



CNCI Bulletin

Issue : Apr. - Jun. 2025 / Vol. 3. No. 2

CHITTARANJAN NATIONAL CANCER INSTITUTE (KOLKATA)

(An Autonomous Body under Government of India, Ministry of Health & Family Welfare, Regional Cancer Centre)

DIRECTOR'S MESSAGE

Dr. Jayanta Chakrabarti

Director,

Tobacco Free Today, Cancer Free Tomorrow

India is home to more than 1.4 billion inhabitants, witnessing a pronounced escalation in cancer incidences attributable to lifestyle alterations, tobacco consumption, suboptimal dietary practices, and a deficiency in physical activity. The prevalence



of lung, bladder, breast, prostate, and hematologic malignancies is surging, driven by heightened exposure to airborne toxins. The Health Ministry forecasts an alarming annual influx of approximately 800,000 new cancer diagnoses, with tobacco-related cancers constituting 35-50% of all male cases and 17% among females. India grapples with an upward trajectory in the incidence rate of cancer; currently, over 1.4 million new cases are documented annually, with nearly 900,000 fatalities resulting from the disease. Tobacco related cancer is significant health concern in India. The North East region has the highest prevalence of tobacco related cancers at 5.4%. Tobacco use is responsible for nearly 1.35 million fatalities every year in India. India has played an active leadership role in the global fight against tobacco. The Advocacy Forum for Tobacco Control (AFTC), a national alliance against tobacco, provided opportunity for all key tobacco control advocates to join an effective campaign for tobacco control resulting in the modified and comprehensive Tobacco Control Bill that was passed in 2004. Although several legislations have been passed by the government to curb tobacco use, effective implementation and enforcement of these

laws are yet to be strongly implemented. Towards this effect, the Ministry of Health and Family Welfare (MOFW) has released a resource manual that deals with the essential aspects of tobacco control laws and outlines the legal arrangement in India for tobacco control. These manuals also present situational analysis of enforcements and make recommendations to improve enforcement and implementation of tobacco control laws. Here are some message for tobacco addicted - Tobacco: a moment's pleasure, a lifetime's pain. We need to burn calories daily, not tobacco.



TLR targeting therapies for breast cancer: Recent updates



Dr. Suparna Mazumder,
Head of the Department , Radio-diagnosis

Dear Reader,

We are in the sixth month of the year 2025, June, named after Juno the Greek goddess. It heralds the onset of monsoons in this part of the world and brings with it respite from summer heat and joy to the farmers. The rains wash away the dust and grime accrued over the dry season and cleans the environment - for we have observed World Environment day on 5th June and there were renewed calls about long term sustainability of our planet. This year's motto was #BeatPlasticPollution and global celebrations were hosted by The Republic of Korea.

The aim is to raise global awareness about the harmful effects of plastic waste on ecosystems, wildlife and our health. Plastics have reached the deepest oceans, remote mountain peaks and even inside our body in the form of microplastics. In the environment, transportation of microplastics from pedosphere to hydrosphere typically occurs through runoff, rainfall and ocean currents. They have not only been found in human faces but also in breast milk, placenta and embryos.

The COVID-19 outbreak dramatically enhanced plastic production and wastes were produced to the tune of 1.6 million tons. An alarming amount of nearly 3.4 billion facial protection items alone were disposed, some of which might have been inappropriately dumped.

Micro plastics (< 5 mm) have potential link to cancer as they can trigger DNA damage, oxidative stress inflammation, cytotoxicity and endocrine disruption. They enter the body through nasal, dermal and oral routes. Apart from being linked to chronic disorders of lungs, bowel, liver and heart, few plastics are being implicated in certain cancers like breast, lung colon and prostate. Some other chemicals used in plastics such as bisphenol A (BPA) and phthalates can act as endocrine disruptors and mimic estrogen potentially promoting breast cancer cell growth. PVC, is another type of plastic made with vinyl chloride, a carcinogen and is commonly used in packaging. If it is burned it makes another potent class of carcinogens- dioxins which are breast carcinogens. Then there are the forever chemicals (PFAS per and poly fluoroalkyl substances) which are highly toxic and persistent.

The roadmap ahead is unclear and there are very few effective legislations restricting plastic use.

In our hospitals we should encourage proper segregation of hospital waste, recycling and avoid waste. Reduce, reuse and recycle are strategies that may be adopted not only in hospitals but also in our daily lives.

Beat plastics before they beat us.

Thank you and we hope that you enjoy this issue.

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Cancer and Air Pollution : India's Urgent Challenge



Dr. Sankar Sengupta

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India is experiencing a surge in cancer cases, with approximately 800,000 new diagnoses annually, largely attributed to lifestyle changes, tobacco use, and alarming levels of air pollution. Ambient air pollution, defined by the WHO as harmful pollutants emitted by industries, households, and vehicles, significantly affects human health. The impact of cancer in the world in 2020, based on estimates from the Global Cancer Observatory (GCO) and prepared by the International Agency for Research on Cancer (IARC), indicates that there were 19.3 million new cases of cancer worldwide

The Devastating Impact of Air Pollution

Air pollution is linked to various chronic conditions, including lung, cervical, and brain cancers, cardiovascular diseases, and respiratory diseases. In India, it accounts for 17.8% of all deaths (1.67 million) and \$28.8 billion in financial losses. Fine particulate matter (PM_{2.5}) is particularly hazardous, contributing to an estimated 2 million premature deaths globally each year. The carcinogenic potential of pollutants varies according to the pollution sources, climate conditions and region topography. In 2021, the World Health Organization (WHO) estimated that each year, 7 million premature deaths occur worldwide due to air pollution. Measures to reduce these levels can reduce the burden of heart disease, respiratory disease, and cancer, especially lung and bladder cancer.

Association between Air Pollution and Cancer

Research suggests a positive association between ambient air pollution and cancers of the pancreas, urinary bladder, breast, prostate, and liver. The International Agency for Research on Cancer classifies outdoor air pollution and PM_{2.5} as a group 1 carcinogen, contributing to human lung cancer.

The Need for Action

With India ranking 5th globally in air pollution, urgent measures are necessary to control pollution and promote early cancer detection. This study aims to examine the association between major ambient air pollutants and the incidence and mortality of lung and non-lung cancers.

Statistics

- India's average US AQI: 151 (Unhealthy)
- Average PM_{2.5} concentration: 11.6 times the WHO annual guideline value
- Lung cancer: a leading cause of mortality in India, with a growing trend in cases and deaths
- The incidence of cancer cases is estimated to increase by 12.8 per cent in 2025 as compared to 2020.

Conclusion

The alarming rise in air pollution and cancer cases in India demands immediate attention and action. Efforts to reduce pollution and promote public health are crucial to mitigating the impact of air pollution on cancer incidence and mortality. National Clean Air Programme (NCAP) has been launched by Ministry of Environment, Forest and Climate Change (MoEFCC) in January 2019 with an aim to improve air quality in 131 cities (non-attainment cities and Million Plus Cities) in 24 States by engaging all stakeholders.

Tobacco: A Sweet Poison with Bitter Consequences



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World No Tobacco Day, observed annually on May 31st, is a critical global initiative spearheaded by the World Health Organization (WHO). This day serves to underscore the severe health consequences associated with tobacco use and to advocate for strong policies aimed at reducing its prevalence worldwide. The 2025 campaign is themed "Unmasking the Appeal: Exposing Industry Tactics on Tobacco and Nicotine Products," with a specific focus on revealing the manipulative strategies employed by the tobacco and nicotine industries, particularly their efforts to target young people through appealing product designs and marketing campaigns. Given that tobacco is a leading preventable cause of cancer, this article will explore the significance of World No Tobacco Day 2025, the vital role played by the WHO, and the crucial connection between tobacco use and cancer.

Tobacco use continues to be a major global public health crisis, responsible for over 8 million deaths each year. This figure includes 1.2 million deaths resulting from exposure to secondhand smoke. Notably, tobacco is the leading preventable cause of cancer, accounting for approximately 25% of all cancer-related deaths globally, which translates to about 2.5 million fatalities annually. Smoking is implicated in 85-90% of lung cancer deaths, the most common

cancer linked to tobacco, and is also associated with at least 20 other types of cancer, including cancers of the mouth, throat, esophagus, pancreas, bladder, and cervix. Furthermore, exposure to secondhand smoke increases the risk of lung cancer by 20-30% in non-smokers, with children being particularly vulnerable to leukemia and other cancers. Recent data from the United States (2001-2021) indicates a general decline in the incidence and mortality of tobacco-related cancers (1975-2022). This progress is attributed to effective tobacco control measures, advancements in medical care, and improved early detection methods. However, concerning trends persist among younger adults (20-49 years), with rising incidence rates observed in specific populations. These disparities underscore the ongoing need for targeted interventions to address vulnerabilities within particular communities.

On a global scale, low- and middle-income countries bear a disproportionate burden of the tobacco epidemic, accounting for 80% of the world's 1.3 billion tobacco users. This situation exacerbates poverty and increases healthcare costs in these regions. The economic impact of tobacco-related diseases, including cancer, is estimated to be \$1.4 trillion annually, placing a significant strain on healthcare systems and national economies worldwide.

The WHO plays a central role in the global fight against the tobacco epidemic through a combination of policy advocacy, international coordination, and public awareness campaigns. The Framework Convention on Tobacco Control (FCTC), adopted in 2003 and ratified by 182 countries, serves as the WHO's foundational treaty for tobacco control. It provides a legal framework for the implementation of various measures, including taxation, the establishment of smoke-free environments, the use of warning labels, the banning of advertising, and the provision of cessation

support. On World No Tobacco Day, the WHO intensifies these efforts through focused campaigns, with the 2025 theme specifically aimed at exposing industry tactics such as the marketing of flavored products and the use of digital platforms to target young people.

The MPOWER framework is a key strategy developed by the WHO to facilitate the implementation of the FCTC measures. This framework includes six evidence-based measures: Monitor tobacco use and prevention policies; Protect people from tobacco smoke; Offer help to quit tobacco use; Warn about the dangers of tobacco; Enforce bans on tobacco advertising, promotion, and sponsorship; and Raise taxes on tobacco.

These measures have contributed to significant progress in reducing tobacco use globally. The number of tobacco users worldwide has decreased from 1.36 billion in 2000 to 1.25 billion in 2022. The WHO projects a further reduction of 25% by 2025, although this falls short of the targeted 30% reduction. Taxation, in particular, has proven to be a highly effective tool in reducing the affordability of tobacco products and deterring uptake among young people, who are often more sensitive to price changes. Graphic warning labels, which now cover 65% of packaging in some countries, have also been effective in increasing public awareness of the health risks associated with tobacco use, including cancer.

The WHO is also actively addressing emerging threats in the tobacco landscape, such as electronic cigarettes (e-cigarettes) and heated tobacco products (HTPs). Data from the WHO European Region in 2022 indicated that 12.5% of adolescents used e-cigarettes, compared to only 2% of adults. In some countries within the region, e-cigarette use among school-aged children was 2-3 times higher than cigarette smoking. The tobacco industry's use of a wide array of flavors

(reportedly 16,000 unique flavors) and extensive social media marketing (generating 3.4 billion views) are key tactics targeting youth, necessitating stricter regulations. The WHO advocates for bans on flavors, digital advertising, and product designs that mask the harshness of tobacco and nicotine products. On World No Tobacco Day 2025, the WHO will recognize individuals and organizations through awards, celebrating significant contributions to tobacco control. Examples of past awardees include Armenia's 2020 tobacco control law, Austria's ban on smoking in hospitality venues, and Uzbekistan's regulations on e-cigarettes. These awards serve to highlight global champions in the fight against industry interference and in the advancement of public health.

The link between tobacco and cancer is undeniable and lethal. Tobacco smoke contains over 7,000 chemicals, including at least 70 known carcinogens that can damage DNA and promote the growth of tumors. Lung cancer, for which smokers have a 15-30 times higher risk compared to non-smokers, is the most prominent tobacco-related cancer. However, tobacco use is also a major risk factor for cancers of the oral cavity, larynx, esophagus, and several other sites. Smokeless tobacco, which is prevalent in regions like South Asia, is a significant driver of oral cancer, with countries like India reporting a high number of cases. The combined use of tobacco and alcohol further amplifies these risks, increasing the likelihood of oral and throat cancers by up to 30 times in heavy users.

The 2025 campaign's focus on "unmasking the appeal" specifically targets the tobacco industry's strategies to initiate youth into tobacco and nicotine use. These tactics include the marketing of flavored e-cigarettes and nicotine pouches, which sustain addiction and increase the long-term risk of cancer. In Africa, where the youth population is rapidly growing, tobacco

companies are exploiting less stringent regulations by promoting the sale of single cigarettes and engaging in extensive social media campaigns. However, Africa's relatively low current smoking prevalence presents a window of opportunity for implementing preventive measures, supported by the WHO's FCTC and local research networks.

Despite the progress achieved in tobacco control, significant challenges remain. The tobacco industry's aggressive marketing efforts, particularly in low- and middle-income countries, continue to undermine control measures. Notably, six countries have reported an increase in tobacco use, highlighting the urgent need for intensified action in these regions. The Global Tobacco Industry Interference Index 2023 also indicates a

deterioration in protections against industry influence in several countries, underscoring the need for stronger enforcement of existing regulations and the implementation of more robust policies.

World No Tobacco Day 2025 presents several key opportunities to address these ongoing challenges. Governments should prioritize policy strengthening by adopting the WHO's MPOWER measures, including increasing tobacco taxes and implementing comprehensive bans on advertising, to reduce youth access to tobacco and nicotine products. Youth protection is paramount, and measures such as banning flavors in tobacco and nicotine products and regulating digital platforms used for marketing can curb their appeal to young people. Public awareness campaigns, including

initiatives like poster competitions, school workshops, and social media advocacy using hashtags like #Tobacco Exposed, can effectively educate communities about the risks of tobacco use, including the link to cancer. Expanding access to cessation support, such as quit lines and pharmacotherapy, can help current smokers quit, thereby reducing the incidence of tobacco-related cancers. Finally, cancer screening programs should be enhanced to improve early detection of tobacco-related cancers, particularly in high-risk regions, which can lead to better treatment outcomes.

In conclusion, World No Tobacco Day 2025, with its theme "Unmasking the Appeal," highlights the WHO's crucial role in exposing the manipulative tactics of the tobacco industry and in reducing the global burden of

cancer. By effectively leveraging the FCTC, implementing the MPOWER framework, and conducting targeted campaigns, the WHO is driving progress in the fight against the 8 million annual tobacco-related deaths, including the 2.5 million deaths caused by cancer. While global tobacco use has seen a decline, the rising incidence in vulnerable populations and the persistent interference of the tobacco industry necessitate sustained and intensified action. Governments, communities, and individuals must work together to implement WHO-recommended policies, protect young people, and promote cessation to achieve a tobacco-free future, ultimately saving millions of lives from preventable cancers. So Either smoke or health, the choice is yours.

Regular Mock Fire Drills: Preparedness is Key to Patient Safety

-Indrajit Bhattacharjee,

Regular fire mock drills in hospitals are essential for emergency preparedness, legal compliance, and patient safety. While they may pose some logistical and emotional challenges, the benefits far outweigh the downsides when drills are well-planned and communicated effectively. Hospitals should document each drill, note learnings, and update their fire safety protocols accordingly.

Ensuring fire safety in hospitals is critical due to the presence of vulnerable patients, complex infrastructure, and high occupancy rates. Effective fire safety measures-including regular

risk assessments, staff training, fire detection and suppression systems, and clearly marked evacuation routes-are essential to protect lives and property. A proactive and well-maintained

Continuous improvement and readiness are key to minimizing risks and ensuring rapid response in the event of a fire emergency.

Improving hospital evacuation drills is key to ensuring readiness during real emergencies. Here are practical and effective suggestions to enhance the quality, realism, and outcomes of your fire evacuation drills:

- Simulate different fire locations (ICU, kitchen, storeroom).
- Include obstructed exits, power failures, or multiple hazards.
- Rotate drill times: day shift, night shift, weekends.
- Use fake smoke machines (non-toxic).
- Have staff wear mock injuries or simulate panic.
- Practice with real evacuation equipment: stretchers, evacuation chairs, sleds.
- Allow staff to practice different roles: leader, assistant, observer.
- Build cross-functional teams

so everyone understands the process end-to-end.

- Record the drill via CCTV or mobile cams for post-drill analysis.
- Use mobile apps for checklists, timing, and team communication.
- Evaluate using clear metrics:
 - ◆ Response time
 - ◆ Communication efficiency
 - ◆ Proper use of evacuation equipment
 - ◆ Number of patients safely relocated
- Test PA announcements, walkie-talkies, and backup alarms.
- Ensure non-verbal cues and signs are understood by all.
- Announced drills for training.
- Surprise drills to test true readiness.



fire safety plan not only ensures compliance with regulatory standards but also fosters a culture of safety and preparedness.

TLR targeting therapies for breast cancer: Recent updates



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Breast cancer is the second leading cause of cancer-associated death for women globally. However, the efficacy of current treatments is limited for late-stage breast cancer patients. Therefore, a novel therapeutic strategy is urgently needed to improve current treatment for breast cancer. Increasing evidence has demonstrated that innate immunity, particularly Toll-like receptors (TLRs), plays a pivotal role in the regulation of tumor microenvironment and controlling immune responses in tumor development and treatment. TLRs are a crucial family of pattern recognition receptors (PRRs) within innate immune system of our body. TLR activation averts pathogen infection and mitigates any damage-induced danger signals. Cumulative evidence advocates that TLRs play a pivotal role in breast cancer progression and treatment. TLR activation is a double-edged sword that can either exhibit pro-tumor/anti-tumor effect. However, the underlying mechanisms of TLR signaling in breast cancer are poorly understood. TLR targeting may be a novel strategy for improving immunotherapy for breast cancer treatment. This article briefly showcases involvement

of each human TLR in breast cancer and current understanding of these TLR in breast cancer treatment.

It is well known fact that Antigen Presenting Cells (APC) recognize tumor antigens and present it to T-cells for releasing cytotoxic molecules (like perforin, granzyme-B etc) to induce apoptosis of tumor cells. However, tumor cells create immunosuppressive micro-environment to induce T-cell exhaustion to fade T-cell function. The crosstalk between immune cells - tumor cells are different among different subtypes of breast cancer due to the heterogeneity leading to different treatment outcomes. Scientific evidences reveal pivotal role of TLR2 which typically necessitating heterodimerization with either TLR1 or TLR6 to initiate MyD88-dependent TLR signaling pathway. Depending on specific receptor combination, TLR2 may exhibit different roles. In breast cancer, TLR2 may either promote or hinder tumor growth. Human breast cancer samples constantly express higher TLR2 expression which correlates with worse overall survival and resistance to endocrine therapy for luminal B subtype. Reports demonstrated that TLR2 is crucial for cancer stem cell renewal, maintenance and induction of regulatory T cells. TLR3 largely aids as tumor suppressive function hence stimulation of TLR3 prompts apoptosis in human breast cancer cells. High expression of TLR3 in TNBC indicates a better prognosis due to TLR3 mediated dendritic cell activation. TLR4 was first identified human TLR which initiates innate immune responses. Its higher expression TLR4 in several breast cancer cells and tissues was associated with impaired breast cancer cell growth and apoptosis. TLR4 is

also known to trigger anti-tumor immune responses by activating DCs and cytotoxic T lymphocytes. TCGA data supports that TLR5 high expression directs a favourable prognosis in breast cancer patients. However, further research is required to explore the potential therapeutic applications of TLR5 agonists as immunotherapeutic approaches. Recently, the potential of TLR7 in breast cancer revealed its dual role (pro-tumorigenic and anti-tumor effects) in breast cancer. TLR7 activation by ssRNA or synthetic agonists is associated with enhanced breast cancer cell proliferation, migration and invasion in vitro via activation of NF- κ B pathways. In contrary, TLR7 stimulation also leads DC activation that stimulates cytotoxic T-lymphocytes and antitumor immunity. Hence, dose of the agonist within tumor microenvironment of the breast cancer sub-type regulates TLR7 functioning and more studies are required. Evolving evidence advocates TLR8 function favors breast cancer progression and modulates anti-tumor immunity as enhanced TLR8 expression reported in breast cancer cell lines and tumor tissues when compared to normal tissues. The landscape of TLR expression was explored in the tumor microenvironment of triple-negative breast cancer (TNBC), identifying distinct roles of TLR4 and TLR8 in the maintenance of the tumor-immune microenvironment. In few contexts, TLR9 signaling linked with tumor-promotion within breast cancer as its activation may promote tumor cell proliferation, survival, and invasion. Augmented TLR9 signaling may contribute to an immunosuppressive tumor microenvironment. Low TLR9 expression has been linked to an aggressive subtype of TNBC and poor disease-specific

survival in patients. In summary, different TLR signaling in breast cancer is complex and context-dependent, exerting both pro-oncogenic and anti-tumor effects.

Thus, targeting TLRs demonstrated a promising approach to enhance the effectiveness of immuno-therapies for breast cancer. Modulation of TLR signaling via agonist or antagonists may be used as immunoadjuvants for overcoming the immunosuppressive tumor micro-environment and boosting anti-tumor immune responses.

For examples, TLR3 agonist poly(I:C), TLR7/8 agonists like imiquimod and resiquimod; TLR9 agonists like CpG oligodeoxynucleotides are being explored for the same. Currently, these TLR agonists are being used in combination with immune checkpoint inhibitors (e.g., anti-PD-1, anti-PD-L1, anti-CTLA-4) for breast cancer treatment. TLR activation can prime both innate and adaptive immune system, while checkpoint inhibitors rejuvenate the cytotoxic T cells from anergy and boost anti-tumor immunity.

Overall, the role of TLRs in breast cancer immunotherapy is multi-layered and opened new horizon which needs further investigation to fully elucidate their therapeutic potential. In conclusion, TLRs offer fertile ground for research and therapeutic innovation in breast cancer. By harnessing their potential to modulate both innate and adaptive immune responses, we can unlock novel therapeutic pathways to mitigate therapy resistance and ultimately enhancing the survival and quality of life for breast cancer patients.

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Tobacco and Cancer Among Adult Population



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Introduction

Tobacco consumption has been recognized as a major risk factor contributing to preventable morbidity and mortality globally. Notwithstanding global awareness and legislative initiatives, tobacco usage continues to exert a significant burden on public health, especially due to its correlation with cancer. This article examines the global and national aspects of tobacco consumption, the carcinogenic pathways it initiates, and its contribution to the increased incidence of cancer in adult populations. Particular emphasis is placed on India and the state of West Bengal, where cultural and socioeconomic elements distinctly influence tobacco consumption patterns and health consequences.

1. Epidemiology of Cancers associated with use of Tobacco products

1.1. Global Epidemiology and Burden of Disease

Tobacco continues to be a significant threat to the battle against non-communicable diseases worldwide. The World Health Organization (WHO) reports that over 1.3 billion individuals utilize tobacco, predominantly in low- and middle-income nations. Tobacco directly accounts for around 8 million fatalities per year, with around 1.3 million resulting from second-hand smoke exposure. In

2020, over 22.3% of the world-wide adult population utilized tobacco, exhibiting notable gender disparities-36.7% among men against 7.8% among women. Tobacco is responsible for approximately 2.4 million cancer-related fatalities each year, underscoring its significant role in global cancer mortality.

1.2 Burden of Cancers Associated with Tobacco Use in India

Cancers associated with tobacco constitute a significant share of the cancer burden in India. According to GLOBOCAN 2022, India documented 1.46 million new cancer cases, with tobacco associated with almost 50% of male cancers and 25% of female cancers. Tobacco-related malignancies in West Bengal, including those of the oral cavity, oesophagus, larynx, and lung, account for around 46.7% of male cancers and 15.4% of female cancers. The state is anticipated to experience a consistent increase in tobacco-related cancers by 2025, influenced by population growth and established consumption habits.

1.3 Tobacco Consumption

Tobacco is ingested in many forms that can be classified into two primary categories: smoked and smokeless. Smoked forms include of cigarettes, bidis, cigars, hookahs, and pipes, whilst smokeless types include gutkha, khaini, zarda, paan with tobacco, snuff, mishri, etc. The mode of intake directly impacts the location of carcinogenic exposure, with smoked tobacco predominantly damaging the respiratory system and smokeless varieties elevating the risk of oral and gastrointestinal malignancies.

1.4 Carcinogens in Tobacco

Tobacco smoke and smokeless tobacco products encompass numerous hazards. The most notorious of them include tobacco-specific nitrosamines (TSNAs), polycyclic aromatic hydrocarbons (PAHs), formaldehyde, benzene, and heavy metals like arsenic and cadmium. These compounds initiate and induce carcinogenesis

by causing DNA damage, obstructing repair systems, and enhancing cellular proliferation. The International Agency for Research on Cancer (IARC) categorizes tobacco smoke as a Group 1 carcinogen, definitively associating it with human malignancies.

1.5 Casual Relationship between Tobacco and Cancer

Scientific evidence unambiguously establishes the causal link between tobacco consumption and multiple forms of cancer. The risk of lung cancer climbs approximately twenty times among heavy smokers. Users of smokeless tobacco encounter an eightfold increased chance of developing mouth cancer. Additional cancers linked to tobacco are those of the oesophagus, larynx, stomach, pancreas, kidney, bladder, and cervix. Carcinogens in tobacco induce alterations in epithelial cells, provoke chronic inflammation, and establish a conducive environment for tumor development, highlighting the necessity for effective preventive measures.

Tobacco Consumption in India

Our nation, characterized by its intricate cultural and economic framework, offers a diverse perspective on tobacco smoking. The Global Adult Tobacco Survey-2 (2016-17) indicated that 28.6% of Indian adults utilized tobacco, comprising 42.4% of males and 14.2% of women. Smokeless tobacco prevalence is 29.6% among men and 12.8% among women. The prevalence of smoked tobacco consumption is markedly greater in men (19%) than in women (2%). Recent WHO figures reveal a reduction in smoking prevalence to 7.1% in India; nonetheless, smokeless tobacco remains prevalent, particularly in rural and northeastern regions.

Tobacco Consumption in West Bengal

West Bengal is distinguished by a significant incidence of tobacco consumption, especially in

smokeless varieties. GATS-2 indicates that the state reported smoking rates of 21.3% and smokeless tobacco usage at 21.9%. Data from NFHS-5 indicates that over 50% of adult men and 10% of women in the state utilize tobacco, with urban areas such as Kolkata exhibiting significantly higher prevalence. Cultural acceptance on the usage of tobacco amongst all socio-economic strata, the accessibility of inexpensive smokeless products, and limited knowledge on hamper perpetuate continued usage, especially among low-income and rural demographics. In addition to this, the glorification of smoking among Bengali intelligentsia, including scholars, creative artists exert a promotional influence on the use of tobacco, and encourage youngsters, both males and females, to take up smoking.

Prevention

A. International Preventive Approaches

The worldwide initiative addressing tobacco-related harm has been led by the WHO Framework Convention on Tobacco Control (FCTC). Under the MPOWER approach, MPOWER strategy represent global best practices for reducing tobacco use, which include monitoring tobacco use and policies, protecting people from tobacco smoke, offering help to quit, warning about dangers, enforce advertising bans, and raising taxes on tobacco. Nations such as Australia, Brazil, and Turkey have attained substantial decreases in tobacco prevalence through the thorough execution of these strategies.

B. Tobacco Control Initiatives in India

India has implemented numerous robust policy measures. The Cigarettes and Other Tobacco Products Act (COTPA, 2003) forbids smoking in public areas and limits advertising. The Goods and Services Tax (GST) on tobacco products is among the highest, and the graphic health warnings on packaging are among the strictest worldwide.

The National Tobacco Control Programme (NTCP) endorses state-level programs and offers cessation treatments via public health institutions. Digital treatments such as the mCessation program and Quitline services have broadened their reach; nonetheless, rural areas necessitate increased attention.

C. Suggested strategies for West Bengal

West Bengal need tailored solutions to address tobacco consumption. Raising the price of tobacco products via taxation, implementing mandatory licensing for tobacco retailers, and prohibiting the sale of loose products are essential measures. In addition to this, availability of tobacco products needs to be restricted near academic institutions and office spaces. Health promotion campaigns in Bengali and specific school

programs addressing the detrimental effects of tobacco would promote health-conscious practices among youth and discourage any type of addiction, hence benefiting the broader population. Along with this, the incorporation of cessation services with existing health centres and facilities can enhance outcomes. Enhancing cancer screening, particularly for oral, lung, and esophageal malignancies, ought to be a public health imperative.

Conclusion

Tobacco persistently inflicts a catastrophic impact on public health, with cancer representing its most fatal consequence; thereby affecting families with considerable financial burden, workday losses, and national morbidity and mortality. Despite considerable success from global and national initiatives, the

challenge persists, especially in high-burden areas such as West Bengal. A mix of evidence-based policy, public education, health promotion, and accessible preventive healthcare services will be essential to mitigate this growing threat.

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Healing Greens: The Impact of Herbal Gardens in Cancer Hospitals

-Sutanuka Jana,

Herbal gardens in cancer hospitals serve as a symbol of hope and resilience, reminding patients of the healing power of nature. By integrating nature into healthcare, hospitals can create a more holistic and supportive environment for patients. Herbal gardens not only beautify the surroundings but also offer numerous benefits for patients, staff, and the ecosystem.

Benefits for Cancer Patients

1. Therapeutic Benefits: The calming atmosphere of herbal gardens helps reduce stress and anxiety, promoting emotional well-being.
2. Holistic Healing: Herbal remedies grown in the garden, such as turmeric and ginger, are used to complement conventional cancer treatments.
3. Sensory Experience: Patients can engage with nature, stimulating their senses and improving their mood.

Environmental Impact

1. Biodiversity Conservation: Herbal gardens promote the growth of medicinal plants, preserving biodiversity and supporting ecosystem health.
2. Air Quality Improvement: The lush greenery helps purify the air, improving indoor air quality and creating a healthier environment.
3. Sustainable Practices: Hospitals can adopt eco-friendly gardening methods, reducing their carbon footprint and promoting environmental sustainability.

Important Medicinal Plants

Turmeric

Anti-inflammatory and antioxidant properties. Curcumin has shown very promising results in suppressing cancer cell growth and proliferation in several different types of cancer, such as prostate, colorectal, breast, pancreatic, brain, head, and neck cancers. What comes next is a summary of the anticancer

activity of curcumin and its derivatives in different types of cancer based on the data from in vitro studies in different cancer cell lines and animal studies.

Ginger

Ginger and its active constituents suppress the growth and induce



apoptosis of variety of cancer types including skin, ovarian, colon, breast, cervical, oral, renal, prostate, gastric, pancreatic, liver, and brain cancer. These properties of ginger and its constituents could be associated with

antioxidant, anti-inflammatory, and ant mutagenic properties as well as other biological activities. In this review, focus has been laid solely on GI cancers to describe whether ginger and its active components exhibit chemo preventive and chemotherapeutic potential.

(Source - National Library of Medicine)

Hibiscus

Hibiscus is rich in antioxidants, which is important for protecting the heart from damage. Hibiscus extract is effective on breast cancer, most notably on generally resistant triple-negative breast cancer, while being selective for normal healthy cells. Hibiscus extract could supplement chemotherapeutic regimens as an adjuvant and lead to a more efficacious treatment approach to reduce chemotherapy dosages and related toxicity.

Source - National Institute of Health,

Nurses' role in early detection can make oral cancer manageable



Rita Dutta,

Assistant Nursing Superintendent

Nurses play a critical role in both clinical care and health education, especially for condition like leukoplakia which is preventable and often linked to lifestyle.

We know it is a precancerous lesion presented by white patches in the mouth that cannot be rubbed off. It is an early sign of oral cancer, caused by infection with Epstein-Barr virus. Once we have been infected with this virus, it remains in the body for life. This virus being active when immune system becomes weakened.

But men often confuse oral thrush with leukoplakia. Oral thrush is also an infection that causes creamy white patches in the mouth that can be wiped away. Major risk factors behind this condition like leukoplakia is **use of smokeless tobacco** (e.g. khaini, gutkha, Zarda, betel quid with tobacco), **poor oral hygiene, lack of awareness** and **lack of dental services**.

Especially villagers are more prone to this disease than city dwellers. It becomes a significant public health concern primarily due to cultural and socio-economic factors.

Based on global health data South Asian countries particularly India reports the highest numbers of leukoplakia. Second Bangladesh,

Third Pakistan, Fourth Sri Lanka, Fifth Thailand and sixth Nepal. In some rural areas of India it can be as high as 10% whereas Global prevalence around 1-5% of the population.

All these countries with high prevalence due to use of smokeless tobacco, poor oral hygiene, low awareness, late presentation, low healthcare accessibility in some region.

If we look at Developed countries like USA, UK or Australia, Leukoplakia exists in these

though many myths exist in rural areas. They believe that "it's just stain from food or hot tea, it will go away on its own", "If the patch is not painful, it is not serious". But nurse's role is to bust these myths through storytelling, NukkadNatak, and real patient examples.

It is also true that people get affected with leukoplakia not only using tobacco and betel nuts but also poor fitting denture and chronic irritation causing leukoplakia. In that case our



Discoid leukoplakia with hyperkeratosis of the undersurface of the tongue

countries but is less common and usually related to smoking and alcohol abuse not smokeless tobacco. Prevalence is lower due to better awareness and early intervention.

As a nurse we can take responsibility to reduce the number of oral cancer in our country and reduce the expenditure burden of government organizing health camp providing assessment and early detection, referral and documentation, health education, tobacco cessation counselling in hospital set up as well as community set up.

To achieve this goal we have to target young audience aged 15 years and above (especially tobacco users and betel nut),

responsibility is to refer the patient to Dental department.

As a nurse we can reduce the percentage of delayed start treatment cases and overburden on the head neck surgery department by performing oral examination, identify lesions, document size, location, appearance of the lesion and providing supportive treatment in the early detection center. If we see suspected leukoplakia case then promptly refer to Oral Oncology Specialist for further diagnosis or biopsy if needed.

During counselling session, we need to provide one to one counselling and explain the harmful effect of the smokeless tobacco and provide emotional support to the patient.

Another major risk factor of leukoplakia is lack of awareness, which we could reduce by organizing different public awareness program in hospital set up and community set up, collaborate with healthworkers, NGO and community influencer like

- Display real life stories through audio visual aids in OPD and party waiting area.
- Use visual aids poster, flip chart, distributing leaflet, pamphlets explaining the harmful effect of tobacco in Bengali, Hindi and English language.
- Besides these we should encourage people to visit the nearest PHC for any white patches.
- The importance of oral hygiene and regular dental checkups.

We know that quitting tobacco is not easy for most users. For this reason we need to organize tobacco cessation counselling three to four days in a week.

With the help of doctor we can educate people about Nicotine replacement therapy (patches, gum and lozenges) and provide Helpline number. (National Quitline Number (1800-11-2356). It is managed by the ministry of Health and Family Welfare Government of India.

Recommendation:

- We could provide leaflet with National Quitline Number when patient is coming in Early Detection Center/ Dental Department / Head Neck Surgery Department for oral check up with tobacco use history.
- Display audio visual aids / use TV screens in the OPD / party waiting area featuring real patient stories about the harmful effect of tobacco use.

Cytogenetics of Paediatric Acute Myeloid Leukaemia & How it's different from adult



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Paediatric acute myeloid leukaemia (AML) is a rare and diverse condition with various abnormalities in morphology, immunophenotyping, and genetic and cytogenetic markers. Survival rates hover around 70%, with a relapse rate of approximately 30%. Cytogenetics plays a crucial role in diagnosing and determining prognosis, with the current WHO classification of AML highlighting key cytogenetic abnormalities that inform risk-adapted therapies. In children, 95% of cases represent de novo AML, and chromosomal abnormalities (CAs) are recognized as an important factor in diagnosis and as an independent prognostic indicator.

Chromosomal abnormalities are detected in 75 to 80% of paediatric AML cases, either primary or secondary, and are closely associated with morphological subtypes. Primary CAs are closely associated with morphological subtypes, such as the inversion of chromosome 16, inv(16)(p13q22), in a M4Eo AML. These molecular abnormalities, immunophenotypic features, and recurrent mutations found in AML provide powerful markers for the detection of minimal residual disease (MRD), which is used as a prognostic marker in current AML treatment trials.

Initial risk stratifications for treatment in most AML therapeutic protocols are based on chromosomal and molecular abnormalities of the leukemic cells, with three prognostic categories: good (favourable), intermediate, and adverse (poor). The definition of standard-risk may be misleading because it is applied either to favourable (non-high-risk) or intermediate risk groups, dependent on the therapeutic protocol.

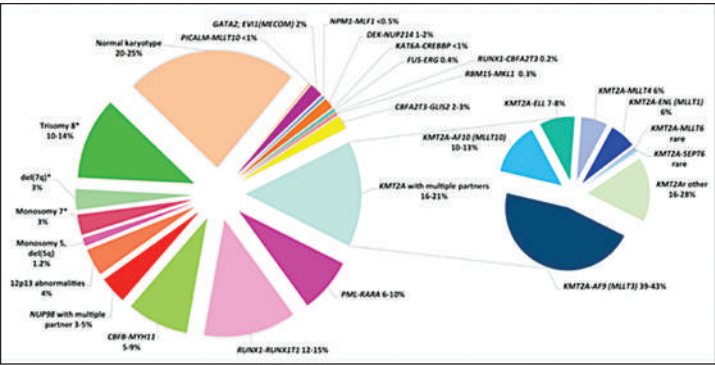
In terms of clinical impact, adult classification systems, such as those defined by ELN, cannot be completely transferred to the classification of childhood AML, because the cytogenetic (and genomic) landscapes of paediatric and adult AML and the cytogenetic risk associations are different according to age. Age is an important factor among children, as indicated by age-specific FAB/WHO subtypes.

Table 3: Differences in Paediatric and Adult AML cytogenetic risk stratification

Risk Category	Paediatric AML Risk Stratification	Adult AML Risk Stratification (Excluding APL *)
Favorable	t(15;17)(q24;q21)/PML-RARA * t(8;21)(q22;q22)/RUNX1-RUNX1T1 inv(16)(p13q22) or t(16;16)(p13q22)/CBFB-MYH11 t(1;11)(q21;q23)/KMT2A-MLLT1(AF1Q) ** Cytogenetically normal cases with: - NPM1 mutation; - CEBPA double mutation GATA1 mutation **.	t(8;21)(q22;q22)/RUNX1-RUNX1T1 inv(16)(p13q22) or t(16;16)(p13q22)/CBFB-MYH11 NPM1 mutation without FLT3-ITD or with FLT3-ITD ^{low} † CEBPA double mutation
Intermediate	CAs not classified as favorable or adverse	CAs not classified as favorable or adverse t(9;11)(p21;q23)/KMT2A-MLLT3 (AF9) ‡ NPM1 mutation with FLT3-ITD ^{high} † Wild-type NPM1 without FLT3-ITD or with FLT3-ITD ^{high} † (without adverse-risk genetic lesions)
Adverse	inv(3)(q21q26) or t(3;3)(q21;q26)/GATA2; MECOM (EVII) del(5q), -5 -7 f t(6;9)(p23;q34)/DEK-NUP214 t(4;11)(q27;q23)/KMT2A-MLLT2(AF4) t(6;11)(q27;q23)/KMT2A-MLLT4(AF6) t(10;11)(p13;q23)/KMT2A-MLLT10(AF10) t(5;11)(q35;p13)/NUP98-NSD1 ** t(7;12)(q36;p13)/ETV6(TEL); HLBX9(MNX1) ** t(9;22)(q34;q11)/BCR-ABL1 Complex karyotype (≥3 CAs) † FLT3-ITD mutation § WT1 mutation §	inv(3)(q21q26) or t(3;3)(q21;q26)/GATA2; MECOM (EVII) del(5q), -5 -7 f t(6;9)(p23;q34)/DEK-NUP214 t(v;11q23)/KMT2Ar †† t(9;22)(q34;q11)/BCR-ABL1 Complex karyotype (≥3 CAs) † -17/abn17p and/or TP53 mutation * ††† Monosomal karyotype †† FLT3-ITD ^{high} † § ASXL1 mutation § RUNX1 mutation §

Cytogenetic analysis, supplemented by FISH, remains crucial in diagnosing AML by providing rapid, comprehensive genome analysis. Other molecular cytogenetic techniques, such as CGH or SNP-array, detect unbalanced cytogenetic abnormalities and identify mutations with prognostic significance, especially in cases with normal karyotypes, and are mandatory in current therapeutic protocols.

Cytogenetics abnormalities in paediatric AML



The most frequent cytogenetic abnormalities in paediatric AML are Balanced chromosomal rearrangements, leading to the formation of chimeric fusion genes, only some of which are also found in adults. Unbalanced abnormalities, such as monosomies of chromosomes 5 and 7, are less frequent in children, but they are associated with a poor outcome, as observed in adults.

Balanced Cytogenetic Abnormalities:

Recurrent balanced genomic rearrangements are predominant in paediatric AML. Downstream consequences of these rearrangements may be: (1) the formation of a fusion gene, which encodes an oncogenic chimeric protein, or (2) more rarely, the overexpression of a gene implicated in self-renewal, cellular cycle or another major cellular function, by relocation to the vicinity of enhancer sequences.

Table1: Balanced Cytogenetic Abnormalities

Cytogenetic Subgroups	Genes Involved	Median Age(Y)	Frequency	Special Features	Secondary Molecular Abnormalities	Risk Category
CBF leukaemia20-25%						
t(8;21)(q22;q22)	RUNX1-RUNX1T1	8		M2,blasts with single and thin Auer rods, dysgranulopoiesis, CD19+,CD56+	KIT,RAS,FLT3-ITD, FLT3-TKD,ASXL1/2, RAD21	Favourable
nv(16)(p13q22)/t(16;16)(p13q22)	CBFB-MYH11	9		M4eo	KIT,RAS,FLT3-TKD, FLT3-IT	Favourable
11q23/KMT2Ar	KMT2Awith multiple partners	2.2	16-21%	M4 & M5, infants	High EVII expression, few mutations	Adverse or Intermediate (Depending on partners)
11p15/NUP98r	NUP98with multiple partners	11	3-5%	M4,M5 and M7	FLT3-ITD,WT1mut	Adverse
12p13 abnormalities	NUP98-KMD5A del(12p) ETV6(12p13.1)		4%			
t(7;12)(q36;p13)	ETV6;MNX1	0.5	1%	Only infants		Adverse

Unbalanced Cytogenetic Abnormalities:

In addition to classical reciprocal translocations, other types of recurrent cytogenetic abnormalities occur in paediatric AML, including the gain or loss of material or numerical aberrations, which are found

in around 40% of childhood AML [56]. The most prognostically significant are monosomy 5, deletion of the long arm of chromosome 5 (del(5q)), and monosomy 7. Although they are associated with a poor outcome, they occur in fewer than 5% of patients

Table2: Unbalanced Cytogenetic Abnormalities

Cytogenetic Subgroups	Genes Involved	Median Age(Y)	Frequency	Special Features	Secondary Molecular Abnormalities	Risk Category
Monosomy5,del(5q)		12.5	1.2%	M0		Adverse
Monosomy7		7.2	3%	Exclude a primary CA and a predisposition syndrome (GATA2)		Adverse
del(7q)		7.6	3%			intermediate
Trisomy8		10.1	10-14%		FLT3-ITD	
Hypodiploidy		2	11%	AMKL		Nosignificance
Complex karyotype		3	8-17%	Exclude a primary CA		
Monosomal karyotype		3.6	3-5%	Exclude a CBF leukaemia		Adverseevenafter exclusionofmon7

Normal karyotype:

Normal karyotypes account for around one-quarter (22-26%) of paediatric AML. Their risk assignment is based on the search for cryptic cytogenetic abnormalities. Indeed, even though these mutations are found at a much lower level in children than in adults, increasing with age, they share the same prognostic significance.

Table3: Normal karyotype

Normal karyotype		8.8	20-26%	Search for a cryptic CA	Search for prognostic mutations: FLT3-ITD, CEBPAdm,NPM1	According to cryptic CA or to mutations
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Changes in Cytogenetic and Molecular Genetics According to Age

A German study confirmed the variation in cytogenetic/molecular subtypes in children with acute myeloid leukaemia (AML) based on routine diagnostic cytogenetic and molecular data. The study divided children into three age groups: 0-2 years, 2-12 years, and 12-18 years, representing 23%, 40%, and 23% of childhood cases, respectively. Infants had fewer cases in favourable cytogenetic groups, while KMTArcases were prevalent. Normal karyotypes increased with age, with intermediate risk cytogenetic subtypes being similar in all age groups. A Japanese study confirmed the similar genomic profile of children 0-1 and 1-2 years old, including inv(16)/CBFA2T3-GLIS2 and t(11;12)/NUP98-KDM5A cryptic rearrangements. High-throughput genomic analyses of nearly one thousand paediatric cases confirmed a similar genomic profile. Differences in genomic profiles according to age, with an increasing rate of ACA or mutations, likely have pathogenetic explanations, such as the presence of fusion genes in cord blood and differences in the latency period towards the development of AML according to genetic subtypes.

Special Considerations: FAB Subtype (M7), Age, Predisposition

Acute megakaryoblastleukaemia (AMKL) is a distinct type of acute myeloid leukaemia (AML) in children, characterized by a founding GATA1 mutation leading to a transient abnormal myelopoiesis (TAM) found in about 25% of new-borns. This can evolve to a full AMKL in 10% of cases before the age of 5 years. DS-AMKL blasts harbour megakaryoblast and erythroid markers, and it is reported in the WHO classification as "myeloid leukaemia associated with Down syndrome" (ML-DS). NonDS-AMKL occurs in about 10% of paediatric AML, mainly in infants with a median age of about 1.5 years. It is globally associated with adverse outcomes, with an overall survival between 42 and 49% and a relapse rate approaching 50%. However, several cytogenetic subgroups are associated with different prognoses. In a recent international collaborative study, t(11;12)/NUP98-KDM5A, inv(16)/CBFA2T3/GLIS2, KMT2Ar, and monosomy 7 cases independently predicted a poor outcome. In contrast, the other group, including t(1;22)/RBM15-MKL1, hyper diploidy, 7p abnormalities, and normal karyotype, showed an improved outcome. GATA1 mutations, characteristic of DS-AMKL, can also be found in 9% of nonDS-AMKL cases, with trisomy 21 being a constant feature.

AML Predisposition Syndromes

In adults, AML may classically be an evolution of a myelodysplastic or myeloproliferative neoplasm (MDS and MPN, respectively). In children, AML after aMDS/MPN, such as juvenile myelomonocytic leukaemia (JMML), is rare. Children with constitutional genetic pathologies, such as Down syndrome or inherited bone marrow failure syndrome (IBMFS), have a higher risk of developing AML. In recent years, more subtle phenotypic syndromes linked to germline mutations have been identified, with some involving genes implicated in normal and malignant haematopoiesis. GATA2 has been identified as a frequent germline mutated gene predisposing to paediatric AML and MDS. The presence of a germline mutation has significant consequences for the patient and their family. Thus, every newly diagnosed patient of AML should be screened for potential germline abnormalities, which becomes even more important if these familial haematological disorders are identified in light of potential intrafamilial donors for HSCT.

Conclusions

Cytogenetics (karyotype and FISH), combined with PCR-based methods and targeted sequencing for detecting fusion transcripts and mutations, remains the gold standard for diagnosing AML, enabling risk-assessment and tailored therapy for each case. Additionally, children with de novo AML respond better to intensive therapy than adults, and outcomes continue to improve as our understanding of the cytogenetic and molecular AML landscape advances, along with the development of targeted therapies.



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Published by **SANMOY CHAKRABORTY** On behalf on **CNCI**, Designed & Printed, by Mistry Company,
Regent Estate, Kolkata - 700 092, Ph.: 033 3572 2407, 9830211292. Price: Rs.1/-