The Observatory of the
Economics of Public Health
Rethink Healthy Living

Content

Members of the Observatory

PROF. GIUSEPPE ARBIA
Director of ALTEMS

Giuseppe Arbia is a Professor at Università Cattolica del Sacro Cuore and at Università della Svizzera italiana. He earned his PhD from the University of Cambridge and has previously held positions at the University of Trento, University of Padua, and University "G. d'Annunzio" of Chieti-Pescara.

PROF. FRANCESCO MOSCONE
Professor at the Brunel University

Francesco Moscone is a Professor at Brunel Business School and at Ca' Foscari University of Venice. He holds a PhD from the University of Leicester and previously worked at the University of Cambridge, University of Bergamo and Università Cattolica del Sacro Cuore.

PROF. LUCA SALMASI
Professor at the Università Cattolica del Sacro Cuore

Luca Salmasi is a Professor of Economic Policy at Università Cattolica del Sacro Cuore. He holds a PhD in Economics from the University of Verona and has previously held academic positions at the University of Padua and the University of Sassari.

PROF. GILBERTO TURATI
Professor at the Università Cattolica del Sacro Cuore

Gilberto Turati is a Professor of Public Finance at Università Cattolica del Sacro Cuore, Deputy Director of the Osservatorio sui Conti Pubblici Italiani and board member of the Italian Society of Public Economics (SIEP).

LUCIA DELLA RATTA
PhD student at the Università Cattolica del Sacro Cuore

Lucia Della Ratta is a PhD candidate in Health Systems and Service Research at Università Cattolica del Sacro Cuore, while also conducting research at the Sant'Anna School of Advanced Studies in Pisa. Her work focuses on healthcare disparities, healthcare econometrics and policy evaluation.

FRANCESCA CARDILE
PhD student at the Università Cattolica del Sacro Cuore

Francesca Cardile holds a Bachelor's degree and a MSc in Service Management with a specialization in Healthcare Management from Università Cattolica del Sacro Cuore. She is currently pursuing a PhD in Health System and Service Research at the Università Cattolica del Sacro Cuore.

Executive Summary

i. **Unique expertise:** The Observatory for the Economics of Public Health is the only platform in Italy that combines economic modelling, health innovation and behavioural science. It builds on the extensive knowledge of ALTEMS and offers direct advice to policymakers to translate research into action.

ii. **Research, policy, and public engagement:** The Observatory delivers data-driven analysis, policy guidance, expert commentary, and public events to inform decision-makers, shape healthcare policies, and engage the public in evidence-based discussions.

iii. **Universal but unequal:** Italy's healthcare system provides universal coverage, but inter- and intraregional disparities remain large. While Northern regions benefit from well-funded healthcare, Southern regions struggle with lower screening rates, fewer specialists, and longer waiting times.

iv. **Hospital-centric and reactive:** Italy invests too much in hospital-based care and too little in early prevention. Chronic diseases like diabetes, obesity, and cardiovascular conditions are rising, yet primary prevention and care remains underdeveloped and underfunded.

v. **Aging population, shrinking workforce:** The demand for healthcare is increasing, yet many general practitioners and nurses are retiring without adequate replacements. Training bottlenecks and unattractive public-sector wages exacerbate shortages, particularly in rural areas.

vi. **Fragmented digital infrastructure:** Italy lags behind in electronic health records and digital healthcare tools. The lack of interoperability between regions results in wasted resources, inefficiencies, and gaps in patient care.

vii. **Paradigm shift:** The Italian healthcare system requires a paradigm shift, moving towards greater equity, better integration between public and private healthcare, and increased investment in prevention to ensure long-term sustainability, tackle potentially escalating health problems and improve health outcomes.

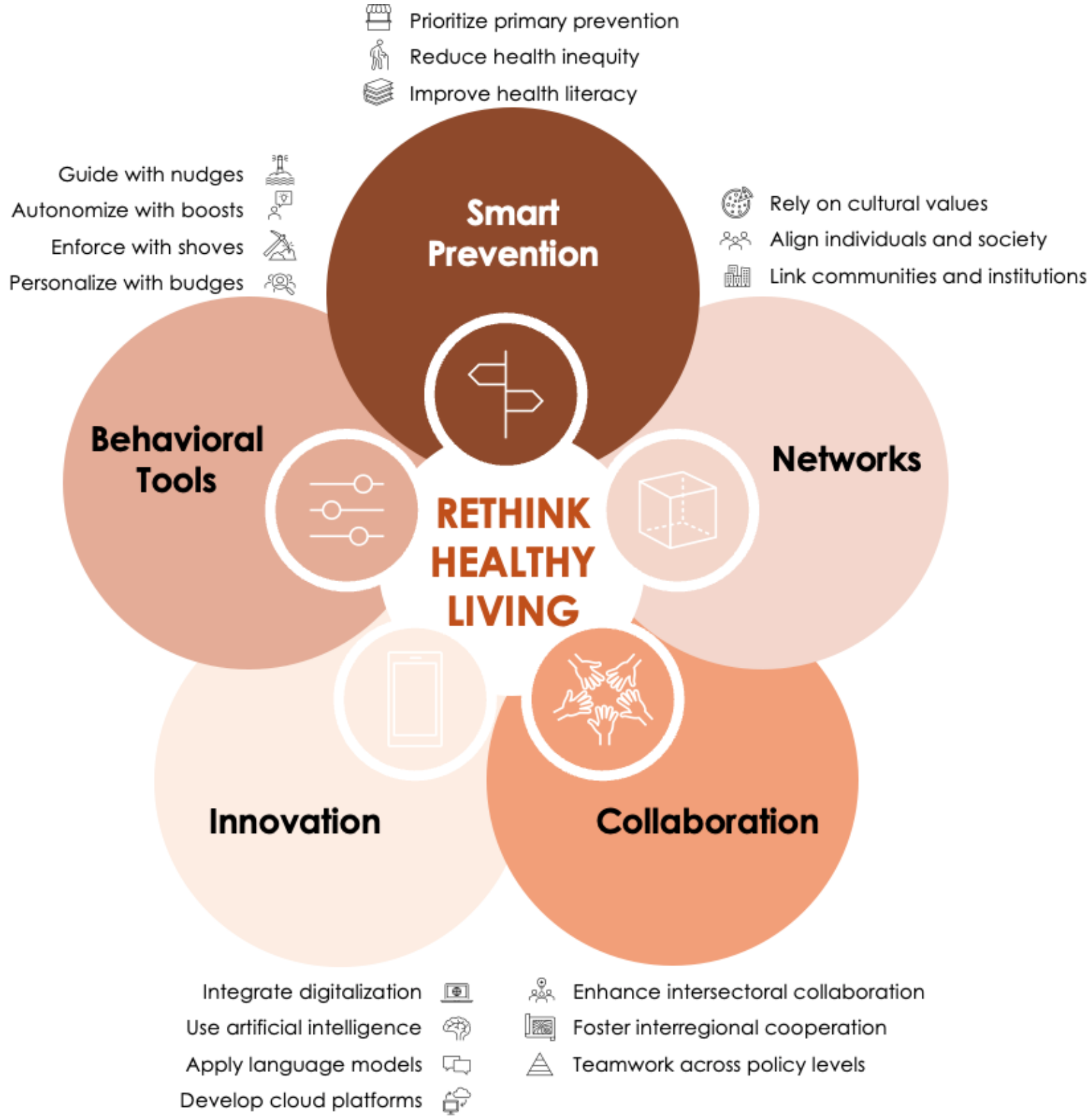
viii. **Smart prevention approach:** A focus on primary prevention includes investment in vaccinations, screenings, and lifestyle interventions. There needs to be compulsory health education in schools on nutrition, mental wellbeing and physical activity, and older people need to be informed through community programs.

ix. **A systematic, all-level approach:** Prevention must be embedded in schools, workplaces, communities, and digital health strategies. Interregional and -sectoral cooperation must ensure minimum prevention standards nationwide.

x. **Leveraging behavioral tools:** Default enrollment in screenings, digital health nudges, and social norm campaigns can boost participation in preventive care. Financial incentives for early check-ups can further drive engagement.

xi. **Smarter use of innovation:** Digital and innovative advancements like AI-powered predictive analytics can help identify at-risk populations and enable early interventions. Telemedicine should be expanded, particularly for preventive consultations.

xii. **Economic impact:** Shaping a prevention-first healthcare system lowers healthcare costs, boosts workforce productivity, and stabilizes public finances, ensuring a healthier population and a more competitive Italian economy.


Prioritize primary prevention
Reduce health inequity
Improve health literacy
Guide with nudges
Autonomize with boosts
Enforce with shoves
Personalize with budges
Smart Prevention
Rely on cultural values
Align individuals and society
Link communities and institutions
Behavioral Tools
Networks
RETHINK HEALTHY LIVING
Innovation
Collaboration
Integrate digitalization
Use artificial intelligence
Apply language models
Develop cloud platforms
Enhance intersectoral collaboration
Foster interregional cooperation
Teamwork across policy levels

Vision of the Observatory of the Economics of Public Health at ALTEMS

1.1 WHAT ARE THE OBJECTIVES?

The Observatory of the Economics of Public Health is an initiative promoted by ALTEMS (Alta Scuola di Economia e Management dei Sistemi Sanitari) with the aim of systematically analyzing and monitoring the lifestyle habits of the Italian population and their impact on national healthcare expenditure.

The Observatory is dedicated to pinpointing and tackling the critical issues in Italy's healthcare system, delivering solutions backed by solid evidence. It serves as a strategic partner to national, regional, and local governments, ensuring healthcare policies are shaped by empirical evidence and a clear understanding of their societal impact.

By offering policymakers actionable insights, the Observatory drives the development of effective strategies to enhance healthcare literacy, efficiency, and equity. It also fosters public engagement, raising awareness and encouraging dialogue on pressing health issues.

As a mix of think tank, research hub and collaborative platform, the Observatory strengthens decision-making at all levels. While its primary focus is Italy, its research and recommendations extend beyond national borders, contributing to global discussions on healthcare innovation and reform.

The Observatory aims to become a reference point for research and innovation in the field of healthcare prevention, contributing to:

- Improving the understanding of behavioral habits among the Italian population.
- Guiding healthcare policies towards more targeted and effective interventions.
- Generating scientific evidence to promote a more rational and efficient use of healthcare resources.

Through a multidisciplinary and integrated approach, the Observatory aims to provide concrete tools to improve the well-being of the Italian population and ensure the sustainability of the national healthcare system.

1.2 WHY ALTEMS?

The team behind the Observatory has unparalleled expertise in health policymaking, honed through the work at ALTEMS, a leading institution in healthcare management and policy research in Italy. The team's proficiency in Health Policy and Planning, Digital Innovation and Health Communication, and Big Data Analytics makes the Observatory unique. Academic excellence is combined with practical application, leveraging deep familiarity with the Italian healthcare system. This ensures the delivery of data-driven insights and the implementation of reforms with impact and sustainability.

1.3 WHY DO WE NEED IT?

Italy's healthcare system needs to be reformed. It is fragmented, inefficient and inequitable. The North performs better than the South. Decentralization, while allowing for regional autonomy, results in inconsistent policy implementation and healthcare standards, making it further difficult to ensure equal access to care. Data availability remains insufficient, limiting the ability to conduct evidence-based policymaking and improve system efficiency.

Shortages of the healthcare workforce, particularly general practitioners and nurses, exacerbate this crisis. The ageing workforce further threatens future healthcare capacity, as a significant percentage of doctors are nearing retirement.

Italy's healthcare system suffers from weak cross-sector collaboration, leading to fragmented planning and inconsistent service delivery. Strengthening coordination between healthcare providers and public institutions is essential to ensuring equitable access to care and more effective policy implementation.

The system remains overly focused on secondary and in particular tertiary care, neglecting primary prevention and community-based services. This reactive approach drives up costs and leaves chronic diseases poorly managed. A shift toward early intervention and prevention would not only improve long-term health outcomes but also alleviate financial pressures on both households and the public system.

Vulnerable populations, including lower-income groups and the elderly, face inadequate healthcare access due to financial, bureaucratic and cultural barriers. The complex medical language further complicate access for disadvantaged groups, limiting their ability to navigate the healthcare system and receive appropriate care.

In recent decades, lifestyle evolution has played a crucial role in shaping public health, significantly contributing to the spread of non-communicable chronic diseases (NCDs) such as obesity, diabetes, cardiovascular diseases, and respiratory disorders. These conditions, heavily influenced by behavioral factors, are among the primary determinants of increasing healthcare costs.

1.4 WHAT ARE THE GUIDING PRINCIPLES?

Italy must transition from a reactive, treatment-based healthcare model to a systemic, proactive approach. This approach prioritizes early intervention, behavioural health strategies and innovative solutions. A more efficient healthcare system will strengthen economic competitiveness by reducing the governmental and household resources.

Early prevention

A stronger focus on primary prevention is essential to reducing direct and indirect healthcare costs. Compulsory health education in schools can equip younger generations with knowledge on the healthy impact of nutrition, physical activity, and mental well-being. Workplace prevention policies should include regular screenings, ergonomic assessments, and mental health support. Addressing air pollution, unhealthy food consumption, and workplace-related diseases is critical to improving public health. Establishing health kiosks in community centers and pharmacies will facilitate routine check-ups, chronic disease monitoring, and digital health literacy for older populations, enabling early intervention and reducing hospital admissions. By integrating electronic health records and AI-powered analytics, screening participation, immunization rates, and regional disparities in preventive care can be tracked, allowing policymakers to allocate resources where they are most needed. This is particularly relevant for reducing the North-South healthcare divide, where Southern regions have significantly lower participation in screenings and preventive programs.

A good first step is the National Prevention Hub, which is funded by the PNRR with 24.5 million Euro allocated by 2026, will centralize prevention efforts across regions, schools, and healthcare providers, ensuring a coordinated and data-driven approach to public health.

Complex adaptive systems

A holistic approach necessitates the implementation of behavioural health policies that motivate both patients and professionals to proactively engage in health-related actions. Patients should be systematically enrolled in screening programs, receive personalized digital reminders for vaccinations, and be incentivized through the reduction of insurance costs for preventive check-ups. General practitioners and pharmacies, as the most accessible healthcare providers, should be incentivized to prioritize early diagnosis and lifestyle interventions over reactive drug treatments. Pharmacies must assume a more prominent role by offering on-site diagnostic services, vaccination programs, and chronic disease management counselling, particularly in rural and underserved areas.

As the experience of the COVID-19 pandemic has shown, ensuring strong intergovernmental collaboration is essential for standardizing prevention strategies across Italy's decentralized healthcare system. National policies must enforce minimum preventive care standards for all regions, preventing disparities in access to vaccinations, screenings, and chronic disease management. Municipalities and regional governments must be held accountable for implementing local prevention programs, while companies should be required to integrate occupational health policies to reduce absenteeism and improve productivity.

Innovation

Technological advancements have emerged as a pivotal element in the development of scalable and cost-effective solutions that support a prevention-first approach. The integration of artificial intelligence into diagnostics and predictive analytics has the potential to facilitate early disease detection and risk assessment, thereby enabling the delivery of targeted interventions to high-risk populations. The expansion of telemedicine services has the potential to enhance access to preventive consultations in remote and underserved regions, with a particular focus on chronic disease monitoring and post-screening follow-ups. The promotion of wearable devices and mobile health applications is recommended, with the objective being the encouragement of self-monitoring of vital signs, medication adherence, and real-time health coaching. This will render prevention more personalized and actionable. Advances in food technology, including lab-grown meat and AI-assisted personalized nutrition, have the potential to reduce the prevalence of lifestyle-related diseases such as obesity, diabetes, and cardiovascular conditions. Digital prescriptions and AI-driven decision support tools should be made available to GPs to ensure consistent and evidence-based preventive care across all regions.

1.5 WHAT ARE THE ACTIVITIES?

The Observatory will produce a wide range of outputs, tailored to the needs of policymakers and the general public. These include:

- **Data analysis:**
    - In-depth analyses of key issues affecting public health and economic policy in Italy, offering review of surveys, economic analyses, data insights, quantitative models, academic studies and topic-specific reports.
    - Monitoring of key indicators related to the lifestyle habits of Italians (eating habits, physical activity, alcohol and tobacco consumption, stress management, sleep quality, etc.), specifically creating a monitoring platform that integrates data from ISTAT surveys, administrative sources, and epidemiological studies to

provide an updated and comprehensive overview of Italian population behaviors.

- Analysis of the connections between lifestyle factors and healthcare expenditure trends, assessing the economic and managerial implications for the National Health Service. Exploration oft he connections between socio-economic, cultural, and geographical factors and the prevalence of at-risk lifestyle patterns.
- Examination of the economic impact of unhealthy lifestyle behaviors on the healthcare system, identifying the most affected expenditure areas and estimating potential savings from preventive policies.

- **Policy Commentary:**
  - Concise documents, such as policy papers, regulatory briefs, legislative updates, position statements, impact analyses, designed to inform and influence decision-makers, providing clear guidance on pressing challenges.
  - Identification of possible strategies and interventions aimed at promoting healthy choices and containing healthcare costs through targeted prevention policies.
  - Development of evidence-based recommendations to guide policymakers, healthcare managers, and industry professionals in defining preventive strategies and health promotion interventions.
- **Media Communication:** Expert commentary on current events and emerging trends, delivered through newspaper articles, expert critiques, radio interviews and press statements.
- **Public Events:** Interactive sessions aimed at sharing knowledge, building capacity, and fostering dialogue among stakeholders hosting webinars, workshops, interdisciplinary events, conferences and roundtables.

1.6 WHO IS IT?

The Observatory will be coordinated by a Scientific Committee composed of multidisciplinary experts in the fields of health economics, statistics, econometrics and public health. The Committee will be responsible for:

- Defining the Observatory's scientific priorities.
- Overseeing data collection and analysis activities.
- Coordinating various working groups on specific topics.
- Promoting the dissemination of results through scientific publications, reports, public meetings, and policy briefs.
- Encouraging dialogue with healthcare institutions, local authorities, and civil society organizations to implement effective prevention and health promotion strategies.

The Observatory brings together a diverse group of experts, uniting the knowledge of seasoned professionals with the perspectives of a new generation of scientists from the Università Cattolica del Sacro Cuore. The multidisciplinary team comprises high-ranking academics, policy experts, and thought leaders, both Italian and international.

The inclusion of foreign experts allows that global best practices inform the Observatory's recommendations while allowing Italy to adapt proven strategies to its specific cultural, economic, and social contexts. At the same time, young researchers and emerging scientists will play a pivotal role, bringing new methodologies, sparkling ideas, and a forward-looking approach to the Observatory's work.

1.7 WHAT ARE THE TOPICS?

- **Early prevention:** Investigating how early detection and preventive interventions can be better integrated into the healthcare system. This includes analyzing strategies to improve screening adherence, expand vaccination programs, and enhance the role of general practitioners and pharmacies in delivering accessible and proactive healthcare.
- **Lifestyles and public health trends:** Exploring how dietary habits, physical activity, substance use, and other lifestyle factors shape public health outcomes. A key focus is on understanding behavioral patterns and assessing policy measures that encourage healthier lifestyles, including initiatives that promote the Mediterranean diet as a central element of preventive health strategies.
- **Behavioral health policies:** Examining how behavioral science can influence health-related decision-making and participation in preventive care. This includes exploring the effectiveness of digital nudges, financial incentives, and structured education programs in promoting healthier behaviors. It is also essential to understand the role of health literacy in ensuring individuals can navigate healthcare systems and make informed choices about their well-being.
- **Regional and sectoral collaboration:** Studying how coordination between regional governments, public health institutions, and private-sector stakeholders can enhance healthcare resilience and efficiency. Lessons learned from the COVID-19 pandemic regarding resource allocation, emergency preparedness, and intersectoral collaboration are analyzed to inform future policies and improve system-wide response mechanisms.
- **Efficiency and economic competitiveness:** Investigating how a prevention-focused healthcare model can impact economic performance, workforce productivity, and long-term healthcare costs. Research assesses the financial implications of chronic disease

prevention, workplace health programs, and disparities in healthcare access, with a particular focus on how public health investments contribute to national economic stability.

- **Health equity and regional disparities:** Exploring differences in healthcare access and outcomes across socio-economic and geographic groups to identify policies that promote more equitable healthcare delivery. Targeted interventions for low-income populations, and the elderly are examined to address barriers such as affordability, language, and geographic access to care.
- **Technological innovation:** Analyzing the role of AI, telemedicine, wearable health devices, and predictive analytics in shaping the future of healthcare. Digital health solutions are assessed for their ability to enhance early intervention, patient engagement, and system efficiency, as well as their potential to optimize healthcare resource allocation.

2. Public Health – The Theory

2.1 DEFINITION

Public health is defined as the science and practice of protecting and improving the well-being of populations through prevention, education, and policy interventions.[1] In contradistinction to clinical medicine, which focuses on treating illness, public health aims to prevent disease and promote health at the community and societal levels. It encompasses physical, mental, and social well-being, emphasizing factors that shape health outcomes, including environmental conditions, access to resources, and behavioural patterns.

Public health initiatives encompass a wide range of activities, from the tracking and control of infectious diseases to the addressing of chronic conditions and the mitigation of lifestyle-related risks. These initiatives include the implementation of vaccination programs, the assurance of food and water safety, the promotion of healthier living environments, and the mitigation of public health crises. In addition, structural factors such as income, education, and housing play a critical role in influencing policies designed to enhance population health. A fundamental focus of public health is health equity, ensuring that all individuals, irrespective of their background, have access to essential health services and opportunities for a healthier life. To this end, targeted interventions are required to reduce disparities, expand healthcare accessibility, and promote social well-being. Strategies such as community-based outreach programs, culturally tailored health education, and policies addressing social determinants of health, such as expanding public healthcare, improving transportation access, and increasing funding for underserved clinics are essential in advancing health equity.

Public health professionals are employed across a variety of disciplines, including epidemiology, environmental health, policy-making, health education, and emergency response.[2] Their work is conducted within government agencies, healthcare organizations, research institutions, and community-based programs, with an emphasis on collaboration between sectors to effect systemic change. Beyond the sphere of disease prevention, public health fosters the development of resilient communities by improving living conditions, promoting healthy behaviours, and preparing for health emergencies.[3]

The implementation of policies such as smoke-free environments, nutrition programs, and workplace safety regulations serve to illustrate the influence of public health on daily life. The success of public health is not solely measured by the extent to which it reduces the prevalence of diseases, it is also contingent on its capacity to foster environments conducive to the flourishing of individuals and communities. Corporate and community-based health interventions, such as employer-sponsored wellness programs that promote active lifestyles, mental well-being, and social engagement, have been shown to enhance health outcomes and reduce disparities.[4] Additionally, research indicates that adverse working conditions, such as job insecurity and high psychosocial stress, negatively impact both physical and mental health, reinforcing the importance of workplace policies aimed at improving job quality.[5] Socioeconomic factors, including income and education, also play a crucial role in shaping public health outcomes, with evidence suggesting that structural inequalities contribute to disparities in health access and life expectancy.[6] Public health performs a pivotal function in the augmentation of life expectancy, the enhancement of quality of life, and the fortification of healthcare systems to ensure long-term viability.

2.2 DIRECT AND INDIRECT IMPACT ON SOCIETY AND ECONOMY

Population health plays a fundamental role in shaping both society and the economy.[7] A healthier population leads to greater productivity, stronger communities and long-term economic stability, while poor health reduces labor efficiency, increases financial burdens and weakens social structures.

At the societal level, public health influences disease prevention and health maintenance, reducing the spread of infections and lowering mortality rates. Vaccination programs, improved sanitation and early detection of diseases protect not only individuals but entire communities by limiting outbreaks and preventing long-term health complications. When fewer people suffer from preventable diseases, families experience less emotional and financial strain, creating more stable households and stronger social ties.

Population health has been demonstrated to have a significant impact on a number of key areas, including education and workforce readiness. It has been observed that children who enjoy good health demonstrate higher levels of school attendance, achieve better academic results, and develop stronger cognitive abilities, all of which have been shown to enhance their future earning potential.[8] Conversely, the presence of malnutrition, chronic conditions, or frequent illness has been shown to result in delays in learning and limitations in career opportunities, thereby perpetuating cycles of poverty and economic hardship.[9] At the level of the workforce, the maintenance of good health enables individuals to maintain productivity, leading to a reduction in absenteeism and an improvement in overall labor efficiency. Employees who are not burdened by illness contribute more consistently to economic output, enhancing both business performance and national economic growth.

Beyond individual productivity, public health serves as a fundamental driver of economic growth. Research has shown a strong positive correlation between life expectancy and GDP per capita, with countries experiencing higher economic growth rates as health outcomes improve.[10] Increased life expectancy leads to greater labor force participation and higher productivity, as healthier individuals are able to work longer and more efficiently. Additionally, improved health increases savings rates and capital accumulation, as people invest more in education and long-term financial security rather than medical expenses Unhealthy populations require greater medical care, increasing household spending on treatments and reducing disposable income available for other necessities or investments. When health-related costs rise, savings rates decline, limiting economic mobility and long-term financial security. On a national scale, robust public health has been demonstrated to be correlated with higher GDP growth, as countries with healthier populations tend to experience greater economic development, better workforce participation, and improved demographic trends. Lower infant mortality and increased life expectancy contribute to labor market shifts that support sustained growth.

2.3 EFFECT OF RISK FACTORS

Risk factors play a decisive role in shaping public health, driving the prevalence of chronic diseases, environmental hazards, and lifestyle-related conditions.[11] Behavioral risk factors such as poor diet, alcohol consumption, drug use, physical inactivity, and smoking contribute significantly to mortality and long-term health complications, increasing the likelihood of cardiovascular disease, diabetes, respiratory disorders, and cancer. Beyond individual behaviors, environmental hazards such as air and water pollution, exposure to toxic chemicals, and hazardous working conditions contribute to adverse health outcomes.[12] While

healthcare services play a role in treating diseases, research suggests that even high-intensity medical interventions have a relatively small impact on overall population health, particularly in highly developed countries. Instead, lifestyle choices such as maintaining a healthy diet, regular exercise, and avoiding harmful substances have a much stronger effect on long-term well-being and life expectancy.

Dietary habits

Nutritional habits strongly influence health outcomes, yet adherence to a balanced diet remains inconsistent. Despite the well-documented benefits of the Mediterranean diet, only 5% of Italians consumed the recommended daily intake of fruits and vegetables in 2023.[13,14] This low adherence is influenced by multiple factors, including economic constraints that make fresh produce less affordable, cultural shifts toward fast and processed foods, and accessibility issues, particularly in urban areas with fewer fresh food markets.[15] Additionally, changing lifestyles, time constraints, and increased consumption of convenience foods have contributed to a decline in traditional dietary patterns.

This dietary insufficiency raises the risk of obesity, cardiovascular disease, and metabolic disorders. 35% of Italian adults can be classified as overweight and 12% as obese, with a higher prevalence among men, individuals aged 65 to 74, and lower-educated groups.[16] Regions with the highest share of obese people are Puglia, Basilicata, Molise and Sicilia. Poor diet, combined with high blood sugar levels and hypertension, contributes to the rising burden of chronic diseases in Italy.

Every Italian consumes 32 kg of sugar per year equivalent to 22 sugar cubes per day (2021), ranking 48th worldwide.[17] This is more than ever and a rise of 135% since the 1960s. While diabetes and obesity are considered to affect quality of life, they are not seen as life-threatening. Nevertheless, 109,000 Italians died prematurely in 2021 as a result of an unhealthy diet.[18]

Poor diet-related economic costs are increasing, primarily due to the treatment of diet-related diseases such as obesity, diabetes, and cardiovascular conditions. In the USA, treating diabetes alone costs 413 billion USD annually, including 307 billion USD in direct medical costs and 106 billion USD in reduced productivity.[19]

Alcohol

Alcohol plays a central role in Italian culture, particularly wine and beer. In 2023, nearly half of Italians savor wine at least occasionally, including 10% indulging in a daily glass or two.[20] A small group (2%) even drinks more than half liter of wine each day. Beer, on the other hand, follows a seasonal rhythm, with 12% enjoying it during specific times of the year. Yet, beer is still very popular, as almost 40% sip it at least infrequently, and 5% make it part of their daily routine.

Although alcohol-free drinks have become increasingly popular, harmful drinking still costs the global economy 2.6% of GDP each year, with productivity losses, caused by absenteeism, accidents, and premature deaths, making up the majority (61%) of these costs.[21,22,23] In Italy, alcohol-related diseases result in over 42,000 hospital discharges annually, with direct and indirect costs weighing heavily on healthcare systems and businesses alike.[24,25] For instance, young workers (aged 20–39) are particularly affected, as 25% of deaths in this age group are alcohol-related, exacerbating workforce shortages in labor-intensive industries.

Tobacco

Smoking remains one of the most persistent public health challenges in Italy. 19% of Italians smoked in 2023, with the highest prevalence among men aged 25 to 34.[26] While national smoking rates have declined by 5 percentage points over the past two decades, this declining trend has not been observed in all regions.

Despite the well-known dangers, only 30% of smokers tried to quit smoking and in almost 80% of cases it failed, highlighting gaps in prevention and intervention strategies. Cessation and prevention have constituted the pillar of Italy's strategy to fight smoking. However, Italy risks not achieving the ambitious goals set: a 30% reduction in prevalence by 2025 compared to 2010, corresponding to a prevalence of 16.1% at the national level, and a 5% decrease by 2024, as established by the WHO.

At the same time, novel products are reshaping Italy's approach to smoking and nicotine consumption. E-cigarette use has risen steadily but modestly over the years, climbing from under 2% in 2014 to nearly 4.8% in 2023.[27] If we look at the Eurobarometer data e-cigarette users represent 3% of the population and heated tobacco users 4%.

Regarding the general consumption of nicotine products among youth, if we analyze the data from the Global Youth Tobacco Survey by ISS, since the introduction of new products, there has not been an overall increase in total nicotine consumption.[28]

Smoking remains one of the most persistent public health challenges in Italy. 19% of Italians smoked in 2023, with the highest prevalence among men aged 25 to 34.[29] While national smoking rates have declined by 5 percentage points over the past two decades, this declining trend has not been observed in Abruzzo and Basilicata, where smoking is today more popular than in 2001. Regions where the reduction in smoking is also progressing only very slowly are Umbria, Molise and Veneto. Despite the well-known dangers, only half of smokers receive medical advice on quitting, highlighting gaps in prevention and intervention efforts.

At the same time, novel products are reshaping Italy's approach to smoking and nicotine consumption. As one of the leading nations in promoting reduced-risk alternatives, Italy has received growing support from authorities to help smokers switch to less harmful options like e-cigarettes and heated tobacco products (HTPs). E-cigarette use has risen steadily but modestly over the years, climbing from under 2% in 2014 to nearly 5% in 2023.[30] Younger adults (18-24) lead the trend with 8% prevalence, while usage among older adults (50-69) was only 2% in 2023.

Tobacco alone accounts for more than 1.4 trillion USD or 1.8% of the world's annual GDP in global economic losses each year.[31] This includes both healthcare costs and productivity losses. Countries with high smoking prevalence, such as Indonesia and China, face disproportionate burdens, as smoking-related diseases reduce workforce productivity and increase demand for medical care. These economic losses hinder national development, particularly in countries with already strained healthcare infrastructures. Beyond economic impacts, risky behaviors exacerbate social inequalities. Inequities in mortality from smoking-related conditions account for 22% of the overall inequities in death rate from any cause among European men.[32]

In Italy, smokers are responsible for 26 billion EUR annually in social and health costs.[33] Smoking-related diseases represent 6% of the total cost of hospitalizations.[34] These costs translate to higher health insurance premiums for employers and lost productivity due to illness or premature death.

2.4 Deep Dive: Mediterranean diet

The Mediterranean Diet (MD) has long been considered a model of nutritional excellence and in 2010 was officially recognized by UNESCO as an Intangible Cultural Heritage of Humanity.[35] Beyond its role as a dietary model, the MD embodies cultural traditions, social practices and sustainable food systems that contribute to long-term well-being.

American physiologist Ancel Keys was the first to study the Mediterranean Diet systematically in the 1950s, conducting research in the town of Pollica, Campania, Italy.[36] His observations highlighted the positive impact of the local diet and lifestyle on overall health. The Mediterranean Diet is characterized by a high consumption of fruits, vegetables, legumes, whole grains and olive oil, integrated with a moderate intake of fish, dairy products and red wine. These elements are widely produced and promoted within the Campania region.

MD origins are deeply rooted in Southern Italy, especially in the Campania region, where the Cilento and Salerno areas have played a significant role in shaping its historical and cultural development. These areas have actively contributed to preserving and promoting the Mediterranean diet through their traditional agricultural products. The Salerno area, particularly the city of Pagani, is renowned for its production of San Marzano tomatoes, while the Cilento region stands out for its high-quality olive oil, made from the pressing of local “pisciottane” olives.

The Agro Nocerino-Sarnese area and the Cilento, Vallo di Diano, and Alburni National Park have played a key role in the birth of the Mediterranean diet and remain essential in preserving, promoting, and safeguarding this valuable dietary heritage worldwide.

Eating habits and their impact on the system

Poor eating habits not only result in health risks but also have important economic and systemic implications. An unhealthy lifestyle affects public spending, the efficiency of health care systems, and the overall economic performance. According to the OECD report The Heavy Burden of Obesity: The Economics of Prevention, obesity is a key factor in the increase in sick leave, resulting in decreased efficiency in the workplace and translating into billions of euros in lost productivity. In addition, overweight conditions reduce the GDP by 3.3%. To cover the costs associated with obesity, each citizen actually pays about 300 Euro (USD 359) per year.[37]

On the contrary, good eating habits provide benefits not only from a health perspective but also in terms of economic and systemic efficiency. A study highlights that the Mediterranean diet promotes better health by reducing the risk of cardiovascular diseases, obesity, hypertension, and type 2 diabetes, leading to improved overall well-being.[38] This, in turn, translates into significant economic benefits. Researchers have measured that in the USA and Canada, an 80% increase in adherence to the MD would lead to savings of approximately 31 billion USD and 1.2 billion CAD, respectively.[39]

Regarding the Italian case, a 2024 Statista survey found that 35% of the population identify with the Mediterranean diet.

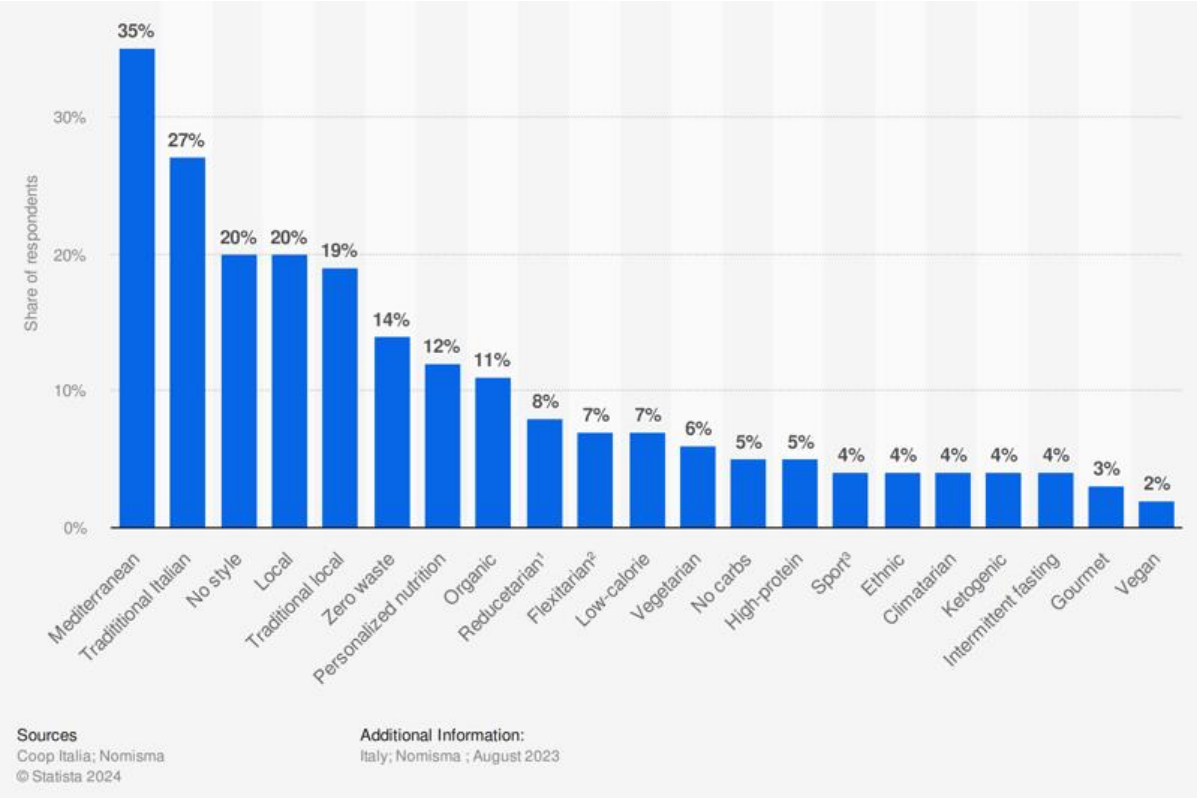


Figure 1: Food choices in Italy in 2023[40]

One health approach

Beyond the benefits that adopting the Mediterranean diet brings to individuals' health, it is also possible to consider additional advantages for both people and the surrounding environment. This diet can, in fact, be interpreted through a 4.0 approach, which highlights the benefits it generates in four key areas:[41]

1. Health: The Mediterranean diet significantly lowers the risk of chronic degenerative diseases, cardiovascular conditions, diabetes, and mental disorders such as depression.[42] Extensive scientific research supports its role in preventing major chronic non-communicable diseases.
2. Environment: In addition to its health benefits, the Mediterranean diet is more sustainable as it reduces water consumption and environmental impact, particularly by limiting the intake of meat and dairy products. An Italian study suggests that increasing adherence to the Mediterranean diet could significantly lower the country's water footprint.[43] The environmental benefits of this diet also include reduced greenhouse gas emissions and a smaller carbon footprint. Researchers have found that the Mediterranean diet generates significantly lower greenhouse gas emissions compared to the actual dietary patterns in Mediterranean countries (2.3 kg CO_2eq/day vs. 4.46 kg CO_2eq/day).[44]
3. Socio-cultural benefits: As stated by UNESCO, the Mediterranean Diet has been recognized as an Intangible Cultural Heritage of Humanity due to its essential role in strengthening social bonds through shared meals. The practice of eating together is deeply embedded in Mediterranean culture, reinforcing regional identities and culinary traditions that have been preserved for centuries. Furthermore, the Mediterranean Diet promotes the appreciation of regional food traditions, safeguarding the cultural heritage of small-scale food production and ensuring the transmission of culinary knowledge across generations.

Sharing a meal and embracing long-standing traditions can be considered a key element of collective well-being and social cohesion. In this regard, research suggests that adherence to the Mediterranean Diet enhances psychological well-being, as it is associated with lower rates of depression and social isolation, largely due to the significance of shared dining experiences.[45]

4. Economic benefits: The Mediterranean diet generates positive economic effects, measurable in terms of national and local production as well as exports to international markets. According to the FAO, adopting this diet directly supports local production, reducing reliance on imports and stimulating agricultural economies.[46]

On a global scale, exports reflect the growing adoption of the Mediterranean diet by other countries, which widely recognize its value and benefits. A Coldiretti report highlights a significant rise in exports of key Mediterranean diet products in 2024. Notably, extra virgin olive oil sales surged by 56%.[47]

These figures confirm the Mediterranean diet's economic impact, reinforcing its global relevance not only for health but also for market growth.

The Mediterranean Diet embodies a holistic 4.0 approach, benefiting health, the environment, culture, and the economy. It prevents chronic diseases, reduces environmental impact, strengthens social bonds, and supports local and global markets. Recognized as both a cultural heritage and a sustainable development model, its promotion through education, policy measures, and economic incentives is essential to preserving its legacy while fostering a healthier future. Special attention should be given to younger generations, as dietary habits formed during childhood and adolescence have lasting consequences on health, sustainability, and cultural identity. Understanding the barriers and motivations influencing their adherence is crucial for designing effective interventions that promote lifelong healthy eating behaviors and counter the shift toward Westernized diets. By aligning public health strategies with environmental and economic sustainability, the Mediterranean Diet can remain a cornerstone of well-being, resilience, and cultural preservation for future generations.

2.5 ROLE OF SOCIETY

Health is often framed as a matter of personal responsibility, but society plays a fundamental role in determining health outcomes. The conditions in which individuals are born, raised, and live have a far greater impact on long-term well-being than genetics or personal choices. Factors such as socioeconomic status, regional disparities, access to healthcare, and environmental quality shape health trajectories from birth and continue to influence outcomes throughout life.

One of the strongest determinants of health is early-life conditions.[48] The quality of prenatal care, maternal health, and childhood environment all contribute to future well-being. Children raised in lower-income households or disadvantaged regions often face higher exposure to pollution, inadequate nutrition, and limited access to healthcare, increasing their risk of chronic illnesses. Children from families in the lowest income tertile in Italy are 22% more likely to experience healthcare access problems compared to those from the highest income tertile.[49] Non-vaccination due to parental hesitancy can lead to the resurgence of preventable diseases, affecting both individuals and public health at large.

Living conditions in Italy play a crucial role in shaping long-term health risks, particularly among socioeconomically disadvantaged groups.[50] Urban environments with limited access to fresh food contribute to diets high in ultra-processed foods, increasing the prevalence of obesity,

diabetes, and cardiovascular diseases. Poor housing conditions, including overcrowding and structural deficiencies, are strongly associated with deteriorating health. Exposure to secondhand smoke during childhood remains a significant risk factor for respiratory conditions such as asthma. Material deprivation – such as the inability to afford basic needs or unexpected expenses – has a stronger impact on health than income alone. Moreover, individuals facing socio-economic hardship are more likely to have low levels of physical activity and social participation, further compounding their vulnerability to poor health outcomes.

Beyond immediate environmental influences, education, employment opportunities, and government policies further impact public health. Access to quality education and stable employment correlates with better health outcomes, while inadequate social support can lead to cycles of poor health and economic disadvantage.

2.6 ROLE OF ADDICTIONS

Addictions exert a profound and often irreversible influence on individual behavior, making change exceptionally difficult. Unlike conscious lifestyle decisions such as diet or exercise, addiction rewires brain function, creating dependence that overrides personal will and rational choice. Genetic predisposition also plays a crucial role, as certain individuals have a heightened vulnerability to addiction due to inherited variations in brain chemistry and reward system sensitivity.[51] Even when individuals recognize the harm, compulsion often outweighs intention, demonstrating the deep biological and psychological hold of addictive substances and behaviors.

In Italy, 39% of adolescents aged 15-19 consumed illegal substances at least once.[52] Alcohol consumption, though legally accepted, contributes to widespread health deterioration, leading to chronic diseases, mental health disorders, and social instability. Binge drinking – defined as consuming multiple alcoholic beverages in a short period – has become increasingly prevalent, particularly among young adults and adolescents. High-intensity drinking, where individuals consume two or more times the binge drinking threshold, exacerbates health risks, increasing the likelihood of alcohol poisoning, risky behaviors, and long-term dependence.[53,54] Addiction is not simply a personal failing but a systemic issue, often reinforced by economic hardship, social environment, and psychological distress.

Beyond drugs and alcohol, behavioral addictions such as gambling and compulsive digital consumption reflect the involuntary nature of these patterns. In Southern Italy, ultra-processed foods contribute significantly to obesity and metabolic diseases, reinforcing these cycles of dependency.[55] These foods, engineered for high palatability and low nutritional quality, promote overconsumption by altering reward mechanisms and reducing satiety. There is a direct correlation between increased ultra-processed food intake and higher adiposity indices, particularly among individuals with severe obesity. Soft drinks, the most consumed ultra-processed food, exacerbate these health risks, with their intake rising in tandem with BMI. In low-income communities, the affordability and accessibility of ultra-processed food further entrench these dietary habits, displacing healthier, minimally processed foods and weakening adherence to the Mediterranean diet

Escaping addiction is rarely a matter of determination alone. Withdrawal, ingrained habits, and environmental triggers keep individuals locked in destructive cycles. Social surroundings shape these dependencies, with exposure to substance use, economic instability, and peer influence acting as strong determinants of addictive behavior. Understanding addiction as a force that overrides self-control is essential to addressing it effectively. Expecting individuals to break free

through willpower alone is unrealistic – comprehensive public health strategies, harm reduction policies, and long-term support systems are necessary to mitigate the devastating consequences on both personal and societal levels.

2.7 ROLE OF POLICYMAKERS

Policymakers play a pivotal role in shaping and sustaining public health policies, influencing both the structure of healthcare systems and the long-term direction of public health initiatives. Their responsibilities extend beyond direct healthcare interventions to include economic regulations, intersectoral collaboration, and legal frameworks that drive systemic change.[56] At the core of their influence, policymakers shape healthcare systems top-down through decisions on insurance premiums, drug pricing, and funding for research and development. By setting the financial and regulatory environment, they determine accessibility, affordability, and the overall quality of healthcare services.

Public health is also influenced by policies beyond the healthcare sector, including those related to education, employment, and environmental standards, which affect broader determinants of health.[57] For example, the introduction of a point-record driving license (PRDL) system in Italy led to a reduction in seat belt offenses and a decrease in road accidents.[58] However, this policy also resulted in an increase in non-occupant fatalities, suggesting a 'Peltzman effect,' where improved safety measures led to riskier driving behaviors.

A key function of policymakers is long-term planning. Public health work is shaped by national and regional strategies that establish priorities for disease prevention, health promotion, and emergency preparedness. Ensuring these policies remain durable despite political changes is essential, as public health measures often require years to demonstrate their full impact. One strategy for maintaining policy continuity is institutionalizing key health programs through legal frameworks, making it more difficult for subsequent administrations to reverse them. Establishing independent public health agencies with dedicated funding can also help insulate policies from political shifts, ensuring their longevity regardless of government turnover.

Collaboration across multiple sectors is fundamental. Many health challenges – such as urban pollution, food security, and occupational health risks – require cooperation between education, urban planning, agriculture, and transportation sectors. Embedding health considerations into interministerial agreements or cross-sectoral action plans can further reinforce policy sustainability by integrating public health objectives into broader governance structures. Policymakers also play a role in data-driven advocacy and legislative reinforcement. By publishing regular health reports, benchmarking progress against international standards, and empowering civil society organizations, they create public pressure to sustain momentum on key health issues. Moreover, fostering bipartisan support and aligning public health initiatives with economic and social goals can enhance political buy-in, reducing the likelihood of abrupt policy reversals.

3. Public Health – The Situation

3.1 GLOBAL CONTEXT

What are the global challenges?

The global health landscape is increasingly shaped by globalization, demographic shifts, urbanization, environmental risks, and the growing burden of both chronic and infectious diseases. Advances in medicine have extended life expectancy, yet healthcare systems worldwide are under immense pressure due to aging populations, antimicrobial resistance, and the continued emergence of zoonotic diseases.

The COVID-19 pandemic exposed critical vulnerabilities in global health governance, underscoring the complex interdependencies of global health systems and their susceptibility to disruptions. The crisis highlighted delays in global response and coordination, allowing the virus to spread rapidly before effective containment measures were implemented. Vaccine inequity became a glaring issue, with high-income countries securing the majority of early supplies while low-income nations struggled with limited access, prolonging the pandemic and deepening global health disparities. Many countries also lacked sufficient pandemic preparedness, leading to overwhelmed healthcare systems, shortages of essential protective equipment, and reactive rather than proactive health policies. The spread of misinformation further complicated response efforts, eroding public trust in health authorities and scientific recommendations, which in turn hindered compliance with public health measures and vaccination campaigns. Additionally, the pandemic exposed a lack of unified global leadership, as inconsistent policies and fragmented decision-making among nations weakened collective efforts to mitigate the virus's impact.

The growing burden of non-communicable diseases (NCDs)

Non-communicable diseases (NCDs) have overtaken infectious diseases as the leading cause of mortality worldwide, accounting for nearly 75% of global deaths.[59] In 1990, NCDs were only responsible for 57% of global mortality.[60] Cardiovascular diseases alone claim 18 million lives annually, followed by cancers, respiratory diseases, and diabetes.[61] The prevalence of NCDs correlates with urbanization, environmental pollution, and lifestyle choices, such as poor diets, low physical activity, smoking, and alcohol consumption. Air pollution exacerbates respiratory and cardiovascular diseases, contributing to millions of premature deaths annually. Industrialized regions with high pollution levels experience increased cases of lung disease, heart disease, and stroke.

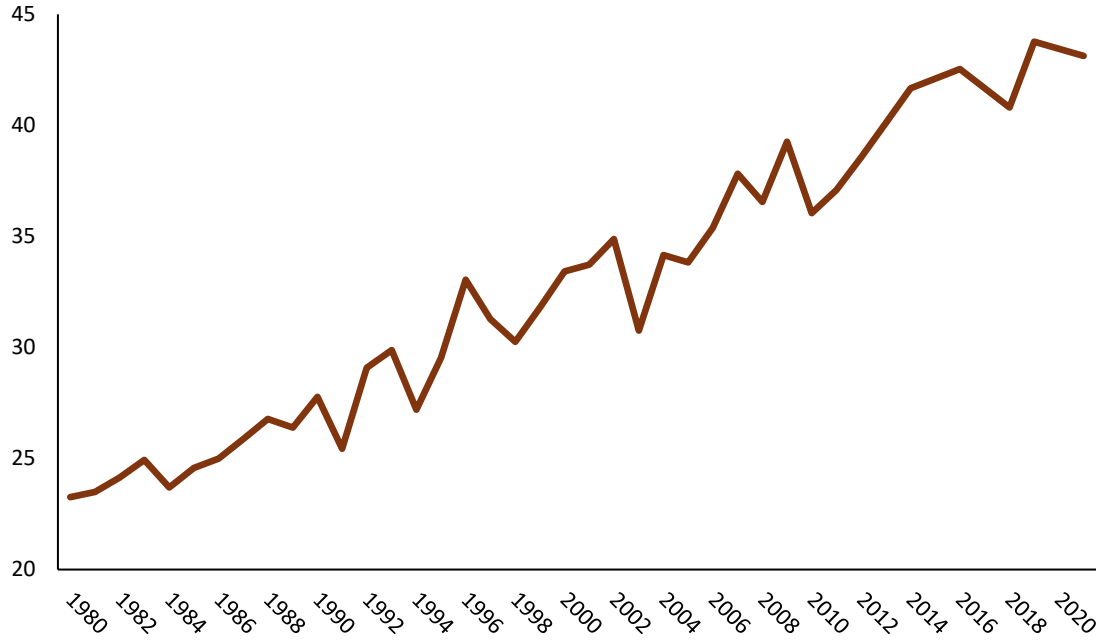


Figure 2: Number of non-communicable diseases globally in million[62]

Aging populations and the rising demand for healthcare

The world is experiencing a rapid demographic shift toward an aging population. By 2030, one in six people will be aged 60 or older, and by 2050, the global elderly population will surpass two billion.[63] This demographic change is accompanied by increased demand for long-term care, specialized medical treatments, and geriatric healthcare services. Many countries are facing shortages of trained social care workers – Europe alone will have a shortfall of 4 million health and social care workers by 2030 – further complicating their ability to provide adequate care for aging populations.[64]

Alzheimer's disease and other forms of dementia are becoming major global health concerns, with 78 million people projected to be affected by 2030.[65] This growing prevalence places additional strain on healthcare infrastructure, requiring expanded resources for memory care, assisted living, and home-based medical support. Countries with underdeveloped eldercare systems are experiencing rising healthcare costs, as hospital visits and long-term care services become more frequent.

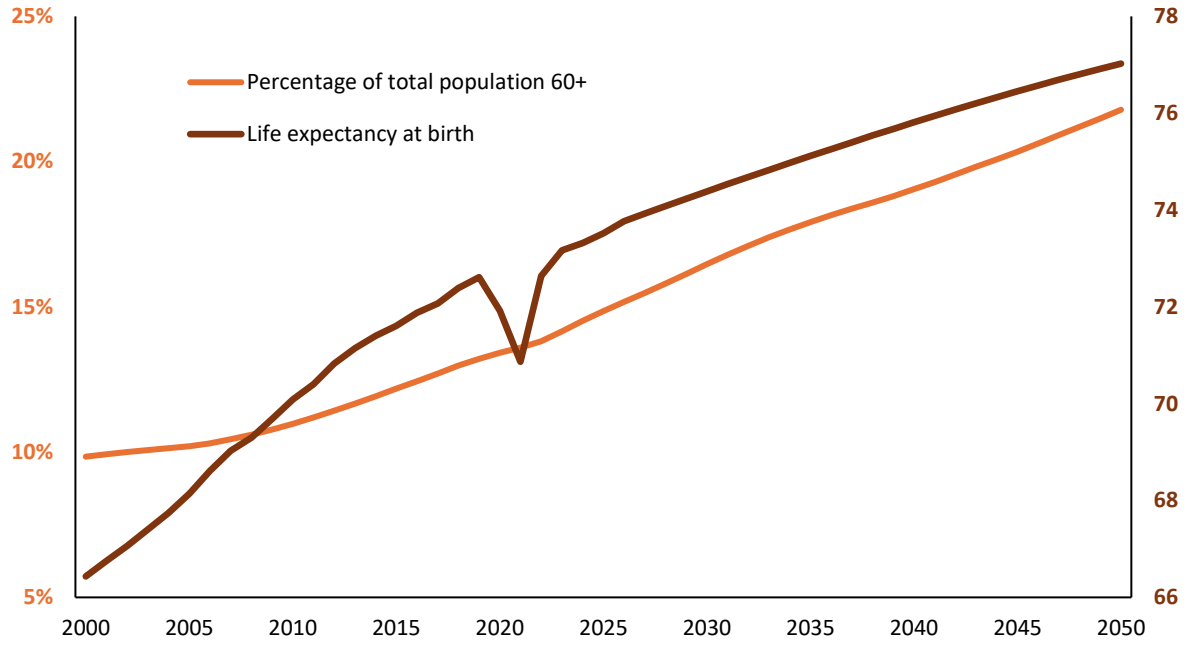


Figure 3: Projected share of people aged 60+ and life expectancy at birth globally[66]

Infectious diseases and the challenge of antimicrobial resistance

Despite advancements in vaccines and medical treatments, infectious diseases remain a leading global health threat. Lower respiratory infections, diarrheal diseases, tuberculosis, malaria, and HIV/AIDS together cause millions of deaths each year, particularly in low- and middle-income countries.[67,68]

Antimicrobial resistance an escalating concern, rendering many bacterial infections increasingly difficult to treat. Drug-resistant infections currently cause five million deaths annually, and projections indicate this number could reach 10 million per year by 2050, surpassing cancer as the leading cause of mortality.[69] Overuse and misuse of antibiotics in both human healthcare and livestock farming have accelerated the development of resistant bacteria, raising concerns about the future efficacy of treatments for common infections.

To address this crisis, several global initiatives have been launched. The Global Action Plan on Antimicrobial Resistance, endorsed by the World Health Assembly in 2015, aims to improve awareness, strengthen surveillance and research, reduce infection incidence, optimize antimicrobial use, and ensure sustainable investment in new medicines and diagnostics.[70] The Global Leaders Group on Antimicrobial Resistance, established in 2020, brings together world leaders and experts to advocate for urgent action, maintaining political momentum and public support in the fight against Antimicrobial Resistance.[71] The WHO AWaRe Classification, launched in 2017, categorizes antibiotics into three groups – Access, Watch, and Reserve – to guide appropriate use and limit resistance development.[72] Additionally, organizations like the One Health Trust, a WHO Collaborating Center for Antimicrobial Resistance, conduct surveillance and research, particularly in low- and middle-income countries, to inform policy decisions and combat resistance effectively.[73]

Emerging zoonotic diseases pose another persistent threat. Three out of four newly emerging infectious diseases originate in animals, as observed in the cases of COVID-19, Ebola, and avian influenza.[74] Human encroachment into wildlife habitats, deforestation, and industrial-scale animal farming are increasing human-animal interactions, providing opportunities for pathogens to jump species. Urbanization, combined with high global connectivity through air

travel and trade, has facilitated the rapid spread of new diseases, as seen with COVID-19, which led to a global pandemic within weeks.

The One Health approach is an integrated, unifying strategy that aims to sustainably balance and optimize the health of people, animals, and ecosystems.[75] It recognizes that the health of humans, domestic and wild animals, plants, and the wider environment are closely linked and interdependent. By fostering collaboration across multiple sectors and disciplines, One Health seeks to address health threats at the human-animal-environment interface, thereby enhancing global health security and promoting sustainable development.

The climate-health nexus: rising risks from environmental change

Climate change is emerging as a significant driver of global health risks, affecting disease patterns, food security, and healthcare infrastructure. Rising global temperatures have led to an increase in heat-related illnesses and deaths, with Europe recording 61,000 heat-related fatalities in 2022 alone.[76] Heatwaves disproportionately affect vulnerable populations, particularly the elderly and individuals with preexisting health conditions.

Vector-borne diseases such as malaria and dengue fever are expanding into new geographic areas due to rising temperatures and shifting precipitation patterns. Warmer climates have led to an increase in malaria and dengue transmission in tropical and subtropical regions. Meanwhile, extreme weather events – hurricanes, floods, and wildfires – are displacing people worldwide as was recently the case with the fire in Los Angeles, increasing exposure to infectious diseases, and straining healthcare systems.[77]

Environmental pollution is another major health hazard. Air pollution is responsible for 3 million premature deaths annually rising to 7 million by 2050, contributing to lung disease, cardiovascular problems, and neurological disorders.[78] Industrial emissions, vehicular pollution, and agricultural chemicals exacerbate health problems, particularly in densely populated urban centers. Countries with poor air quality experience higher rates of asthma, chronic obstructive pulmonary disease (COPD), and stroke, linking pollution exposure to long-term health outcomes.

The impact of natural disasters on healthcare systems

Natural disasters have increasingly severe consequences for public health. The 2022 floods in Pakistan resulted in over 1,700 deaths and left eight million people in need of medical assistance due to outbreaks of waterborne diseases like cholera and leptospirosis.[79] Such disasters not only disrupt local healthcare systems but also create long-term challenges in rebuilding infrastructure and restoring access to essential medical services. Earthquakes, hurricanes, and rising sea levels continue to displace large populations, leading to overcrowded shelters, increased disease transmission, and malnutrition. The destruction of hospitals and clinics during disasters increases mortality rates, particularly in regions with already fragile healthcare systems.

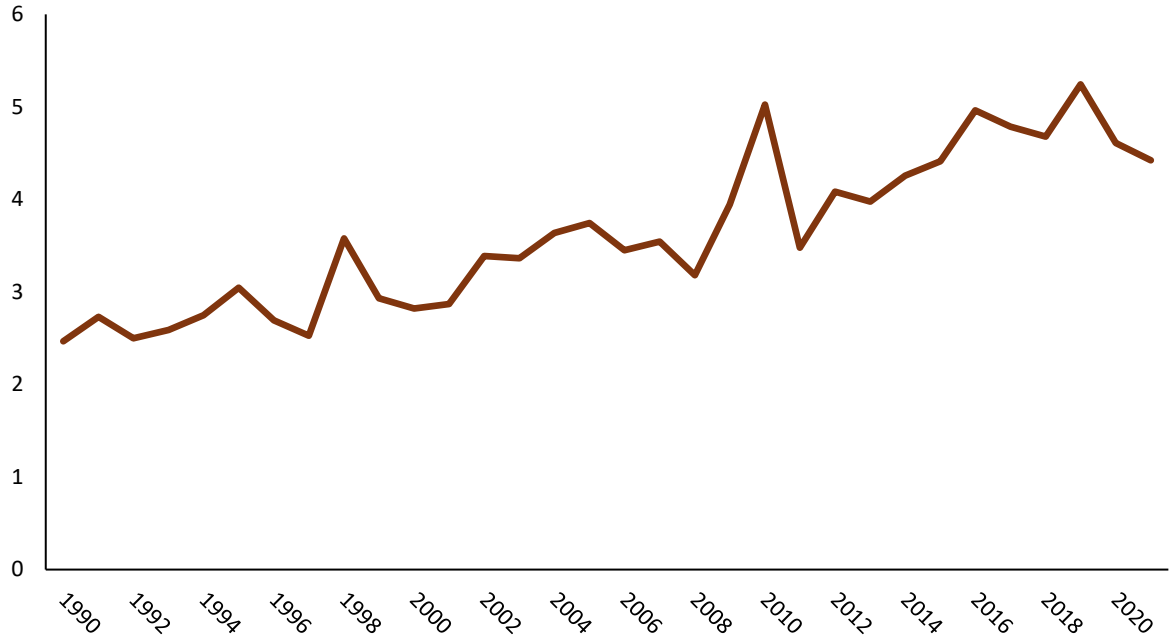


Figure 4: Number of death cases due to high temperatures in 100,000[80]

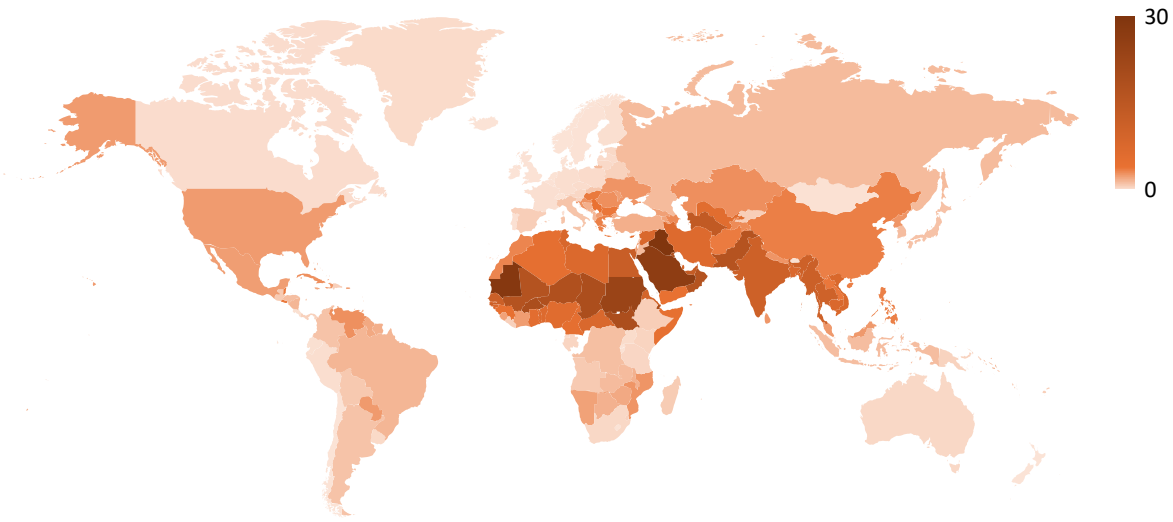


Figure 5: Number of death cases due to high temperatures per 100,000 inhabitants in 2021[81]

Italy has also faced public health challenges due to natural disasters in recent years. The Emilia-Romagna region experienced devastating floods in 2024, leaving entire communities submerged, destroying homes, and causing widespread displacement.[82] These floods not only led to immediate casualties but also heightened the risk of infectious disease outbreaks due to contaminated water sources and poor sanitation. Meanwhile, extreme summer heat has posed a growing threat, with 18,010 heat-related deaths recorded in Italy during the summer of 2022, the highest number in Europe.[83] Vulnerable populations, particularly the elderly, have been disproportionately affected, highlighting the urgent need for stronger climate adaptation measures and public health preparedness strategies. Additionally, the spread of the bluetongue virus in Sardinia has placed pressure on local agricultural systems, threatening

livestock health and economic stability while also raising concerns about the potential for zoonotic disease transmission.[84]

Healthcare workforce and resource distribution challenges

The global healthcare workforce is facing significant strain. Over 70 million people work in healthcare worldwide, but many regions continue to experience shortages of doctors, nurses, and public health professionals.[85] The demand for medical professionals is growing, particularly in aging societies and low-income regions, where populations have limited access to trained specialists. Regions most affected by healthcare workforce shortages include Sub-Saharan Africa and South-East Asia, where healthcare worker density is often below the critical threshold needed to deliver essential health services.[86] In high-income countries, rural and underserved areas experience shortages, leading to disparities in healthcare access.

To address these shortages, various strategies are being implemented globally. Task shifting allows specific responsibilities to be delegated from physicians to trained nurses or community health workers, optimizing the use of available personnel. Incentive programs, such as financial support, housing assistance, and educational opportunities, are being introduced to attract and retain healthcare workers in underserved areas. Expanding training and education programs is another key approach, ensuring that more professionals enter the workforce, particularly through local recruitment to improve retention. Some countries are also relying on international recruitment, bringing in healthcare workers from abroad while maintaining ethical guidelines to prevent workforce depletion in source countries. Additionally, technology and telemedicine are being used to extend the reach of healthcare professionals, improving service delivery in remote areas.

Resource allocation disparities further increase healthcare inequalities. Many low- and middle-income countries struggle with underfunded healthcare systems, limiting their ability to provide adequate services, particularly during public health emergencies. Even within high-income nations, disparities in healthcare access persist, with rural areas experiencing fewer medical facilities and higher patient-to-doctor ratios.

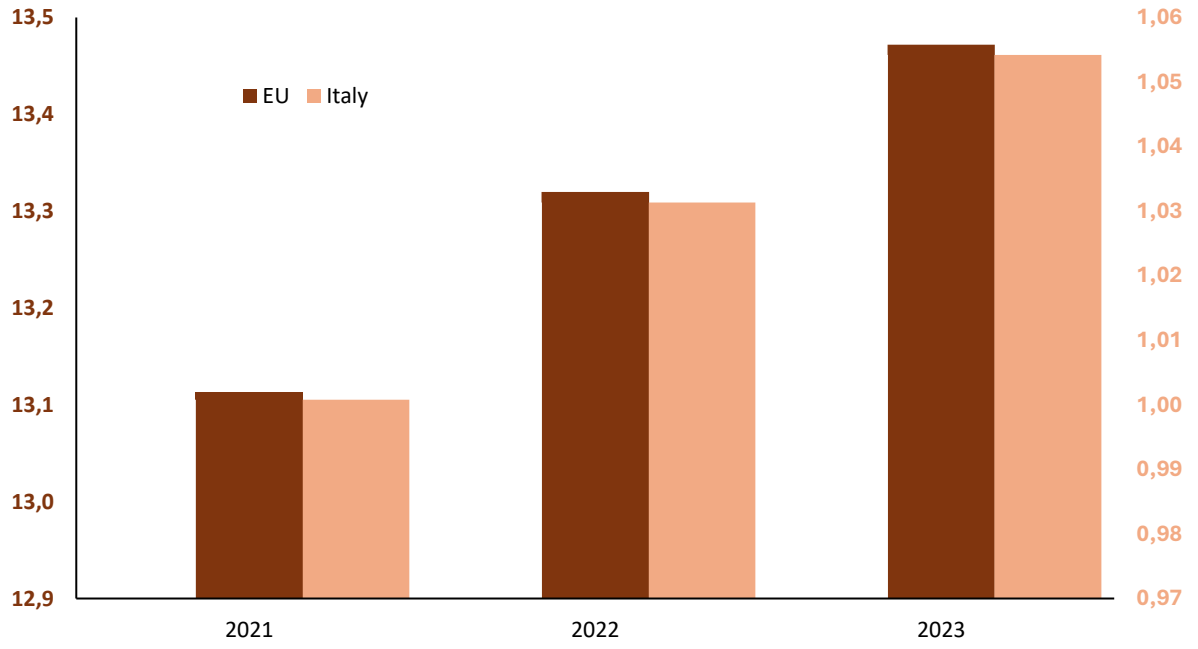


Figure 6: Number of employees in the healthcare and social services sector in the EU and in Italy in million[87]

What kind of paradigm shift is needed?

The current global health model prioritizes treatment over prevention, leading to skyrocketing healthcare costs, preventable diseases, and overburdened medical systems. Chronic illnesses, emerging infectious diseases, and climate-driven health risks can be significantly reduced through proactive interventions. However, funding and policy decisions continue to support pharmaceutical companies and insurance providers rather than addressing the root causes of illness. A paradigm shift is necessary – one that focuses on early prevention, lifestyle changes, and environmental improvements to protect public health before diseases develop.

Focus on prevention

Many of the most widespread health conditions are preventable, yet governments and health systems allocate the majority of their resources to treating diseases rather than preventing them.[88] Cardiovascular diseases, diabetes, respiratory illnesses, and many cancers could be significantly reduced through changes in diet, air quality, and physical activity levels. Instead of waiting for people to develop chronic conditions and then prescribing costly medications, investment should be directed toward comprehensive public health programs that promote healthier lifestyles and limit exposure to harmful substances. Shifting focus from treatment to prevention would not only improve health outcomes but also generate cost savings for healthcare systems. Treating chronic illnesses places a heavy financial burden on both individuals and governments, with long-term medication costs, hospitalizations, and productivity losses adding up over time. Preventive measures, such as promoting exercise, reducing air pollution, and ensuring better nutrition, require lower investment compared to the cost of managing advanced diseases.

Food systems play a critical role in shaping public health. The consumption of ultra-processed foods, excessive sugar, and trans fats has fueled the rise of obesity and metabolic disorders.[89] Instead of relying on expensive diabetes and heart disease treatments, policies should focus on making fresh, nutritious food more accessible. Governments should implement stricter regulations on misleading food advertising, introduce taxation on harmful food products, and invest in school meal programs that promote balanced diets from an early age. By addressing dietary risk factors early, public health systems can reduce the need for expensive interventions, including insulin therapy for diabetes or cardiac surgeries for advanced heart disease.

Cancer prevention is another area where early intervention is more effective than late-stage treatment. Tobacco control policies, widespread HPV and hepatitis B vaccinations, and improved workplace safety regulations can drastically reduce the incidence of preventable cancers.[90] However, current efforts often focus on expensive drug development while neglecting simple posterior measures that could stop the disease before it starts. Investing in prevention programs, such as smoking cessation campaigns or vaccination initiatives, is far more cost-effective than funding years of chemotherapy, radiation, and palliative care.

Root causes of pandemics

The global response to infectious diseases remains reactionary, with governments focusing on emergency preparedness rather than tackling the factors that allow diseases to spread in the first place.[91] Zoonotic diseases, which originate from animals, are a direct consequence of deforestation, wildlife trade, and intensive livestock farming.[92] These human activities create conditions where viruses and bacteria can jump from animals to humans, increasing the likelihood of global outbreaks.

A more effective approach would involve protecting ecosystems, regulating livestock production, and strengthening disease surveillance in animal populations. Instead of investing billions in various and sometimes contradictory treatments every time a new pathogen emerges, resources should be spent on preventing the conditions that lead to outbreaks. Strengthening biosecurity measures in agriculture, improving food safety standards, and enforcing stricter controls on wildlife trade may reduce the risk of future pandemics.

Improving sanitation and hygiene in vulnerable communities is also a key component of pandemic prevention. Many infectious diseases spread due to inadequate access to clean water, poor waste management, and overcrowded living conditions. Basic infrastructure improvements, such as better sewage systems and access to handwashing facilities, are far more cost-effective than treating large-scale disease outbreaks after they occur.

Environmental health and climate-driven diseases

Air pollution remains one of the most pressing yet overlooked public health threats. Exposure to harmful pollutants from industrial activity, traffic emissions, and household cooking fuels contributes to respiratory diseases, cardiovascular problems, and neurological disorders.[93] Current healthcare models focus on managing the symptoms of these conditions rather than eliminating their causes. Governments should implement stricter emissions regulations, expand public transportation networks, and promote renewable energy to reduce pollution-related health risks.[94]

The increasing frequency of extreme weather events is also placing additional stress on health systems. Heatwaves are causing higher rates of heatstroke, cardiovascular issues, and respiratory distress, particularly in urban areas with poor ventilation and limited green spaces.[95] Rather than relying on hospitals to manage the consequences, cities must be designed to mitigate these risks. Expanding tree coverage, improving building insulation, and creating accessible cooling centers can dramatically reduce heat-related illnesses.[96]

Vector-borne diseases are spreading into new regions due to shifting climate patterns.[97] Mosquito populations carrying malaria and dengue are thriving in previously unaffected areas, increasing the burden on public health systems. Governments should prioritize ecological solutions, such as restoring wetlands and improving urban drainage, to naturally control mosquito populations rather than relying solely on insecticides and medical interventions.

Reward prevention with healthcare funding

The economic model that underpins healthcare is fundamentally flawed, with financial incentives favoring treatment rather than disease prevention.[98] Pharmaceutical companies profit from selling medications rather than supporting initiatives that keep people healthy. Insurance providers focus on covering hospital stays and medical procedures rather than rewarding individuals for maintaining good health. This system encourages dependency on expensive treatments rather than reducing the incidence of disease.

Healthcare funding should be restructured to prioritize preventive care. Insurance models should shift more toward covering wellness programs, fitness memberships, and nutritional counseling. Governments should redirect subsidies from pharmaceutical companies to public health initiatives that encourage early intervention. Investments in health education, screening programs, and lifestyle coaching would yield far greater long-term benefits than continuously expanding hospital infrastructure and drug coverage.

The role of corporate responsibility must also be addressed. Industries that contribute to poor health outcomes – such as food manufacturers and polluting industries – should be held

accountable for their impact on public health. Taxing harmful products, enforcing stricter labeling requirements, and imposing penalties on companies that fail to meet health standards would create an environment where businesses are incentivized to prioritize public well-being over profit.

The role of education in public health

Long-term health improvements require a shift in public attitudes toward wellness and disease prevention. Health literacy should be integrated into school curriculums to ensure that children grow up with an understanding of nutrition, exercise, and mental well-being.[99] Workplaces also play a role in promoting healthier lifestyles by offering fitness incentives, mental health support, and better work-life balance policies.[100]

Behavioral science should be leveraged to encourage healthier choices. Simple changes, such as making fresh food more visible in grocery stores, providing financial rewards for quitting smoking, and designing urban environments that promote walking and cycling, can have a profound impact on long-term health outcomes.[101,102] Instead of blaming individuals for poor health decisions, governments and policymakers should focus on creating environments that make healthier choices the default option.

Public awareness campaigns should focus on long-term well-being rather than short-term medical solutions.[103] People are often more receptive to changes when they understand how their choices impact their quality of life rather than simply being told to avoid disease. Framing prevention in terms of increased energy, reduced stress, and greater longevity is far more effective than emphasizing risks alone.

3.2 ITALIAN CONTEXT

What are the challenges for the Italian healthcare system?

The Servizio Sanitario Nazionale (SSN) is funded primarily through general taxation, supplemented by regional taxes and user co-payments for certain medical services. In theory, coverage extends to all citizens and legal residents, guaranteeing essential care across prevention, diagnosis, treatment, and rehabilitation. Undocumented migrants in urgent need also receive essential care, although practical barriers often limit full access. The system's founding ideal was that access to care should not be determined by location or personal income. However, disparities have emerged not solely due to regional administration but also because healthcare services, like other public goods such as education, are delivered at the local level, where resource allocation and service quality can vary.

Italy's healthcare system successfully extends coverage to the entire population but faces stark challenges around regional equity, workforce imbalances, high out-of-pocket costs, and an overemphasis on hospital-based medicine. Shortages of general practitioners and nurses, particularly in Southern regions and rural areas, have led to limited access to primary care and increased pressure on emergency services. While life expectancy remains among the highest in Europe, persistent gaps in preventive care, mental health services, and integrated long-term care pose significant risks to system sustainability.

Mixed public-private model

Italy's healthcare system, in its modern form, dates back to 1978 when the SSN was established to provide universal healthcare coverage.[104] This pivotal reform replaced the insurance-based mutual societies model and was designed around the principles of equity, universality, and solidarity. Over time, the system evolved into a mixed public-private structure, wherein the

state remains responsible for ensuring core healthcare services, while a sizable private sector offers supplementary or alternative options for those who can afford out-of-pocket expenditures or private insurance. The mixed model is structured as follows for facilities:

- **Public:** Fully funded by the Servizio Sanitario Nazionale (SSN), these facilities provide services either free of charge or with a small co-payment, commonly referred to as a "ticket" fee.
- **Private accredited:** These privately managed institutions operate under agreements with the SSN, meaning patients can access care without direct payment (except for applicable co-pays). While these facilities maintain autonomy, they must adhere to public healthcare standards set by regional authorities.
- **Purely private:** These facilities operate outside the SSN, requiring direct payment for services through private insurance or out-of-pocket expenses. In the case of hospital care, purely private providers represent only a small portion of the system, as the majority of hospital services are delivered through public or accredited private facilities within the SSN.

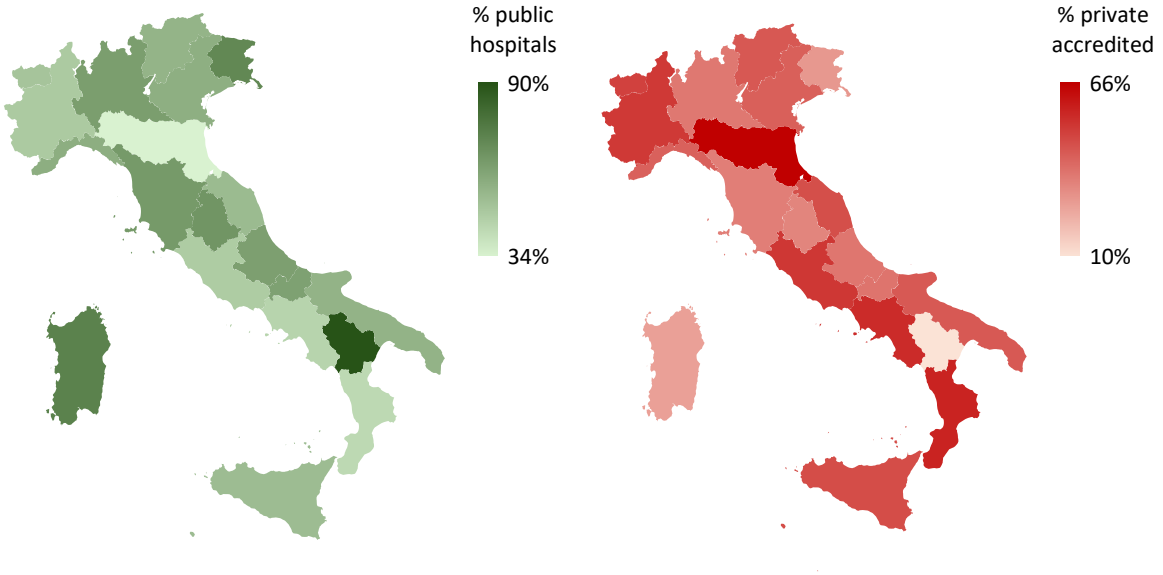


Figure 7: Share of privately accredited and public hospitals[105]

This mixed model has helped reduce waiting times and alleviate pressure on public healthcare services, particularly during crises. Accredited private hospitals provide an alternative for diagnostics and elective procedures while encouraging efficiency improvements in the public sector. However, regional disparities in accreditation standards have led to uneven quality control, with some regions maintaining rigorous oversight while others lack proper enforcement. Additionally, delayed SSN payments pose financial risks for accredited facilities, potentially affecting service continuity. Delays in public payments have been a persistent problem in Italy, leading to liquidity problems for accredited providers and affecting their ability to maintain operations efficiently. The 2020 Constitutional Court ruling (Sentenza n. 78/2020) confirmed the legitimacy of financial regulations aimed at ensuring timely payments by SSN entities, recognizing the critical role of prompt compensation in sustaining healthcare services.[106]

The system has also widened healthcare inequities. Italians who can afford private options enjoy faster diagnosis and treatment, whereas low-income residents sometimes delay care due to cost or distance. A study of public and private hospitals in Lombardy, a region with a high concentration of accredited private providers, found no significant difference in overall healthcare quality.[107] However, private hospitals reported lower 30-day mortality rates for emergency conditions such as heart attacks (acute myocardial infarctions), possibly due to greater efficiency in specialized care or patient selection criteria. Conversely, for elective procedures like hip replacements, private hospitals had higher readmission rates, indicating potential quality concerns in post-operative care.

While private hospitals appeared to have shorter waiting times for elective surgeries, this advantage disappeared after adjusting for factors like patient demographics and severity levels. This suggests that wealthier patients, who often seek private care, may benefit from a more favorable healthcare experience, characterized not only by shorter perceived wait times but also by higher patient satisfaction and more personalized service quality. Meanwhile, public hospitals, which are larger and handle a broader mix of cases, continue to serve as the backbone of Italy's universal healthcare system but may struggle with longer waitlists due to higher demand and resource constraints.

To address these challenges, reforms to the accreditation system could help standardize evaluation criteria nationwide and improve financing mechanisms. Accreditation programs should incorporate evidence-based quality measures, ensuring that facilities meet minimum standards for patient care and safety across all regions. Additionally, linking accreditation outcomes to healthcare financing mechanisms can provide incentives for facilities to maintain compliance while also securing timely reimbursements to avoid financial instability. Countries like Australia and Rwanda have successfully integrated accreditation into broader health system reforms, demonstrating how external oversight and structured evaluation frameworks can enhance service delivery and public trust.[108]

Decentralization

Italy's healthcare governance is organized at three levels:

- **National:** The central government defines healthcare objectives, allocates funding, and sets national standards known as the Essential Levels of Assistance (LEA) or Livelli Essenziali di Assistenza.[109] These standards establish the core benefits that regions are obliged to offer.
- **Regional:** Twenty regions (plus two autonomous provinces) manage the organization and delivery of services in their jurisdictions. They oversee both public hospitals, which are fully funded by the SSN, and accredited private facilities, which operate as private entities but provide services reimbursed by the SSN under regional agreements, as defined in Legislative Decree No. 502/1992 Article 8-quarter.[110]
- **Local:** Local Health Units (Aziende Sanitarie Locali, ASLs) coordinate primary care, community-based services, and preventive interventions. These local authorities contract with general practitioners, pediatricians, and other professionals to ensure coverage.

The regionalization that grants autonomy to the twenty administrative regions has led to a inequality gap between Northern and Southern areas. Regions such as Emilia-Romagna, Lombardy and Veneto lead in efficiency and are most attractive for healthcare mobility, though they rely on private providers. Meanwhile, the South grapples with older infrastructure, fewer health professionals, and has to solve the financial problems of the regional administrations. Consequently, health migration sees patients from the South seeking specialized procedures

up North, leaving disadvantaged regions to manage growing deficits. The hospitalization migration flow is allocated as follows: 84% to the North, 68% to the Center and 27% to the South.[111] The most attractive hospital facilities are the accredited private ones, which handle about three-quarters of high-complexity services.

The 2001 constitutional reform, which shifted healthcare management from a national to a regional system, has exacerbated disparities, increasing inequality between Northern and Southern Italy without reducing overall costs.[112] The brain drain of healthcare professionals, caused by limited career prospects, low salaries, and bureaucratic barriers, weakens the healthcare workforce in southern regions, making it harder to improve services. The New Guarantee System identifies these weaknesses, but transformation remains slow, partially due to political complexities at both regional and national levels.

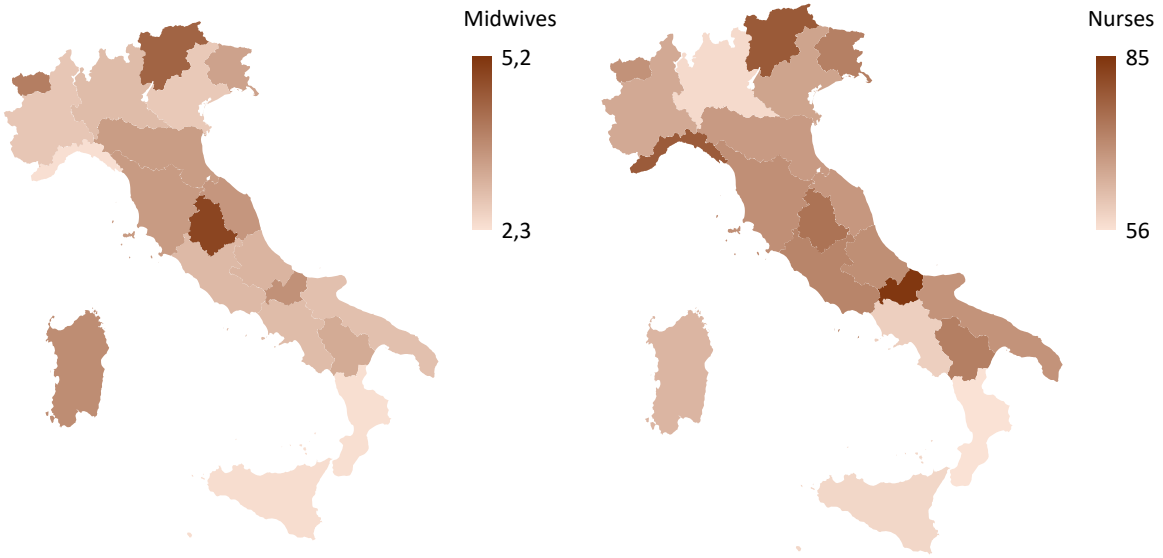


Figure 8: Number of midwives and nurses per 10,000 inhabitants in 2022[113]

Health expenditure

According to OECD estimates, Italy spends 9.4% of its GDP on both public and private healthcare together – below the EU average of 11% – translating to roughly 2,792 Euro per capita, which is around 30% lower than the EU average.[114] This lower expenditure impacts healthcare outcomes, contributing to longer waiting times, staffing shortages, and regional disparities in service quality. Regions receive the bulk of SSN funding from the central government, derived from general and regional taxation. Concerns grow that regions have difficulties to meet growing demands with relatively constrained budgets.[115] This shortfall translates into fewer healthcare investments, especially in preventive care, long-term care and innovative technologies.

In Sicily, for example, unfilled medical positions and emergency room overcrowding have led to a decline in service quality and increased stress on healthcare workers. The lack of available hospital beds has created a bottleneck effect, preventing timely admissions and worsening patient outcomes. Beyond workforce shortages, Sicily's limited healthcare spending has resulted in lower investment in preventive care, long-term care, and innovative medical technologies. Between 2013 and 2023, private healthcare spending in Sicily increased by 20% in real terms, reaching over 40 billion euros in 2023.[116] This shift has disproportionately

affected low-income populations, who are often forced to delay or forgo medical treatment due to cost barriers.

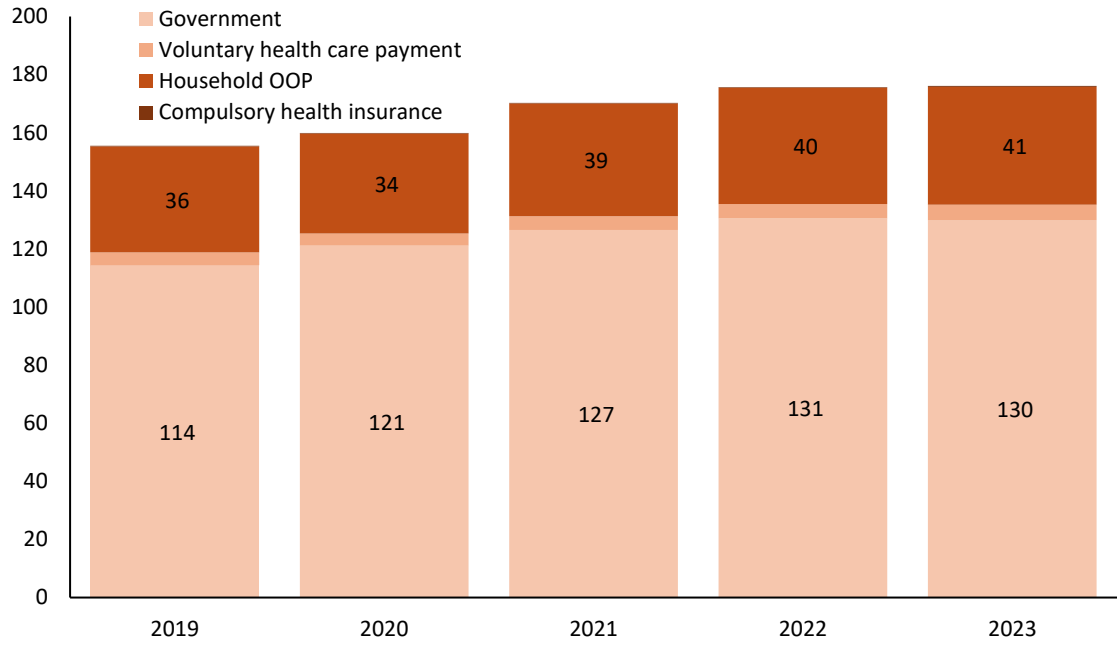


Figure 9: Health expenditure by financing scheme in billion Euro[117]

Italy's SSN guarantees coverage of primary and secondary care, yet the implementation is regionally variable. In 2021, the New Guarantee System identified seven regions that failed to meet the required benchmarks in at least one macro-area – prevention, outpatient care, or hospital services – mostly in Southern Italy.[118] Meanwhile, some Northern regions score well, consistently meeting or surpassing national targets.

Although coverage is theoretically universal and automatic for legal residents, the private sector plays a sizable role. Specialist consultations, laboratory tests, and elective procedures often involve long waiting lists in public facilities, prompting many to pay out of pocket for private services. For higher-income or well-insured individuals, this dual-track system provides shorter wait times. Conversely, lower-income citizens face potential financial burdens, as Italy does not cap annual out-of-pocket spending. Italy ranks among the least financially protective healthcare systems in the EU, with 24% of individuals not at risk of poverty and 39% of those at risk reporting severe difficulties affording medical care, compared to the EU average of 12% and 19%.[119] In contrast, countries like France, Sweden, and the Netherlands report much lower financial hardship.

Personal expenditures are significant, with out-of-pocket payments at 22% of total health spending, a figure higher than the EU average of 19%.[8] Co-payments, over-the-counter medication costs, and privately financed specialist appointments account for the largest proportion. Dental and optical services are especially problematic, as coverage is minimal. The financial burden on households increased during the pandemic, which made equal access to basic care even more difficult.

Workforce in the health sector

Italy has 4.1 doctors per 1,000 residents, aligning with EU averages, but with a notable shortage of general practitioners.[120] Specialists outnumber general practitioners in many regions, reflecting a system historically geared toward hospital-based care. In addition, more

than half of Italian doctors are over 55, and retirement rates are outpacing incoming medical graduates. Since 2013, the bottleneck in postgraduate residency training slots has prevented many new doctors from specializing, exacerbating workforce gaps.[121] This mismatch triggers a cycle of delayed workforce entry, unfilled positions, and uneven coverage across specialties.

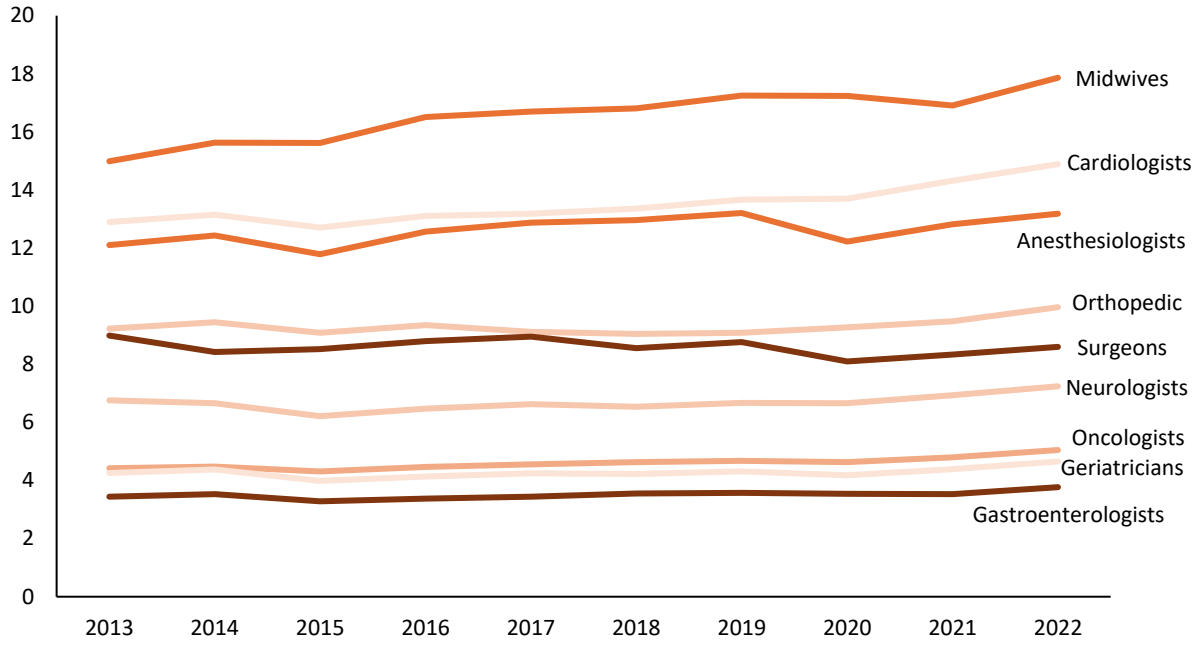


Figure 10: Personnel of health services in Italy in 1,000[122]

Additionally, public-sector compensation is relatively low, prompting doctors to seek employment abroad, such as in Switzerland or Northern Europe.[123] Compounding the problem, Italian public doctors generally earn less than their private-sector colleagues, leading to a public systems' brain drain, as newly trained professionals gravitate toward private practices. As a result, certain specialties – particularly emergency medicine and rural primary care – struggle to recruit new professionals. Nurses likewise remain underrepresented at around 6.2 per 1,000 people, lagging the EU benchmark of 8.5.[124]

To counter these shortages, expanding medical residency programs and increasing the number of funded training slots could help accelerate workforce entry and reduce specialization gaps. Additionally, financial incentives, such as loan forgiveness programs, housing support, or salary bonuses, could attract doctors and nurses to underserved areas, ensuring more equitable distribution of healthcare professionals across Italy.

Long-term care (LTC)

Italy's LTC sector is underfunded relative to other high-income countries. Family-based care is typical, especially for older relatives who wish to remain at home, yet it places considerable strain on caregivers, often female family members. Only a small fraction of health spending – under 10% – is devoted to LTC, far below many EU peers.[125] The informal care model has become unsustainable as families shrink, the population ages, and age-related conditions like Alzheimer's and other dementias increase.[126]

Compared to other EU nations, Italy lags in LTC service provision. Public LTC spending was 1.7% of GDP in 2019, only slightly above the EU average of 1.6%, but Italy remains far behind Continental and Northern European countries in both residential and home care services.[127] Gender disparities further exacerbate the problem, as nearly 90% of formal

caregivers are women, and women aged 65+ are more likely to require LTC than men (32% vs. 19%). To address these challenges, Italy's National Recovery and Resilience Plan (NRRP) and the 2022 "Turco Commission" Reform Proposal have set goals to strengthen home care services, introduce new assisted living solutions, and improve integration between social and healthcare services.[128] However, progress has been slow, and gaps in coverage remain significant.

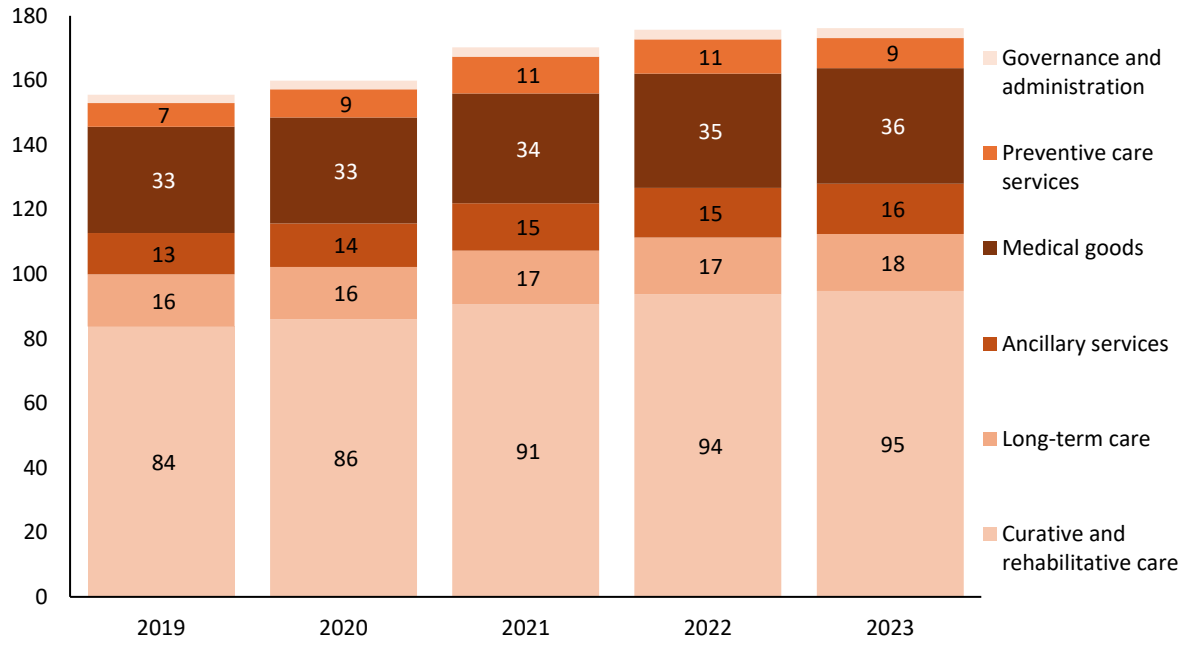


Figure 11: Health expenditure by healthcare function in billion Euro[129]

Hospital-based care

Italy's healthcare system remains tilted toward tertiary care, with extensive hospital networks but insufficient support for primary care, mental health services, and public health initiatives. Despite the proven cost-effectiveness of early interventions, limited funds are allocated to community prevention. Many chronic diseases, such as cardiovascular conditions and diabetes, could be significantly reduced through expanded screening programs, improved nutrition policies, and the promotion of active lifestyles.

This imbalance stems partly from historical public-sector expansions in hospital-based medicine, which continue to dictate budget priorities. The WHO has repeatedly emphasized the need for stronger community-oriented healthcare in Italy, yet funding still disproportionately favors large hospitals over local health initiatives.[130] Italy could look to successful community-based healthcare models from other countries to shift toward a more decentralized approach. For example, the U.S. has implemented the Steps to a HealthierUS program, which funds local initiatives aimed at reducing obesity, increasing physical activity, and improving dietary habits.[131] This program has demonstrated cost-effectiveness by reducing chronic disease burdens and saving healthcare costs. Similarly, REACH U.S., a CDC-funded initiative, has worked to eliminate racial and ethnic health disparities through targeted community interventions. Shifting the paradigm toward a prevention-focused model requires cultural, administrative, and financial adjustments.

Although Italy boasts one of the highest life expectancies in Europe (82 years), its approach to prevention remains inadequate.[132] Vaccine uptake – such as HPV immunization for cervical cancer – still falls short of WHO's 90% target, and participation in preventive screenings for

breast and colorectal cancer lags behind EU averages, worsened by pandemic-related disruptions.[133] Meanwhile, chronic disease rates are rising, particularly for hypertension, diabetes, and heart disease, further increasing healthcare costs.

Emerging community-based healthcare models, such as the 'House of Community' in Florence, demonstrate how primary care centers can serve as the backbone of a more integrated system.[134] Another example is the Case della Salute model in the Emilia-Romagna region, which has expanded rapidly since 2010.[135] These Community Health Centers integrate primary and specialist care, prevention services, health education, and social assistance, offering a more holistic approach to healthcare delivery. With 67 operational centers, covering an average of 66,524 residents per center, this model has improved coordination among healthcare professionals and enhanced service efficiency. By embedding multiprofessional teams within communities, these centers improve accessibility, continuity of care, and social integration, ensuring that prevention becomes a structural priority rather than an afterthought. Strengthening such initiatives would reduce the strain on hospitals, curb rising healthcare expenditures, and improve long-term health outcomes.

COVID-19 lessons

COVID-19 struck Italy early in 2020, exposing significant weaknesses in its healthcare system.[136] The initial wave overwhelmed hospitals in Lombardy and Veneto, as intensive care units quickly reached capacity. Procurement challenges further complicated the crisis, with Italy struggling to acquire ventilators and personal protective equipment due to fragmented supply chains. While the country's mixed public-private procurement system showed promise, inconsistencies between local and national decision-making created delays and inefficiencies. At the same time, routine healthcare services suffered severe disruptions, with immunizations and cancer screenings postponed, increasing the risk of late-stage diagnoses and long-term public health consequences.

Beyond these immediate hurdles, Italy's policy response revealed crucial lessons in pandemic management.[137] The government's early reliance on travel bans proved ineffective, as the virus spread primarily through local transmission chains that were not adequately contained in the early weeks. Mixed public messaging further delayed decisive action, creating confusion among citizens and healthcare providers. A poorly managed lockdown announcement on March 7, 2020, triggered mass migrations from Northern Italy to the South, inadvertently accelerating the virus's spread.

Despite these setbacks, the pandemic also spurred certain healthcare innovations. Telemedicine adoption increased significantly, particularly for follow-up visits and triage, providing an alternative to in-person care and alleviating pressure on hospitals.[138] However, its implementation varied by region, with some areas integrating digital health solutions more effectively than others.

Mental health

Although Italy was a pioneer in de-institutionalizing psychiatric care in the late 1970s, mental health remains a neglected segment. Community mental health services are unevenly distributed, with a shortage of outpatient clinics and psychiatric staff. Many Italians resort to private therapists or psychiatrists, compounding the financial burden for conditions such as depression or anxiety. Younger individuals face especially long wait times, as school-based counseling programs are scarce in many regions.

Although Italy was a pioneer in de-institutionalizing psychiatric care in the late 1970s with the Basaglia Law, which led to the closure of psychiatric hospitals and a shift toward community-based mental health services, the implementation of these services has been uneven.[139] While some regions, such as Trieste, have developed robust alternative care models emphasizing patient integration, others suffer from a lack of resources, resulting in limited access to care.

Italy's mental health system is structured around Dipartimenti di Salute Mentale, which oversee various services, including outpatient Centers for Mental Health, Day Centers, residential facilities, psychiatric hospital units, and day hospitals.[140] However, the distribution and availability of these services vary across regions, leading many Italians to seek private psychiatric or psychological care, which can be a significant financial burden, particularly for conditions such as depression and anxiety.

A major concern is the accessibility of mental health support for younger individuals.[141] School-based mental health programs are scarce, with national policies primarily focused on broader health promotion rather than systematic mental health support in schools. Some initiatives, such as emotional self-regulation programs to address problematic internet use among adolescents, have been introduced, but a comprehensive, nationwide school-based counseling system is lacking.

Additionally, funding remains a problem. Italy allocates only about 3.4% of its healthcare budget to mental health – far below the over 10% dedicated by other high-income countries.[142] Experts estimate that an additional 1.9 billion Euro is needed to enhance mental health services, along with a 47% increase in mental health personnel. Investments in digital health and telemedicine have been proposed as part of the solution, but these efforts must be complemented by increased staffing and improved service distribution to ensure equitable access to care.

Digital health infrastructure

Progress in digital health has lagged behind many other EU countries. Telemedicine options exist but lack uniform protocols or integrated reimbursement systems across regions. A national mapping study found discrepancies in the number and type of telemedicine services available, ranging from a single service in some regions to over 30 in others. Although national guidelines for telemedicine services were introduced in 2020, their implementation remains inconsistent due to decentralized governance.

The limited implementation of electronic health records hinders continuity of care, and data are fragmented among various local authorities and private providers.[143] The Fascicolo Sanitario Elettronico aims to centralize health data, ensuring continuity of care across regions.[144] It allows patients to access and control their medical records while enabling healthcare professionals to provide more efficient and informed treatment. Interoperability across regions enhances patient mobility and emergency care. Full implementation is expected to streamline healthcare, reduce redundant tests, and cut administrative costs, but awareness and usage remain low. While the COVID-19 pandemic accelerated digital health adoption, many Italians still prefer in-person visits, citing privacy concerns and accessibility issues. Strengthening national coordination and promoting EHR awareness are key to overcoming these challenges.

Climate change

Italy experiences increasing climate-related risks – heatwaves, floods, and intense storms. Heat-related mortality soared in the summer of 2022, particularly affecting older adults.[145]

Urban areas with poor ventilation faced spikes in respiratory distress and cardiovascular complications. Additionally, vector-borne diseases like dengue are spreading to previously unaffected areas. Infrastructure to manage climate-driven health crises remains uneven, especially in coastal or mountainous regions prone to extreme weather. Additionally, environmental pollution, especially air pollution from industrial and transport sources, continues to cause respiratory and heart problems, resulting in an estimated tens of thousands of premature deaths annually.[146] Without robust environmental policies and adaptation measures in healthcare facility design, these issues will intensify.

Treatment services

In Italy, addiction treatment services are provided by Ser.D. (Servizi pubblici per le Dipendenze), a network managed under the Department for Anti-Drug Policies.[147] These specialized services operate within local health authorities and are accessible to all residents, with over 550 Ser.D. centers spread across the country. Typically, one Ser.D. center is available for every health district, covering 100,000 inhabitants. These centers conduct thorough assessments of individuals' health and develop personalized therapeutic plans, which may be delivered either on-site or in collaboration with accredited therapeutic communities.

A comparison with other EU countries shows wide varieties in addiction treatment models. Switzerland and the Netherlands prioritize harm reduction with supervised consumption and heroin-assisted treatment, while Germany and the UK offer decentralized and mixed approaches, blending substitution therapy with rehabilitation.[148,149] In contrast, Portugal's decriminalization model and Nordic countries' cautious harm reduction adoption highlight diverse strategies that could inform improvements to Italy's Ser.D. system.

The entire range of these services is fully covered by national health insurance, ensuring that financial barriers do not hinder access to care.[150] However, disparities in the availability and quality of treatment persist across regions, particularly in Southern and rural areas. Additionally, rising costs have strained resources, prompting calls for increased funding to expand services and enhance equitable access to addiction care nationwide.[151]

Treatment programs for alcohol abuse are available through a combination of pharmacological and support-based interventions.[152] Medications such as disulfiram, acamprosate, naltrexone, nalmefene, and sodium oxybate are approved for use, targeting various aspects of alcohol use disorders, including cravings and relapse prevention. Despite the availability of these treatments, the actual treatment rate for AUDs remains low, with significant regional disparities in access and consumption of these medications. These variations are attributed to differences in healthcare organization, patient severity, and access to specialized services. Low treatment uptake for AUDs in Italy is due to stigma, regional disparities, financial barriers, limited provider awareness, and COVID-19 disruptions. Support programs such as counseling, group therapy, and harm-reduction strategies also play a role in addressing alcohol abuse, but their availability and consistency vary across regions.

A key aspect of addiction treatment in Italy is the emphasis on harm reduction, an approach that aims to minimize the negative consequences associated with substance use.[153] Interventions include needle exchange programs, supervised consumption facilities, and opioid substitution treatments. They have been shown to reduce the spread of infectious diseases such as HIV among people with substance use disorders. There is a need for innovative and evidence-based approaches to addiction treatment, involving policies that ensure equitable access to harm reduction services across all regions. However, despite the demonstrated benefits, challenges remain in achieving full implementation due to regional

disparities, funding limitations, and societal stigma surrounding substance use and harm reduction policies.

Treatment programs for obesity primarily focus on prevention, lifestyle modification, and, in severe cases, medical or surgical interventions.[154] Multidisciplinary care is recommended by independent guidelines but lacks comprehensive national coordination or strategy. While lifestyle interventions form the foundation of obesity management, anti-obesity medications are available but are not covered by the National Healthcare System. For those with severe obesity, bariatric surgery is an option when other weight-loss efforts have failed.

What kind of paradigm shift is needed?

Italy's healthcare system is struggling with inefficiencies, deep regional disparities, and an overburdened hospital network. Key systemic inefficiencies include delays in resource allocation, fragmented governance, and unequal healthcare access. Long waiting times for specialist care and diagnostics force many patients into private healthcare, increasing out-of-pocket expenses and worsening health inequities. Bureaucratic inefficiencies further slow healthcare funding and service delivery, as national policies must align with regional governance structures, often leading to delays in resource allocation.

Additionally, emergency departments are overwhelmed due to limited access to general practitioners and urgent care centers, causing unnecessary hospital visits and straining resources. Data from emergency facilities across Italy reveal significant disparities in emergency room congestion, with some municipalities managing over 100,000 patient visits annually and average stay times varying widely, from 3 to 15 hours.[155] High-acuity cases (red and yellow triage codes) account for a substantial portion of emergency visits, but a significant number of patients classified under lower-acuity green and white codes still contribute to ER overcrowding, suggesting an overreliance on emergency services for non-urgent care. The strain has escalated to the point where healthcare workers face increased violence from frustrated patients and their families, leading to calls for military protection in hospitals.[156] Addressing these systemic inefficiencies through targeted reforms in governance, resource allocation, and urgent care expansion could alleviate pressure on the healthcare system and improve overall service delivery.

At the same time, Italy faces significant demographic and external pressures. An aging population is increasing demand for long-term care, yet the country continues to rely heavily on informal caregiving rather than structured home-care models. Future pandemics and climate-related health risks add further urgency to addressing these systemic vulnerabilities. Technology adoption remains inconsistent, with limited implementation of telemedicine and electronic health records, exacerbating fragmentation and inefficiencies in patient care.

The Italian healthcare system requires a paradigm shift, moving towards greater equity, better integration between public and private healthcare, and increased investment in prevention to ensure long-term sustainability and improved health outcomes. The current healthcare model is reactive, hospital-centric, and focused on treatment rather than prevention. This approach is neither sustainable nor equitable. A shift toward a more proactive, prevention-based system is essential to improving healthcare outcomes, optimizing resource allocation, and ensuring long-term system resilience. Various initiatives – such as the New Guarantee System and partial digitalization of patient records – aim to reduce fragmentation, but without a comprehensive strategy, their impact will remain limited.

Prevention in healthcare involves strategic interventions at three distinct stages – primary, secondary, and tertiary. Each addresses a different point in the natural history of a disease or injury, and together they form the backbone of an effective public health strategy. Italy's approach to strengthening these layers is reflected in the country's evolving policies and programs. The National Prevention Plan 2020–2025 focuses on person-centeredness, trust, awareness, and responsible action, emphasizing coordinated strategies to promote health, prevent disease, and reduce regional disparities in healthcare access.[157]

Primary prevention seeks to avert the onset of disease by addressing risk factors at their source.[158] Measures include improving air quality, promoting healthy eating habits, and supporting legislation against hazardous products. Italy's current push for compulsory health education in schools exemplifies how such measures can equip younger generations with knowledge about nutrition, physical activity, and mental well-being.[159] Nutritional guidelines, anti-smoking laws, and community immunization further illustrate the ways that nationwide initiatives may help individuals avoid risk factors altogether. Local-level interventions add an important layer of accessibility, for example, placing health kiosks for older adults in community centers or pharmacies facilitates routine check-ups, dietary counseling, and digital literacy. Systematic disease prevention and health promotion are crucial steps for creating healthier communities.[160]

Secondary prevention targets early detection and prompt intervention in cases where diseases or injuries have just begun to develop.[161] This level relies on screenings, diagnostic check-ups, and evidence-based therapies that catch problems at more manageable stages. Mammograms, Pap smears, and colonoscopies, for instance, are instrumental in detecting cancer early, yielding better outcomes and lowering mortality rates. In workplaces, periodic check-ups and ergonomic evaluations can highlight issues such as repetitive strain injuries or elevated blood pressure, allowing for swift corrective measures that halt progression. Although secondary prevention still depends on specialized clinical services, when dispersed across local facilities – rather than concentrated in large hospitals – it shortens wait times and prevents unnecessary hospitalizations.

Tertiary prevention focuses on long-term disease management once a condition has fully developed.[162] Rehabilitation services for stroke or cardiac patients, support groups for chronic conditions like diabetes, and mental health programs for depression or anxiety all fall into this category. While such measures are vital for enhancing quality of life, they reflect a reactive approach and tend to be resource-intensive. Tertiary prevention primarily relies on medical treatment and pharmaceuticals, leading to escalating healthcare costs. Overreliance on tertiary care has historically strained Italian hospitals, redirecting funds that could have been better spent on the earlier layers of prevention.[163]

Several national initiatives in Italy demonstrate the country's effort to reorient its healthcare toward more proactive, early prevention strategies. The National Prevention Hub, funded by 24.5 million euros through the PNRR by 2026, should unify data-driven public health campaigns and work with schools, community centers, and private healthcare providers.[164] Electronic health records and AI-powered analytics may track immunization rates, screening participation, and disparities in preventive uptake – particularly relevant for closing the North-South divide in healthcare outcomes. Particularly Southern regions have historically lagged in screening participation, leading to later-stage diagnoses and higher long-term costs.[165] Barriers to fully implementing AI-driven healthcare analytics in Italy that include fragmented digital infrastructure, inconsistent data-sharing protocols, and regional disparities in technology adoption, should be teared down.

4. Economics of Public Health

Public health economics explores how resources can be allocated efficiently to maximize health outcomes while minimizing opportunity costs. For example, allocating funds to preventive measures, such as vaccination programs, may reduce long-term treatment costs associated with preventable diseases, highlighting a key opportunity cost in public health spending. Behavioral economics offers insights into how individuals make health-related decisions, using incentives, nudges, and strategic framing to encourage healthier choices. Unlike traditional economic models such as rational choice theory, which assumes individuals always act in their best economic interest, behavioral economics acknowledges cognitive biases and emotional influences that often lead to suboptimal health decisions, such as avoiding preventive care due to present bias.

Policymakers play a crucial role in shaping the healthcare landscape by designing regulations, subsidies, and taxation policies that promote accessibility and efficiency. Hard money, such as taxes, directly influences employer and consumer behavior – for instance, tax incentives can encourage workplace wellness programs, while levies on harmful products discourage unhealthy consumption. This not only applies to taxation but also to direct public health expenditures, such as government funding for smoking cessation programs or subsidies for healthier food options, which can shape long-term public health outcomes.

4.1 BEHAVIORAL ECONOMICS

Behavioral economic tools

Behavioral economics has evolved significantly over the past few decades, refining its strategies to better shape decision-making in health, finance, and public policy.[166] Initially dominated by nudges, interventions that subtly guide people toward beneficial behaviors without restricting freedom of choice, the field has expanded to include a wider range of tools such as boosts, shoves, and budges, each with varying levels of intervention and autonomy.

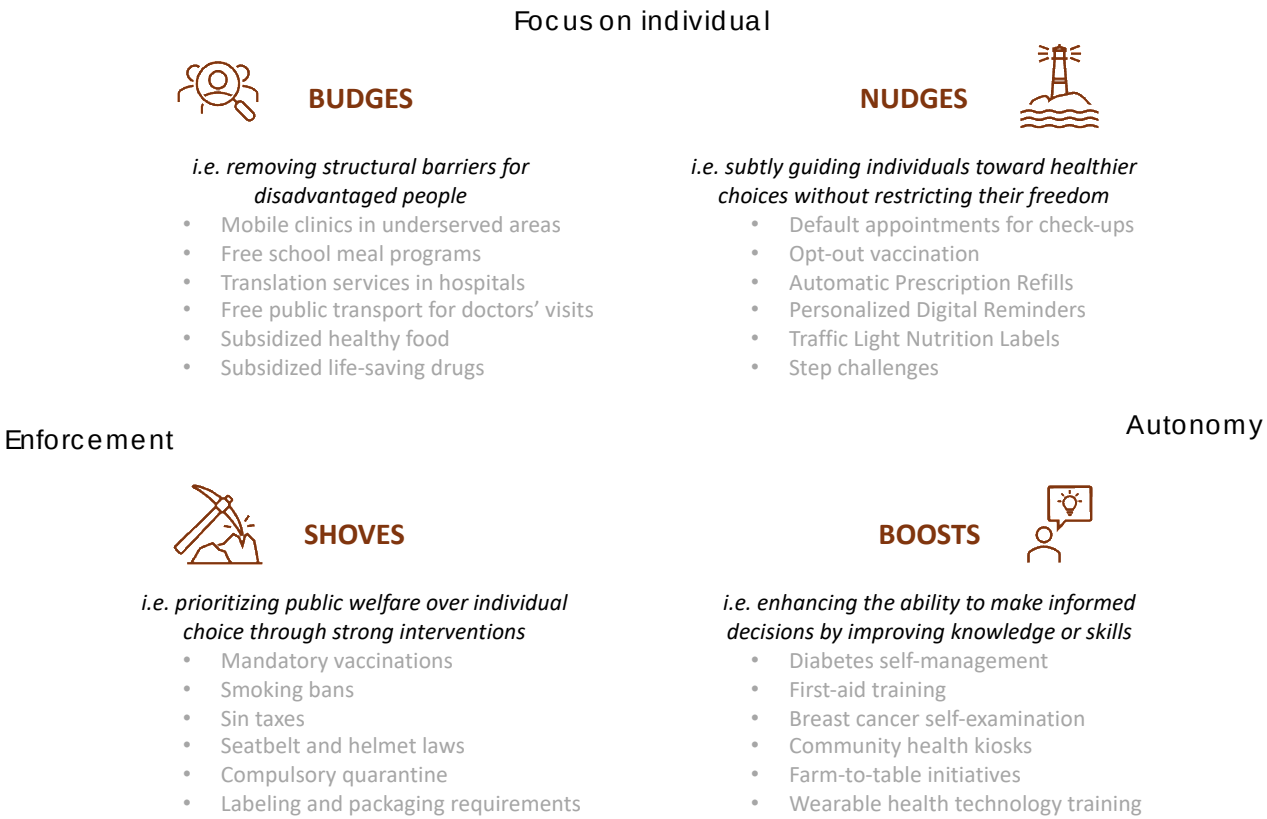
Nudges: Nudges, made famous by Richard Thaler and Cass Sunstein, leverage cognitive biases to help people make better decisions while preserving their freedom to choose.[167] A classic example is automatic enrollment in workplace retirement plans, which significantly increases participation without forcing individuals to save. Similarly, in public health, opt-out organ donation systems have led to higher donor rates compared to opt-in systems.[168] However, while nudges have proven effective in many contexts, they have limitations. Critics argue that nudging alone does not always lead to sustained behavior change, particularly in complex health or financial decisions where individuals need greater cognitive support. This has led to the development of boosts, which aim to improve individuals' decision-making competencies rather than subtly steering them toward predefined choices.

Boosts: Unlike nudges, which manipulate choices within a decision-making environment, boosts work by enhancing individuals' ability to process information, manage risks, and make informed choices independently.[169] Boosts, which focus on improving individuals' decision-making competencies, may lead to more sustained behavior change than nudges by equipping individuals with the skills and knowledge to make informed decisions independently. For instance, financial literacy programs teach individuals how to evaluate investment options rather than defaulting them into a savings plan. In healthcare, boosts include nutrition education programs that help individuals interpret food labels, enabling them to make healthier choices without requiring regulatory intervention. A real-world example of boosts in action is diabetes self-management education programs, which teach patients how to monitor

blood sugar levels, adjust their diets, and recognize early symptoms of complications. While nudges might remind individuals to take medication, boosts provide them with the knowledge to self-regulate their health choices over time.

Shoves: Shoves represent a more forceful intervention than nudges or boosts, often using regulatory measures, penalties, or mandatory participation to ensure compliance with health and safety policies.[170] Unlike nudges, which preserve autonomy, shoves leave little room for noncompliance. One example is mandatory vaccination policies in schools, where children must be vaccinated to attend. Another is tobacco taxation and smoking bans, which push smokers toward quitting by making cigarettes more expensive and restricting smoking in public spaces. The justification for shoves is that in certain cases, such as infectious disease prevention or workplace safety, public welfare takes precedence over individual choice.

Budge: A lesser-known but increasingly relevant concept is the budge, which aims to eliminate structural and systemic barriers that prevent individuals from making optimal decisions. Unlike nudges, which assume that individuals have the agency to act but need guidance, budges recognize that some populations lack access, resources, or the capability to act on their own. For example, providing free and accessible childcare for working mothers can improve women's participation in the labor force and increase economic stability. In healthcare, mobile clinics that bring preventive screenings to underserved rural areas act as budges by eliminating logistical barriers to healthcare access.



By integrating nudges, boosts, shoves, and budges, behavioral economics now provides a more comprehensive toolkit for influencing behavior. Each approach has strengths and weaknesses, and their effectiveness depends on the context in which they are applied. The future of behavioral interventions will likely involve combining these tools to achieve more sustainable and equitable health and economic outcomes.

Fiscal measures

Excise taxes function as an important behavioral lever by influencing the cost-benefit calculations individuals make when making consumption choices.[171] By raising the price of goods that pose public health risks, these taxes shift purchasing behavior and encourage alternatives that align with long-term health benefits. For example, taxes on sugary drinks have successfully reduced consumption in countries like Mexico and the UK, where soda purchases dropped significantly following price increases. Similarly, higher alcohol taxes in Nordic countries have been linked to lower alcohol-related harm. However, their effectiveness depends on factors such as how consumers perceive the tax, the availability of substitutes, and how taxation interacts with social norms and habits. Unlike direct regulations, excise taxes offer individuals freedom of choice while nudging them toward healthier decisions.

From a behavioral economics perspective, excise taxes operate through loss aversion, a key concept from Kahneman & Tversky's prospect theory, which suggests that people are more sensitive to losing money than to gaining equivalent benefits.[172,173] By making unhealthy choices more expensive, governments leverage this psychological bias to discourage negative health behaviors without outright bans. The impact of these taxes is further shaped by price elasticity of demand, meaning that some consumers are more responsive to price increases than others. For instance, sugary beverages tend to have high elasticity because consumers can easily switch to water or diet options, while alcohol and tobacco exhibit lower elasticity due to their addictive properties, making demand less responsive to price hikes. In contrast, essential medications often have very low elasticity, as consumers prioritize them regardless of cost.[174] Despite their success in some areas, excise taxes do not always lead to desired outcomes. In cases where demand is inelastic, such as for tobacco or alcohol in some populations, heavy taxation may not significantly reduce consumption but instead encourage black market sales or smuggling, as seen in certain Eastern European countries. When alternatives are less accessible or available, taxation alone may not be sufficient to drive behavior change.

Excise taxes

One of the key insights from behavioral science is that people tend to follow established habits, even when faced with rational arguments to change. Excise taxes work by creating a financial disruption in habitual consumption patterns, forcing individuals to reconsider choices that were previously automatic. When a product suddenly becomes more expensive, the additional cost triggers momentary reflection, increasing the likelihood of behavioral shifts.[175]

However, price alone does not always change behavior. A consumer faced with higher prices may seek workarounds, for instance, switching to untaxed or cheaper versions of the same product rather than reducing consumption altogether. To maximize the impact of excise taxes, tax differentiation, where products are taxed at different rates based on their health impact, can steer people toward better choices.[176] For example, tiered taxation on processed foods based on sugar or fat content nudges consumers toward healthier options without limiting availability.

Governments can reinforce the effectiveness of excise taxes by pairing them with complementary behavioral interventions. These include:

- **Salient price signals:** Clearly displaying price increases in ways that emphasize the tax's purpose (e.g., "This product includes a public health tax").[177]

- **Default settings:** Making healthier options more accessible and cost-competitive by reducing taxes on nutritious alternatives.
- **Commitment devices:** Encouraging individuals to set personal health goals tied to tax-affected products, such as reducing sugary drink consumption.

Social proof also plays a key role, when people believe that most of their peers are adapting to healthier choices, they are more likely to follow suit. Excise tax policies should therefore be accompanied by strategic messaging that emphasizes changing social norms, such as "Most families are now choosing lower-sugar drinks" or "80% of people in your community support healthier food policies."[178]

Tax calendarization

The major challenge of excise taxes is that abrupt price hikes can generate resistance or negative emotional responses, particularly if consumers perceive them as punitive rather than health-oriented.[179] Research suggests that gradual tax increases are more effective at reducing backlash than sudden hikes, as they allow consumers to adjust their behavior over time rather than reacting negatively to a large, immediate price jump.[180] Tax calendarization as the gradual implementation of tax increases over time helps mitigate these effects by allowing for predictable adaptation.

From a behavioral standpoint, tax calendarization aligns with status quo bias, the tendency to resist sudden changes. If individuals know that a product's price will increase incrementally over several years, they are more likely to adjust gradually rather than react negatively to a single large price hike.[181] This anticipatory effect allows both consumers and producers to modify their behaviors in a way that feels less forced. A notable example of this effect is seen in the taxation of sugary drinks, where gradual tax increases in countries like the UK and Mexico have been linked to a reduction in consumption, as well as product reformulation by beverage companies to maintain competitiveness.[182]

For businesses, a predictable tax schedule encourages innovation, as companies have time to develop and market healthier alternatives. This dynamic has been observed in industries affected by excise taxation, where gradual tax increases led to product reformulation to maintain market competitiveness.

The application of real-time behavioral data analytics further enhances tax efficiency. By monitoring how different demographics respond to price changes, governments can adjust tax policies dynamically, ensuring that interventions remain effective without disproportionately burdening lower-income groups.

4.2 COLLABORATION

For interventions to be effective on a large scale, they must be embedded within broader systems across policy levels, sector and between public and private sectors rather than functioning as isolated initiatives.[183] One of the major challenges in Italy's healthcare system is the fragmentation of medical services across different regions and sectors. Access to public healthcare varies significantly based on income, geographical location, and professional availability. Long waiting times for specialist visits, an aging population of general practitioners, and a shortage of healthcare professionals further exacerbate the problem. A key contributor to this fragmentation is the growing scarcity of general practitioners, as an aging workforce and insufficient recruitment have led to fewer available doctors, longer waiting times, and an increased burden on emergency departments. This shortage limits access to primary care, pushing more patients toward hospital services and further straining the system.

To overcome these barriers, stronger collaboration between healthcare providers, local governments, and different sectors is required.[184] The lessons from the COVID-19 pandemic have highlighted the need for better coordination between primary care physicians, hospitals, and public health authorities. One hospital in a region must work seamlessly with primary care providers in another, even across regional borders. However, efforts to integrate electronic health records (EHRs) face challenges related to privacy regulations, data standardization, and interoperability between regional healthcare systems. Differences in how patient data is stored, accessed, and shared create inefficiencies, as doctors in different regions may lack access to comprehensive patient histories, leading to redundant diagnostics and delays in treatment. Addressing these issues through nationally standardized EHR systems with clear data protection protocols could significantly improve care coordination while safeguarding patient privacy.

Moreover, healthcare services should not be siloed but should work in tandem with the education, urban planning, and employment sectors. For example, preventive healthcare initiatives should be linked to schools and workplaces to promote long-term behavior change.[185] Schools should implement compulsory health education to instill lifelong knowledge about nutrition, mental well-being, and exercise. Workplaces should incorporate regular screenings, ergonomic assessments, and mental health support, ensuring that employees remain productive and healthy.

At the policy level, regional and national collaboration must be reinforced. Policymakers should standardize preventive care measures across all regions, ensuring that Southern Italy does not lag behind the North in access to screenings, vaccinations, and preventive treatments. This requires centralized governance mechanisms such as the National Prevention Hub, which will coordinate prevention strategies across regions, track immunization rates, and reduce disparities in healthcare access.[186] To strengthen collaboration, regulatory measures such as mandatory regional health reporting, unified electronic health record standards, and performance-based funding allocations could be implemented. Additionally, a national framework for preventive care, supported by legally binding agreements between regions, could ensure consistency in service delivery and accountability for meeting health equity goals.

4.3 SYSTEMIC LAYERS

A systemic – or network – approach is considering that individual behavior is not isolated but embedded in cultural and community factors and at the same time influenced by governmental and institutional decisions.[187] This requires a shift from focusing on individual behavior modification toward designing structural and systemic interventions that leverage behavioral science to improve outcomes.[188] One of the most promising systemic applications of behavioral economics is the shift toward value-based healthcare models. Instead of compensating hospitals based on the number of procedures performed, these models reward healthcare providers for preventing illnesses and improving patient outcomes. This restructuring aligns financial incentives with long-term health promotion rather than short-term disease treatment, pushing healthcare systems toward a more preventive rather than reactive approach. Italy, with its decentralized healthcare system, could benefit from incorporating such models more effectively, ensuring that regional disparities in health services are reduced and that the system rewards interventions that lead to better long-term health outcomes.

In addition, interventions must be embedded into broader public health infrastructures that integrate real-time behavioral data. In the digital age, big data and behavioral science are

converging, allowing policymakers to make real-time policy adjustments based on population behavior. Instead of relying on periodic surveys, governments can now analyze public transportation usage, food purchasing habits, and health-related searches to design interventions that align with real-world trends.[189] In Italy, this could mean tailoring regional health strategies by analyzing how different demographic groups respond to preventive care measures or adjusting outreach campaigns based on social media engagement. Furthermore, real-time mobility data could be used to track and manage interregional healthcare mobility, identifying patterns in patient movement between regions. This information could help policymakers develop targeted interventions to reduce unnecessary travel for medical services, such as strengthening local healthcare infrastructure in high-outflow regions or reallocating resources based on patient demand.

Behavioral insights can be incorporated into public health campaigns that use social influence and peer networks to encourage behavior change. Research shows that behaviors spread through peer influence, meaning that messaging emphasizing community norms such as “9 out of 10 people in your region participate in cancer screenings” is more effective than risk-based communication alone.[190] Such approaches have been successfully implemented in vaccination campaigns, smoking cessation efforts, and preventive health initiatives worldwide.[191]

Additionally, commitment devices, where individuals make public pledges to adopt healthier behaviors, are effective in increasing smoking cessation rates, gym attendance, and adherence to medication.[192,193] Italy could integrate these tools into digital health platforms, leveraging behavioral commitments to enhance preventive healthcare engagement.

While traditional interventions focus on individual dietary habits, behavioral scientists now recognize that obesity results from a web of interconnected factors, including food supply chains, urban infrastructure, cultural eating habits, and marketing strategies. Tackling obesity at the system level means regulating food advertising, designing cities for walkability, and ensuring affordable access to nutritious food and not just telling individuals to eat healthier.

Cultural factors play a crucial role in shaping how behavioral interventions are designed and received. Italy’s Mediterranean diet, recognized by UNESCO as part of its Intangible Cultural Heritage, contributes significantly to the country’s high life expectancy and lower rates of cardiovascular disease compared to other nations.[194] Unlike generic dietary guidelines, interventions in Italy must leverage this cultural foundation rather than imposing external models of nutrition. Public health campaigns promoting traditional Mediterranean food choices, such as fresh vegetables, olive oil, and fish, could have a stronger impact than generic messages about reducing processed food intake.

Similarly, leveraging Italy’s communal dining culture, where meals are often social occasions, could provide opportunities for public health messaging that resonates with local traditions rather than contradicting them.[195,196] Behavioral science research suggests that interventions aligned with existing cultural norms are more likely to be effective than those requiring individuals to adopt unfamiliar habits. For example, rather than telling Italians to eat "healthier" in broad terms, campaigns could emphasize the benefits of reviving traditional recipes that naturally align with good nutrition.

4.4 SMART PREVENTION

Italy's transition from a reactive, treatment-based healthcare model to a systemic, proactive approach requires prioritizing early intervention, behavioral health strategies, and equitable

access to care. This shift is essential not only for improving public health outcomes but also for strengthening economic resilience by reducing long-term healthcare costs and minimizing productivity losses due to preventable diseases.

A smart prevention approach must focus on three key areas: strengthening intersectoral collaboration, addressing health inequities, and improving health literacy. Collaboration will integrate healthcare providers and policymakers for a more efficient system. Equity will be addressed through standardized preventive care across regions, while literacy efforts will empower individuals with education and digital tools. These strategies, explored in the following sections, aim to enhance healthcare efficiency, reduce hospital burdens, and improve well-being.

Health inequity

Italy's universal healthcare system aims to provide equal access to medical services, but in reality, deep inequalities persist. Certain socioeconomic groups, migrants, and rural populations face significant barriers to receiving essential preventive care.[197] This includes limited access to screening programs, chronic disease medications, and lifestyle counseling.

One of the most overlooked aspects of health inequity is the unequal availability of resources at the primary prevention level. Low-income individuals are less likely to afford fresh, nutritious food, electric vehicles, or gym memberships, factors that contribute to better health outcomes. They are also more likely to live in polluted urban areas and have limited access to green spaces for exercise.[198] If health prevention strategies are to be truly effective, access to healthy lifestyle choices must be democratized. For example, France's "Territoires Santé" initiative has attempted to address such disparities by increasing healthcare access in underserved regions through financial incentives for doctors and expanded community health centers.[199]

To tackle this, financial and regulatory incentives should be used to make healthier options accessible for all. Tax breaks or subsidies could encourage supermarkets to prioritize fresh food over ultra-processed alternatives, and government grants could support fitness programs in low-income communities. Schools in disadvantaged areas should be required to offer free, balanced meals, a policy successfully implemented in Sweden, where universal school meal programs have improved childhood nutrition and health outcomes. [200] Supermarkets should prioritize fresh food over ultra-processed alternatives, while employers should offer free or subsidized fitness programs as part of occupational health policies.

Another critical issue is the digital divide. Many elderly and low-income individuals do not have easy access to online health resources, telemedicine consultations, or electronic prescriptions.[201] Government-backed telemedicine initiatives, such as Spain's "Salud Andalucía" digital health application, have successfully expanded remote healthcare services, improving access for rural populations. Italy could adopt a similar approach by installing AI-powered health kiosks in underserved areas, allowing individuals to receive check-ups, access health information, and manage chronic conditions without overburdening hospitals.

Streamlining electronic prescriptions would further improve medication access, ensuring that patients in remote areas do not need to travel long distances for refills. The UK's Electronic Prescription Service demonstrates how digitalizing prescriptions can reduce administrative barriers and improve adherence to treatment, particularly for chronic disease patients requiring medications like insulin or cardiovascular drugs.[202]

Ensuring fair and equitable access to healthcare resources must be a national priority. Policymakers should strengthen existing health equity programs and implement targeted financial incentives, digital health expansions, and community-based interventions to close the healthcare gap. To make these changes a reality, national funding frameworks must align with regional health policies, ensuring consistent implementation across all areas, particularly in underserved regions.

Health literacy

A lack of health literacy is one of the biggest obstacles to effective prevention. Many people remain uninformed about how to recognize early disease symptoms, manage chronic conditions, or make lifestyle changes that improve health outcomes. The COVID-19 pandemic revealed widespread confusion regarding the difference between viruses and bacteria, the role of vaccines, and the logic behind lockdown measures, highlighting the need for better public education on health issues.[203,204]

Health literacy must start from early education. Schools should incorporate comprehensive health education programs that teach children not only about nutrition and exercise but also about mental well-being, hygiene, and infectious disease control. However, health literacy should not be confined to schools. Community-level communication strategies should be implemented to reach adults and the elderly, who are often the most vulnerable to health misinformation. This could involve public health campaigns through TV, radio, and digital platforms, explaining key health concepts in clear, simple language.

4.5 INNOVATION

Many elderly citizens are unfamiliar with online health platforms, telemedicine, or wearable health tracking devices. In Italy, digital illiteracy among older adults remains a high barrier, with nearly 60% of individuals over 65 never having used the internet, leaving them excluded from digital healthcare advancements.[205] Providing training sessions in community centers and pharmacies on how to use these tools would empower individuals to monitor their health, access telehealth services, and engage with preventive healthcare measures.

Health professionals, too, must keep pace with digital advancements. The integration of AI-driven decision-support tools into healthcare workflows ensures that doctors and nurses can offer standardized, evidence-based preventive care. However, barriers to adoption in Italy include concerns about data privacy, resistance from medical professionals, and a fragmented digital infrastructure that varies across regions. A lack of standardized interoperability between hospital IT systems further complicates implementation, making a national framework for digital health integration essential. Training programs should be implemented to ensure that both young medical professionals and experienced practitioners understand how to utilize these technologies effectively.

The field of behavioral economics is rapidly evolving, driven by technological advancements, real-time data collection, and the increasing interconnection between psychology, artificial intelligence, and policy design. The coming years will see an expansion of hyper-personalized behavioral interventions, stronger integration into digital ecosystems, and a shift toward system-level incentives that encourage healthier lifestyles.[206,207]

Machine learning and AI are revolutionizing behavioral interventions by customizing nudges and boosts based on real-time data. AI-driven health apps already track exercise, diet, and sleep patterns, offering personalized recommendations and reminders to encourage better health habits. Future developments will see AI-powered "adaptive nudging", where behavioral

interventions adjust dynamically to individuals' changing habits and environments. For example, AI-based chatbots for mental health support, such as Woebot or Wysa, already use natural language processing to detect emotional distress and offer real-time cognitive behavioral therapy exercises.[208] These interventions prevent mental health crises before they escalate, reducing the burden on traditional therapy services. However, these innovations also raise ethical concerns, particularly regarding data privacy, algorithmic bias, and the potential for manipulation. If AI-based nudging becomes too intrusive or coercive, it may undermine personal autonomy rather than support informed decision-making.

Beyond healthcare and finance, behavioral economics is now being integrated into climate policy and sustainability efforts. While not directly linked to personal healthcare, climate initiatives such as improved urban air quality and access to green spaces contribute to long-term public health by reducing respiratory diseases and promoting physical activity. Research shows that carbon footprint labeling on consumer goods influences purchasing decisions, nudging consumers toward environmentally friendly choices.[209] Similarly, dynamic pricing for energy consumption, where consumers are charged higher rates for using electricity during peak hours, encourages more efficient energy use.[210] Governments are also using green financial incentives, such as subsidies for electric vehicles and renewable energy adoption, using behavioral insights to accelerate the transition to a low-carbon economy.[211]

Employers are increasingly leveraging behavioral economics to improve workplace productivity, mental health, and financial well-being. The gig economy and remote work have introduced new challenges, such as burnout and financial instability, leading companies to develop behaviorally informed incentive structures. One example is automatic payroll deductions for retirement savings, which ensure employees consistently save without needing to make an active choice.[212] Another is structured work-break reminders that encourage employees to step away from screens, reducing stress and increasing productivity.[213] In Italy, companies like UniCredit have introduced wellness programs that integrate behavioral economic principles, offering incentives for physical activity and mental health support.

5. Conclusion

The Observatory of the Economics of Public Health at ALTEMS envisions a healthcare model that moves Italy away from reactive, treatment-based care and toward a systemic, prevention-oriented approach. This transformation requires targeted policy reforms, intersectoral collaboration, and a data-driven approach to ensure that preventive healthcare is not just an ideal but a fundamental component of Italy's healthcare system.

Currently, Italy's healthcare system is struggling with inefficiencies, regional inequalities, workforce shortages, and an overreliance on hospital-based care. While life expectancy remains among the highest in Europe, preventable diseases like cardiovascular conditions, obesity, and diabetes continue to rise, driving up long-term healthcare costs. A Smart Prevention Approach could reverse this trend by emphasizing early intervention, behavioral health strategies, equitable access to healthcare services and the implementation of innovative strategies.

The Observatory at ALTEMS is positioned as a research-driven policy hub, providing evidence-based recommendations to national and regional governments. However, it does not have direct legislative power. Instead, it can drive change by influencing decision-makers through rigorous data analysis, policy briefs, and collaboration with public health authorities.

The Observatory's key contributions will include:

- Monitoring and evaluating prevention programs to identify which interventions yield the highest returns on health and economic outcomes.
- Providing real-time data and predictive modeling to help policymakers allocate resources effectively.
- Bridging the gap between research and policy implementation, ensuring that successful prevention strategies are scaled nationally.
- Fostering interregional collaboration, working with regional health authorities to standardize preventive healthcare initiatives across Italy.
- Promoting public engagement and health literacy, using behavioral science to improve communication strategies and increase participation in prevention programs.

The Observatory will focus on achievable, evidence-based reforms rather than advocating for unrealistic structural overhauls. By leveraging Italy's existing healthcare infrastructure, the Observatory will work to make preventive healthcare more efficient, data-driven, and widely accessible.

Key areas where the Observatory can make a concrete impact include:

- Supporting the development of the next National Prevention Plan by collaborating with regional health authorities to implement data-driven strategies that strengthen early detection, integrate preventive services, and drive measurable health improvements.
- Enhancing data collection and health monitoring systems, ensuring that regional disparities in preventive healthcare are continuously assessed and addressed.
- Supporting policymakers to learn from best-practice examples in other EU countries regarding healthcare systems and policy and innovative strategies that can be adopted.
- Partnering with policymakers to expand workplace prevention programs, reinforcing the role of employers in promoting employee health and reducing long-term healthcare burdens.
- Encouraging the integration of digital health solutions, such as AI-driven risk assessments and personalized health tracking, into routine healthcare services.
- Collaborating with medical professionals to incentivize early interventions, ensuring that general practitioners and pharmacies play a larger role in prevention and chronic disease management.

While the Observatory cannot directly implement reforms, it can shape the direction of healthcare policies by producing credible research, fostering dialogue among key stakeholders, and ensuring that prevention remains central to Italy's long-term health strategy.

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