



# 1. INTRODUCTION

## 1.1 Tobacco use in India

### 1.1.1 Background

There is substantial scientific evidence on the negative impact of tobacco use on health, society and the environment. Tobacco is one of the greatest public health threats globally and also in India. As the second most populated country, India has a considerable share in the global burden of tobacco-related diseases and deaths.<sup>1</sup> The total percent of deaths from tobacco use was 10% in 1990 (14.2% in males and 4.2% in females) and this increased to 13% in 2019 (18.6% in males and 6.8% in females).<sup>2</sup> The challenges arise with the rising prevalence of tobacco use in the younger population and the predominant use of smokeless tobacco over smoking amongst women.

### 1.1.2 Prevalence of tobacco use

India was one of the first countries to undertake planned and well-designed tobacco surveillance: Global Adult Tobacco Surveillance (GATS) in 2009-10.<sup>3</sup> Over the years, the evidence generated from various surveys has been driving policies and programmes on tobacco control in India.

The National Noncommunicable Disease Monitoring Survey (NNMS) findings released in 2021 reported that 32.8% of adults between 18-69 years used either smoked or smokeless forms of tobacco, and 28% used tobacco daily.<sup>4</sup> 12.6% per cent of adults smoked, and twice this proportion used smokeless tobacco (24.7%).<sup>4</sup> Tobacco use is recorded to be more than 40% in the North-eastern states of India, the highest being in Tripura (64.5%).<sup>3</sup> GATS-2 also reported a higher prevalence of smokeless tobacco use than smoking across most states and union territories. However, the prevalence of smoking than smokeless tobacco was highest in Meghalaya, Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Haryana, and Andhra Pradesh.<sup>3</sup> The predominant use of tobacco in the rural areas and dual-use of tobacco (both smoked and smokeless forms) among men than women is notable.<sup>2,4</sup> According to the GATS-2, 43% of pregnant women (during the survey period) used tobacco in Mizoram. This was larger than the national prevalence of 7.5%, and the majority used smokeless forms (7.4%) than smoked tobacco (0.7%).<sup>3</sup>

The average age of initiation of tobacco use is observed to be 21 years.<sup>4</sup> Older adults aged 65+ years were the highest (41%) proportion of current tobacco users in India.<sup>4</sup> The prevalence of ever use of tobacco among adolescents was 7%, smokeless tobacco use (5%) was higher than smoking (3.5%).<sup>4</sup> The prevalence of tobacco use escalated with every



ten years of increasing age and notably, more than two-folds from 12 % in the 15-24 years age group to 30 % in the 25-44 years age group.<sup>3</sup> However, from 2000 to 2015, there was a substantial reduction in tobacco use in the country. It is projected to further reduce from 25% in 2020 to 22.3% by 2025.<sup>5</sup> This would help to attain the national NCD monitoring target of 30% reduction in tobacco use as laid out in the National NCD Action Plan for 2025.<sup>6</sup>

There are various forms of tobacco use. They have been broadly classified as smoking forms of tobacco (cigarette, *bidi*, *hookah*, cigar, cheroot, cigarillos etc.) and smokeless forms of tobacco (*khaini*, *gutka*, betel quid with tobacco, pan masala with tobacco, snuff etc.). Bidis account for the most significant proportion of smoked tobacco consumed every day in India.<sup>4</sup> Daily, every three in five adults aged 18-69 years smoke bidis and one in five smoke manufactured cigarettes.<sup>4</sup> Nearly 70% use chewed form of smokeless tobacco followed by paan with tobacco (28%) daily.<sup>4</sup> The two most commonly used smokeless tobacco products among adults in India are *khaini* (11.2%) and *gutka* (6.8%).<sup>3</sup> The former is a mixture of tobacco and lime, while the latter, in addition to the two ingredients, also contains areca nut. The combination of smokeless tobacco and areca nut is a class 1 carcinogen. It is evident from studies that a more significant proportion consumes this combination than any other tobacco form in India.<sup>7</sup>

## 1.2 Tobacco and Cancer

India had an estimated record of about 1.39 million new cancer cases in 2020.<sup>8</sup> Among the various cancer risk factors, tobacco is well established and a leading preventable factor worldwide.<sup>9</sup> Hence tobacco use forms the foremost preventable cause of cancer incidence and mortality. There are over 5000 chemical constituents, of which over 60 chemicals are established carcinogens in tobacco smoke.<sup>10</sup> The carcinogens include hydrocarbons which could be polyaromatic (PAHs), heterocyclic, volatile hydrocarbons, nitro hydrocarbons; amines: aromatic, N-heterocyclic, N-nitrosamines, aldehydes, organic, inorganic compounds and phenolic compounds. The carcinogens in tobacco bring about progression to cancer by altered DNA methylation patterns and altered gene expression. Tobacco smoke appears to have accounted for about half of all cancer deaths in males and an increasing proportion of cancer deaths in females.<sup>11,12</sup>

During the 1950s', it was reliably established that prolonged cigarette smoking is a significant cause of lung cancer and several other cancer types.<sup>13</sup> The risk of lung cancer was also affected by the number of cigarettes used per day. Other factors that influence the duration of use include age at initiation, age in current users, and smoking cessation.<sup>14</sup> The significance of the relationship between the duration of smoking and risk for lung cancer was demonstrated in the British Doctors' Study.<sup>11</sup> It was estimated that lung cancer



incidence increased by about 100-fold among males who had smoked for 45 years than those with 15 years of smoking history.

According to the International Agency for Research in Cancer (IARC) monograph published in 1986, 1987 and 2004; there exists sufficient evidence that besides lung cancer, smoking was the causal agent for other cancer types: upper gastrointestinal tract, pancreas and urinary bladder.<sup>15,16,17</sup> Smoking tobacco is also associated with an increased risk of oral leukoplakia, which could progress into oral cancer.<sup>18,19</sup> Studies have shown that the risk of oesophageal squamous cell carcinoma increased by about 3 - to 7-fold in current smokers compared to non-smokers.<sup>20</sup> The risk of oesophageal squamous cell carcinoma is greater than adenocarcinoma in smokers. Evidence from literature indicates that the population attributable risk (PAR) of bladder cancer for smoked tobacco ranges from 50% to 65% in males and 20% to 30% in women.<sup>21,22</sup> Moreover, current cigarette smoking increases bladder cancer risk by three times more relative to never smoking.

As in smoked tobacco, smokeless tobacco products contain many carcinogenic nitrosamines, volatile aldehydes, and polynuclear agents.<sup>23</sup> The link between smokeless tobacco and cancer was observed as early as 1761, when a British doctor observed 'nasal polyps' suggestive of nasal cancer among users of tobacco snuff.<sup>24</sup> Smokeless tobacco has been associated with the high burden of oral potentially malignant diseases (OPMD) and head and neck cancer in South Asia.<sup>25</sup> A meta-analysis of the association between smokeless tobacco use and oral cancer estimates that the risk of oral cancer was 4.7 times more in tobacco chewers and 7.1 times more among *paan* with tobacco users in South Asia.<sup>26</sup> Tobacco chewing has also been shown to be associated with an increased risk of oesophageal cancer.<sup>27, 28, 29</sup>

## 1.3 Tobacco and cancer control initiatives in India

### 1.3.1 Cancer control programmes

In response to the rising NCD epidemic, the Government of India launched the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS) in 2010. The major focus of the NPCDCS is to generate awareness for cancer prevention, strengthen cancer care services through population-based screening for common cancers, strengthening of Regional Cancer Centres (RCCs), setting up State Cancer Institutes (SCIs) and Tertiary Cancer Care Centres (TCCCS). The programme adopts a decentralised approach by establishing state and district level NCD cells for effective implementation and monitoring. In addition, the establishment of Health and Family Welfare Centers as a part of 'Ayushman Bharat' and Pradhan Mantri Jan Arogya Yojana (PMJAY)



will address NCDs and afford financial protection to vulnerable families from catastrophic health expenditure.

### 1.3.2 Tobacco control initiatives

The Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act (COTPA) was passed in 2003, before India became a part of the WHO Framework Convention on Tobacco Control in 2005. The Government of India, in 2007-08, launched the National Tobacco Control Program (NTCP) to create awareness on harmful effects of tobacco use, to reduce its production and supply of any form of tobacco products, to ensure the effective implementation of the COTPA, assist in tobacco cessation and to facilitate the implementation of tobacco use prevention and control strategies according to the WHO Framework Convention of Tobacco Control (FCTC)<sup>30</sup>. The initiatives include smoke free places; restrictions and ban on tobacco advertising, promotion and sponsorship; packaging and labelling of tobacco products; sale restrictions that prohibit its sale within 100 yards of any educational institutions and to persons under the age of 18 years. Presently, NTCP is implemented in all the 36 states and Union Territories.

On 5 December 2019, the Government passed a prohibition on the sale of e-cigarettes, including all Electronic Nicotine Delivery Systems (ENDS) forms, including Heated Tobacco Products, e-Hookah and the like devices.<sup>31</sup> As a part of tobacco cessation, the Ministry of Health and Family Welfare (MOHFW) has partnered with World Health Organization (WHO) and the International Telecommunication Union (ITU) to implement the mobile technology based 'mCessation programme', which encourages tobacco users to quit the habit by a customized guidance in the form of text messages.<sup>32</sup> The programme is reported to have about 2.1 million self-registered users.

The Food Safety and Standards Authority of India (FSSAI) has also banned the use of tobacco and nicotine in food items, which has resulted in the ban of 'gutka' and flavoured smokeless tobacco products.<sup>33</sup> The MOHFW, in partnership with the National Tobacco Testing Laboratories and other stakeholders, are providing support for product testing and capacity building to strengthen the control of smokeless tobacco use.<sup>34</sup>





## 1.4 About the Report

The NCRP of the ICMR is implemented by the National Centre for Disease Informatics and Research (NCDIR) in Bengaluru. The NCRP has been playing a vital role in cancer surveillance since 1981 by collecting and compiling data on cancer epidemiology and clinical profile of cancer cases in the country. There are two kinds of registries in the NCRP network: Population and Hospital Based Cancer Registries (PBCRs and HBCRs). The PBCRs, provide data on cancer-related incidence, mortality, trends and survival about cancer in the population of a well-defined geographical area. The HBCRs collate and generate essential information on diagnosis, staging, treatment modalities, and outcomes in patients who avail of care at a specific hospital in any part of the country. Thus, the functioning of PBCRs and HBCRs are complementary to each other.

The NCRP has been using the classification of the International Agency for Research on Cancer (IARC), World Health Organization monographs for enlisting the anatomical sites of cancer associated with tobacco use.<sup>16,35</sup> The sites include- lip (C00), tongue (C01–C02), mouth (C03–C06), oropharynx (C10), hypopharynx (C12–C13), pharynx unspecified (C14), oesophagus (C15), larynx (C32), lung (C33–C34), and urinary bladder (C67). The present report is based on an analysis of data compiled from 28 PBCRs' and 58 HBCRs' under the NCRP for 2012 to 2016. The data on incidence (crude, age-adjusted and age-specific), mortality (crude and age-adjusted), cumulative risk, leading anatomic sites and trends in incidence over time (> 10 years) have been analysed from PBCR data. In addition, HBCR data has been used to analyse the clinical extent of disease at presentation for all sites of cancer associated with tobacco use. The findings are presented as pooled analysis for all the sites as well as site-wise estimates. The operational definitions and statistical terms are enlisted in Annexure 1.