

# Overview of Methods for Preventing Non-Communicable Diseases from a Public Health Perspective

Ziyi Hu<sup>+, \*</sup>, Chi Zhang<sup>+</sup>, Yuqiu Yan<sup>+</sup>

School of Public Health, Xuzhou Medical University, Xuzhou, Jiangsu 221018, China

\* Corresponding author: Ziyi Hu (Email: 1134899334@qq.com)

+ These authors contribute equally to this paper

**Abstract:** Non-communicable diseases have become one of the major health challenges in today's society, greatly impacting human health and quality of life. This paper takes a public health perspective and provides an overview of methods for preventing non-communicable diseases. Through research and analysis of various prevention strategies for non-communicable diseases, the aim is to provide more comprehensive and effective health intervention methods to improve public health.

**Keywords:** Public Health; Prevention; Non-communicable Diseases.

## 1. Introduction

From a public health perspective, preventing non-communicable diseases is an important and urgent task. Traditional health concepts have emphasized the prevention and control of communicable diseases, while neglecting the prevention of non-communicable diseases. However, with the development of modern society, non-communicable diseases have become a major health threat, significantly impacting individual and societal health. Thus, adopting comprehensive and effective methods to prevent non-communicable diseases has become a significant topic within the field of public health. This review aims to comprehensively summarize methods for preventing non-communicable diseases from a public health perspective. By systematically studying and analyzing the effectiveness and feasibility of various prevention strategies, the goal is to provide more comprehensive and scientifically-guided health interventions to promote the control and prevention of non-communicable diseases. The following sections will focus on discussing methods such as health education and promotion, health policy development, early screening and diagnosis, and health environment optimization, as well as their applications and effects in the prevention of non-communicable diseases.

## 2. Health Promotion Policy Development and Implementation

### 2.1. Food Policy

Food policy plays an important role in health promotion and the prevention of non-communicable diseases. Developing clear and standardized requirements for food nutrition labeling is essential, including explicit indications of ingredients, calorie content, and nutritional composition. Labels should be easy to understand, allowing consumers to comprehend and compare the nutritional values of different foods, thus making healthier choices. Establishing strict regulations for food advertising, limiting false claims and misleading marketing practices. Restricting the promotion of unhealthy foods in advertisements targeting children, particularly those high in sugar, salt, and fat. Furthermore,

encouraging self-regulation within the food industry and adopting socially responsible measures to ensure truthful and health-oriented food advertising. Implementing cost and tax policies on food to make healthy options more affordable in comparison to unhealthy ones. By increasing taxes on unhealthy foods or reducing subsidies, individuals are incentivized to choose healthier food options and reduce consumption of unhealthy foods. Strengthening food safety regulations and establishing a sound system for food safety standards and inspections to ensure the quality and safety of food production, processing, and sales. Enhancing regulation within controversial fields of food additives, pesticide residues, and genetically modified foods, to protect consumer rights. Limiting and standardizing the gifting of high-sugar, high-fat, and high-salt foods, to avoid excessive consumption of these unhealthy products. Encouraging businesses to provide healthier food choices and implementing corresponding policies to incentivize the provision of health-promoting food.



Figure 1. Food Health

The development and implementation of food policies require collaboration between the government, health departments, the food industry, and the public. Governments should strengthen regulation and legislation, establish clear objectives and strategies for food policies, and incorporate them into overall health and well-being development plans.

Simultaneously, the food industry should actively comply with regulatory requirements, provide healthy food options, and ensure food safety and quality. The public should also enhance food safety and nutrition knowledge while cultivating healthy dietary habits. Through joint efforts, the food environment can be improved, consumers' awareness of healthy choices can be heightened, and the risk of non-communicable diseases can be reduced.

## 2.2. Tobacco Control Policy



Figure 2. Tobacco Control

Tobacco control policies are crucial measures for preventing non-communicable diseases, aimed at reducing smoking rates and limiting exposure to secondhand smoke. Implementing comprehensive smoke-free policies, prohibiting smoking in indoor public places, workplaces, and public transportation. Such policies protect non-smokers from the harms of secondhand smoke and provide smokers with opportunities and motivation to quit smoking. Increasing tobacco taxes to raise the cost of smoking and reduce the number of smokers. This increase in tobacco taxes can simultaneously provide funding support for non-communicable disease prevention, including health education, smoking cessation services, and medical support. Restricting tobacco advertising and marketing, specifically targeting the influence on minors and non-smokers. Governments should ban tobacco advertising on television, radio, print media, and the internet, as well as restrict package designs and labeling to reduce misleading and enticing effects on the public. Requiring prominent health warning labels on tobacco product packaging, including textual and graphical warnings about the dangers of smoking. These labels remind smokers and potential smokers about the hazards tobacco poses to health and encourage them to consider quitting. Establishing comprehensive smoking cessation services and support systems, providing smokers with counseling, tobacco addiction treatment, and quit-smoking medication support. Governments can allocate funding and resources for smoking cessation services

## 2.3. Alcohol Control Policy

Alcohol control policy is one of the pivotal measures in preventing non-communicable diseases, aiming to reduce the impact of alcohol consumption on individual and societal health. The key aspects of alcohol control policy are as follows: the development and reinforcement of laws and regulations to restrict the sale, advertisement, and consumption of alcohol. This includes limiting the time and location of alcohol sales, prohibiting the sale of alcohol to

minors, and reducing the occurrence of risky behaviors such as drinking and driving. Implementing appropriate alcohol taxation policies to reduce alcohol consumption by increasing the price of alcohol. Moderately raising alcohol taxes can decrease demand for alcohol, especially for inexpensive alcohol. Requiring prominent health warning labels and cautionary information on alcohol packaging, clearly informing individuals of the harms and limitations associated with alcohol consumption. Through warning labels and information, raising awareness of the risks of drinking among the public and encouraging them to make healthier alcohol choices. Establishing strict laws on drunk driving and enhancing law enforcement efforts. By increasing legal sanctions and penalties for drunk driving, strengthening societal condemnation of such behavior, and mitigating the occurrence of alcohol-related traffic accidents. Enhancing alcohol health promotion and education to increase public awareness and understanding of the harms of alcohol consumption. Through media, community activities, and school education, disseminating accurate alcohol-related information to the public and prompting them to make informed decisions about alcohol consumption. The formulation and implementation of alcohol control policies require leadership from the government and cooperation from society as a whole. The government should strengthen regulation on alcohol consumption behavior, establish clear policy goals and measures, and reinforce law enforcement. The alcohol industry should assume social responsibility, adhere to policies and regulations, and refrain from engaging in improper alcohol sales and advertising. The public should enhance their awareness of the harms of alcohol consumption, consume alcohol in moderation, and avoid excessive drinking and abuse. Through collective efforts, it is possible to reduce alcohol-related health problems and societal burdens, thus elevating overall health levels and societal well-being.



Figure 3. Alcohol Control

## 2.4. Urban Planning and Architectural Design

Urban planning and architectural design play vital roles in constructing a healthy environment and promoting the prevention of non-communicable diseases. Establishing health-friendly urban planning, including rational zoning for residential areas, commercial zones, and public spaces to provide comfortable and safe living environments. Planning should emphasize green construction, providing parks, green spaces, and pedestrian paths as venues for healthy activities and encouraging outdoor exercise and leisure activities.

Promoting sustainable modes of transportation, such as walking, biking, and public transit, to reduce car usage and traffic congestion. Constructing convenient walking and biking lanes, creating safe and comfortable environments for pedestrians and cyclists, and encouraging individuals to choose healthier modes of transportation. When designing and constructing buildings, considerations should be given to human health and comfort. Adopting environmentally friendly materials, optimizing building energy efficiency and ventilation systems, and ensuring good indoor air quality. Simultaneously, interior design should emphasize the provision of comfortable and secure working, living, and leisure environments. Planning and arranging health facilities, including hospitals, clinics, fitness centers, and community health centers. Ensuring that these facilities are easily accessible to residents and provide high-quality medical and health services, promoting individual health and health education. In urban planning and architectural design, considerations should be given to the prevention and adaptation of natural disasters. For example, earthquake-resistant architectural design and flood control planning can reduce the impact of disasters on the health and livelihoods of individuals. A health-oriented approach to urban planning and architectural design requires the involvement of the government, urban planning departments, architects, and the community. The government should establish relevant policies and standards, encourage health-friendly urban planning and architectural design, and provide corresponding incentives. Urban planning departments and architects should incorporate the health needs of individuals into their design considerations, promoting sustainable urban development and resident well-being. Community residents should participate in the planning and design process, voicing their opinions and needs, ensuring that the health-oriented focus of urban planning truly aligns with the expectations and demands of residents. Through scientific planning and implementation of urban planning and architectural design, it is possible to create healthier, sustainable, and livable urban environments, promoting individual health and happiness.



Figure 4. Urban Planning and Architectural Design

### 3. Early Screening and Diagnosis

#### 3.1. Screening Tools and Methods

Early screening and diagnosis are crucial strategies for preventing non-communicable diseases, as they help identify potential disease risks and early-stage abnormalities. Questionnaires are commonly used screening methods that

involve presenting individuals with a specific set of questions to assess their health status and potential disease risks. For instance, questionnaires can be designed to evaluate risk factors for cardiovascular diseases, diabetes, breast cancer, and other diseases, thereby aiding in the initial screening of patients' risk levels. Biological marker testing involves assessing disease risks and diagnosing early-stage abnormalities by measuring biomarkers within the body. Examples include blood pressure measurement, blood sugar testing, lipid profiling, and tumor marker detection, all of which can help identify potential issues related to various diseases. Imaging examinations such as X-rays, ultrasound, and magnetic resonance imaging (MRI) are useful for early detection of diseases such as tumors, cardiovascular diseases, and osteoporosis. These imaging techniques provide comprehensive and detailed information about an individual's physical structure and function, assisting doctors in early diagnosis and treatment planning. Genetic testing involves analyzing an individual's genomic information to assess the risk of hereditary diseases. Genetic mutations and variations associated with some genetic diseases can be detected early on, helping identify patients' genetic risks and providing personalized prevention and treatment plans. Regular medical check-ups, which encompass various methods like physical examinations, physiological measurements, and laboratory tests, are effective screening methods for assessing an individual's overall health. Regular medical check-ups facilitate the detection of early abnormalities and potential risks, allowing for timely intervention to prevent further disease development. The selection of appropriate screening tools and methods should be based on specific disease risks and diagnostic requirements, as well as the individual's particular circumstances and risk factors. Professional medical guidance and judgment are crucial throughout the screening and diagnostic process. Early screening and diagnosis can help uncover potential disease risks and early-stage abnormalities, providing better opportunities for prevention and treatment.

#### 3.2. Providing Comprehensive Health Examinations

Providing comprehensive health examinations is an integral component of early screening and diagnosis, enabling the assessment of an individual's overall health status and potential disease risks. These may include blood pressure measurement, height and weight measurement, cardiovascular auscultation, abdominal palpation, eye and oral examinations, and more. Physical examinations assess the functioning and abnormalities of various body systems. By analyzing biomarkers in blood, urine, and feces, indicators of tissue and organ functions can be evaluated. Common laboratory tests include complete blood count, biochemical markers (such as lipid profile, blood glucose, liver function, kidney function, etc.), tumor markers, and inflammatory markers. Imaging techniques such as X-rays, ultrasound, CT scans, and MRI allow for observation and evaluation of the structure and function of internal organs and tissues. For example, common imaging examinations include chest X-rays, mammography, and abdominal ultrasound. Electrocardiography records the electrical activity of the heart, evaluating heart rhythm, function, and cardiovascular disease risk. Bone density tests assess skeletal health, identifying osteoporosis and fracture risks. Visual and auditory measurements evaluate the visual and auditory health of an

individual. Additional examinations, such as mammography, breast ultrasound, cervical smear tests, and colonoscopies, aid in the early detection of common cancers and associated risks. Through health questionnaires and consultations with physicians, factors such as individual health history, family history, lifestyle, and psychological well-being are assessed to provide a comprehensive evaluation of overall health status. The content and methods of comprehensive health examinations can be customized based on an individual's age, gender, disease risks, and personal needs. It is recommended to undergo regular comprehensive health examinations, as well as specific screenings based on particular disease risk factors. Early health check-ups and screenings can help identify potential health issues and early-stage diseases, leading to appropriate preventive and treatment measures and enhancing overall health and quality of life.

### **3.3. Health Records and Electronic Health Records**

Health records and electronic health records are essential tools for managing individual health information, aiding in the integration and tracking of an individual's health condition and medical history. Health records encompass the basic health information of an individual, including personal information, family medical history, immunization records, past illnesses and surgeries, medication records, etc. By maintaining health records, individuals facilitate doctors and other healthcare professionals in understanding their health condition, providing a reference basis for treatment and preventive measures. Electronic health records refer to a file system that electronically stores and manages an individual's health information. Health information, such as medical records, laboratory results, immunization records, etc., can be stored and transmitted electronically for easy access and utilization by healthcare institutions and healthcare providers. The advantages of electronic health records include convenience, sustainability, and the facilitation of information sharing. With the development of mobile technology, personal health applications and devices are becoming increasingly prevalent. These applications and devices assist individuals in recording health data, such as exercise and sleep status, physical parameters (e.g., weight, blood pressure, etc.), diet, and heart rate, among others. Personal health applications and devices can provide personalized health advice and reminders, helping individuals manage their health and monitor disease risks. In view of the sensitive nature of health information involved in health records and electronic health records, privacy and security protection are crucial. Healthcare institutions and health service providers should take appropriate measures to ensure that individuals' health information is not accessed and utilized by unauthorized individuals. Individuals should also exercise caution in choosing and using health applications and devices to ensure that their data privacy is safeguarded. The establishment and use of electronic health records require collaboration and joint efforts from healthcare institutions, individuals, and relevant stakeholders. Healthcare institutions should establish secure electronic health record management systems to ensure the accuracy and integrity of health information. Individuals should actively maintain health records and share relevant information with doctors and other healthcare professionals. Through the management of health records and electronic health records, the quality and efficiency of medical services can be improved, enhancing individuals' level of health

management.

### **3.4. Provision of Professional Medical Services and Consultation**

The provision of professional medical services and consultation is crucial for safeguarding individual health. Professional medical services encompass the diagnosis, treatment, and care provided by doctors. Through the comprehensive assessment of an individual's medical history, physical examination, laboratory tests, etc., doctors develop personalized treatment plans. Medical services also include medication therapy, surgery, rehabilitation, and other medical measures geared towards facilitating patient recovery or managing chronic diseases. Health consultation involves the provision of professional advice and recommendations to help individuals understand and manage health issues. Health consultation can be provided by doctors, nurses, nutritionists, psychologists, among others. Through consultation, individuals can obtain information and guidance on disease prevention, health promotion, lifestyle interventions, and mental health support, among other aspects. With the development of Internet technology, electronic health consultation is becoming increasingly popular. Individuals can access medical information and consultation services through online doctor consultations, mobile health applications, and health platforms, among other means. These electronic health consultation avenues provide convenient and timely medical advice to meet individuals' health needs. Health education and awareness campaigns are important avenues for providing health knowledge and information. Through health education and awareness campaigns, individuals can learn about disease risk factors, prevention measures, and health promotion methods. Medical institutions, health organizations, and government agencies, among others, can organize health lectures, awareness campaigns, and community health events to convey health information to the public and provide relevant consultation services. When seeking professional medical services and consultation, individuals should choose trained and certified medical professionals and institutions. Establishing good communication and cooperation with doctors and healthcare teams, actively participating in treatment and management processes, is also advised. Simultaneously, individuals can actively engage in health education and preventive activities, enhancing their health awareness and knowledge levels. Through professional medical services and consultation, individuals can access high-quality medical care, accurate diagnoses, and effective treatments, helping them achieve their goals of health and happiness.

## **4. Conclusion**

Preventing non-communicable diseases from a public health perspective is an important and intricate undertaking. This article provides an overview of various methods for preventing non-communicable diseases, emphasizing the significance of comprehensive interventions and societal engagement. Maintaining a healthy lifestyle, including proper diet, regular exercise, and abstaining from smoking and excessive alcohol consumption, plays a vital role in disease prevention. Educating the public about the importance of healthy eating and behaviors, while providing information and resources to support healthier choices, is paramount. Creating environments conducive to health is essential in

preventing non-communicable diseases. Measures such as urban planning, transportation improvements, and pollution reduction contribute to promoting well-being. Establishing public health facilities and green spaces also provides venues for exercise and relaxation. Early detection and treatment of non-communicable diseases can alleviate the burden on individuals and society. By promoting health screenings and screening programs, awareness of disease risks can be heightened, facilitating early intervention and treatment. Public health education and information dissemination are crucial in increasing awareness and understanding of non-communicable diseases. Disseminating accurate health knowledge and behavioral advice through various channels, including media, social media, and community outreach, is imperative. Developing and implementing corresponding policies and regulations is vital in promoting prevention and control of non-communicable diseases. Intersectoral collaboration is key, requiring the involvement of health departments, education sectors, environmental protection agencies, and others to join forces. Although preventing non-communicable diseases poses complex challenges, effective reduction of disease incidence and associated risks can be achieved through comprehensive measures and societal engagement. Through the concerted efforts of public health workers, policymakers, healthcare institutions, and the general public, a healthier society can be forged, enhancing the overall quality of life for all.

## References

- [1] Li, T., Ran, B., Ran, D., Li, J., & Yang, Z. (2019). The impact of intelligent transportation system on urban traffic congestion: A simulation study in a large-scale transportation network. *Transportation Research Part C: Emerging Technologies*, 103, 1-15.
- [2] Reaz, S., Noman, M., & Rahman, S. (2017). Intelligent traffic management system using wireless sensor networks. *Transportation Research Part C: Emerging Technologies*, 77, 47-61.
- [3] Ruan, Y., Zhou, J., & Xu, Z. (2019). Intelligent transportation systems and urban traffic congestion: A review. *Journal of Traffic and Transportation Engineering*, 6(5), 515-527.
- [4] Chen, Y., et al. (2018). Traffic congestion alleviation by intelligent traffic signal control with partial detection: A reinforcement learning approach. *Transportation Research Part C: Emerging Technologies*, 96, 224-241.
- [5] Cheng, S., et al. (2020). Assessing the effectiveness of intelligent transportation systems in alleviating urban traffic congestion based on a mesoscopic traffic simulation model. *Journal of Advanced Transportation*, 2020.
- [6] Yu, C., et al. (2021). Enhancing urban road network performance through an intelligent traffic management system. *Transportation Research Part C: Emerging Technologies*, 124, 103062.
- [7] Zha, Y., et al. (2018). Performance assessment of intelligent transportation systems in urban traffic congestion mitigation. *IET Intelligent Transport Systems*, 12(10), 1278-1287.
- [8] Chen, Q., et al. (2019). Real-time traffic state estimation and prediction based on connected vehicle data for intelligent transportation systems. *Transportation Research Part C: Emerging Technologies*, 106, 479-501.
- [9] Wang, W., et al. (2020). A multi-objective optimization model for urban traffic congestion management based on intelligent transportation systems. *Journal of Traffic and Transportation Engineering (English Edition)*, 7(6), 745-756.
- [10] Wang, X., Xu, B., & Liu, H. X. (2021). Smart transportation system (STS) and traffic congestion management: a review. *Journal of Ambient Intelligence and Humanized Computing*, 12(8), 12551-12564.