG	Liquefied Petroleum Gas
MCH	Maternal and Child Health
MO	Medical Officer
NCD	Non-Communicable Diseases
NFHS	National Family Health Survey
NHM	National Health Mission
NIRT	National Institute for Research in Tuberculosis
NOHP	National Oral Health Programme
NPCDCS	National Programme for Prevention and Control of Cancer, Diabetes Cardiovascular Diseases and Stroke
OOPE	Out of Pocket Expenditure
PBS	Population-based Screening
PDS	Public Distribution System
PEN	Package of Essential Non-communicable diseases
PHC	Primary Health Centre
PM-JAY	Pradhan Mantri Jan Arogya Yojana
PMNDP	Pradhan Mantri National Dialysis Program
PSG	Patient Support Group
PUFA	Poly Unsaturated Fatty Acids
QoC	Quality of Care
SDG	Sustainable Development Goals
SHDRC	State Health Data Resource Centre
SHS	State Health Society
SMS	Short Messaging Service
SSB	Sugar Sweetened Beverages
STEMI	ST Elevation Myocardial Infarction
STEPS	Step wise approach to Surveillance
TAEI	Tamil Nadu Accident and Emergency care Initiative
TAN-QuEST	Tamil Nadu Quality Enhancing Structured Training
TAPS	Tobacco Advertising, Promotion and Sponsorship
TASMAC	Tamil Nadu State Marketing Corporation
TNHSP	Tamil Nadu Health Systems Project
TNMSC	Tamil Nadu Medical Services Corporation
UGPHC	Upgraded Primary Health Centre
UHC	Universal Health Coverage
USG	Ultrasonogram
VIA	Visual Inspection with Acetic acid
WHO	World Health Organization
WHV	Woman Health Volunteer

1. Introduction

Tamil Nadu has forged ahead as one of the model states in the country. It has made great progress in improving the health of its people through improved infectious disease control and maternal and child care. This has led to increased life expectancy. This progress is however being threatened by the rising incidence of non-communicable diseases (NCD). With enhanced life span one can also anticipate the NCDs to increase. NCDs namely cardiovascular diseases, diabetes, cancer, chronic respiratory diseases, and mental disorders are currently the leading causes of death and disability in Tamil Nadu.

The rising burden of NCDs may be attributed to the growing exposure to modifiable risk factors, particularly tobacco use, harmful use of alcohol, physical inactivity, unhealthy diet, and air pollution. The NCDs now pose a danger to the welfare of the individual, the household, and the nation as well. Thus, the prevention and management of NCDs are of prime importance as these diseases lower the quality of life, impair economic growth and place a heavy, rising demand on families. Healthcare costs due to NCDs can increase the risk of high out-of-pocket expenditure and may push households into poverty and in turn challenge the economic and social prosperity of the nation. NCDs result in large indirect costs due to related premature mortality reduced productivity and high treatment costs. Unless the NCD epidemic is addressed, the mounting impact of NCDs will continue and the goal of reducing poverty will be undermined. Tamil Nadu can reverse this dangerous trend only if it fights it with a planned collaborative effort.

Considering the current burden of NCDs and resource requirements for their preventive measures, this strategy document will address the following diseases and their risk factors.

- Cardiovascular diseases (which include coronary heart diseases [CHD], cerebrovascular diseases [CVD], and hypertension)
- Diabetes mellitus
- Cancers (emphasis on Oral, Breast, and Cervix)
- Mental health

The NCD strategy is essential to give NCDs an appropriate priority and to organize resources efficiently. The emphasis is on promoting the health and well-being of the population by preventing NCDs associated with modifiable risk factors, providing acute and integrated long-term care for people with NCDs, and maximizing their quality of life.

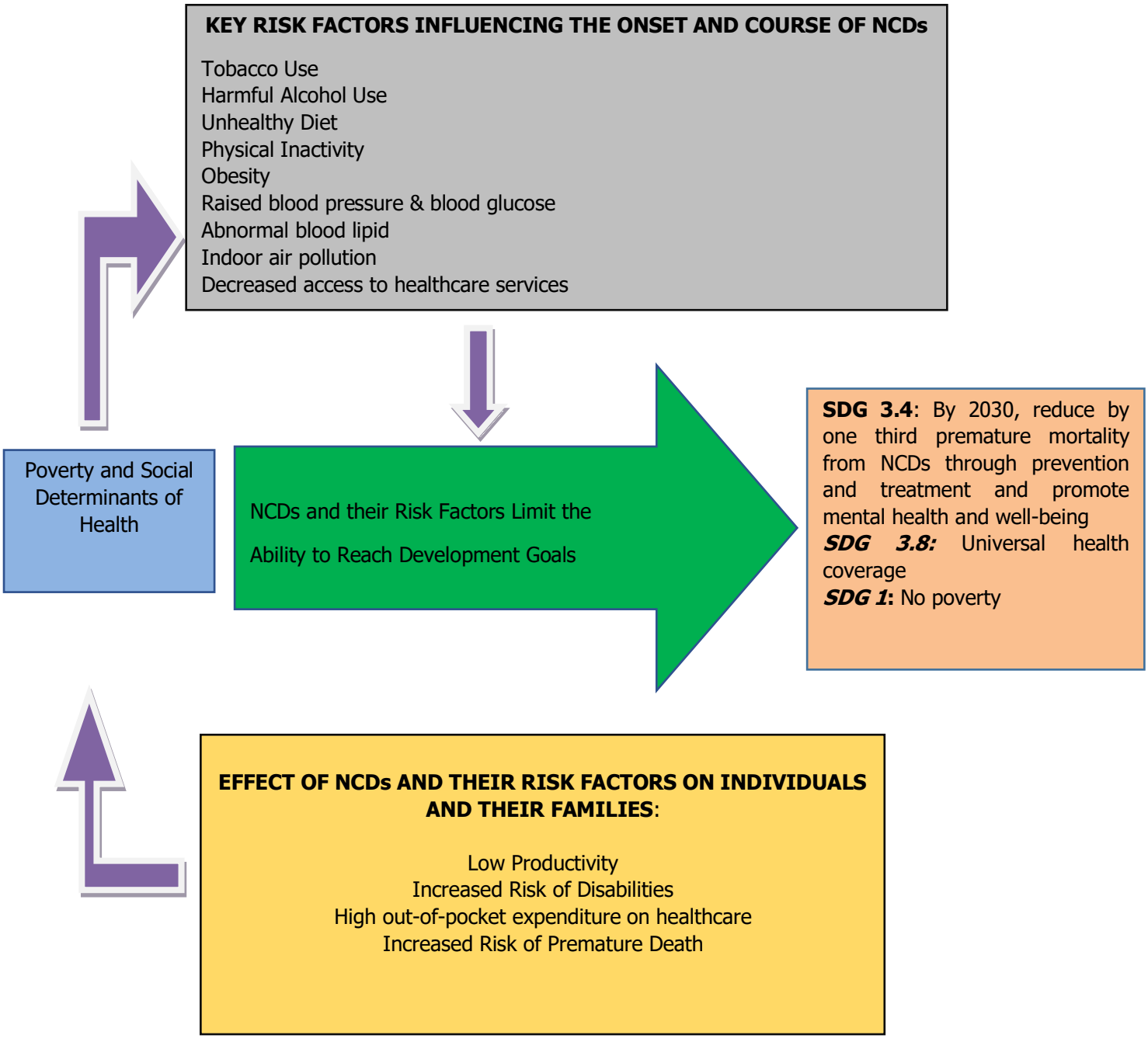


Figure 1: NCDs across SDGs – an overview

2. Purpose, Vision & Guiding Principles

Purpose

The NCD strategy provides a blueprint for the State to tackle the growing burden of NCDs within the specific socio-economic, cultural, and health systems contexts of the state. High-level political commitment, sustained financial support, and the concerted involvement of government, communities, and other stakeholders in society is the cornerstone of this NCD Strategy.

Implementation of this strategy will be monitored through a set of indicators that are consistent with the NCD Global Monitoring Framework. The strategy will ensure a holistic approach embracing policy, legal and structural components necessary to address complex social determinants of NCDs and their risk factors.

Vision

"A State where everyone is free from preventable morbidity and mortality due to NCDs"

Guiding Principles

Tamil Nadu provides free health care services at the point of use to its public. Accordingly, the principles that have guided the formulation of this strategy include:

Adoption of a life-course approach

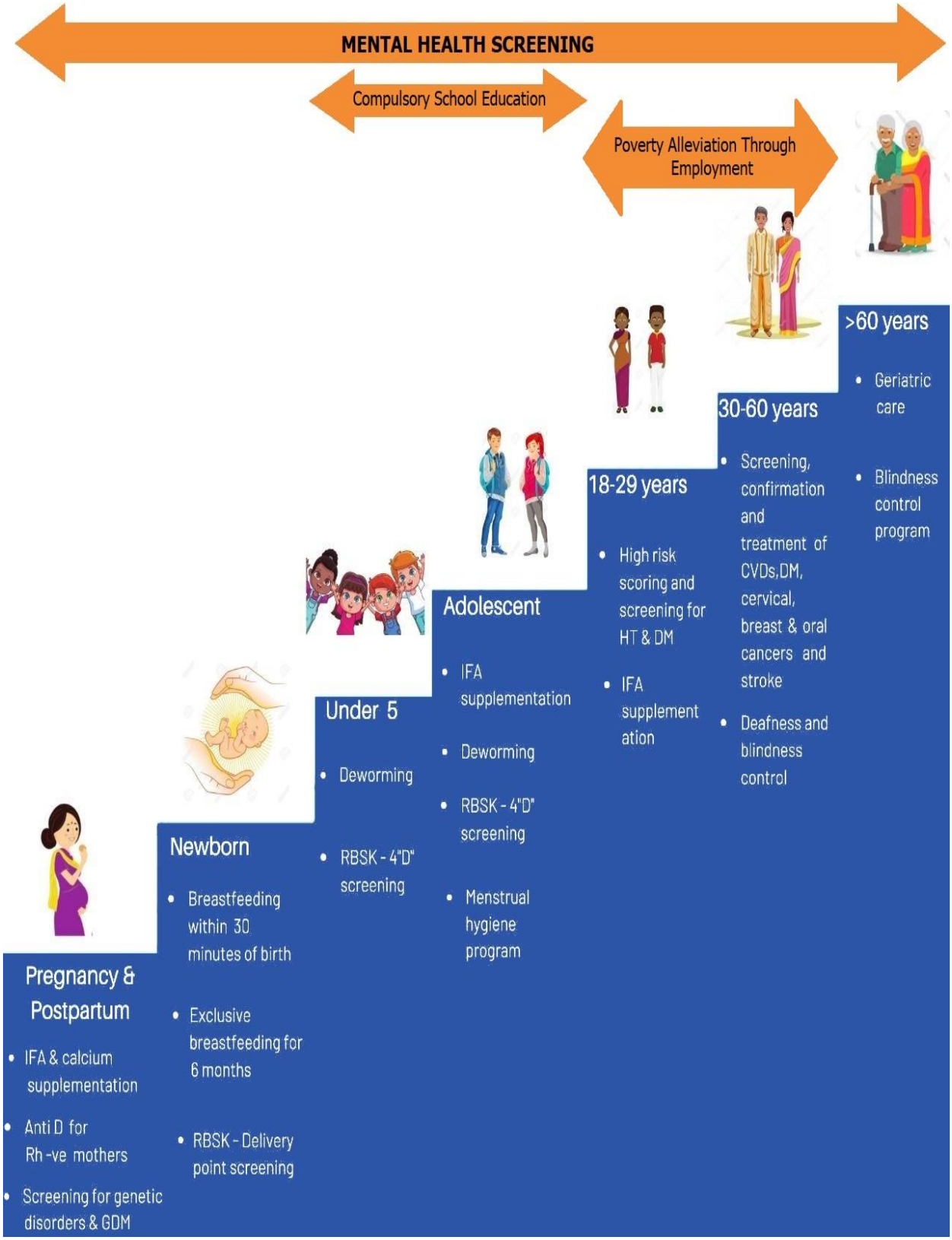
NCDs cut across the entire life course of an individual. The perspective should be to not only look at the morbidity and mortality aspects but in a true sense, we should look at the emergence of NCD related risk factors right from the time of conception and their subsequent contribution to the development and ramification of NCDs. The other important aspect for a healthy community is to address mental health at all ages in a comprehensive manner which is to be seen in the context of the individual, family, and community.

Integrated service delivery

NCD preventive, curative, rehabilitative, and palliative services shall be evidence-based, cost-effective, appropriate and equitable, and provided at all service levels. The management and service delivery systems at the primary, secondary and tertiary levels will be strengthened and measures to ensure the standard of care to provide integrated NCD services will be in place.

People-centered service delivery, community, and family empowerment

Individuals and communities will be empowered to take responsibility to improve healthcare-seeking behavior and to adopt healthy lifestyles.



IFA- Iron & Folic Acid, GDM- Gestational Diabetes Mellitus, RBSK- Rashtriya Bal Swasthya Karyakram, 4D – Defects, Deficiencies, Diseases & Developmental delays

Figure 2: Life-course approach

Prioritized, evidence-based interventions implemented at scale across the state

Shift the focus from opportunistic NCD care to population-based comprehensive NCD services. Evidence-based clinical management for NCDs with efficient laboratory support and other ancillary services will be made available. Efforts will be made to ensure the quality of care with an emphasis on responsiveness.

Continuous learning and adapting

Continuous professional development will be an inherent component in health system strengthening to ensure an appropriate standard of care. Implementation research focused on high-impact and affordable interventions (best buys), needs to be introduced to generate the required insight. Implementation research seeks to understand how to effectively deliver efficacious interventions in a specific context, thus filling this gap between knowledge and practice. This will enable the state to adopt evidence-based, cost-effective, and feasible interventions thereby constantly adapting to the needs of the population.

3. Goals & Objectives

Goals

To reduce the burden due to NCDs in the state through a Multisectoral approach by

- Promoting healthy lifestyles in the community
- Reducing preventable morbidity and mortality due to NCD
- Integrating preventive, promotive, curative, rehabilitative and palliative services for providing comprehensive NCD services.

Objectives

- To raise the priority accorded to non-communicable diseases and to integrate prevention and control of such diseases into policies across all government departments
- To promote interventions to reduce the main modifiable risk factors for non-communicable diseases: tobacco use, unhealthy diets, physical inactivity and harmful use of alcohol
- To strengthen health systems to provide accessible and affordable good quality care to all people with NCDs or risk factors.
- To improve the capacity of individuals, families, and communities to make healthier choices by creating healthy environments that promote health and reduce the risk of NCDs.
- To promote research for the prevention and control of NCDs.
- To establish sustainable surveillance, monitoring, and evaluation systems that promote evidence-based policy and program development.

4. Situational Analysis

The rising burden of NCDs and Associated Risk Factors in India

The proportion of deaths in India due to NCDs increased from 37.9% in 1990 to 63.58% in 2017. NCDs also contributed to three out of five leading individual causes of disease burden or disability-adjusted life years (DALYs). States like Tamil Nadu, Punjab, and Kerala who are at a more advanced epidemiological transition stage towards NCDs had higher DALY rates due to ischaemic heart disease and diabetes, while states that are at a less advanced epidemiological transition stage like Bihar, Madhya Pradesh, and Uttar Pradesh, had higher DALY rates due to chronic obstructive pulmonary diseases (1).

In India, risk factors like dietary risks, high systolic blood pressure, high fasting plasma glucose, high total cholesterol, and high body mass index together were responsible for about one-quarter of DALYs in 2017, and tobacco use alone contributed to 6.5% of the DALYs (2).

The burden of NCDs and Its Risk Factors in Tamil Nadu

Almost 70% of deaths in Tamil Nadu are attributed to NCDs with 36% of deaths due to cardiovascular disease alone. About DALYs, 65.3% is due to NCDs of which major contribution is borne by cardiovascular diseases (3). Cardiovascular disease, diabetes, and cancer are the leading causes of death for those above the age of 40. Ischaemic heart disease represents 14 percent of DALYs (17 percent among men and 11 percent among women), while cancer represents more than 6 percent of DALYs in Tamil Nadu. The top five most frequent cancers excluding non-melanoma skin cancer are breast, lip, and oral cavity, cervical, lung, and stomach cancers (4).

The National Mental Health Survey estimates that nearly 6.7 million adults (18 years and above) and 380,000 adolescents are likely to be suffering from one or more mental health problems. About 11 percent of the population suffers from a common mental health problem, including depression, anxiety disorders, and substance use disorders. About 5 percent of the adult population suffers from depression, and the prevalence of depression is higher among women than men (5.9 percent compared to 2.8 percent). Schizophrenia and other psychotic disorders affect 0.4 percent of the adult population in Tamil Nadu, and the prevalence is highest (0.7 percent)

among 30–39-year-olds (5,6). The Tamil Nadu Government has given greater and due importance to Mental Health issues by releasing a separate Mental Health Policy and Mental Health services are provided through the District Mental Health Program, delinking it from NCD Program.

The top three risk factors of non-communicable diseases are dietary risks, high blood glucose, and high blood pressure (Figure 3). Almost one-fourth of the adult population is overweight, and 12 percent of women and 18 percent of men have hypertension. The prevalence of hypertension is particularly high among individuals with no schooling and those residing in urban areas (7).

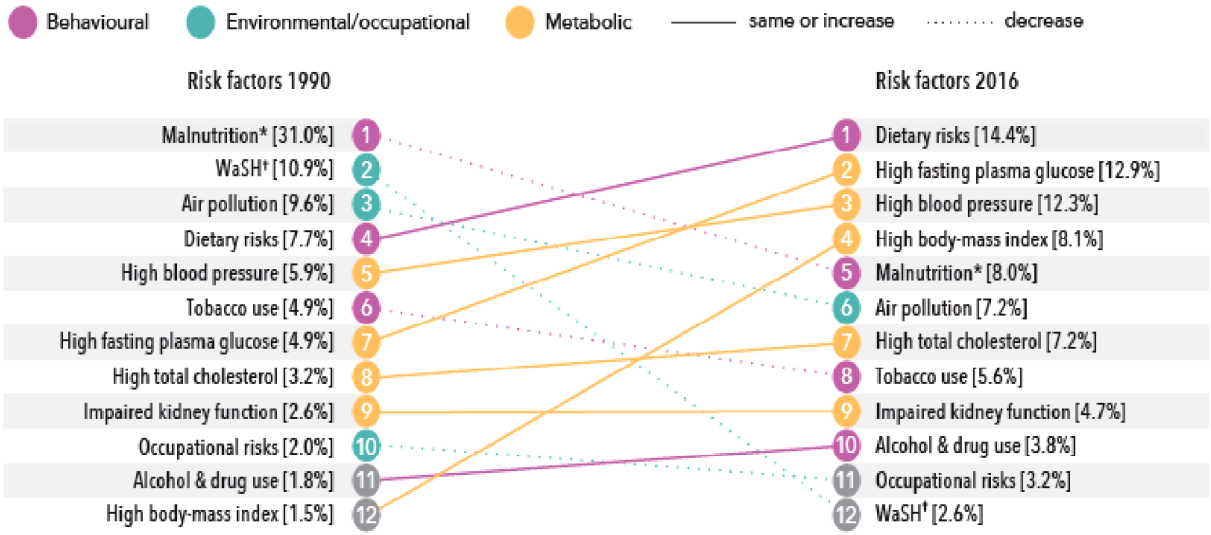


Figure 3: Contribution of top 10 risks to DALYs number, both sexes (1)

Table 1: Comparison of selected NCD Indicators – Tamil Nadu Vs India & Lower Middle-Income Countries (LMIC)

Indicators	Tamil Nadu	India	LMIC
Percentage of deaths due to NCDs	60.0%[a]	61.8% [a]	60.7%[b]
Probability (%) of dying between 30-70yrs of any 4 Common NCDs			
Both sexes	NA	23.3%[b]	23.3%[b]
Men		26.7%[b]	NA
Women		19.8%[b]	
Percentage of DALYs attributed to NCDs	65.3%[a]	55.0% [a]	51.0%[b]
Prevalence of raised blood pressure 15-49 yrs (Sys BP ≥140 mm Hg/Dia BP ≥90 mmHg or currently taking antihypertensive)			
Men[f,]	17.6%[c]	14.8%[c]	23.4%[b*]
Women	11.5%[c]	11.0%[c]	22.0%[b*]
Percentage of individuals with hypertension whose blood pressure is under control 15-49yrs			
Men	4.0%[c]	3.4%[c]	NA
Women	13.0%[c]	10.0%[c]	
Prevalence of raised random blood glucose 15-49yrs (≥ 140 mg /dl)			
Both sexes	NA		10.4[$]
Men	9.7%[c]	8.0%[c]	NA
Women	7.1%[c]	5.8%[c]	
Percentage of individuals 15-49 yrs who are overweight (BMI ≥25)			
Both sexes	NA	19.7%[b*]	27.0%[b*]
Men	24.4%[c]	17.8%[b*]	23.9%[b*]
Women	22.6%[c]	21.6%[b*]	30.0%[b*]
Percentage of individuals 15-49 yrs who are obese (BMI ≥ 30)			
Both sexes	NA	3.9%[b*]	7.6%[b*]
Men	3.9%[c]	2.7%[b*]	5.3%[b*]
Women	8.3%[c]	5.1%[b*]	9.9%[b*]
Prevalence of use of any kind of tobacco15-49yrs			
Men	31.7%[c]	44.5%[c]	39.8%[b]
Women	2.2%[c]	6.8%[c]	4.6%[b]
Prevalence of Alcohol consumption 15 – 49 yrs in past 12 months			
Men	46.7%[c]	29.2%[c]	40.1%[b**]
Women	0.4%[c]	1.2%	19.8%[b**]
Alcohol per capita consumption aged 15+ (liters of pure alcohol)			
Both sexes	NA	NA	4.7[b]
Men		9.4[b]	NA
Women		1.7[b]	
Percentage of women (15-49yrs) ever undergone specific examination of the Cervix	23.1%[c]	22.3%[c]	NA
Percentage of women (15-49yrs) ever undergone specific examination of breast	15.4%[c]	9.8%[c]	NA
Percentage of women (15-49yrs) ever undergone specific examination of oral cavity	12.1%[c]	12.4%[c]	NA

[a]Global Burden of Disease 2016 [b] WHO [c] NFHS-4 2015-2016

[*]Among population aged 18yrs or older ** among population aged above 15yrs

[$]Blood glucose estimation: NFHS estimates the random blood glucose (Values ≥140mg/dl is considered as raised). WHO estimates the fasting blood glucose levels and values ≥ 7 mmol equivalents to 126mg/dl is considered as raised. Hence the two values are not comparable)

Coverage of NCD screening has increased considerably, but there is still substantial room for improvement, particularly for screening for breast and cervical cancer. Almost 30 percent of individuals 30 years or older are screened for hypertension and 25.1 percent are screened for diabetes. Meanwhile, 21.8 percent and 17.6 percent of women ages 30 or older are screened for breast and cervical cancers, respectively (5,6). For comparability purposes, NFHS-4 data shows that only 23 percent of women between the ages of 15 and 49 years have ever undergone specific examination of the cervix, comparable to the national average but substantially below Kerala's share of 61 percent. Specific examination of the breast and the oral cavity are even lower – with only 15 percent and 12 percent of women respectively (7). According to data from the NCD app, 10.77 million individuals were screened for hypertension in 2017-2018, of which 0.85 million (or approximately 8 percent) were diagnosed with hypertension (5,6).

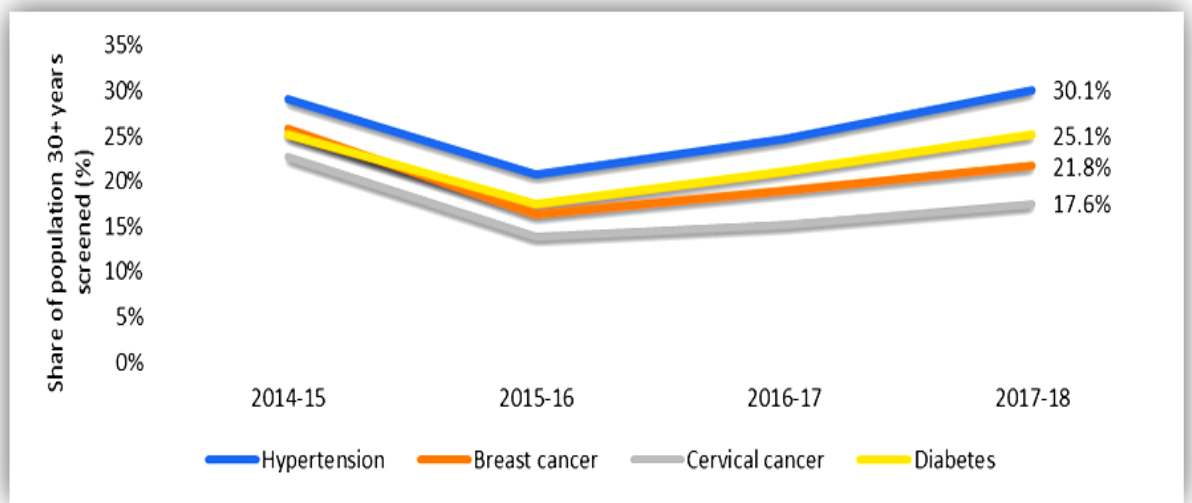


Figure 4: Share of Target Population (30+ yrs) screened for Hypertension, Diabetes, Cervical & Breast Cancer in Tamil Nadu, 2014-2018 (5)

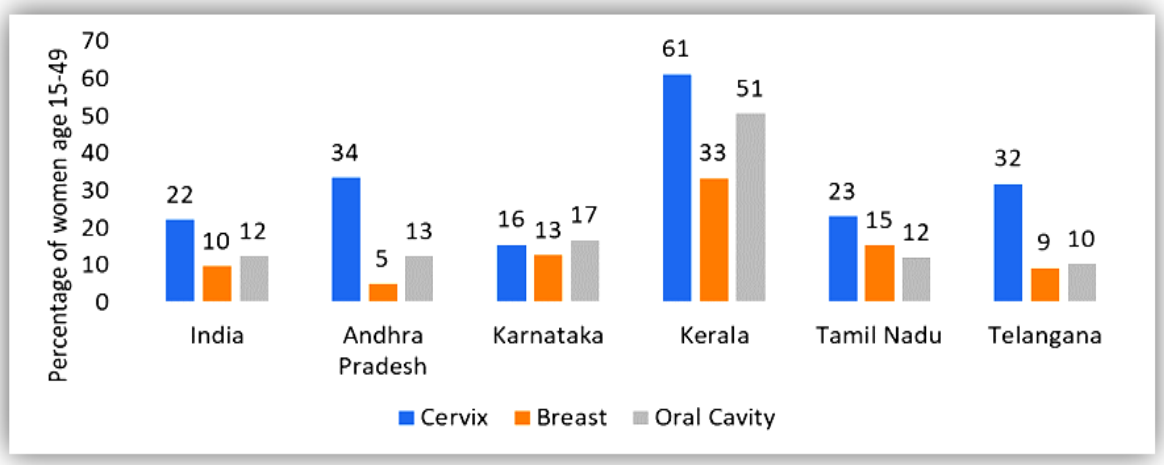


Figure 5: Percentage of women ages 15 – 49 Years who have ever undergone specific health examination of Cervix, Breast & Oral cavity (7)

Data also point to gaps in the quality of NCD care. Despite recent reductions, the prevalence of smoking remains high, particularly among men. According to data from NFHS-4, while 31.7 percent of men currently use tobacco products, only slightly more than half (55 percent) of those who visited a doctor in the past 12 months were advised to quit smoking. As a comparison, in Karnataka, 80 percent of smokers who visited a doctor in the past year were advised to stop smoking. In addition, while 12 percent and 18 percent of women and men, respectively, were diagnosed with hypertension, less than 2 percent of individuals had it under control, indicating both supply and demand-side challenges in the management of NCD and its risk factors Tamil Nadu (7).

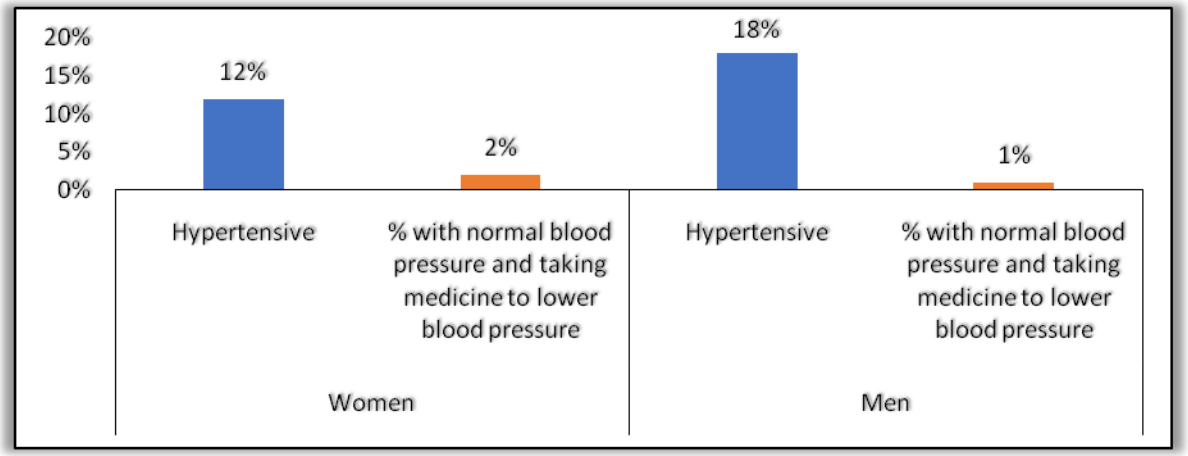


Figure 6: Management of Hypertension among Women & Men, 2015-16 (7)

Tamil Nadu's initiatives to combat NCDs

Tamil Nadu took up the flagship program, Non-Communicable Diseases Intervention Program in 2012, under the Tamil Nadu Health Systems Project (TNHSP), the first of its kind to be implemented on a very large scale in India with the financial support of the World Bank. It was implemented covering all 32 districts in a phased manner. With the closure of the World Bank-supported TNHSP on 15 September 2015, the Non-Communicable Diseases Intervention Program is continued and sustained under the National Health Mission (NHM) through the National Programme for Prevention and Control of Cancer, Diabetes Cardiovascular Diseases and Stroke (NPCDCS).

Opportunistic NCD services are provided through the Government health facilities across Primary, Secondary, Tertiary, and Municipal levels of health care. Under the program, screening, treatment, and follow-up services are provided for hypertension and diabetes mellitus, to all individuals aged 30 years and above and individuals aged 18-29 years at risk of NCD, attending any government health facility in the State. In the case of hypertension and diabetes mellitus, besides the regular drug treatment and follow-up, the focus is on counseling individuals on lifestyle modification. Women aged 30 years and above are also screened for cervical and breast cancer. NCD drugs are part of the essential drug list under the Tamil Nadu Medical Services Corporation and there are a strong supply chain and regular supply at the facility level.

To improve the coverage of screening and management of NCDs, population-based screening (PBS) is implemented with a Woman Health Volunteer (WHV), recruited from every Health sub-center area. The WHV carries out house-to-house visits, creates awareness on NCDs and modifiable risk factors, and screens for hypertension and diabetes for those aged 30years and above. Further, women aged 30 years and above are motivated to carry out monthly self-breast examination and to attend the nearest PHC for cervical and breast cancer screening. The WHV also identifies individuals aged 18-29 yrs who are at risk of hypertension or diabetes. The Health Sub-centres and PHCs are being converted to Health and Wellness Centres to provide an expanded package of services.

There is an exclusively NCD trained Staff Nurse at all primary health care facilities. She is trained on the screening, management, and follow-up protocols of the NCD programme. As there is a turnover of staff repeated refresher training programmes are conducted for the health workers on screening and management protocols.

Tamil Nadu is implementing the State Mental Health Policy (2019) with the vision "To promote mental health, prevent mental illness, enable recovery from mental illness, promote de-stigmatization and desegregation, and ensure socio-economic inclusion of persons affected by mental illness by providing accessible, affordable and quality health and social care to all persons through their life span, within a rights-based framework". The district mental health program was rolled out to all the districts in a phased manner. The health and wellness centers would act as the point of the first contact and the program would comprehensively address mental health and poverty alleviation. Awareness of mental health issues and creating a supportive environment by family members and the community through social media is also being focused on. Ensuring community participation is also one of the strategies of the mental health programme. Health workers in the primary and secondary level are being trained on mental health issues of both urban and rural areas, and to also interact with the family.

Chief Minister's Comprehensive Health Insurance Scheme (CMCHIS): CMCHIS integrated with the Pradhan Mantri Jan Arogya Yojana (PM-JAY) provides non-contributory coverage to the poor, near-poor, and vulnerable individuals for an explicitly defined inpatient-focused benefits package that can be availed at all empanelled government and private institutions. It also includes diagnostic packages and follow-up care for certain defined post-hospitalization conditions (Annexure I). Families with an annual income of less than Rs.72,000/- per annum are eligible to be enrolled under the CMCHIS.

Intensive Care Units (ICUs) in District Headquarters Hospitals and Medical College Hospitals have been strengthened across the state to ensure the provision of critical care for cardiovascular diseases, diabetes, and stroke. Initiatives like the Pradhan Mantri National Dialysis Program (PMNDP), STEMI Program, to treat heart attacks,

management of diabetic retinopathy have been effected through the State Health Society, National Health Mission.

Tertiary care hospitals in the state are linked to District Hospitals / Community Health Centres for disease confirmation/initiation of Chemotherapy and further management like surgical procedures, management of complications of hypertension and diabetes, and in cases of STEMI/CVA for thrombolysis.

In the districts where Government Medical College Hospitals are not available, histopathology Laboratories are established at the District Headquarters Hospital, reducing the delay in receiving reports. Many of the diagnosed cancer patients also fail to report to the same tertiary care institutions for maintenance chemotherapy after the 1st chemo cycle. Day Care Chemotherapy Centres have been established in District Headquarters Hospitals / Govt Medical College Hospitals to reduce the loss to follow up and out of pocket expenditure (OOPE) incurred by these patients and their families.

Group counseling and 'Patient Support Group' (PSG) have been introduced to strengthen the community participation in the NCD management by engaging not only those with the disease condition but also the family members. PSGs provide an opportunity for those with similar disease conditions and their family members/caregivers to discuss the experiences, challenges, and also apprehensions regarding the disease. It also serves as a platform for mutual support and to create awareness about compliance to treatment and complications.

It was piloted in the UHC blocks of 3 districts namely Cuddalore, Villupuram, and Virudhunagar during August 2019 and is currently being up-scaled to all 47 UHC blocks of Tamil Nadu. This will be integrated with the visit schedule of the 'Hospital on wheels' program through the Mobile Medical Units (MMU) in villages covered by MMU Team and in the rest of the villages, it would be covered as part of the regular work plan of Health &wellness centers. The Women Health Volunteer is the first point of contact for the community in the household level screening for NCDs.

Institutional and Community Based Palliative Care Centres have been established to provide services to relieve the anguish and misery of patients with life-threatening

conditions. The palliative services at the community level would reduce the physical difficulties of severely disabled patients.

NCD App: The NCD mobile app has been developed with the help of the National Informatics Centre (NIC) to improve the quality of NCD screening for Diabetes, Hypertension, Cervical and Breast Cancer. Around 2830 NCD staff nurses across primary, secondary, and tertiary care facilities in the state have been provided with a tablet computer for entering the data in the NCD app.

Currently, on average 1000 staff are entering data on a real-time basis daily. The NCD application will further be integrated with the Comprehensive IT platform with the entire population as a denominator to establish a continuum of care from community to referral units.

Tamil Nadu's initiatives to control Tobacco & Alcohol

Tamil Nadu initiated tobacco control measures from even before the Cigarettes and Other Tobacco Products Act 2003 through the Tamil Nadu Prohibition of Smoking and Spitting Act, 2002. Tobacco cells were piloted in Kancheepuram and Villupuram and scaled up to 10 districts. The state has formed enforcement squads in all the Health Unit Districts &Chennai Corporation Area for monitoring violations of the Central Act 34 of 2003 (Section 4, 5 6a & 6b of COTPA) Tamil Nadu has been ahead in banning E-cigarettes and smokeless tobacco. Effective enforcement necessitates the multisectoral coordinated efforts of health, law, education, etc, and other departments, which requires strengthening.

The Centre levies GST (Goods and Services Tax) and Cess for tobacco. Smoked Tobacco GST – 28%, Additional Cess – up to 21%, chewing tobacco (with lime tube) – GST 28% + Cess 14%, chewing tobacco (without lime tube) – GST 28% + Cess 160%. Smoking in public places is punishable under Section 4 of the Act. Graphic warnings are displayed on all tobacco packets. There is also a strict ban on tobacco advertising, promotion, and sponsorship as per COTPA 2003. The state has the option of levying additional cess but experiences have shown that increased taxes have not had the desired effect due to cross-border illegal transactions.

Tamil Nadu has fixed the minimum legal age for drinking as 21 years. The state also has a long history of prohibition. Illicit arrack was banned under Tamil Nadu Prohibition Act 1984. To reduce deaths due to illicit liquor, the Tamil Nadu State Marketing Corporation (TASMAC) was established for wholesale and retail vending of alcohol.

Other Initiatives under NHM

Occupational Health services and NCD service delivery linkage with IT platform, Hub and Spoke model with Lab Information Management System, Emergency Care, and Recovery Centres and dedicated retrieval vehicles to rescue mentally ill persons are some other initiatives of the Tamil Nadu government to tackle NCDs.

5. Key Challenges

Challenges that need to be addressed are as enlisted below.

Box 1: Key Challenges

1. **Increasing NCD burden warrants commensurate prioritization:**
   The epidemiological and demographic transitions that Tamil Nadu is undergoing has resulted in an increasing burden of NCDs, which warrants greater prioritization of NCDs alongside existing programs on communicable diseases & MCH services.
2. **Implementation of legislation, strategies, programs and interventions:**
   Sustained, high-fidelity implementation of legislations, strategies, programs and interventions that will help prevent and manage NCDs will be increasingly needed.
3. **Scaling up of promising NCD initiatives:**
   Pilot projects and initiatives like PBS, HWC currently ongoing in few districts have been successful. These initiatives will have impact at state level when scaled-up, including the necessary financing and HR inputs.
4. **Strengthening linkages between communities and facilities:**
   Improvement in healthcare seeking behavior of the community and access to health facilities along with community participation in promoting healthy lifestyles are essential in stemming the rise of NCDs and reversing risk factors.
5. **Integration of health service delivery:**
   Integration of various vertical programs will contribute to a more effective, efficient and people-centered health system that provides better quality of NCD services and reduces the burden on health workers.
6. **Rationalization of existing HR availability, distribution and capacity:**
   Current human resource structure is to be revisited in terms of adequacies, rationalization and accountability mechanisms to strengthen and integrate NCD service delivery.
7. **Complex and multiple data management systems:**
   HMIS and manual collection of reports need to be revamped to improve data collection, analysis for follow-up of NCD patients, generate standardized data on NCDs and their determinants for both effective monitoring and improved patient outcomes. Establishment of a surveillance framework that monitors exposures (risk factors and determinants), outcomes (morbidity and mortality) and health system responses (interventions and capacity) is needed, which would also enable field-level, district-level and state-level program managers to readily access necessary information to improve program management.
8. **Awareness, empowerment and disposition at community level to seek care and change behaviors due to a combination of supply- and demand-side issues:**
   Insufficient knowledge and motivation for behavioral change and healthcare seeking has resulted from inadequate social and behavior change communication activities (including IEC and BCC).
9. **Provision of quality NCD services:**
   Quality of NCD services can be further improved by addressing attrition of health care personnel trained in NCD services, strengthening quality control mechanism for laboratories, and periodically updating and promoting adherence to NCD protocols.

6. Service Delivery Strategies

(1) Multisectoral approach

Actions under this area aim to increase:

1. Advocacy
2. Research, surveillance, and evaluation
3. Leadership, Multisectoral partnerships, and community mobilization
4. Health systems strengthening

Many of the critical interventions to prevent and control NCDs lie outside the direct sphere of influence of the health sector. Thus, Multisectoral partnerships are essential to successful NCD prevention and control. The NCD strategy needs to be viewed as a shared goal across different government departments, and be used as an innovative approach to intersectoral action. The health sector needs to construct a dialogue on why health is a shared goal across society and identify how other sectors can benefit from action to protect the health, in terms of their priorities. The health sector also has an important role in working with other sectors to reduce differences in exposure and vulnerability to NCD risk factors.

(2) Continuum of care

This Strategy affirms the importance of a balanced approach to non-communicable diseases, beginning with prevention and health promotion, lifestyle interventions to modify risk factors, screening, clinical interventions for high-risk individuals and groups, all the way through to chronic care, rehabilitation, and palliation. This implies that the active participation of the entire health system is fundamental to creating an impact on population health.

(3) Health Promotion

Lifestyle, socioeconomic conditions, rapid urbanization, and globalization, are the determinants of NCDs. Positive behavior change towards a healthy life can be accomplished by carefully engaging with people at the individual and community levels. Exposure to risk factors begins in childhood and builds throughout life underpinning the importance of providing a conducive environment for people to adopt and sustain healthy living habits. The population-level measures include raising awareness, creating a conducive environment, and instituting healthy public policies. Creating a conducive and enabling environment can be achieved by appropriate legislative, regulatory, and fiscal measures.

The key outcome to be achieved includes the reduction of risk factor levels in children, adolescents, and adults. The risk factors include behavioral risk factors such as tobacco use, alcohol use, unhealthy diet, physical inactivity, environmental pollution including household air pollution, and other social determinants. Stress management is another important component that needs adequate attention to reduce NCDs.

(4) Health Systems Strengthening

The health system has to be strengthened to move towards universal health coverage. Universal access, without discrimination, to determined sets of promotive, preventive, curative and basic rehabilitative health services; and essential, safe, affordable, effective and quality medicines. It is also important to ensure that the use of these services does not expose the users to financial hardship. A strengthened health system directed towards addressing NCDs should aim to improve prevention, screening, early diagnosis, and sustained management of people with or at high risk for major NCDs to prevent complications, reduce the need for hospitalization and costly high technology interventions and premature deaths. Non-communicable diseases impact on the health care system not only in terms of increased service utilization and the associated costs but also in the nature of the demands on service delivery to meet the needs of patients requiring long-term care.

To strengthen Tamil Nadu’s health system the following areas needs to be addressed:

a. Emphasis on the patient's responsibility and role in disease management
b. Follow-up services
c. Community-based services
d. Provision and utilization of preventive health services

As the NCD burden grows, ensuring that the health systems can adequately address non-communicable diseases is critical for achieving better health outcomes.

7. Prioritized Interventions to address NCDs

Tamil Nadu has selected interventions based on the challenges identified in the situation analysis combined with global evidence on what works to address NCDs. These interventions are consistent with WHO's guidance on "best buys" and other recommended interventions to prevent and control NCD (1).

These interventions can be organized into macro-, meso- and micro- level and these indicate the level at which these interventions can be implemented. These intervention levels refer to the state level or policy level, district or sub-district level and the patient interaction level respectively. They are not distinct themselves, but each of these levels interacts with and dynamically influences the other two.

Macro interventions are those which would be implemented at the level of the state government or other state-level stakeholders. These interventions are directed at regulations to improve standards, financing and other large-scale engagements to changing health priorities.

Meso interventions are characterized by those that would be implemented at the next level of health delivery i.e., the district and sub-district level through effective communication.

Micro interventions are given at the level of patient interaction with the health care. They are aimed at empowering patients and their families to be informed, motivated and prepared to improve their health outcomes.

There has generally been greater focus on micro level interventions to address diseases. However, evidence-based studies have shown that interventions aimed at the macro- and meso- levels, especially the macro-level interventions have a greater and long-standing impact on the health system and the health of the people at large. With this in mind, Tamil Nadu has prioritized interventions at the Macro level with additional complementary interventions at the Meso and Micro levels for effective control of NCD related morbidity and mortality.

Table 2: Prioritized Interventions (8)

S.N	Level	Domain	Selected/Prioritized Interventions	Already being implemented at scale & to be continued	Already being implemented & needs to be scaled up	To be introduced
1.	Macro	Enabling action	Integrate very cost-effective comprehensive non-communicable disease interventions into the basic primary health care with referral systems to all levels of care to advance the universal health coverage agenda	Opportunistic screening for NCDs at primary, secondary and tertiary levels; and inter facility referral. Population Based Screening (PBS) with referral and reverse referral	To be scaled up to all districts	
2.			Explore viable health financing mechanisms and innovative economic tools supported by evidence	Certain procedures are already in place in secondary & tertiary care centres under CMCHIS is integrated with PM-JAY	Patient Support Groups for effective Community Control [ongoing pilot in Villupuram, Cuddalore & Virudhunagar districts UHC (Universal Health coverage) blocks]	Performance-based financing/Incentives for the Patient Support Groups for effective Community Control
3.			Train the health workforce and strengthen the capacity of health systems, particularly at the primary care level, to address the prevention and control of non-communicable diseases and risk factors	Induction and Refresher training programs on NCDs are ongoing under NPCDCS	HWC+PBS (HR strategy; TAN-QuEST (in alignment with the QoC to include NCDs– rejuvenate existing CME program)	

S.N	Level	Domain	Selected/Prioritized Interventions	Already being implemented at scale & to be continued	Already being implemented & needs to be scaled up	To be introduced
4.	Macro		Improve the availability of the affordable basic technologies and essential medicines, including generics, required to treat major non-communicable diseases, in both public and private facilities	Generic drugs to treat NCDs are available in public health facilities through TNMSC (Tamil Nadu Medical Services Corporation)	Improve availability of NCD drugs and diagnostics; Rational distribution-supply chain management	Diagnostics to be brought under rate contract
5.			Develop and implement a palliative care policy, including access to opioid analgesics for pain relief, together with training for health workers	Palliative care policy in place	Comprehensive Support centres; Continuous supply of opioids (to be synchronized with above intervention)	
6.			Adopt core list of medicines required for implementing essential NCD interventions as part of benefits package	Generic drugs to treat NCDs as per protocol are available in public health facilities through centralized procurement system (TNMSC)	List revised periodically	
7.		Prevention	Increase excise taxes and prices on tobacco products, alcoholic beverages, other harmful products (sugary beverages)	Already in place. Unmanufactured tobacco (without lime tube) GST 28% + Additional Cess up to 71%; Chewing tobacco (with lime		

S.N	Level	Domain	Selected/Prioritized Interventions	Already being implemented at scale & to be continued	Already being implemented & needs to be scaled up	To be introduced
	Macro			tube) – GST 28% + GST Cess 142%; Chewing tobacco (without lime tube) – GST 28% + GST Cess 160%		
8.			Implement plain/standardized packaging and/or large graphic health warnings on all tobacco packages	Graphic health warnings in place as per COTPA (COTPA 2003 and its Amendments 2007 & 2018)	Enhance enforcement of COTPA in state	
9.			Enact and enforce comprehensive bans on tobacco advertising, promotion and sponsorship	Ban on Tobacco Advertising, Promotion and Sponsorship as per COTPA (COTPA 2003 and its Amendments 2007 & 2018)	Enhance enforcement of COTPA in state	
10.			Eliminate exposure to second-hand tobacco smoke in all indoor workplaces, public places, public transport	In place, as per provisions in COTPA (COTPA 2003 and its Amendments 2007 & 2018) through TAPS	Enhance enforcement of COTPA in state	

S.N	Level	Domain	Selected/Prioritized Interventions	Already being implemented at scale & to be continued	Already being implemented & needs to be scaled up	To be introduced
11.	Macro		Implement effective mass media campaigns that educate the public about the harms of smoking/tobacco use and second-hand smoke	In place, as per provisions in COTPA (COTPA 2003 and its Amendments 2007 & 2018)	Enhance enforcement of COTPA in state	
12.			Enact and enforce bans or comprehensive restrictions on exposure to alcohol advertising (across multiple types of media)	In place as per Tamil Nadu Prohibition Act 1937 & Amendment 2008	Rigorous implementation of the Act to be continued	
13.			Reduce salt intake through the establishment of a supportive environment in public institutions such as hospitals, schools, workplaces and nursing homes, to enable lower sodium options to be provided			Incentivize healthy food practices among Patient Support Groups
14.			Reduce salt intake through a behavior change communication and mass media campaign		Existing communication strategy to be strengthened and newer SBCC strategies to be developed & implemented	

S.N	Level	Domain	Selected/Prioritized Interventions	Already being implemented at scale & to be continued	Already being implemented & needs to be scaled up	To be introduced
15.	Macro		Reduce salt/sugar intake through the implementation of front-of-pack labelling	Front-of-pack labelling of food items under PDS (Public Distribution System) initiated in synergy with National level/ FSSAI(Food Safety & Standards Association of India)		
16.			Implement community wide public education and awareness campaign for physical activity which includes a mass media campaign combined with other community-based education, motivational and environmental programs aimed at supporting behavioural change of physical activity levels			Education through media, inclusion of NCD & risk factors awareness in school curriculum, promotion of physical activity in schools, workplace & communities, provision of space for physical activity under urban and rural planning
17.			Vaccination against Human Papillomavirus (2 doses) 9–13-year-old girls			Could be considered as pilot program (subject to Policy decision)
18.		Detection	Prevention of cervical cancer by screening women aged 30+	Opportunistic screening is done at all public health facilities		High-risk cervical cancer screening among women aged 18-29 yrs

S.N	Level	Domain	Selected/Prioritized Interventions	Already being implemented at scale & to be continued	Already being implemented & needs to be scaled up	To be introduced
19.	Macro	Surveillance	Develop and implement a prioritized state research agenda for non-communicable diseases			Operational Research Program + HTA (NIRT) + MoU with NIE
20.			Establish and/or strengthen a comprehensive non-communicable disease surveillance system, including reliable registration of deaths by cause, cancer registration, periodic data collection on risk factors and monitoring state response		Notification of deaths due to NCDs and capture of the same through medical audit, cancer registry and existing HMIS platform; periodical population-based survey on NCDs and risk factors	
21.	Meso	Enabling action	Workshops to train primary care workers to deliver integrated NCD care		To be scaled up	
22.		Surveillance	Data monitoring and supervision		NCD App/HMIS	
23.	Micro	Detection, treatment and management	Detection, treatment and control of hypertension	Opportunistic screening in place	PBS+HWC to be scaled-up in all districts of TN; Patient Support Groups to be scaled up	

S.N	Level	Domain	Selected/Prioritized Interventions	Already being implemented at scale & to be continued	Already being implemented & needs to be scaled up	To be introduced
24.	Micro	Prevention	Counselling about healthy lifestyles	Education through media, inclusion of NCD & risk factors awareness in school curriculum, promotion of healthy lifestyles in schools, workplace and communities	To be strengthened based on situation analysis and SBCC strategy to be developed	
25.		Prevention, detection, treatment & management	Apply WHO PEN protocols at PHC	In place	Self-care of diabetes patients, referral of suspected cancer patients in some of the areas to be strengthened	
26.		Treatment	Effective glycaemic control for people with diabetes, along with standard home glucose monitoring for people treated with insulin to reduce diabetes complications	Addressed in Population-Based Screening		Mandate investigation of HbA1C once in 6 months (The state can make a policy decision on this).
27.		Screening	Mental health awareness and screening	District mental health programs in place; Periodical capacity building of field functionaries involved, to carry out effective screening and management; Public-Private Partnerships with NGOs in co-ordination with the existing system	Enhancement of services addressed in Mental Health Program	Consideration of permanent HR/ psychiatric social workers

8. Multisectoral Coordination among Stakeholders & their Roles in addressing NCDs:

Figure 7: Multisectoral coordination (9)

New insights into the impact on health of poor housing, built-up environment, lack of education and unemployment, suggest the implementation of whole-of-government strategies working between different sectors to address these issues. As no single sector on its own can mount an effective response, new systems and governance are required to deliver a range of actions for prevention of NCDs.

Health systems should catalyze, coordinate and coherently integrate policies across other relevant health sectors to create conducive environments that enable people to make and maintain healthy living choices.

a. Implementation Mechanisms:

This NCD Strategy Action Plan covers the period 2020-2025. First year would focus on conducting the STEP wise approach to Surveillance for NCDs and their risk factors Surveillance to establish the baseline, establishing the mechanisms for Multisectoral and multistakeholder engagement, planning and developing guidelines and policies for improving Health Promotion and strengthening Health System. The years 2021-2025 would focus on enactment of the policies and guidelines across sectors,

launching of IEC campaigns, capacity building and health systems strengthening, improving the surveillance mechanisms and building in research mechanisms.

Principally the focus would be to establish Multisectoral and multistakeholder actions.

The stakeholders would include:

- governmental agencies across sectors, such as health, agriculture, communication, education, employment, energy, environment, finance, food, housing, justice and security, legislature, social welfare, social and economic development, sports, tax and revenue, trade and industry, transport, urban planning and youth affairs
- developmental agencies and funding partners
- nongovernmental organizations
- partnership with relevant civil society and private sector entities

In alignment with the National Multisectoral Action Plan, it is proposed to form Committee of Secretaries, State NCD Cell in the state and Co-ordination Committees at the state and the district levels

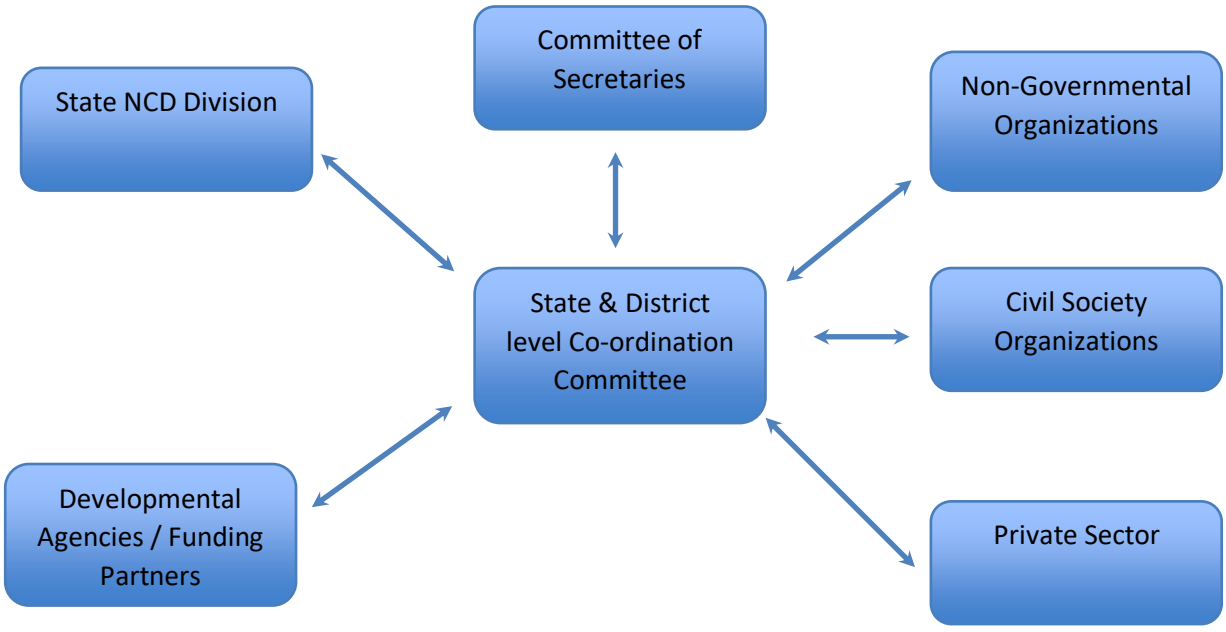


Fig 8: Schematic Mechanisms for Multisectoral Action Plan

b. Committee of Secretaries:

It is proposed to form a Committee of Secretaries (CoS) at the State level under the chairmanship of the Chief Secretary. The Committee would include the Secretaries from each of the identified ministries and the Experts/Officials from the Directorates and State NCD Cell. The Committee would function with the 'Whole of the Government' and would discuss on the cross-cutting issues that would not fall in the purview of the domain of Department of Health and Family Welfare. Issues /Interventions with possibilities of conflicts and paucity of agreements among the stakeholders from the identified departments would also be brought in front of the CoS for a collaborative and comprehensive decision-making.

c. State level Coordination Committee:

It is proposed to form a Co-ordination Committee at the State level, under the chairmanship of the Health Secretary. The Committee would comprise the Experts/Officials from the Directorates and State NCD Cell. The Committee would be responsible for synergizing and harmonizing the actions as envisaged in the NCD Strategy for the State. The Committee will decide on the specific focus areas and departmental policies for prevention and control of the NCDs in the state and ensure the smooth implementation of the same. They would decide upon the issues/interventions having possibilities of conflicts and paucity of agreements to be placed in the CoS for resolution. The Committee can call representations from the Government, Development Partners/Funding Agencies, Non-Governmental Organizations, Civil Society, Private Sectors in addition to the lined Departments in the meetings for discussions.

d. District level Coordination Committee:

It is proposed to form a Co-ordination Committee at the district level, under the chairmanship of the District Collector. The Committee would comprise the Nodal Officers at the capacity of Joint Director / Deputy Director, from each of the identified departments at the district level along with the District Program Officers (NCD). The Committee would decide on the specific focus areas and interdepartmental policies for prevention and control of the NCDs at the district level

and elevate the same to the State level Co-ordination Committee for necessary action. The Committee can call representations from the Non-Governmental Organizations, Civil Society, and Private Sectors in addition to the lined Departments in the meetings for discussion.

e. State NCD Cell:

The Action Plan will ensure a holistic approach embracing policy, legal and structural components necessary to address complex social determinants of NCDs and their risk factors. Most importantly, the Action Plan provides a framework to support and strengthen a partnership with non-health stakeholders to integrate NCD prevention strategies within their plans and programs. Within the health sector, the Action Plan will build synergies with the existing programs.

The key functions as envisaged for the State NCD Cell would be to:

1. Assess the capacity, identify the key action areas and prepare guidelines for the effective implementation of the NCD Strategy
2. Discuss sustainable and accountable mechanisms to review/audit the initiatives devised under the NCD Strategy that have positive/negative impact on NCDs in the State.
3. Periodically review the progresses made on the activities planned and discuss the appropriate strategies to fill in the gaps identified in the implementation
4. Review and guide the District NCD Cell for effective implementation of the NCD Strategy.

Role of Key Ministries

Each Ministry shall:

- Identify Nodal Officers at the rank of the Joint Director/Deputy Directors in the relevant department/s to synergize and harmonize policies and actions.
- Prepare an Action Plan based on the guidance of Committee of Secretaries (CoS) and Co-ordination Committees for NCD prevention and control.

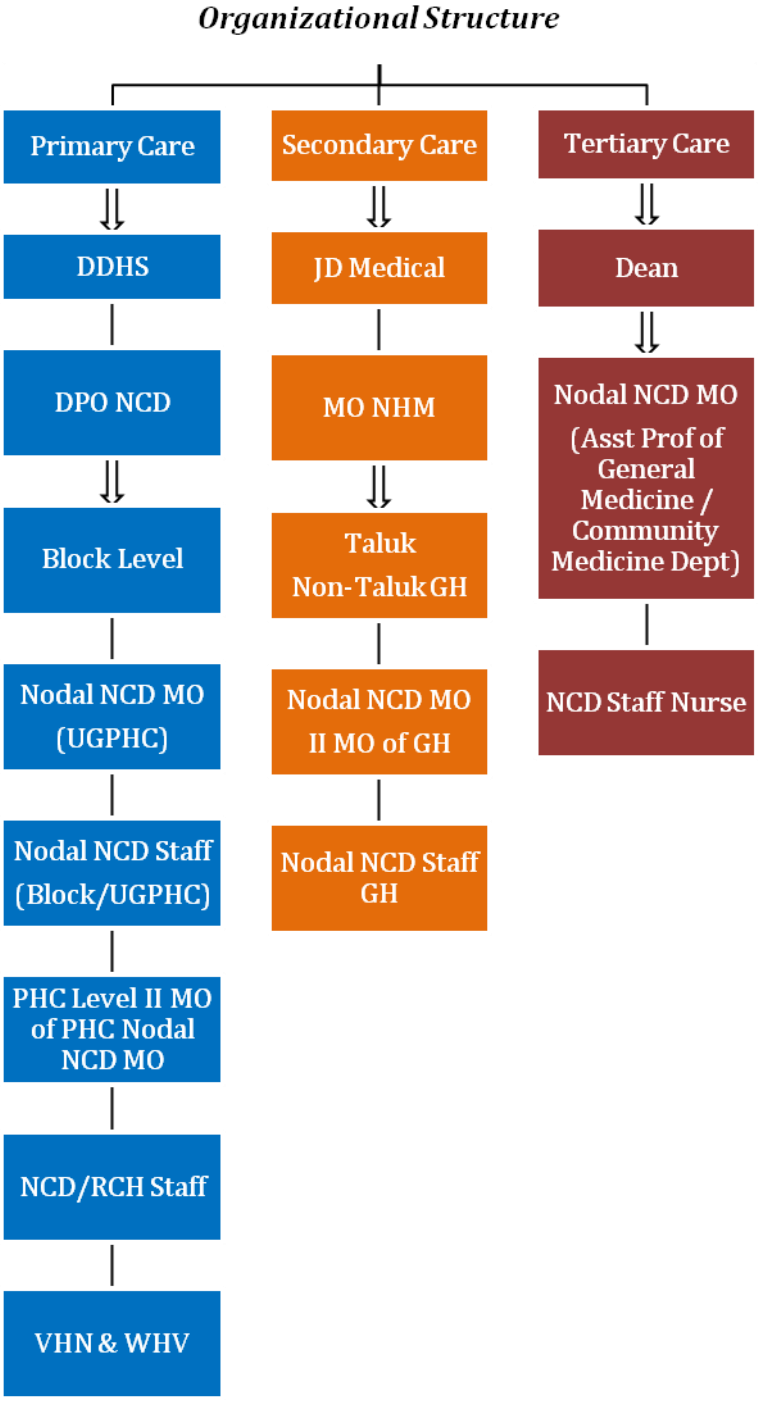


Figure 9: Organizational Structure for NCD services at District Level

Figure 9 shows the organizational structure for implementation of NCD program at District level. District Program Officer NCD (NCDDPO) working under DDHS should take a lead role in the implementation of NCD program in the District. NCDDPO should interact with MO-NHM working under JDHS and Nodal officer of NCD at Medical colleges (Assistant professor of Medicine Dept./Community medicine Dept) for effective implementation of NCD program at all three levels of health system, and they should conduct monthly review meeting of all nodal Medical officers identified in PHC, GH and Medical college to monitor the program. In each block/UG PHC, 1 medical officer and 1 staff nurse will be identified as nodal NCD MO & nodal NCD staff for the block. Second MO of additional PHC and 1 staff nurse (RCH/NCD) will be the nodal NCD MO & staff of that PHC respectively. Nodal NCD MO & nodal NCD staff will be identified at each Taluk, Non-Taluk hospital.

9. Tamil Nadu NCD Measurement Framework

Table 3: Measurement Framework

S. no	Framework Elements	Indicator Name	Numerator/ Denominator	Frequency	Source of Data	Domain
1.	Tobacco use	**Proportion of individuals aged 18 and above using tobacco (smoke or smokeless)**	Number of individuals aged 18 and above currently using any tobacco product (smoke or smokeless) / Number of individuals aged 18 and above	Once in 2 years	STEPS survey. Baseline to be established.	Outcome
2.	Alcohol use	**Proportion of individuals aged 18 and above consuming alcohol**	Number of individuals aged 18 and above consumed alcohol in the last 12 months / Number of individuals aged 18 and above	Once in 2 years	STEPS survey. Baseline to be established.	Outcome
3.	Harmful use of alcohol: heavy episodic drinking	**Proportion of individuals aged 18 and above with heavy episodic drinking among individuals who consumed alcohol in the last 12 months**	Number of individuals aged 18 and above consumed 6 or more drinks on any occasion in the last 30 days / Number of individuals aged 18 and above who consumed alcohol in the last 12 months	Once in 2 years	STEPS survey. Baseline to be established.	Outcome
4.	Low fruit and vegetable consumption	**Proportion of individuals aged 18 and above consuming less than five total servings (400 grams) of fruit and/or vegetables per day**	Number of individuals aged 18 and above eating less than 5 servings of fruit and/ or vegetables per day / Number of individuals aged 18 and above	Once in 2 years	STEPS survey. Baseline to be established.	Outcome

S. no	Framework Elements	Indicator Name	Numerator/ Denominator	Frequency	Source of Data	Domain
5	Salt intake	**Proportion of individuals aged 18 and above who knew that taking too much salt or salty food could cause health problems**	Number of individuals aged 18 and above who knew that taking too much salt or salty food could cause health problems / Number of individuals aged 18 and above	Once in 2 years	STEPS survey. Baseline to be established.	Outcome
6	Salt intake	**Proportion of individuals aged 18 and above adding extra salt in food before/during eating**	Number of individuals aged 18 and above adding extra salt in food before/during eating / Number of individuals aged 18 and above	Once in 2 years	STEPS survey. Baseline to be established.	Outcome
7.	Physical inactivity	**Proportion of individuals aged 18 and above with insufficient physical activity**	Number of individuals aged 18 and above not meeting the criteria for physical activity / Number of individuals aged 18 and above	Once in 2 years	STEPS survey. Baseline to be established.	Outcome
8.	Over weight	**Proportion of individuals aged 18 and above identified as overweight (BMI 25 and above)**	Number of survey individuals aged 18 and above who are overweight / Number of individuals aged 18 and above	Once in 2 years	STEPS survey. Baseline to be established.	Process
9.	Obesity	**Proportion of individuals aged 18 and above with obesity (BMI 30 and above)**	Number of individuals aged 18 and above who are obese / Number of individuals aged 18 and above	Once in 2 years	STEPS survey. Baseline to be established.	Process

S. no	Framework Elements	Indicator Name	Numerator/ Denominator	Frequency	Source of Data	Domain
10.	Hypertension	**Percentage of individuals aged 18 and above screened for Hypertension**	Number of individuals aged 18 and above screened for hypertension / Number of individuals aged 18 and above	Monthly	Monthly Reports / HMIS	Process
		Proportion of individuals aged 18 and above confirmed with Hypertension	Number of individuals aged 18 and above confirmed with raised Blood Pressure / Number of individuals aged 18 and above screened for Hypertension	Monthly	Monthly Reports / HMIS	Process
		Proportion of Hypertensives aged 18 and above whose blood pressure is under control	Number of Hypertensives aged 18 and above with blood pressure under control / Number of individuals aged 18 and above with hypertension	Once in 2 yrs	STEPS survey. Baseline to be established.	Outcome
		Proportion of Hypertensives aged 18 and above presenting with complications*	Number of Hypertensives aged 18 and above presenting with complications / Number of individuals aged 18 and above with hypertension	Monthly	Monthly Reports / HMIS	Outcome
		Percentage of PHC / HSC patients over 30 yrs old whose blood pressure was measured	No. of patients over 30 yrs old whose blood pressure was measured / No. of patients over 30 yrs who attended PHC / HSC	Monthly	Monthly Reports / HMIS	Process

S. no	Framework Elements	Indicator Name	Numerator/ Denominator	Frequency	Source of Data	Domain
11.	Diabetes	**Percentage of individuals aged 18 and above screened for Diabetes Mellitus**	Number of individuals aged 18 and above screened for Diabetes Mellitus / Number of individuals aged 18 and above	Monthly	Monthly Reports / HMIS	Process
		Proportion of individuals aged 18 and above confirmed with Diabetes Mellitus	Number of individuals aged 18 and above with fasting plasma glucose value ≥ 7.0 mmol/L (126 mg/dl) / Number of individuals aged 18 and above screened for Diabetes Mellitus	Monthly	Monthly Reports / HMIS	Process
		Proportion of Individuals aged 18 and above with Diabetes Mellitus whose blood glucose is under control	Individuals aged 18 and above with blood glucose under control / Number of individuals aged 18 and above with Diabetes Mellitus	Once in 2 yrs	STEPS survey. Baseline to be established.	outcome
		Proportion of Individuals aged 18 and above with Diabetes Mellitus presenting with complications**	No: of individuals aged 18 and above presenting with complications / Number of individuals aged 18 and above with Diabetes Mellitus	Monthly	Monthly Reports / HMIS	Outcome
12	PBS	**Percentage of blocks implementing Population Based Screening**	No. of Blocks implementing Population Based Screening / Total number of Blocks	Annual	Monthly Reports / HMIS	Input

S. no	Framework Elements	Indicator Name	Numerator/ Denominator	Frequency	Source of Data	Domain
13	PSG	**Percentage of districts with active Patient Support Groups**	No. of districts with active Patient Support Groups / No. of districts	Annual	Monthly Reports / HMIS	Input
14	Drug therapy to prevent heart attacks and stroke	**Proportion of HT/DM/Both receiving drug therapy and counselling (including glycemic control) to prevent heart attacks and strokes**	Number of individuals above 18+ years confirmed with Hypertension/Diabetes Mellitus/Both who are receiving drug therapy and counselling / Number of individuals above 18+ years with Hypertension/Diabetes Mellitus/Both	Annual	Monthly Reports / HMIS	Process
15	Drug Stock Out in Essential NCD Medications	**Percentage of drug stock out against essential drugs for NCDs**	No of essential drugs for NCDs not available / Total number of essential drugs for NCDs	Monthly	Monthly Reports / HMIS	Structural
16	Cervical cancer	**Percentage of women aged 30 and above screened for Cervical Cancer**	Number of women aged 30 and above screened for Cervical Cancer / Total number of women above 30 years	Annual	Monthly Reports / HMIS	Process
		Percentage of women with positive VIA undergoing follow-up Colposcopy	No: of women who had undergone follow-up Colposcopy within 6 weeks of positive VIA test / No: of women found positive by VIA	Annual	Monthly Reports / HMIS	Process

S. no	Framework Elements	Indicator Name	Numerator/ Denominator	Frequency	Source of Data	Domain
17	Breast cancer	**Percentage of women aged 30 and above screened for Breast Cancer**	Number of women **aged 30 and above** screened for Breast Cancer / Total number of women above 30 years	Annual	Monthly Reports / HMIS	Process
		Percentage of women who tested positive with Clinical Breast Examination (CBE) underwent USG/Mammogram	No: of Women who tested positive with CBE underwent USG/ mammogram within 6 weeks / No: of women found positive by CBE	Annual	Monthly Reports / HMIS	Process
18	Cervical Cancer 5 Yr Survival Rate	**Percentage of Cervical Cancer patients survived for 5 years**	No. of women with cervical cancer who have survived for 5 years after diagnosis / No. of women diagnosed with cervical cancer	Annual	Cancer Registry	Outcome
19	Breast Cancer 5 Yr Survival Rate	**Percentage of Breast Cancer patients survived for 5 years**	No. of women with breast cancer who have survived for 5years after diagnosis / No. of women diagnosed with breast cancer	Annual	Cancer Registry	Outcome
20	Oral Cancer 5 Yr Survival Rate	**Percentage of Oral Cancer patients survived for 5 years**	No. of individuals with Oral Cancer who have survived for 5 years after diagnosis / No. of individuals diagnosed with Oral cancer	Annual	Cancer Registry	Outcome

S. no	Framework Elements	Indicator Name	Numerator/ Denominator	Frequency	Source of Data	Domain
21	Food pack labelling	**No. of food items with front of pack labelling**	No. of food items with front of pack labeling	Monthly		Structural
22	Depression & Stress Hotline	**Depression and Stress Hotline established**	Yes			Structural
23	Trained Mental Health Staff	**Percentage of primary and secondary facilities with at least one staff trained on mental health**	No. of primary and secondary facilities with at least one staff trained on mental health / No. of primary and secondary health facilities	Annual		Structural
24	Mental Health	**Number of Mental Health education activities undertaken**	Number of Mental Health education activities undertaken during the month in Schools / Colleges / Workplaces	Monthly		Structural

*Hypertensive nephropathy, renal failure, coronary artery diseases, vasculitis, cerebral complications like stroke, etc.

**Diabetic retinopathy, nephropathy and renal failure, coronary artery diseases, diabetic foot, vasculitis, cerebral complications like stroke, etc.

10. Monitoring & Evaluation

Multiple stakeholders need to be engaged in monitoring and evaluation of intersectoral action for prevention of NCDs.

- Monitoring NCDs and their risk factors provides the foundation for advocacy, policy development and program implementation
- Collection of mortality and risk factor data helps to assess the magnitude, track the trends of NCDs and their risks over time, and evaluate the effectiveness and impact of interventions

Strategies for effective monitoring and evaluation of the Tamil Nadu NCD Program:

1. Baseline assessment of the indicators at district level: In order to set reasonable targets, it is important to do a situational analysis. This will also help in prioritization and appropriate allocation of resources.

2. Fix targets for each indicator for different time frames: Using the targets proposed by WHO, we can adapt these to our state context. While it might be useful to have targets set for 2025, it is important to have targets set for a shorter time frame. This will also enable us to modify the strategy based on their intermediate effectiveness. Also, it is possible that the state might want to focus more on certain aspects in the immediate future and postpone certain interventions for a later date.

3. Evolve sustainable systems for surveillance: Non-availability of data is one of the major reasons that programs are not effectively monitored. NCDs being a Multisectoral disease will require collection of information beyond the health sector. We need to establish new or utilize existing systems for data collection and analysis which are aligned to other state health programs. There would be a need to establish quality assurance procedures for all data collected, be it from health facility, laboratory, or community.

4. Up scaling of the current HMIS to ensure timely and regular collection, collation, analysis and reporting of data. Maintenance and regular update of district database of common NCDs is of utmost importance.

5. Monitoring of activities at sub-district levels through supervisory visits.
6. Periodic meetings at district and state levels for monitoring progress: While it is relatively easy to roll out new programs, their consistent and full implementation is critical to success. This can only happen if these programs are reviewed in earnest at regular intervals, feedback provided, and strategies reassessed.
7. Establish External Review mechanisms to monitor progress in an unbiased manner.

11. Health Management Information System & Surveillance

- High-quality data can only be generated by adequate investment in civil registration and in surveillance systems
- Sustainable NCD surveillance systems need to be formalized as a key component of the public health infrastructure and become part of a state's health information system.
- The development of the surveillance system should be an incrementally evolving process

At present there are various software applications being used by the Department of Health and Family Welfare. There are both Web Applications and Mobile Apps. Few of these are listed below.

Web Applications:

1. Health Management Information System (HMIS)
2. State Health Data Resource Center (SHDRC)
3. Human Resource Management & Information System (HRMIS)
4. Application for Health and Wellness Centres (UHC)
5. Chief Minister's Comprehensive Health Insurance Scheme (CMCHIS)

Mobile Apps:

1. Non-Communicable Diseases Programme App (NCD)
2. National Oral Health Programme (NOHP)
3. Universal Health Care (UHC)
4. Tamil Nadu Accident and Emergency care Initiative (TAEI)
5. Urban Poly Clinic App

The present health information system will be strengthened and expanded to provide key information to guide and advocate decision makers at State, district and local levels. The following measures and principles are applied in strengthening and utilizing the health information system.

- The information system strengthening and data collection will be oriented by objectives of assessing the effectiveness of policies and the impact of programs, and tracking the trends of major risk factors and NCDs.

- The categories of core information to be collected will include:
    - Inpatient and outpatient morbidity and mortality data
    - Mortality data from the vital registration systems
    - Registries for selected diseases
    - Data on standard indicators of the major risk factors and their determinants from sentinel surveillance sites
    - Data on process, output and outcome indicators for monitoring and evaluation of all programs related to prevention and control of major NCDs
    - Data for monitoring standards of care
    - Data generated from research and special studies on NCDs

Current limitations and way forward

Health applications in the State are in silos having patient medical history and fragmented IT systems, which limits the health provider to access the available patient information. Unique Health Identifier across the health applications and common master list of facilities, address, family folders and variables are gaps in the existing HMIS.

The state has conceptualized that a State owned Comprehensive IT platform with entire population as denominator is essential to establish a continuum of care from community to referral units. The policy also thrusts that all the developments and guidelines should be owned by the public systems (Source codes, datasets, copyrights, intellectual property rights).

The TN State Health Policy-2020 pitches for a user centric unified data exchange platform through an IT systems approach for creating a Master Registry for establishing a digital cohort.

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ANNEXURES

Annexure I

CMCHIS - Package of Services for NCD

Conservative management of:

- Congestive Cardiac Failure
- Infective endocarditis
- Pulmonary embolism
- Arrhythmias
- Severe myocarditis

Cardiac Catheterization

Cardiothoracic surgeries

- Coronary Bypass Surgery with IABPump,
- Valve replacement
- Aneurysmal repair
- Surgeries for intracardiac tumors
- Systemic Pulmonary Shunt
- Pericardiostomy

Oncology:

- Palliative treatment
- Radical therapy
- Adjuvant treatment
- Specialized radiation package

Bariatric surgery like Roux-en-Y Gastric Bypass surgery for Morbid Obesity

Annexure II

Table 4: Roles & Responsibilities at Different Levels of Healthcare

S.No	Facility	Activity	Screening Tool	Person Involved
1	Medical College and Hospital	Screening of Hypertension, Diabetes Mellitus, Cervical Cancer & Breast Cancer Mammographic USG confirmation of cancer Microscopic confirmation of cancer Treatment and Follow up – HT & DM; Treatment of end-stage complication Tumor Staging, Treatment and Follow up of Cancer Screening; Day Care Chemotherapy/ Palliative care/ Dialysis	Blood Pressure – Sphygmomanometer; Blood Sugar – Venous Sample Breast Cancer – Clinical Breast Examination; Cervical Cancer - VIA	Medical Officer / NCD Staff Nurse Radiologist Pathologist General Physician/ Surgeon Medical/ Surgical Oncologist/ Diabetologist/ Ophthalmologist/ Cardiologist/ Nephrologist/ Neurologist/ Neuro Surgeon/ Obstetrician
2	District Head Quarters Hospital	Screening of Hypertension, Diabetes Mellitus, Cervical Cancer & Breast Cancer Mammographic USG confirmation of cancer Microscopic confirmation of cancer (Histopathological Examination) Treatment and Follow up – HT & DM; Treatment of end-stage complication Day Care Chemotherapy/ Palliative care/ Dialysis	Blood Pressure – Sphygmomanometer; Blood Sugar – Venous Sample Breast Cancer – Clinical Breast Examination; Cervical Cancer - VIA	Medical Officer / NCD Staff Nurse Radiologist Pathologist General Physician/ Surgeon Ophthalmologist/ Obstetrician
3	Sub – District Head Quarters Hospital	Screening of Hypertension, Diabetes, Cervical Cancer, and Breast Cancer USG Confirmation of Cancer Treatment and Follow up – HT & DM; Dialysis; Treatment and Follow up of Cancer Screening	Blood Pressure – Sphygmomanometer; Blood Sugar – Venous Sample Breast Cancer – Clinical Breast Examination; Cervical Cancer - VIA	Medical Officer / NCD Staff Nurse Radiologist General Physician/ Surgeon Ophthalmologist/ Obstetrician
4	Primary Health Centre	Screening of Hypertension, Diabetes, Cervical Cancer, and Breast Cancer Treatment and Follow up – HT & DM; Follow up of Cancer Screening	HT- Sphygmomanometer DM- Venous Blood Sugar (Fasting & Postprandial); Hub & Spoke with LIMS Breast Cancer – Clinical Breast Examination; Cervical Cancer - VIA	Medical Officer / NCD Staff Nurse

S.No	Facility	Activity	Screening Tool	Person Involved
5	Health sub-center	Screening for Hypertension, Diabetes Motivation to undergo Cervical and Breast Cancer Screening Additional Screening – Oral Health, Leprosy, Tuberculosis, Mental Health Follow up	HT- Sphygmomanometer Hub & Spoke with LIMS Breast Cancer- Educate on Self Breast Examination; Conduct Clinical Breast Examination;	Village Health Nurse
6	Community	Enumeration of Households and Enlisting of Beneficiaries Screening for Hypertension, Diabetes Motivation to undergo Cervical and Breast Cancer Screening Additional Screening – Oral Health, Leprosy, Tuberculosis, Mental Health Follow up of Cancer Screening	HT- Automated BP apparatus; DM- Glucometer Hub & Spoke with LIMS	Women Health Volunteer / ASHA/ AWW

Annexure III:

Table 5: Roles and responsibilities of different stakeholders

S. No.	Name of the Sector to be involved	Policy Options
1.	School Education Department	Inclusion of curriculum on healthy lifestyle and awareness on NCD Prevention Display of health promoting messages within the premises Prohibition of sale of unhealthy food and promotion of healthy food within the premises Promotion of physical activity within the premises Prohibition of tobacco use within the premises
2.	Revenue and Disaster management Department	Tax on Food High in Fats, Salt and Sugar (HFSS) including Sugar Sweetened Beverages (SSBs) Tax exemption or reduction of tax for sports goods and physical activity equipment. Structure insurance schemes to offer financial protection to patients availing both outpatient and inpatient services
4.	Information Technology Department	Prohibit all forms of advertisement on alcohol and tobacco Regulation of advertisement for High in Fats, Salt, Sugar (HFSS) food and Sugar Sweetened Beverages Allocate free airtime and space for health promotion particularly for NCD risk factors Enforcement of tobacco free films and television policies Allocate adequate funds for health promotion activities/events by various media units to create mass awareness
5.	Industries Department	Brand stretching and surrogate advertisement for demerit goods such as tobacco and alcohol to be restricted. Provision of health promoting facilities in Industrial Corridor to promote healthy lifestyle such as dedicated spaces for parks, health centre, health clubs etc.
6.	Rural Development and Panchayat Raj Department Social Welfare and Nutritious Meal Program Department	Engagement of rural women as Health Ambassadors in Population Based Screening Implementation of initiatives to reduce the consumption of Foods High in Fat, Salt and Sugar (HFSS) which poses risk of chronic diseases Promotion of yoga and other physical activities for children, adolescent girls and women through Anganwadi centres

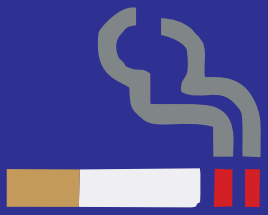
		Create awareness on ill effects of tobacco and alcohol among females, adolescent girls through SABLA program, ICDS and other similar schemes Promote healthy lifestyle and nutrition awareness programs through activities planned under Food & Nutrition Board and during National Nutrition Week
7.	Labour & Employment Department	Providing health promoting corners, visible health messages, healthy food Link the workers through targeted interventions with the schemes of Department of Rural Development for alternative employment Implement population-based screening guidelines for NCDs through ESIC (Employees State Insurance Corporation) and other government schemes Protect child workers involved in Beedi cottage industries
8.	Social Reforms Department Social Welfare and Nutritious Meal Program Department	Raise awareness with focus on marginalized population about alcohol and substance abuse harms Strengthen 'Central Sector Scheme of Prevention of Alcoholism and Substance Abuse' to rehabilitate victims of alcoholism, substance abuse
9.	Housing and Urban Development Department	Implement health promoting activities such as setting up parks, providing equipment in parks, walkable streets, improved connectivity of public transport, provision of shared use of School, Community Recreational Centre and other spaces/ resources
10.	Youth Welfare and Sports Development Department	Provide incentives to encourage sports activities among adolescents and children Promote 'National Physical Fitness Program, 2012' Include NCDs prevention and control as criteria to award beneficiaries under 'National Young Leaders Program' Create awareness about NCD risk factors among youth
11.	Health and Family Welfare Department	'National AYUSH Mission' (to strengthen the availability and accessibility of alternative systems of medicine at primary health care level Use of AYUSH doctors and other staff for health promotion activities Promote Yoga for physical activity Undertake scientific research to generate evidences on alternative medicine, pharmacological intervention and drug

		standardization Strengthen Jan Aushadhi Scheme &Amma Pharmacy and other relevant schemes to scale-up low-cost generic medicines for NCDs
12.	Transport Department	Promote healthy food that is low in saturated fats, sugar and salt in trains & at railway station premises Establish healthy lifestyle clinics at railway hospitals/clinics for raising awareness about NCDs and associated risk factors among railway staff Strictly implement ban on consumption and sale of tobacco products in trains and at railway station premises.
13.	Co-operation, Food and Consumer Protection Department	Use schemes such as 'Jago Grahak Jago' 'National Consumer Helpline -2011' to raise awareness about NCDs and their risk factors (Call wait time of National Consumer Helpline can be utilized for health promoting messages) Increase the availability of fruits and vegetables Generate awareness about nutritional labelling of all packaged food among consumers Review misleading advertisements to consumers related to tobacco, alcohol and unhealthy food products and take actions including r as appropriate
14.	Law Department	Strengthen Sample Registration System and Medical Certification of cause of Death to provide real time data on premature mortality from NCDs Incorporate information on NCDs risk factors and related laws in the training curriculum of Police Forces Involvement of police force in enforcement of ban on sale and distribution of gutka and related tobacco products Enforce penalties for drunk driving Uniform minimum age for purchase or consumption of alcoholic beverages Strengthening of tobacco control laws to make it compliant Framework Convention on Tobacco Control (FCTC)
15.	Micro, Small and Medium Enterprises Department Rural Development &Panchayat Raj Dept	Provide alternative livelihood options for beedi rollers and promote skill development among their children Support small scale industry for production of healthy processed food, low-cost sports equipment

16.	Environment and Forests Department	Enforce penalties on sectors polluting air & water through Central and State Pollution Control bodies Strengthen the surveillance of air quality data at the Central/State Pollution Control Boards for the 'Graded Response Action Plan' Set industry-specific emission and effluent standards; Strengthen 'Environment Health Cell' and Strict implementation of Environment Impact Assessments (EIA) of industrial activities as a major tool to minimize air & water pollution
17.	Highways and Minor Ports Department Transport Department	Implement measures to restrict alcohol sales along National Highways Research and development on pollution checking equipment, setting up of accident relief facilities along National Highways Use spaces along National Highways for health promoting messages
18.	Information Technology Department	Assist in implementation of health records through initiatives such as Bharat Net Program Promotion of Healthy lifestyle choices through use of caller tune/ free SMS/IVR services (Short Message Service / Interactive Voice Response)
19.	Cooperation, Food and Consumer Protection Department	Increase coverage of targeted LPG (Liquefied Petroleum Gas) subsidy schemes Take measures to popularize standard and labelling program for LPG Domestic Gas Review and revise Import Duty Structure on Edible Oils from time to time Ensure access and affordability of food grains (containing high fiber) and healthy edible oils like Poly Unsaturated Fatty Acid (PUFA) Directorate of Sugar & Vegetable Oils to carry out measures to regulate domestic price of healthy edible oils)
20.	Agriculture Department	Introduce schemes to motivate rural inhabitants for cultivating local fruits and vegetables
21.	Finance Department	Foreign Investment Promotion Board to channelize funds/ grants in health promoting areas /institution

** Adapted from the National Multisectoral Action Plan for Prevention and Control of Non-Communicable Diseases (2017-2022), Ministry of Health, Government of India*

Non Communicable Diseases deaths are linked to

Tobacco use 	Harmful use of alcohol 
Unhealthy eating 	Sedentary life style 

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