CHAPTER 1:

BACKGROUND, RATIONALE AND OBJECTIVES

1.1 BACKGROUND

Noncommunicable Diseases (NCDs)

Global burden of Noncommunicable Diseases

The Noncommunicable Diseases (NCDs) like CVDs, cancer, diabetes and chronic respiratory diseases are the leading causes of mortality in the world.[1] NCDs kill 41 million people every year, corresponding to a total of 71% of all deaths world-wide. These four groups of diseases account for over 80% of all premature deaths from NCDs. Tobacco use, physical inactivity, use of alcohol and unhealthy diet are some of the major modifiable risk factors contributing to these NCDs. Every year between the ages of 30 and 69 years 15 million people die from NCDs, over 85% of these "premature" deaths occur in low and middle-income countries. Cardiovascular diseases account for 17.7 million deaths annually, followed by cancer (9.0 million), respiratory diseases (3.9 million), and diabetes (1.6 million).[2]

Magnitude of Noncommunicable Diseases and their associated risk factors in India

NCDs are estimated to account for 63% of all deaths in India.[3] The burden of NCDs have surpassed communicable diseases posing new challenges in the 21st century and this transition is clearly evident over the past few decades. Generations who had survived the early childhood diseases are now prone to lifestyle diseases. The key determinants driving NCD risk factors have been linked to ageing population, globalization, relentless urbanization, which has led to lifestyle changes, opening markets for food, alcohol and tobacco industries. Also, low levels of education, poverty, poor housing conditions and inadequate spaces for physical activity compounds to the burden jeopardizing the sustainable growth and productivity of the Nation. The most vulnerable group to NCDs are constituted by the younger age groups and the poorer sections of population. The *table 1.1.1*, shows the total percentage of deaths from NCDs in India for the year 2016.

Table 1.1.1 Deaths from Noncommunicable Diseases in India [2016] (Percentage) [4, 5]

Major NCDs	Total deaths in 2016 (%)
Cardiovascular Diseases (CVDs)	28.1
Stroke	7.1
Hypertension	1.3
Chronic Respiratory Diseases	10.9
Chronic Obstructive Pulmonary Disease (COPD)	8.6
Cancer	8.3
Diabetes Mellitus	3.1

A “risk factor” is any attribute, characteristic, or exposure of an individual which increases the likelihood of developing a disease. The prevailing risk factors to major NCDs have been well documented and are more or less common to both men and women. Behavioural risk factors like unhealthy diet, inadequate physical activity, tobacco use, exposure to tobacco smoke, air pollutants and excessive alcohol use, alter

the physiology contributing to the development of metabolic risk factors like overweight, obesity, raised blood pressure, raised blood glucose and high cholesterol. On the whole, these could be avoided before initiation, and when recognized over the life course, they should be interrupted by behavioural and lifestyle counselling, or with medications at an economical cost. These risk factors are embedded within the socio-cultural milieu of the society and modifying them is very challenging. It requires commitment and co-operation from varied government and private sectors. The *figure 1.1.1* summarizes the causation pathway for NCDs and the underlying risk factors based on the established evidence.

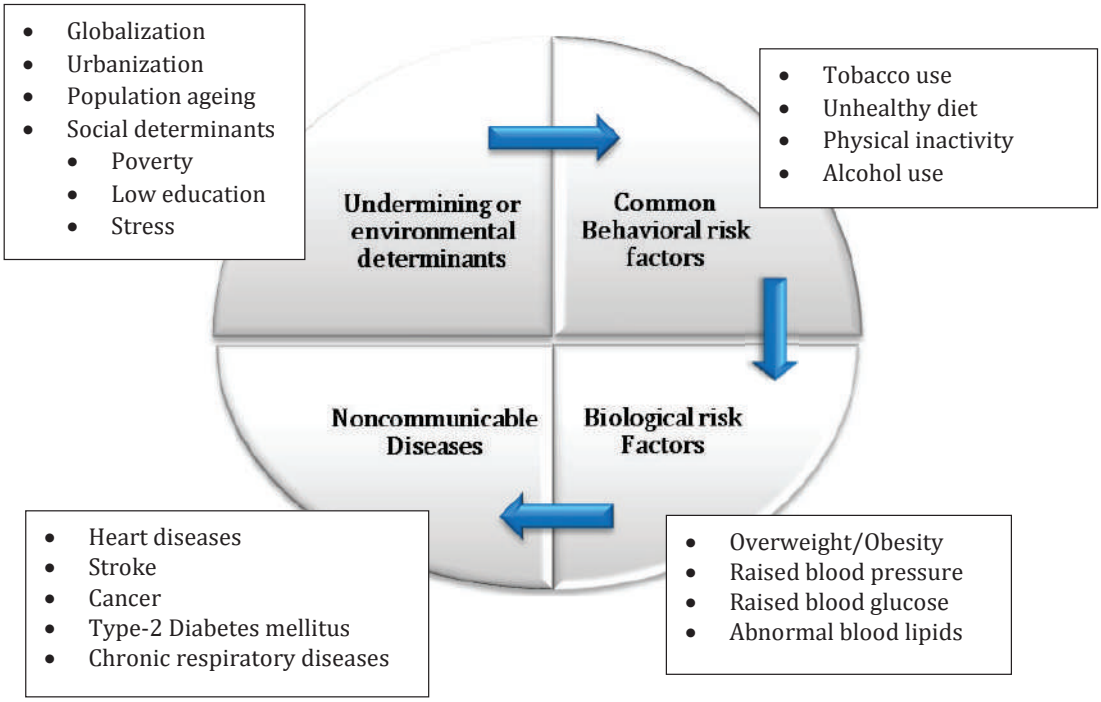

Figure 1.1.1 Causal pathway for NCDs[6,7]

Risk factors to NCDs are not limited only to adults but exist even among adolescents. Adolescence (10–19 years) is an important stage of life for initiation or experimenting with unhealthy behaviours posing greater risks. Multiple risk behaviours inculcated during the most vulnerable phase determines their future health status. Furthermore, promoting healthy behaviours during adolescence has wider prospects of leading a healthy adulthood.

National NCD response

India is committed to the National NCD Monitoring framework and NCD Action Plan[8] with 10 targets and 21 indicators on mortality, risk factors and health systems response to NCDs by year 2025 *(Figure 1.1.2 and table 1.1.2)* and the Sustainable Development Goals[9] agenda by 2030. The spectrum of 17 SDGs and 169 targets are interconnected *(Figure 1.1.3).* Access to basic household amenities like proper housing, provision of piped drinking water, sanitation facilities and clean cooking fuel are important measures of

socio-economic status of the population. In turn, these have implications on their health and living conditions, they provide a context for interpreting the relationship between risk factors and demographics to inform policy debates.

The NCDs are associated with poverty, prevailing gross inequity and high cost of health care. It is estimated that 55 million people in India are pushed every year into poverty and approximately 38 million are poor only because of out-of-pocket payments to purchase medicines.[10] Healthcare needs are not just uncertain and changeable but also catastrophic to many of the families. To address the health inequalities and improve health outcomes, an architectural correction in public healthcare system was attempted by the Ministry of Health and Family Welfare (MoHFW), Government of India, to strengthen the rural as well as the urban infrastructure, human resource capacity and service delivery at the public health facilities. India's commitment towards achieving the Universal Health Coverage (UHC) is clearly reflected through the institutional mechanisms and policies, directed towards increasing coverage and access to health services.

Figure 1.1.2 National NCD Monitoring Targets - NCD Action Plan for 2025

Figure 1.1.3 Sustainable Development Goals (SDGs) by 2030

World Health Organization (WHO), proposed three core dimensions of UHC, (i) the existing healthcare systems and their coverage for the population, (ii) available range of healthcare services to the

population, and (iii) the extent of financial risk protection available to local populations. The National Health Policy, 2017 aims to deliver quality health services at affordable cost for the achievement of UHC.[11,12]

More than half of households in India do not usually seek health care from the public sector, 48% reported due to poor quality of care and unavailability of government facilities. Nevertheless, the use of public health facilities has increased from 34% between 2005-06 to 45% during 2015-16.[13] The public health sector was the main source of health care services for 42% and 46% of households in urban and rural areas respectively.[13] Nearly 51% households sought health care from the private sector, which was the primary source of health care in 56% and 49% urban and rural households respectively.[13]

Table 1.1.2 Targets and indicators for NCD prevention and control in India under National NCD Monitoring Framework[8]

SL. NO	FRAMEWORK ELEMENT	TARGETS			INDICATORS
		OUTCOMES	2020	2025	
Mortality and Morbidity					
1.	Premature mortality from NCDs	Relative reduction in overall mortality from cardiovascular disease, cancer, diabetes, or chronic respiratory disease	10%	25%	1. Unconditional probability of dying between ages 30-70 from cardiovascular disease, cancer, diabetes, or chronic respiratory diseases 2. Cancer incidence, by type of cancer, per 10,00,00 population
NCD risk factors					
2.	Alcohol use	Relative reduction in alcohol use	5%	10%	3. Age-standardised prevalence of current alcohol consumption in adults aged 18+ years
3.	Obesity and diabetes	Halt the rise in obesity and diabetes prevalence	No mid-term target set	Halt the rise in obesity and diabetes prevalence	4. Age-standardised prevalence of obesity among adults aged 18+ years (defined as body mass index greater than 30 Kg/m^2) 5. Prevalence of obesity in adolescents (defined as two standard deviations BMI for age and sex overweight according to the WHO Growth Reference) 6. Age-standardised prevalence of raised blood glucose/diabetes among adults aged 18+ years (defined as fasting plasma glucose value 126 mg/dl or on medication for raised blood glucose)
4.	Physical inactivity	Relative reduction in prevalence of insufficient physical	5%	10%	7. Age-standardised prevalence of insufficient physical activity in adults aged 18+

		activity			years (defined as less than 150 minutes of moderate-intensity activity per week, or equivalent) 8. Prevalence of insufficiently physically active adolescents (defined as less than 60 minutes per day of physical activity)
5.	Raised blood pressure	Relative reduction in prevalence of raised blood pressure	10%	25%	9. Age-standardised prevalence of raised blood pressure among adults aged 18+ years (defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg) and mean systolic blood pressure
6.	Salt/sodium intake	Relative reduction in mean population intake of salt, with aim of achieving recommended level of less than 5 g per day	20%	30%	10. Age-standardised mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years
7.	Tobacco use	Relative reduction in prevalence of current tobacco use	15%	30%	11. Age-standardised prevalence of current tobacco use (smoking and smokeless) among adults aged 18+ years 12. Prevalence of current tobacco use (smoking and smokeless) among adolescents
8.	Household indoor air pollution	Relative reduction in household use of solid fuels as a primary source of energy for cooking	25%	50%	13. Proportion of households using solid fuels as a primary source of energy for cooking
		Additional indicator			14. Age-standardised prevalence of adults (aged 18+ years) consuming less than 5 total servings (400 g) of fruit and vegetables per day
National systems response					
9.	Drug therapy to prevent heart attacks and strokes	Eligible people receiving drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes	30%	50%	15. Proportion of eligible adults (defined as aged 40 years and older with a 10-year cardiovascular risk greater than or equal to 30% including those with existing cardiovascular disease) receiving drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes
10.	Essential NCD medicines and basic	Availability and affordability of quality, safe and	60%	80%	16. Availability and affordability of quality, safe and efficacious essential NCD

	technologies to treat major NCDs	efficacious essential NCD medicines including generics, and basic technologies in both public and private facilities			medicines including generics, and basic technologies in both public and private facilities
11.	**Additional indicators**				17. Access to palliative care assessed by morphine-equivalent consumption of strong opioid analgesics (excluding methadone) per death of cancer 18. Vaccination coverage against hepatitis B virus monitored by number if third doses of Hep-B vaccine (Hep B3) administered to infants 19. Proportion of women aged between 30-49 screened for cervical cancer at least once 20. Proportion of women aged 30 and above screened for breast cancer by clinical examination by trained health professional at least once in lifetime 21. Proportion of high-risk persons (using tobacco, smoking and smokeless and betel nut) screened for oral cancer by examination of oral cavity

Behavioural Risk factors: *Modifiable risk factors include tobacco and alcohol use; unhealthy diet; and physical inactivity which are categorized into primary risk factors.*

Tobacco use and NCDs

India is the second leading consumer of tobacco and third largest tobacco leaf grower in the world. Tobacco use poses greatest threat to mankind and a biggest public health challenge. It is the sole source of preventable deaths of 1.3 million in the country.[4] It is one of the key risk factor to a wide array of chronic diseases, comprising of cancer, respiratory diseases and cardiovascular diseases including stroke. India alone accounts for almost half of all oral cancer cases in the world. Lung cancer is highest among the male tobacco users. The prevalence of tobacco use of any form was 28.6% among adults and 4% among adolescents aged 15-17 years.[14] The Global Adult Tobacco Survey (GATS)-2 reports that, 23% of adults were exposed to second-hand smoke at a public place.[14] The National NCD Monitoring Framework[8] aims to reduce tobacco use by 15% and 30% by the year 2020 and 2025 respectively. *(Table 1.1.2)*

Alcohol use and NCDs

The use of alcohol is one of the identified risk factor for causation of heart diseases, cancers, liver diseases, a range of mental and behavioural disorders, other noncommunicable conditions and injuries including domestic violence. Several studies report, the highest number of alcohol users belonged to the age group of 20–35 years.[15-17] The NFHS-3 reports alcohol use, amongst 15 to 19 years to be 11.0% in males and 1.0% in females.[16] The gender differentials in alcohol consumption have been reported, with majority of the Indian studies, conclusively pointing towards very low use among women when compared to men. The prevalence of alcohol use among women consistently has been estimated at <5%.[17] The NFHS-4 reported that 29% and 1% of men and women respectively consume alcohol.[13] The recent data from the magnitude of substance use in India 2017-18, showed that 14.6% of population consumed alcohol (10–75 years of age). The report highlights that, for every one woman who consumes alcohol, there were 17 men consuming alcohol and 2.7% of the population showed alcohol dependence.[18] The National NCD Monitoring Framework[8] aims to reduce alcohol use by 5% and 10% by the years 2020 and 2025 respectively. *(Table 1.1.2)*

Dietary factors

The shift from traditional to 'modern' foods has affected dietary behaviours and their perception of food. The diet-related risk factors, like low consumption of fruits and vegetables, processed foods high in trans fats, saturated fats, sugar and salt, plus sugar-sweetened beverages contribute to majority of the NCDs (CVDs including hypertension and stroke, diabetes mellitus, cancer etc.). Preference for energy-dense foods, diets with high sugar and salt content pose a serious health risk to the people, especially children. The results from the NFHS-4 revealed that 6.5% and 9.8% of men and 4.5% and 9.8% of women consumed aerated drinks and fried foods daily among those aged between 15-49 years.[13]

The recommended daily intake of fruits and vegetables for optimal health benefits is more than or equivalent to 5 servings.[19] The Integrated Disease Surveillance Project (IDSP) – NCD risk factor survey (2008–09) reports showed that, 86.7% adults had inadequate consumption of fruits and vegetables per day.[20] NFHS-4 reported that 47% and 46.6% of men and women respectively consumed dark green and leafy vegetables daily, while consumption of fruits was less common (12.4% women and 10.9% men).[13]

High dietary salt intake contributes to raised blood pressure, thus increasing risk for heart diseases and stroke. Studies indicate that majority of the population consume 9-12 grams of salt in a day, which is about twice the recommended daily intake limit of 5 grams.[21] Results from a systematic review done in 2017, revealed that the mean salt consumption in India was 11g/day.[21] The National NCD Monitoring Framework[8] aims to reduce salt/sodium intake by 20% and 30% by the year 2020 and 2025 respectively. *(Table 1.1.2)*

Physical inactivity

Increased urbanization, adoption of sedentary lifestyle, high-density traffic, and pollution can discourage people from becoming more physically active. It is one of the 10 leading risk factors for global deaths, causing an estimated 3.2 million deaths each year.[5] Insufficient or lack of physical activity paves way for obesity, dyslipidaemia, insulin resistance, diabetes mellitus and raised blood pressure. It is recommended that, adults should engage in at least 150 minutes of physical activity per week while children and adolescents aged 5-17 years need at least 60 minutes of physical activity every day.[19] The evidence from various sources like ICMR-INDIAB study reports that 54.5% were physically inactive.[22] More recent meta-analysis reveals the prevalence of insufficient physical activity in India was 34% [95% CI: 22.3–47.7].[23] In view with the rising burden of NCDs, the National NCD Monitoring Framework[8] aims to reduce physical inactivity by 5% and 10% by the year 2020 and 2025 respectively. *(Table 1.1.2)*

Physiological/ Metabolic risk factors: *Risk factors like overweight, raised blood pressure, raised blood glucose and raised total cholesterol levels are considered as intermediate risk factors.*

Overweight/Obesity

Obesity is no more an issue of adults, when globally 42 million children under the age of five were considered overweight or obese in the year 2015.[24] Overweight or obesity has been linked to poor health outcomes, with increasing risk of developing major NCDs like cancer and diabetes. The increasing drive to prefer energy dense foods, diets rich in high sugar, high fat, increase in physical inactivity due to the sedentary nature of work, modes of transportation, and increasing urbanization are all contributing to the rise in obesity. The NFHS-4 reported that 21.1% and 19% of women and men were overweight and obese in the 15-49 years age group.[13] According to WHO-countrywide estimates, the prevalence of overweight in adults 18+ in 2006 was 14.6%, while in 2016 it was 19.7%, showing an increase over the last 10 years.[25] The National NCD Monitoring Framework[8] aims to halt the rise in obesity by 2025.

Raised blood pressure

Hypertension is not an inevitable consequence of ageing and its development often compromises the healthy living of an individual requiring expensive and lifelong treatment. Common risk factors like use of alcohol, tobacco, overweight or obesity, physical inactivity and high salt intake contribute to hypertension. If left uncontrolled, hypertension could cause stroke, myocardial infarction, cardiac failure, renal failure and blindness. According to NFHS-4 report, the prevalence of hypertension among the age group of 15–49 years was 14.4% in men and 11% in women. The report also reveals details on the percentage who ever had their blood pressure (BP) measured (60.4%) and were on medication to lower BP (3%).[13] The estimates from the global burden of disease (GBD) 2016, showed that deaths due to hypertension constituted 1.33% of the total deaths in India. High dietary sodium/salt intake, overweight or obesity, tobacco and alcohol use attribute to a

risk of 15%, 24%, 11% and 7% respectively.[5] The National NCD Monitoring Framework[8] aims to reduce raised blood pressure by 10% and 25% by the year 2020 and 2025 respectively. *(Table 1.1.2)*

Raised blood glucose

Raised fasting blood glucose is a 100% attributable risk factor for diabetes mellitus, 19% to stroke, 7.2% for lung cancer, 6.8% to colorectal cancer, 6% for breast cancer and 7.15% to pancreatic cancer.[20] Diabetes mellitus contributes to 3.11% of total deaths in 2016.[5] Type-2 diabetes is a chronic, progressive and damaging ailment, which can be prevented with systematic interventions. The overall prevalence of diabetes as per the ICMR-INDIAB study was 7.3% among the 15 surveyed states[26] and 8.8% according to the International Diabetes Federation, 2017.[27] The risk factors attributable to diabetes mellitus are elevated fasting blood glucose (100%), overweight or obesity (25%), low dietary fruits intake (10%), physical inactivity (2.5%), tobacco (11%) and alcohol (0.55%) use.[5] The National NCD Monitoring Framework[8] aims to have 0% increase in diabetes by 2025. *(Table 1.1.2)*

Raised cholesterol levels

Raised cholesterol increases the risk of heart diseases and stroke. According to the GBD estimates for India in 2016, raised total cholesterol is an attributable risk factor for stroke (8%).[5] Evidence also reveals that a 10% reduction in serum cholesterol in men aged 40 years results in a 50% reduction in heart disease; while for men aged 70 years, an average of 20% reduction in heart disease occurrence within 5 years.[28] There is no specific target under the National NCD Monitoring Framework.

Other NCD risk factors and National NCD targets

Household air pollution

Household air pollution is a unique target included for India in addition to the nine targets set globally. The National NCD Monitoring Framework[8] aims for a 25% and 50% reduction in household air pollution by 2020 and 2025 respectively. Exposure to smoke inside home is greater than outdoors and the major sources being smoke generated while cooking using solid fuels (wood, dung cakes etc.) indoors, which have potential harmful health hazards. The fourth national family health survey 2015 reported that 54.7% of households in India (16.4% urban and 75.2% rural) use some type of solid fuels for cooking with most of them being wood or dung cakes.[13]

National target on drug therapy to prevent heart attacks and stroke

The National NCD Monitoring Framework[8] aims that at least 30% and 50% eligible individuals by year 2020 and 2025 respectively must receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and stroke. Providing drug therapy (including glycaemic control of diabetes mellitus and control of hypertension using a total risk approach) and counselling to high-risk individuals has been identified as one of the most cost-effective measures to prevent heart attacks and stroke.

Availability of essential NCD medicines and basic technologies to treat major NCDs

A 60% and 80% availability of affordable essential NCD medicines and basic technologies to treat major NCDs in both public and private facilities is the National NCD Monitoring Framework[8] target by the year 2020 and 2025 respectively.

NCD prevention and control in India

The National Programme on Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke (NPCDCS) launched in October 2010, aimed at institutionalizing response to NCDs and supplementing State efforts through setting up of State level NCD Cells and integrating it within the National Health Mission (NHM) framework. It is a key implementing entity for these activities, with its coverage expected to increase from 100 to all districts across India. The programme components include: (i) establishment/strengthening of health infrastructure; (ii) early diagnosis and treatment; (iii) human resource development; (iv) health promotion; and (v) monitoring, surveillance and research.[29, 30] Some of the regulatory initiatives undertaken by the MoHFW, Government of India, include the Cigarettes and Other Tobacco Products Act (COTPA) 2003, which aimed at prohibition on advertisement and regulation on production, supplies and distribution of tobacco products.[31] India was among the first few countries to endorse WHO-Framework Convention on Tobacco Control (WHO-FCTC) in 2004. The National Tobacco Control Programme has been in implementation in 21 states of the country. The Food Safety and Standards Authority of India (FSSAI) under the MoHFW, launched the "Eat Right India" movement in the context of India's increasing burden of NCDs, obesity and micro-nutrient deficiencies. There are combined efforts that are aligned with Ayushman Bharat, Swachh Bharat Mission and POSHAN Abhiyaaan (Prime Minister's overarching scheme for holistic nutrition). Food Safety and Standards (Prohibition and Restrictions on Sales) Regulations, 2011 dated 1st of August 2011, issued under the Food Safety and Standards Act, 2006 by the FSSAI, laid down that tobacco and nicotine shall not be used as ingredients in any food products and gutkha has been banned. In 2017, FSSAI also proposed a tax and advertisement ban on unhealthy foods.[31, 32]

The National Health Policy, 2017[12] recognizes the pivotal importance of SDGs and the need to halt and reverse the growing incidence of NCDs. The policy aims to support an integrated approach for screening and prevention of most prevalent NCDs, which would make a significant impact on reduction of morbidity and preventable mortality.

The NITI Aayog (National Institution for Transforming India) in collaboration with the MoHFW, Government of India is exploring opportunities to enhance private sector engagement through public-private partnerships for addressing the growing burden of NCDs in the country. The mandate of NITI Aayog is to co-ordinate the work on SDGs through synergistic approaches. A comprehensive mapping of SDG targets with schemes and programmes have been developed for sustainable development with a focus on their interlinkages.[9]

1.2 RATIONALE FOR NATIONAL NCD MONITORING SURVEY

National NCD Monitoring Framework

As a follow up to the high-level United Nations summit on NCDs in September 2011, the World Health Assembly in May 2013, adopted the comprehensive global NCD monitoring framework. This included a set 9 targets and their 25 indicators capable of application across regional and country settings to monitor trends and to assess progress made in the implementation of national strategies and plans on NCDs. Government of India finalized the national NCD targets and indicators based on regional consultations. A total of 10 targets and 21 indicators were adopted by the MoHFW, Govt. of India, with the year 2010 serving as a baseline for assessing progress made for achieving the NCD targets in 2015, 2020 and 2025[8] *(Table 1.1.2).* Thus, to monitor at a national level, the estimates of these key NCD indicators would require a nationally representative survey.

Increasing burden of NCDs in India, prompted the MoHFW, Govt. of India to prioritize time bound national targets based on WHO guidance. This paved the way for a nation-wide NCD risk factor monitoring survey to arrive at national estimates for the identified indicators. The pivotal role of measuring risk factors for NCDs in predicting future NCD burden in the population is a useful advocacy tool for disease prevention and control programmes. There is a need for a specific sustainable systems for monitoring NCDs in India.

Recognizing the limitations, challenges and the need for a robust system for monitoring, evaluation of NCDs and their risk factors and to further produce evidence for policy and strategies for NCD prevention and control, ICMR was identified as the nodal agency for monitoring, evaluation and surveillance under the national NCD monitoring framework. This activity would establish national baseline estimates to monitor the country's progress towards achieving the National NCD targets. This survey is the first nationwide NCD monitoring survey in India to estimate the National NCD monitoring framework indicators.

1.3 MANDATE AND SCOPE OF THE SURVEY

After reviewing the existing NCD related data collection activities, the national technical working group (TWG) on NCD surveillance recommended ICMR to undertake a separate national level survey to generate estimates on nationally representative sample. It was also recommended that the same protocol would serve as a prototype for future surveys with some modifications as felt appropriate by the TWG at the time of the prospective surveys (2020, 2025). States could adopt the protocol to conduct similar surveys to arrive at State based estimates in the corresponding time periods. ICMR will provide all technical and operational support in conducting these surveys. These activities will help in strengthening

national and sub-national capacities to monitor NCDs and their risk factors and setting up of their surveillance mechanisms.

The National NCD monitoring framework has 21 indicators, of which three are related to adolescents (defined as 10-19 years age group), and the remaining are related to adults (18-69 years age group) and health system response. The present survey covered the age range of 15-69 years which included adolescents between 15-17 years.

1.4 SURVEY OBJECTIVES

Primary objective

- To generate national level estimates of key NCD related indicators (risk factors and health systems response) identified in the national NCD monitoring framework for the year 2017-18.

Secondary objectives

- To set a baseline to track changes and monitor future trends in the prevalence of risk factors associated with NCDs at the national level.
- To create a central and regional pool of resources (capacities, protocols, standard tools, training manuals etc.) to support conduct of similar surveys at State level.

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