The Global Social and Economic Impact of Self-Care (EcoSoc) – 2.0

Expanding the Analytical Framework on Access, Quality of Life and Prevention

An Addendum to the 2021 Global Study (EcoSoc 1.0)

Prepared for
Global Self-Care Federation (GSCF)

Cosima Bauer M.A.
Prof. Dr. Uwe May

Bad Honnef, July 2026

May und Bauer – Konzepte im Gesundheitsmarkt GmbH & Co. KG
info@may-bauer.de

Table of Contents

1. Update of the Global Model and Key Results (2026) 12
1.1. Global Health Sector Under Strain – and the Role of Self-Care 12
1.2. Why Self-Care Is a Strategic Lever for Health Systems Worldwide 13
1.3. Different Realities: The Role of Self-Care in the Global Context 13
1.4. The Global value of Self-care today 15
1.5. The Future: Substantial Untapped Potential 17
1.6. Why Political Action Is Needed Now — and Why This Matters for Policymakers? 19
2. Access to Self-Care 23
2.1. The Fundamental Role of Access to Non-Prescription Medicines 23
2.2. Barriers to Access and global Disparities 24
2.3. Access to Self-Care and Quality of Life: A Micro-Level Perspective 30
3. Self-Care and Quality of Life 32
3.1. The Relevance of Quality of Life and QALYs for Self-Care Assessment 33
3.1.1. Conceptual Foundations of Health-Related Quality of Life 33
3.1.2. Common Instruments for Measuring Health-Related Quality of Life 35
3.1.3. Relation to Health Economic Concepts: QALYs and the Role of Non-Prescription Medication 37
3.1.4. Overview of Studies Examining Common Ailments and HRQoL 39
3.1.5. Framework for the economic valuation of QALYs 40
3.2. Monetary Valuation of QALYs Generated Through Self-Care 42
3.2.1. Framework and Calculation of QALY in EcoSoc 1.0 42
3.2.2. Calculating the monetary value of self-care-generated QALYs 43
3.3. Cost-Effectiveness Analysis of Self-Care 46
3.3.1. Methodological framework and evaluation of cost-effectiveness of Self-Care with non-prescription medicines 46
3.3.2. Challenges and limitations of cost-effectiveness analyses in self-care 50
3.4. Interpretation and Conclusions: Self-Care and Quality of Life 50
4. The Role of Self-Care and Over-the-Counter Medicines in Prevention 52
4.1. Prevention in Public Health and the Role of Self-Care Interventions 53
4.1.1. Conceptual Foundations of Prevention in Public Health 53
4.1.2. Distinction from Related Concepts 54
4.1.3. Levels of Prevention 54
4.1.4. Relevance in Research, Practice, and Policy 57
4.1.5. Integration of Self-Care in Prevention and Its Public Health and Economic Relevance 58
4.2. Preventive effects in selected self-care conditions – Illustrative Examples 59

4.2.1. Illustrative Example I: Smoking Cessation with Nicotine Replacement Therapy 59

4.2.2. Illustrative Example II: Oral Health and the Prevention of Dental Caries.....66

4.2.3. Illustrative Example III: Erectile Dysfunction, Access to PDE5 Inhibitors, and Implications for Prevention of NCDs.....71

4.2.4. Illustrative Example IV: Antifungal Self-Care and Early Intervention in Infectious Disease Control.....74

4.2.5. Illustrative Example V: Oral Rehydration Solutions (ORS) in the Prevention of Diarrhea-Related Complications.....78

4.2.6. Illustrative Example VI: Sunscreen and the Prevention of Skin Cancer 82

4.2.7. Illustrative Example VII: Responsible self-care instead of overtreatment, reducing unnecessary interventions such as antibiotic overuse.....87

4.3. Results and Conclusions on the role of Self Care in Prevention.....92

5. Overall Conclusions and Outlook 96

6. List of References 97

List of Figures

Figure 1: Responsible Self-Care and Key Global Health System Challenges 13
Figure 2: Conceptual Framework of Global Self-Care Models and Benefit Dimensions 15
Figure 3: Global Physician Capacity Savings Through Self-Care 16
Figure 4: Future Potential driven by Economic Development, Demography & Self-Care Policy 18
Figure 5: Country Grouping based on GDP per Capita, Healthcare Expenditure per Capita and Income 26
Figure 6: Different Weighting of Enablers according to Country Groups 27
Figure 7: Correlation between indices Socioeconomic Score (SES) and Self-Care Readiness Index (SCRI) 29
Figure 8: Effects of Access to Self-Care on Health-related Quality of Life.....30
Figure 9: Calculation of QALY gained by Self-care in cases of MA in EcoSoc. 1.0 42
Figure 10: Methodological approach to the monetary valuation of QALYs in the context of self-care and the assessment of cost-effectiveness 46
Figure 11: Global cost-effectiveness classification of self-care interventions based on ICER-to-threshold ratios.....48
Figure 12: Priorisation and cost-effectiveness of self-care in very low-income settings.....49
Figure 13 illustrates the five levels of modern prevention across the health–disease continuum: primordial, primary, secondary, tertiary, and quaternary prevention. It demonstrates how targeted interventions at different stages contribute to improved public health outcomes, ranging from the prevention of risk factors to early detection, rehabilitation, and the avoidance of overmedicalization.....57
Figure 13: Multilevel Prevention and Its Impact on Public Health.....57
Figure 14: Long-term health and economic effects of smoking cessation 62
Figure 15: Model structure for estimating incremental health outcomes and cost effects associated with NRT 63
Figure 16: Smoking Cessation - Saving Millions of Life Years by preventive Self-Care 66
Figure 17: Indirect preventive effects of fluoride toothpaste on broader health outcomes 71
Figure 18: Study design.....72
Figure 19: Proportion of pharmacy consultations and physician referrals in Germany, Norway, Poland, and Switzerland.....73
Figure 20: Treatment Pathway of PDE5i Users Among New Pharmacy Customers 74
Figure 21: Preventive effects of sunscreen on broader health outcomes.....87
Figure 21: Current annual savings through self-care 89
Figure 22: Example Quaternary Prevention: Reducing Unnecessary Antibiotic Overuse.....91
Figure 23: Self-care: Effects of Low-Threshold Access to Prevention.....93
Figure 24: Contribution of preventive self-care to Universal Health Coverage 94
Figure 25: What is the specific value of self-care in prevention?.....94

List of Tables

Table 1: Regional Distribution of Self-Care Benefits and Value Dimensions 17
Table 2: Relationship and Core Dimensions of HRQoL, QoL and Well-being 34
Table 3: Comparison of the main methodological Characteristics between QALYs and DALYs 38
Table 4: GDP-based threshold scenarios used for monetary valuation of QALYs 44
Table 5: Monetary valuation of QALYa generated through self-care by global region 45
Table 6: Monetary valuation of QALYs generated through self-care by country income group 45
Table 7: Country Classification based on ICER relative to cost-effectiveness threshold 47
Table 8: Global Cost-Effectiveness Classification of Self-Care Interventions 47
Table 9: Illustrative cost-effectiveness of selected public health interventions 49
Table 10: Types of Prevention & OTC Self-Care Examples 59
Table 11: Calculation of incremental health outcomes and cost effects associated with NRT 65
Table 12: Overview of health economic evidence on fluoride toothpaste – key findings and sources 69
Table 13: Burden of fungal skin diseases 77
Table 14 Overview of scientific and health economic evidence on ORS 81
Table 15: Key health economic evidence on sunscreen 86

List of Abbreviations

AESGP	Association of European Self-Care Industry
AFAMELA	Asociación de Fabricantes de Medicamentos de Libre Acceso
AIHW	Australian Institute of Health and Welfare
BOFA	Bank of America
CADTH	Canadian Agency for Drugs and Technologies in Health
CAM	Complementary and Alternative Medicine
CHPA	Consumer Healthcare Products Association
CiNii	Scholarly and Academic Information Navigator
CNKI	China National Knowledge Infrastructure
DALY	Disability-Adjusted Life Year
DMPA-SC	Depot-medroxyprogesterone acetate Subcutaneous
ED	Emergency Department
EQ-5D	EuroQol 5-Dimension questionnaire
FDA	Food and Drug Administration
FHCP	Food Health & Consumer Products of Canada
GDP	Gross Domestic Product
GKV	Gesetzliche Krankenversicherung (Statutory Health Insurance)
GP	General Practitioner
GSCF	Global Self-Care Federation
HAS	Haute Autorité de Santé
HIV	Human Immunodeficiency Virus
HIVST	HIV self-testing
HPV	Human Papilloma Virus
HRQoL	Health-Related Quality of Life
ILAR	Asociación Latinoamericana de Autocuidado Responsable (Latin American Association for Responsible Self-Care)
IMF	International Monetary Fund
JBI	Joanna Briggs Institute
MAS	Minor Ailment Scheme

MENA	Middle East and North Africa
MICE	Multivariate Imputation by Chained Equations
NCD	Non-Communicable Disease
NHI	National Health Insurance
NHS	National Health Service
NHSC	National Healthcare System Coverage
NICE	National Institute for Health and Care Excellence
OCP	Oral Contraceptive Pill
OECD	Organisation for Economic Co-operation and Development
OOP	Out-of-pocket
ORS	Oral Rehydration Solution
OTC	Over-the-Counter
PAGB	Proprietary Association of Great Britain
PBAC	Pharmaceutical Benefits Advisory Committee
PDE5i	Phosphodiesterase type 5 inhibitors
PICOS	Population, Intervention, Comparison, Outcomes and Study Design
PMDA	Pharmaceutical and Medical Devices Agency
PMM	Predictive mean matching
PPI	Proton Pump Inhibitors
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRO	Patient-Reported Outcome
PROMs	Patient-Reported Outcome Measures
QALY	Quality-Adjusted Life Year
QoL	Quality of Life
RISS	Research Information Sharing Service
Rx	Prescription-only medicine
Rx-to-OTC	Prescription-only to Over-the-Counter
SHI	Statutory Health Insurance
SHIS	Statutory Health Insurance System
SSA	Sub-Saharan African
STC	Self-Treatable Health Conditions and Minor Ailments
SUS	Sistema Único de Saúde
UAE	United Arab Emirates

UHC	Universal Health Coverage
UK	United Kingdom
UNDP	United Nations Development Programme
USA	United States of America
USD	United States Dollar
UTC	Under the counter
WHO	World Health Organization

Definitions

Country Group: Consists of several countries across different regions of the world that have been grouped together based on similarities in levels of healthcare accessibility, affordability and availability. For this purpose, the following parameters were considered: income per capita, national healthcare system coverage, gross domestic product (GDP), healthcare expenditure per capita and physician density.

Disability-Adjusted Life Year (DALY): Is a measure of overall disease burden representing the total number of years lost due to ill-health, disability, or premature death.

Quality-Adjusted Life Year (QALY): Is a health economic measure that combines life expectancy and quality of life into a single metric. One QALY represents one year of life lived in perfect health.

National healthcare system: There are many typologies used in the literature to classify healthcare systems, yet a collective term for all basic models, such as the National Health Service (NHS), the social insurance and the private insurance model, does not exist. To enable ease of reading and understanding, in this study, 'national healthcare system' refers to all types of healthcare systems, including those that are financed through tax revenues and government contributions, e.g. the Sistema Único de Saúde (SUS) in Brazil and the NHS in the United Kingdom (UK), systems financed via mandatory health insurance contributions such as the Statutory Health Insurance system (SHI) in Germany, the Statutory Health Insurance System (SHIS) in Japan, and the National Health Insurance system (NHI) in Israel.

OTX: Medicines that can essentially be purchased without a prescription, but are reimbursable by the national healthcare system or health insurance companies under certain conditions such as a prescription issued by a physician.

Over-the-counter medicine (OTC): Medicines available for purchase by the patient/consumer without the requirement of a prescription. There are a number of outlets from which OTC medicines can be accessed and they vary from country to country, including pharmacies, drugstores and supermarkets.

Pack: In this study, the definition of "pack" is applied according to IQVIA nomenclature: "The number of packs ("units") sold (IQVIA, 2019). It describes normalised data on OTC expenditure derived from different sources. Standardised units for OTC expenditure are required in global studies due to differences in definitions of OTC pack, including size and dosage, between countries.

Prescription-only medicine (Rx): Medicines that require a prescription, which is written by a physician, dentist, nurse or other approved healthcare professional. They can generally only be supplied at a pharmacy under the supervision of a pharmacist or in the case of rights to dispense by physicians.

Rx-to-OTC switch: A reclassification process that involves changing the status of a medicine from prescription-only status to over-the-counter status.

Self-care: The World Health Organization (WHO) defines self-care as: "The ability of individuals, families and communities to promote health, prevent disease, maintain health, and cope with illness and disability with or without the support of a health care provider" (WHO, 2021). According to the Global Self-Care Federation (GSCF), self-care involves: "Making healthy lifestyle choices, avoiding unhealthy lifestyle habits, making responsible use of prescription and non-prescription medicines, self-recognition of symptoms, self-monitoring and self-management, i.e. managing symptoms of disease, either alone, in partnership with healthcare professionals, or alongside other people with the same health condition" (GSCF, 2021). The definition of self-care used in this study is as follows: The proactive management

of common and transient ailments by a patient or consumer according to their personal preference and without the use of a prescription medicine.

Self-medication: Self-medication is one element of self-care which involves the use of medicines that do not require a prescription by a physician, such as pharmacy-based assisted self-medication. This excludes the use of non-prescription medicines that are prescribed by a physician.

Self-treatment: The act of treating oneself using medicines purchased from pharmacies or readily available at home without any prior medical examination by a physician.

Self-treatable condition or minor ailment (STC): A health problem that is commonly self-limiting and does not result in any long-term consequences. The individual's ability to perform everyday activities and occupational tasks is either not impaired or only impaired for a few days. This also includes the management of certain chronic conditions (e.g. hay fever, migraine).

Under the counter (UTC): In this study, under the counter refers to prescription medicines that are directly sold without the authority of a physician's prescription.

Universal Health Coverage (UHC): Refers to ensuring that all individuals and communities have access to the health services they need without suffering financial hardship. This includes access to health promotion, prevention, treatment, rehabilitation, and palliative care services of sufficient quality.

Uptake of self-care: An increase in the degree of utilisation of over-the-counter treatment options.

Preface

The present report represents an update and extension of the global study *"The Global Social and Economic Impact of Self-Care"* conducted in 2021 on behalf of the Global Self-Care Federation (GSCF). The 2022 study is referred to throughout the following analysis as *EcoSoc 1.0*. The present update from 2026 is hereinafter referred to as *EcoSoc 2.0*.

The original study EcoSoc 1.0 provided, for the first time, a comprehensive and globally comparable assessment of the social and economic value of self-care. It demonstrated the substantial contribution of self-care to health system efficiency, the alleviation of pressure on healthcare resources, and improvements in population health and well-being across different regions of the world.

Since the publication of the initial study, both the global healthcare environment and the availability of data have evolved. Against this background, the first objective of the present report *(Part I)* is to update the underlying data and model calculations to reflect the most recent developments up to 2026. The methodological framework remains unchanged and is therefore only briefly summarised in this report, with full reference to the original study.

In addition to this update, the report extends the analytical perspective by addressing key dimensions that have gained increasing relevance in the policy and scientific debate on self-care. In particular, it explores the role of access to self-care, the impact of self-care on quality of life, and the contribution of preventive use of non-prescription medicines to health outcomes and system efficiency *(Part II)*.

At the same time, against the backdrop of increasing constraints on resources and capacities in healthcare systems worldwide, political interest in self-care as part of broader solution strategies has grown significantly, including at the level of international organisations such as the World Health Organization (WHO).

Taken together, this EcoSoc 2.0 report should be understood as both an update and an addendum to the 2021 study. It aims to further strengthen the evidence base for self-care as a key component of sustainable, accessible and efficient healthcare systems worldwide.

EcoSoc 2.0

PART I: Update of the Global Model and Key Results (2026)

1. Update of the Global Model and Key Results (2026)

The health economic study “Economic and Social Impact of Self-Care Globally” from 2022 has been fully updated and published by (Bauer et al., 2022; GSCF, 2026). This means that all data inputs used in the model have been revised based on the most recent available publications.

The applied methodology and conceptual framework remain unchanged and correspond to the approach outlined at the beginning of this report. For further details on the methodology and calculations, reference is made to the full report as well as to the methodological publication in the journal Frontiers in Public Health.

In the following, selected key results of the updated model are presented, together with an interpretation and their implications from a health policy perspective. A comprehensive overview of all results, broken down by global regions and additional analytical dimensions, is provided in tabular form in the appendix of this report.

1.1. Global Health Sector Under Strain – and the Role of Self-Care

Health systems worldwide are under sustained pressure from ageing populations, rising non-communicable diseases (NCDs), workforce shortages, constrained fiscal space, and increasing geopolitical and economic uncertainty. While the COVID-19 pandemic exposed these vulnerabilities, the core policy challenge in 2026 is no longer emergency response, but long-term health system optimisation. This report confirms the central conclusion that **responsible self-care delivers substantial and measurable social and economic benefits across all health system contexts**.

In line with WHO and GSCF terminology, self-care refers to the ability of individuals to promote health, prevent disease, maintain health, and cope with illness, with or without the support of a healthcare professional. This report focuses on **responsible self-care**, characterized by:

- evidence-based non-prescription medicines and self-care interventions,
- where appropriate, supported by pharmacists or other healthcare professionals,
- clear referral and escalation pathways,
- strong regulatory standards for quality, safety, and efficacy.

The following figure illustrates the concept of responsible self-care and its relationship to major global healthcare challenges, including demographic change, resource scarcity, productivity pressures, and healthcare workforce shortages.

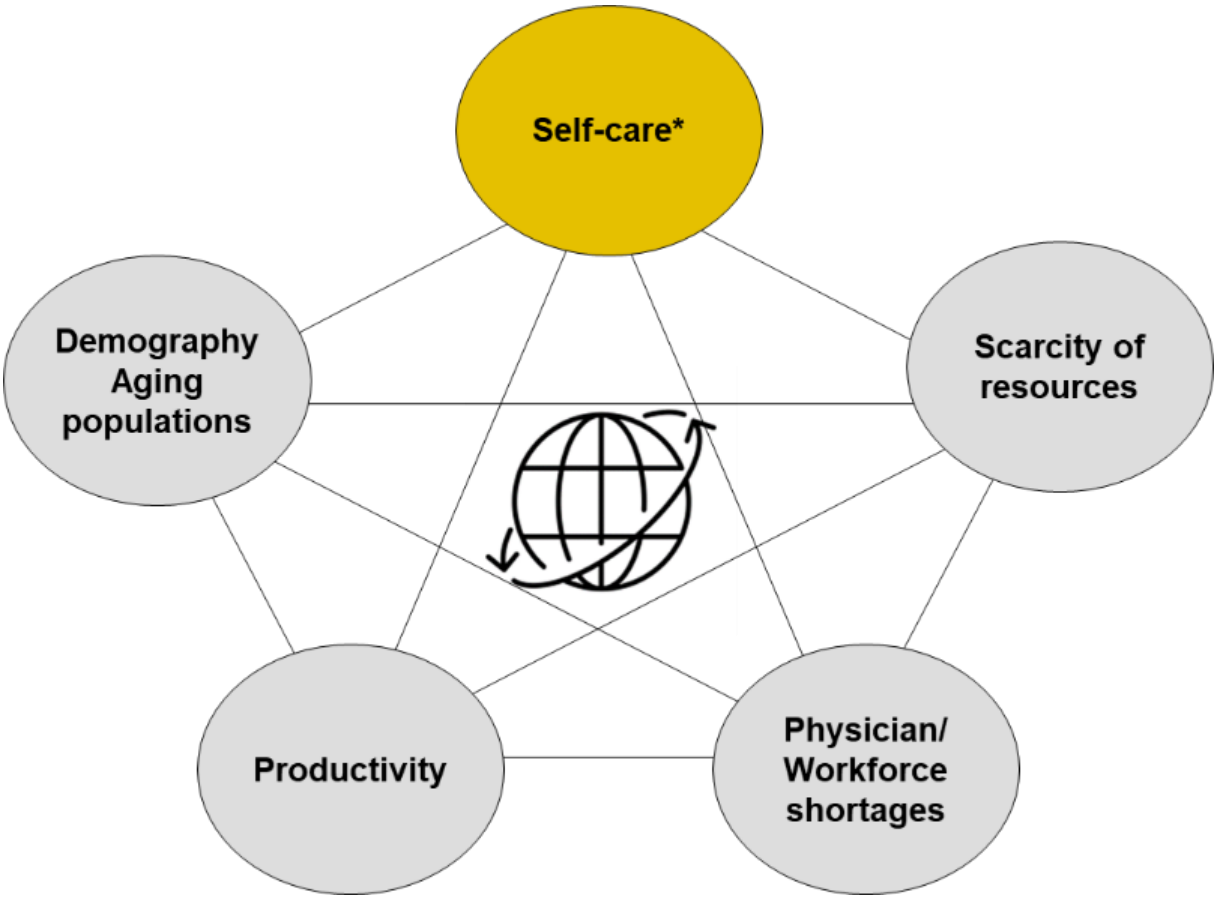


Figure 1: Responsible Self-Care and Key Global Health System Challenges

1.2. Why Self-Care Is a Strategic Lever for Health Systems Worldwide

In 2026, health systems are operating in a markedly different environment than at the start of the decade. Fiscal consolidation, health policy reforms, and restructuring of multilateral institutions are narrowing room for inefficiency. At the same time, ageing societies, the growing burden of NCDs, and workforce shortages are increasing demand for care.

Sustainability no longer depends solely on expanding clinical capacity. It depends on how effectively systems enable people to manage everyday health needs safely, while ensuring timely escalation when professional care is required. In more fragmented global markets, resilience increasingly depends not only on supply security, but also on how efficiently scarce clinical resources are deployed. Strengthening self-care policies should be seen not only as a health intervention, but as part of broader strategies to enhance economic, social, and system resilience.

1.3. Different Realities: The Role of Self-Care in the Global Context

The 2022 GSCF socio-economic research established a global evidence base demonstrating that self-care delivers both cost and time savings in highly developed health systems and productivity, welfare, and quality-of-life gains in less developed systems. A detailed description

of the methodology is available in the peer-reviewed publication of GSCF socio-economic research (May et al., 2023). This conceptual framework remains fully valid in 2026. This updated report confirms the direction and robustness of the original findings while extending the time horizon to 2040 and placing stronger emphasis on policy relevance, system resilience, and equity.

Differences in accessibility and affordability of healthcare creates the need for a country grouping ("High-income" / "Low-income" / "Middle-income" Countries).[1] The study identifies two fundamental functions of self-care, which manifest differently across country groups:

a) High-income countries: "Self-Care First"

In these settings, self-care typically represents the first line of treatment for self-treatable conditions, instead of consulting a general practitioner.
Major benefits include:

- substantial cost savings for health systems,
- significant reduction in physician workload,
- meaningful time gains for patients,
- strengthened personal responsibility and health literacy.

Here, self-care is an efficient complement to well-developed health-care structures.

b) Low-income countries: "Treatment Rate"

For millions of people, self-care is the **only available form of treatment (instead of doing nothing)**, given limited access to affordable medical care.
Key effects include:

- maintaining the ability to work—a necessity for livelihoods,
- reducing the burden of untreated health conditions,
- immediate improvements in quality of life,
- preventing serious complications in the absence of formal care,

In these contexts, self-care does not merely enhance efficiency—it **enables care**.

c) Middle-income countries: Hybrid patterns

Middle-income countries show mixed characteristics, reflecting transitional health-system structures.

[1] For this purpose, five parameters were selected:
1. National Health Care Service Coverage in population
2. Income Group
3. Health Care Expenditure p.c.
4. Physicians per 1,000 population
5. GDP p.c.

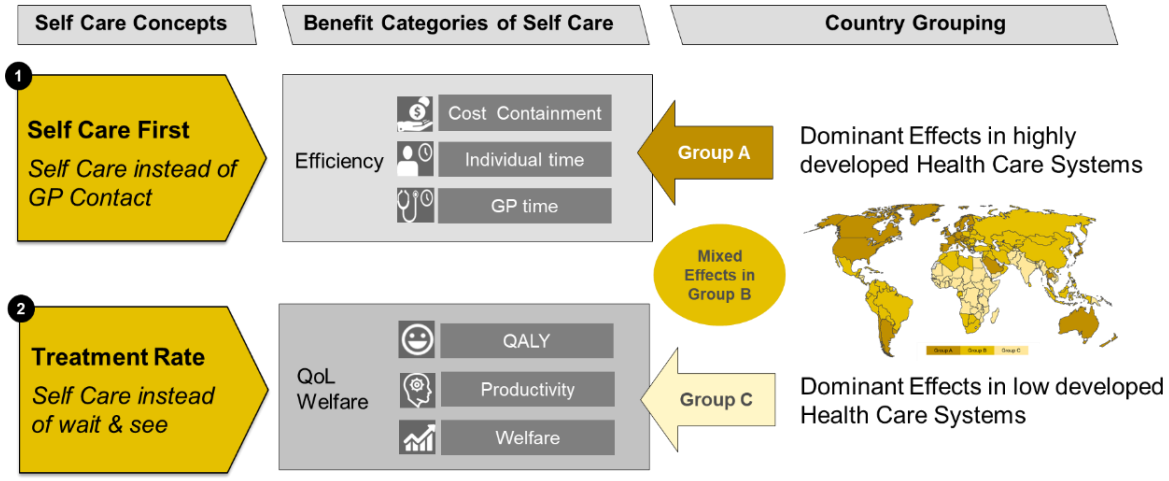


Figure 2: Conceptual Framework of Global Self-Care Models and Benefit Dimensions

1.4. The Global value of Self-care today

The global analysis clearly shows that self-care generates measurable social and economic benefits – for individuals, health systems, and national economies.

Key impacts include:

- **USD 144 billion** in monetary savings within today's health systems.
- Relief equivalent to the working capacity of **over 800,000 physicians p.a.**, enabling a stronger focus on more serious conditions.
- **13 billion** patient hours saved that would otherwise be spent waiting at the physicians office or traveling to medical facilities.
- **43.6 billion** additional productive days gained worldwide.
- **USD 1.97 trillion** in welfare gains attributable to higher productivity.
- **24 million QALYs** gained, directly reflecting improved quality of life.

The figure below presents regional estimates of physician capacity savings attributable to self-care, highlighting the potential contribution of self-care to reducing pressure on healthcare systems worldwide.

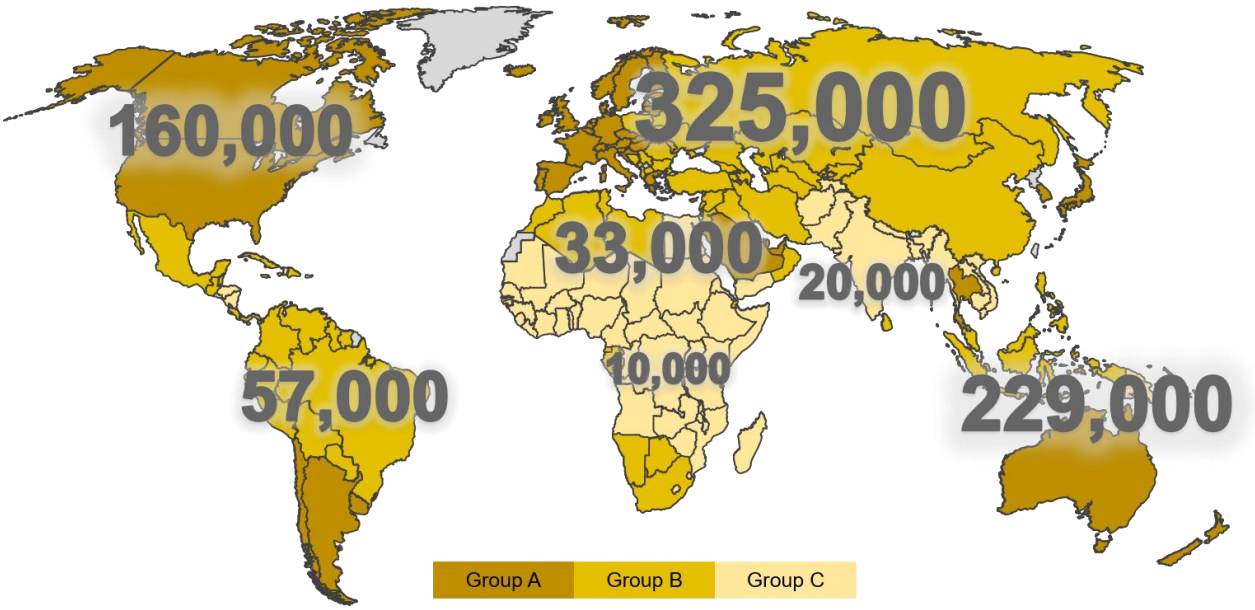


Figure 3: Global Physician Capacity Savings Through Self-Care

While global totals illustrate the relevance of self-care, they can be difficult to interpret. Per-capita metrics (population) more clearly show what self-care means for individuals. Selected findings from the health-economic modelling include e.g.:

- In **North America**, self-care increases welfare by approximately **USD 1,500 per person**.
- In **Europe and Central Asia**, patients save an average of **240 minutes per year**, while every patient gains **53 minutes of physician time which** are freed up for more complex cases.
- **Globally**, self-care generates on average **six additional productive days per person per year**.
- In **Sub-Saharan Africa**, this productivity effect amounts to **only three days**, reflecting limited access to self-care despite high potential need.

These findings demonstrate that self-care is not only a global efficiency factor—it directly improves the daily lives of individuals across regions.

Overall, the updated figures confirm the trajectory identified in 2022, with differences largely explained by demographic change, uneven policy uptake, and variations in access rather than by changes in the underlying self-care mechanisms. The figure below presents the estimated regional contribution of self-care to healthcare system efficiency, economic welfare, productivity, and health-related quality of life, illustrating differences in value generation across healthcare settings and world regions.

Region	Cost Containment	Individual Time Savings	Physician Time Savings	Productivity	Welfare	Quality of Life
East Asia & Pacific	$ 31.9 bn	3.9 bn hours	0.60 bn hours	10.9 bn days	$ 476.6 bn	6 mn QALYs
Europe & Central Asia	$ 58.0 bn	3.7 bn hours	0.82 bn hours	7.3 bn days	$ 633.4 bn	4 mn QALYs
Latin America & The Caribbean	$ 11.7 bn	1.2 bn hours	0.17 bn hours	3.5 bn days	$ 94.3 bn	2 mn QALYs
Middle East & North Africa	$ 6.6 bn	1.1 bn hours	0.16 bn hours	3.1 bn days	$ 72.8 bn	2 mn QALYs
North America	$ 31.8 bn	1.3 bn hours	0.32 bn hours	2.4 bn days	$ 576.8 bn	1 mn QALYs
South Asia	$ 2.3 bn	1.3 bn hours	0.11 bn hours	12.5 bn days	$ 97.4 bn	7 mn QALYs
Sub-Saharan Africa	$ 2.1 bn	0.3 bn hours	0.03 bn hours	3.8 bn days	$ 22.2 bn	2 mn QALYs
GLOBAL VALUE	$ 144.3 bn	12.7 bn hours	2.20 bn hours	43.6 bn days	$ 1,973.5 bn	24 mn QALYs

Table 1: Regional Distribution of Self-Care Benefits and Value Dimensions

1.5. The Future: Substantial Untapped Potential

Measured against the original 2022 ambition, progress to date suggests that self-care uptake is moving in the right direction, but at an uneven pace, reinforcing the importance of deliberate policy action rather than passive evolution. If self-care is supported through appropriate policies, its global benefits could increase significantly by 2040. This basically applies to all the benefits of self-care considered in this study.

The largest gains from self-care are projected by 2040, with increases of almost **50% in quality of life and productivity**. These gains are driven primarily by economic development and supportive policies that expand access to self-care in countries with less developed health systems (Low-income countries). As countries progress from status low-income to middle-income, greater use of self-care is associated with substantial improvements in health outcomes.

By contrast, gains in **healthcare system cost savings and physician time** are expected to be more modest, at around **35%**, reflecting the already high use of self-care in high-income countries. In these settings, self-care is widely used to avoid physician visits, but the marginal potential for additional savings is lower. **Welfare gains** are projected to increase by **34%**, while **patient time savings** are expected to rise by **40%**.

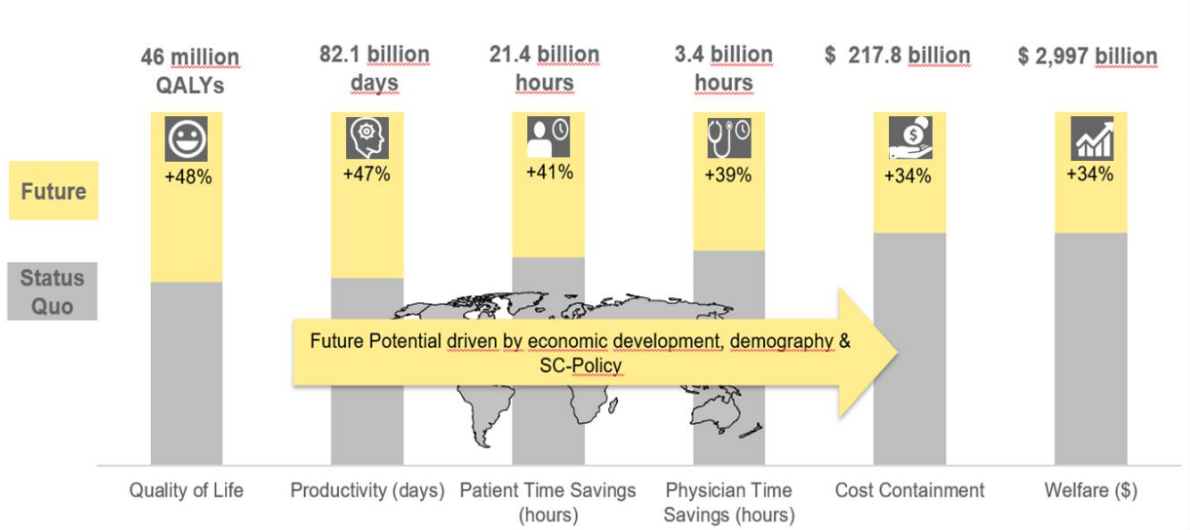


Figure 4: Future Potential driven by Economic Development, Demography & Self-Care Policy

Policy choices are pivotal to actually tap into this potential: effective measures can increase the overall impact of self-care but regional priorities differ:

- **High-income countries:** Incentives for "Self-Care First," e.g., release of additional medicines from prescription requirements and financial incentives for Self-Care. **Middle-income countries:** Balanced strategies aligned with national health-system structures
- **Low-income countries:** Ensuring access, availability, and reliable information

A New Scientific Approach to Global Health Policy

For the first time, this study systematically distinguishes between two globally relevant mechanisms of self-care and quantifies their respective contributions:

- **Doing Self-Care instead of seeing a Physician ("Self-Care First"):** in high-availability health systems
- **Doing Self-Care instead of doing nothing ("Treatment Rate"):** in settings with limited or unaffordable care

This distinction allows the inclusion of regions previously considered "blind spots" in socio-economic research on self-care. The result is a more comprehensive understanding of the global value of self-care—and the urgent need to strengthen it through health policy.

The evidence is clear:

- In high-income countries, non-prescription products help conserve system capacity.
- In low-income countries, they help preserve life opportunities.

Both functions are indispensable for global health resilience.

1.6. Why Political Action Is Needed Now — and Why This Matters for Policymakers?

Responsible self-care is one of the few interventions that simultaneously preserves access, reduces avoidable expenditure, and frees scarce clinical capacity without compromising outcomes. In the context of fiscal constraints, workforce shortages, and rising demand, it offers a pragmatic pathway to health system optimisation.

By strengthening efficiency and resilience, closing care gaps, improving quality of life, boosting productivity, and supporting social participation, responsible self-care enables health systems to do more with existing resources and allows clinicians to focus on more complex and severe conditions.

Conclusion and Outlook

Self-care strengthens systems, people, and societies. It enables countries at all income levels to meet the challenges of the 21st century with greater resilience.

This study identified health literacy as a fundamental catalyst for self-care. While access to information has expanded, misinformation and disinformation increasingly undermine appropriate self-care. Digital tools and AI offer significant opportunities, but only if embedded in trusted regulatory and professional frameworks. Pharmacists play a critical role as accessible, trusted advisors helping people navigate information, select appropriate treatments, and escalate care when needed. Responsible self-care can reduce health inequities, but only if policies address potential gaps. Risks include digital divides, rural access barriers, and affordability constraints. Pro-equity self-care policies should focus on:

- **broad availability of quality-assured non-prescription medicines,**
- **affordable access mechanisms,**
- **inclusive digital solutions,**
- **and targeted support for vulnerable populations.**

Responsible self-care is not a substitute for professional care. It is a complementary pillar that strengthens prevention, supports NCD management, advances Universal Health Coverage, and contributes to healthy ageing. Aligned with the GSCF 2025–2028 strategy, it should be recognized as:

→ a core health system optimisation tool,

→ an economic and social investment,

→ a driver of more equitable, accessible, and sustainable health systems worldwide,

→ a driver of resilience in an uncertain global environment.

In addition to generating new insights, the study highlights areas where important research questions remain open pointing to clear opportunities for further inquiry. Against this backdrop, GSCF has commissioned the study authors, May und Bauer, to deepen the following areas in a subsequent research project:

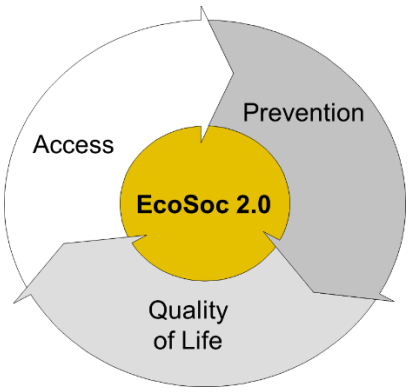
- **The role and concrete benefits of broad and easy access to self-care,**
- **The significance of prevention supported by self-care products,**

- **The adequate measurement of quality-of-life effects resulting from both the treatment and the prevention of health conditions.**

It can be expected that, based on these research themes, additional—and in some cases substantial—benefits associated with self-care will become visible and, to a considerable extent, quantifiable.

EcoSoc 2.0

PART II: Extended Analysis of Key Dimensions of Self-Care



Preliminary Remark

The Interdependent Relationship between Access, Quality of Life and Prevention

The global study *"The Social and Economic Impact of Self-Care Globally"* conducted in 2022 and summarised in the first part of the present report (hereinafter referred to as *EcoSoc 1.0*) has been comprehensively updated within the framework of the current project regarding all underlying data inputs, epidemiological assumptions and model parameters.

The second component of the current project in 2026 (hereinafter referred to as *EcoSoc 2.0*) builds upon these updated findings and extends the analytical framework in three important areas of growing relevance for international health policy and health system sustainability.

First, the report provides a more in-depth discussion of the role of access to non-prescription medicines within self-care systems. Particular attention is given to the relevance of access barriers and enabling factors in the context of health equity, healthcare utilisation and Universal Health Coverage (UHC). The issue of quality of life is also highlighted in this context.

Second, the analysis of quality-of-life effects associated with self-care - already addressed qualitatively and quantitatively in *EcoSoc 1.0* - is conceptually expanded and methodologically refined. The present report develops a broader framework for assessing the contribution of self-care to individual well-being, health-related quality of life and social welfare outcomes.

Third, *EcoSoc 2.0* introduces the topic of prevention within the context of self-care as a new analytical dimension. This aspect was not explicitly examined in *EcoSoc 1.0*, which primarily focused on the treatment of existing symptoms and common health conditions using non-prescription medicines. By incorporating preventive dimensions of self-care, the present analysis substantially broadens the conceptual scope of the original study and further strengthens its relevance for long-term health system resilience, prevention-oriented healthcare strategies and sustainable resource allocation.

The extended conceptual considerations relating to access and quality-of-life effects are applicable both to the treatment-oriented dimensions of self-care analysed in *EcoSoc 1.0* and to the newly introduced prevention-related framework developed in the present report.

2. Access to Self-Care

The following chapter examines in greater detail the issue of access to self-care products, which represents a central dimension of the broader self-care framework. Particular attention is given to its fundamental relevance at the macro level, practical limitations and barriers to access, as well as its implications for individuals at the micro level. As an overarching chapter within the framework of the present report, it also repeatedly highlights the interrelationships and interdependencies between access to self-care and the two major thematic focus areas of the study, namely quality of life and prevention within the context of self-care.

2.1. The Fundamental Role of Access to Non-Prescription Medicines

Access to non-prescription medicines represents a central structural prerequisite for the effective functioning of self-care systems and for the implementation of responsible self-care practices. From a health economic and public health perspective, the availability, affordability and practical accessibility of appropriate non-prescription treatments constitute key enabling factors for the realisation of the individual and societal benefits associated with self-care.

Accordingly, a substantial proportion of the economic, healthcare-related and welfare effects quantified within the framework of EcoSoc 1.0 can be interpreted as effects that are ultimately contingent upon a broad access to non-prescription medicines. Without such access, many of the behavioural and system-level mechanisms underlying the observed benefits of self-care would not materialise.

This relationship applies to both principal analytical scenarios examined in the original model framework. First, in cases where self-care is utilised as an alternative to physician consultation, access to non-prescription medicines contributes primarily to reducing avoidable utilisation of healthcare services and alleviating pressure on medical capacities and healthcare expenditure (*Self-Care First Scenario*). Currently e.g. globally $144 billion in health systems savings are generated by self-care and if self-care did not exist, more than 800,000 additional physicians would be needed worldwide (Bauer et al., 2022). These effects are particularly relevant in the context of increasing resource constraints, workforce shortages and rising demand for healthcare services observed across many healthcare systems worldwide.

Second, access to self-care is also relevant in situations in which individuals would otherwise remain untreated despite experiencing symptoms or common health conditions (*Treatment Rate Scenario*). In these cases, the availability and accessibility of non-prescription medicines may contribute to improvements in health-related quality of life, individual well-being and broader welfare outcomes by enabling treatment that would otherwise not occur (see subchapter 2.3). Currently 43.6 billion additional productive days worldwide leading to $1.97 trillion in welfare gains attributable to higher productivity are generated by self-care. At the same time 24 million Quality-Adjusted Life Years are gained each year because People have access to OTC-Products. From a health economic perspective, these effects are particularly important because they extend beyond direct healthcare system savings and reflect additional societal value generated through improved health status and functioning.

While the original EcoSoc 1.0 framework focused on the treatment of existing symptoms and common conditions, the relevance of access to non-prescription medicines also extends to preventive dimensions of self-care. Access to appropriate preventive interventions and early treatment options may contribute to reducing future disease burden, avoiding complications

and improving long-term health outcomes. As discussed in Chapter 12, these preventive effects represent an additional and potentially substantial dimension of the societal and economic value associated with self-care.

Taken together, these considerations underline that access to non-prescription medicines should not be understood merely as a regulatory or market-related issue, but rather as a relevant determinant of healthcare system efficiency, health equity, population health outcomes and the resilience of healthcare systems. Against the background of ongoing international discussions on Universal Health Coverage (UHC), sustainable healthcare financing and prevention-oriented health policy, the question of access therefore assumes increasing strategic relevance for policymakers and healthcare stakeholders alike.

The remaining future potential of self-care at the global level, as identified in *EcoSoc 1.0 and updated in Part I of EcoSoc 2.0*, is substantially contingent upon further improvements in access to non-prescription medicines and the reduction of existing structural, economic and regulatory barriers to access.

The largest gains from self-care are projected by 2040, with increases of almost 50% in quality of life and productivity. These gains are driven primarily by economic development and supportive policies that expand access to self-care in countries with less developed health systems (Low-income countries). As countries progress from status low-income to middle-income, greater use of self-care is associated with substantial improvements in health outcomes.

By contrast, gains in healthcare system cost savings and physician time are expected to be more modest, at around 35%, reflecting the already broad access and high use of self-care in high-income countries. In these settings, self-care is widely used to avoid physician visits, but the marginal potential for additional savings is lower. Welfare gains are projected to increase by 34%, while patient time savings are expected to rise by 40%.

2.2. Barriers to Access and global Disparities

In many high-income countries, broad regulatory access to OTC medicines is already well established. Non-prescription products are generally widely available through pharmacies and retail distribution channels, including broader retail and online channels in systems such as the United States or the European Union (GSCF, 2022; AESGP, 2024, FDA, 2024). At the same time, high-income country groups are generally characterized by higher GDP, higher household income, and better access to healthcare and self-care products, making self-care more feasible for large parts of the population, although affordability may still vary across social groups (GSCF, 2022).

Under these conditions, self-care can evolve into an integral component of healthcare utilisation and patient behaviour. In Europe, self-care already accounts for a substantial volume of common ailment management and generates measurable economic and social value by reducing unnecessary physician visits, medical expenditure, and productivity losses (May et al., 2023). Consequently, countries like the United States, Germany, and Japan demonstrate relatively mature OTC and self-care systems, although their regulatory models differ. In the United States, OTC medicines are available without prescription through a broad retail system (FDA, 2024). In Germany, OTC medicines and self-care interventions are described as central components of pharmacy-based healthcare (Bertsche et al., 2023). In Japan, regulatory reforms and Rx-to-OTC reclassification have been used to promote self-care and broader OTC access (Nomura et al., 2016).

In those high-income countries (HICs) and other highly developed healthcare systems, the limiting factor is therefore often less the general willingness or ability of individuals to pay for self-care products, but rather the availability of appropriate non-prescription medicines and the regulatory scope for prescription-to-non-prescription switches (AESGP, 2024; FDA, 2024).

In practical terms, this means that suitable substances and treatment options must be available for a broad range of self-treatable symptoms and common health conditions. Where such availability gaps exist in individual countries, they constitute a significant practical barrier to access and thereby limit the effective utilisation and potential benefits of self-care.

In contrast, substantial barriers to access remain present in many low- and middle-income countries. These barriers are often not limited to regulatory restrictions but relate primarily to economic constraints and limited purchasing power among large parts of the population. Even where OTC products are legally available, the actual ability of individuals to purchase medicines may remain severely restricted due to low household incomes and competing expenditures for essential goods such as food, housing or transportation (WHO & World Bank, 2017).

In light of this observation a country grouping approach in two stages to examine the healthcare needs or self-care potential of a country was developed by *May und Bauer (Bauer et al., 2022).* First, economic indicators were analysed to determine the economic strength of a country and the potential per capita spending on OTC products (affordability). For this purpose, GDP per capita, healthcare expenditure per capita and income were selected. Next, indicators relating to healthcare accessibility were examined as accessibility of health services is a key factor that influences healthcare utilisation, self-care practises and health status of the population. The indicators chosen include healthcare system coverage and physician density.

The results of the country grouping are illustrated below in Figure 14 using a three-colour gradient to distinguish between the countries categorised into Group A, B and C. Table 9 further breaks down the country grouping according to region and provides a list of all included countries. A total of 155 countries are included in the economic analysis. Of this total, 41 countries are categorised into Group A, 60 countries into Group B and 54 countries into Group C. While the countries in most regions are predominantly categorised into one or two groups, the East Asia and Pacific region has the most evenly distributed number of countries across the three groups.

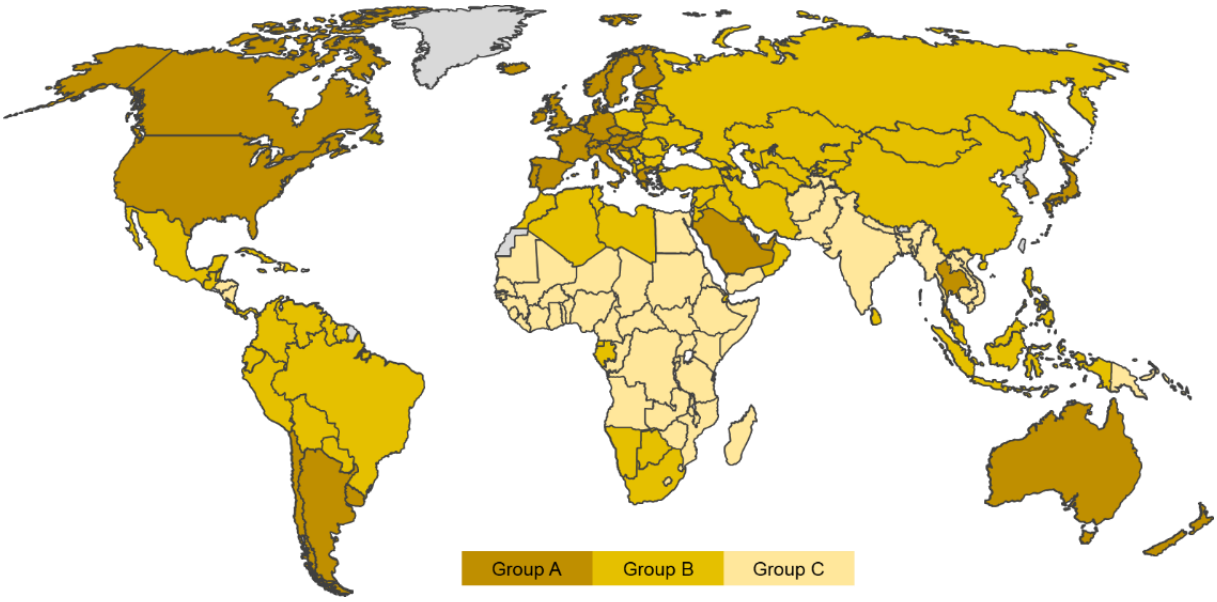


Figure 5: Country Grouping based on GDP per Capita, Healthcare Expenditure per Capita and Income

From a health economic perspective, this distinction is highly relevant. The availability of OTC medicines alone does not automatically translate into effective access. Rather, access must be understood as the interaction between product availability, affordability and the practical ability of consumers to utilise self-care when needed. In many lower-income regions, these conditions are only partially fulfilled, thereby limiting the achievable societal benefits of self-care.

This observation also has important implications regarding the currently untapped global potential of self-care. The analyses suggest that the largest unrealised opportunities for self-care are likely to exist in regions where current access and affordability remain comparatively weak. In particular, many countries in parts of Africa, Asia and Latin America may possess considerable potential for improving population health outcomes through expanded access to affordable non-prescription medicines.

Importantly, the effects of improved access in these regions may differ structurally from those observed in high-income healthcare systems. In wealthier countries, self-care frequently substitutes physician visits and thereby contributes primarily to relieving pressure on healthcare capacities and reducing avoidable healthcare expenditure. In lower-income settings, however, self-care often represents an alternative to untreated illness. Under these conditions, improved access to OTC medicines may generate substantial gains in quality of life, individual well-being and social welfare by enabling treatment that would otherwise not occur.

At the same time, the findings indicate that affordability may represent one of the most critical limiting factors for the future expansion of self-care globally. Even comparatively low OTC prices can constitute a significant economic barrier for vulnerable populations in low-income regions. Consequently, policy approaches aimed at strengthening self-care must not only address regulatory access, but also consider the broader economic conditions that determine effective affordability for households. The issue of affordability becomes even more critical in the context of prevention. In situations involving acute symptoms, such as pain, the immediate patient need is typically high, which correspondingly increases willingness to pay for treatment. In contrast, preventive interventions are generally associated with lower immediate perceived benefit and therefore lower willingness to pay.

From an economic perspective, this behaviour can be regarded as rational and is consistent with the concept of present bias and time preference among individuals acting under conditions of uncertainty regarding future health outcomes. Since the benefits of preventive

measures often materialise only in the longer term, individuals may systematically undervalue preventive interventions relative to treatments addressing immediate symptoms and needs.

Against this background, the extent to which preventive self-care interventions should be more strongly integrated into public health programmes and healthcare financing mechanisms warrants further discussion. Strengthening public support for preventive self-care may help overcome affordability barriers and improve the long-term efficiency, sustainability and resilience of healthcare systems.

The following figure illustrates the differing relevance of the various determinants and enablers of self-care depending on the economic and socio-economic classification of countries applied within the present study.

Whereas access in combination with affordability constitutes the primary driver of self-care, particularly in low-income countries (LICs), economic incentives at the individual level represent the most important factor for promoting self-care in wealthier countries with highly developed healthcare systems.

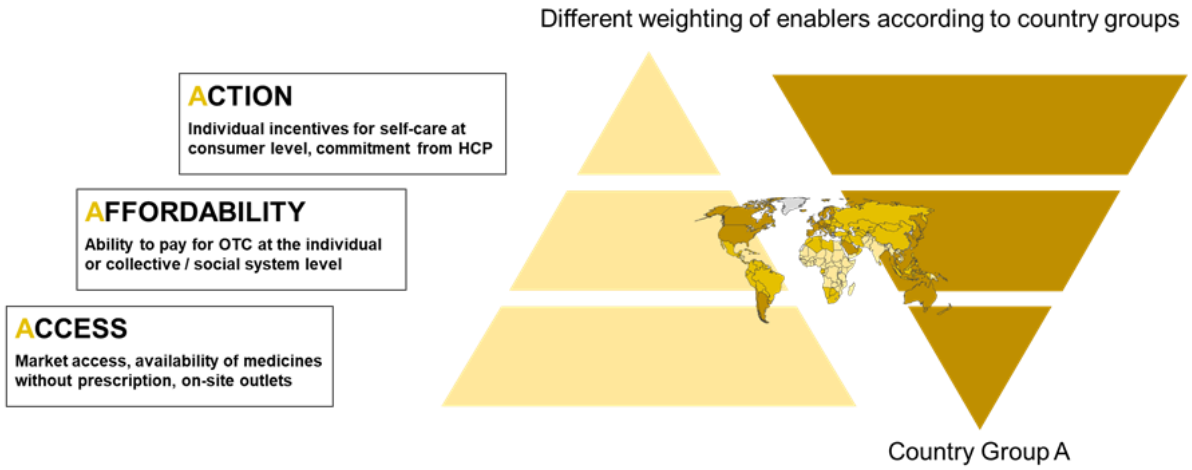


Figure 6: Different Weighting of Enablers according to Country Groups

Against this background, improving access to self-care should be understood not merely as a pharmaceutical policy issue, but as a broader component of health system development, health equity and UHC. Policies that improve access and affordability may therefore contribute simultaneously to:

- strengthening individual health autonomy,
- improving population health outcomes,
- reducing avoidable pressure on healthcare systems,
- and expanding effective access to treatment for underserved populations.

Overall, the analysis suggests that the future global development of self-care will depend to a substantial extent on whether existing barriers to access and affordability can be reduced. In this regard, the greatest remaining growth and welfare potential of self-care may not lie in already highly developed OTC markets, but rather in those regions where significant unmet needs and structural access limitations continue to exist. A suitable scenario analysis in this context would be to estimate the extent to which the global OTC market — and, correspondingly, the associated benefits of self-care — would increase if OTC utilisation in low-income countries (LICs) were to reach the current level observed in middle-income countries (MICs).

In an extended scenario, the analysis could also examine the additional impact if self-care uptake in MICs were to converge towards the level currently observed in high-income countries (HICs)

The relationships described qualitatively above are further supported by the empirical analysis presented below. The conceptual starting point of both empirical approaches was the assumption that the extent of self-care that can be achieved in individual countries or regions of the world depends on various factors. In addition to the number of available over-the-counter products and their accessibility, these include healthcare system infrastructure, economic development, education and awareness. To gain deeper insights into the influence of certain conditions and parameters on the importance of self-care in a country, the Global Self-Care Federation (GSCF) has developed the Self Care Readiness Index (SCRI) (GSCF, 2021; 2022). The following analysis shows how the ratings according to this index relate to socioeconomic factors, which are measured by a so-called *socioeconomic score* (SES) developed by May and Bauer (Bauer et al., 2022). The analysis is intended to provide an even deeper understanding of the complex relationships that need to be considered if the importance of self-care is to be further expanded at the global level.

Based on the studies EcoSoc 1.0 (Bauer et al., 2022) and EcoSoc 2.0, Part I, the relation between various socioeconomic factors and the “self-care readiness” of 20 countries was examined. For this purpose, the results of the SCRI 1.0 and 2.0 compiled and published by the GSCF were correlated with an assessment of socioeconomic factors, the SES (GSCF 2021; 2022). The SCRI are based on the enablers “Stakeholder Support & Adoption”, “Consumer & Patient Empowerment”, “Self-Care Health Policy” and “Regulatory Environment”, while the socioeconomic factors include income, healthcare expenditure per capita, GDP per capita, national healthcare system coverage and physicians per 1,000 people. The underlying data of the original study was extended by the countries and corresponding results of the SCRI 2.0 for this purpose. These countries are Australia, Canada, Colombia, Germany, India, Indonesia, Kenya, Mexico, Singapore and the United Arab Emirates (UAE). The socio-economic data for these countries and those already included in SCRI 1.0 have been updated. These are based on values from the World Bank and the OECD (Organisation for Economic Co-operation and Development [OECD], n.d.; Tikkanen et al., 2020; World Bank Group, 2024, n.d.).

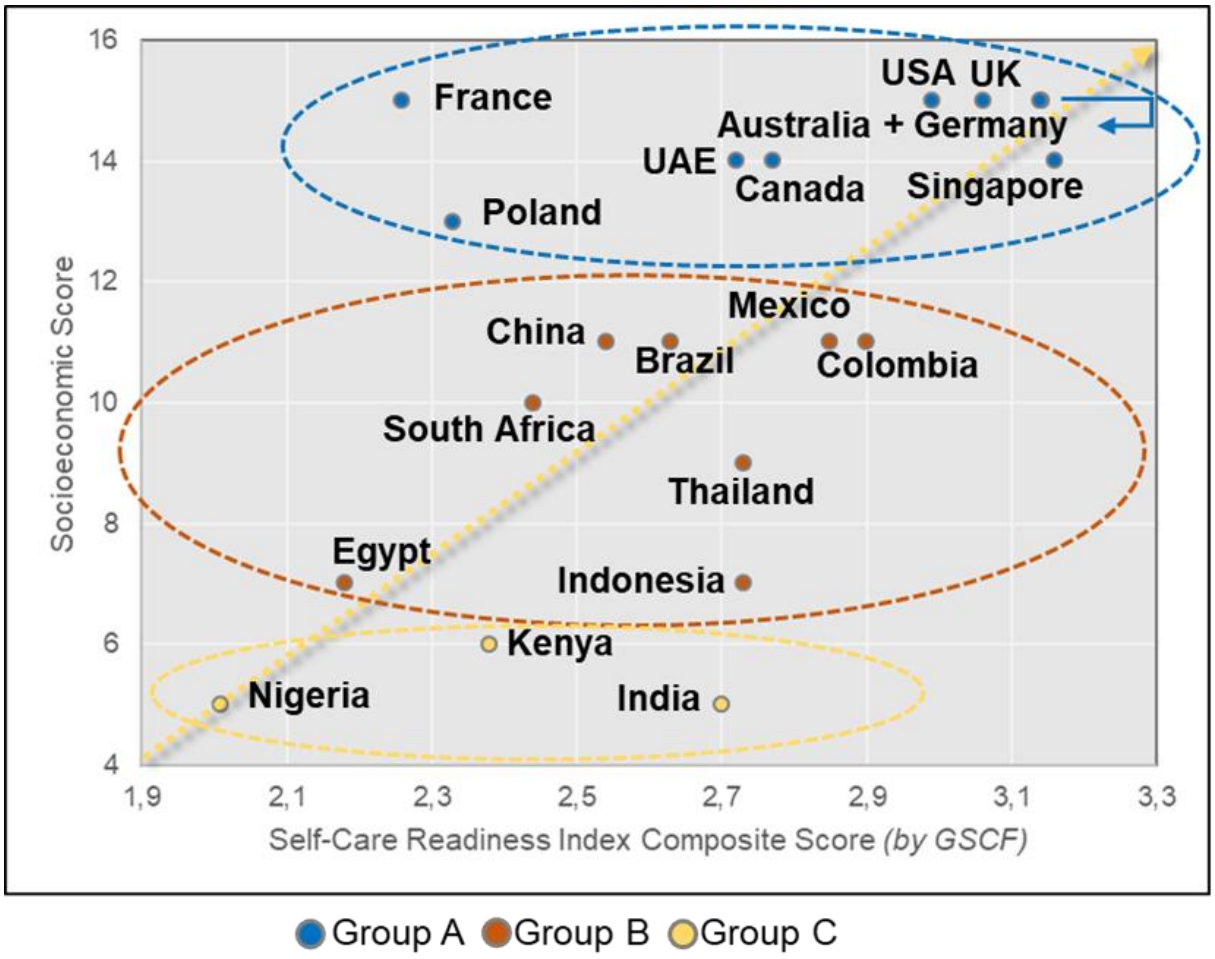


Figure 7: Correlation between indices Socioeconomic Score (SES) and Self-Care Readiness Index (SCRI)

The clear positive statistical correlation between the two indices Socioeconomic Score and Self-Care Readiness Index (SCRI) as shown in Figure 11 indicates that, in general, the pre-requisites and willingness for self-care (*self-care readiness*) are more pronounced in more prosperous countries with a highly developed healthcare system. As self-care readiness is based on regulatory conditions and political initiatives, which often require the use of capacities and resources, it is not surprising that countries with better economic conditions have an advantage here. On the other hand, however, it was also found that there is a relatively wide range in terms of SCRI even within country groups with comparable SEC. This can be seen, for example, in the comparison between Nigeria and India in Country Group C. In Country Group B, Egypt and Colombia are far apart, while in Country Group A, France and Germany represent the extreme poles. This finding is significant as it shows that higher self-care readiness is achievable at any socio-economic level. However, according to the qualitative analysis as discussed above (see Figure 6) different measures need to be prioritised depending on the Country Group.

In Country Group C, access to over-the-counter medicines needs to be improved in order to increase self-care readiness. In Group A countries, improved incentive systems are the key to more self-care. In terms of health and development policy, the significance of this analysis lies in the fact that access to medical care is often limited, particularly in Group C countries, so-called low-income countries. Self-care can be the only way to obtain drug therapy in various regions. This makes it all the more important to recognize that improved self-care readiness can also be achieved in socio-economically less developed countries (with typically low healthcare system coverage).

2.3. Access to Self-Care and Quality of Life: A Micro-Level Perspective

The preceding considerations regarding access to self-care primarily focused on effects at the macro level - that is, effects on healthcare systems, public expenditure and broader economic outcomes - as well as on meso-level aspects, such as the alleviation of pressure on physician capacities and healthcare infrastructures.

However, it is equally important not to overlook that healthcare provision ultimately aims to improve the health status, well-being and quality of life of individual persons, consistent with the WHO understanding of health as physical, mental and social well-being rather than merely the absence of disease (WHO, 1948). From this micro-level perspective, the relevance of access to self-care extends considerably beyond purely clinical or system-related outcomes. In addition to effects on health and health-related quality of life in the narrower sense, self-care also affects broader dimensions of individual well-being, including the ability to organise daily life, participate in work and social activities, enjoy leisure time and maintain overall life satisfaction (see chapter 3.1).

The following conceptual framework illustrates how access to self-care may influence multiple interconnected dimensions of quality of life and individual welfare. The framework should be interpreted as a dynamic cycle beginning with access to self-care and subsequently (steps according to the numbering) affecting different dimensions of individual well-being and socio-economic participation.

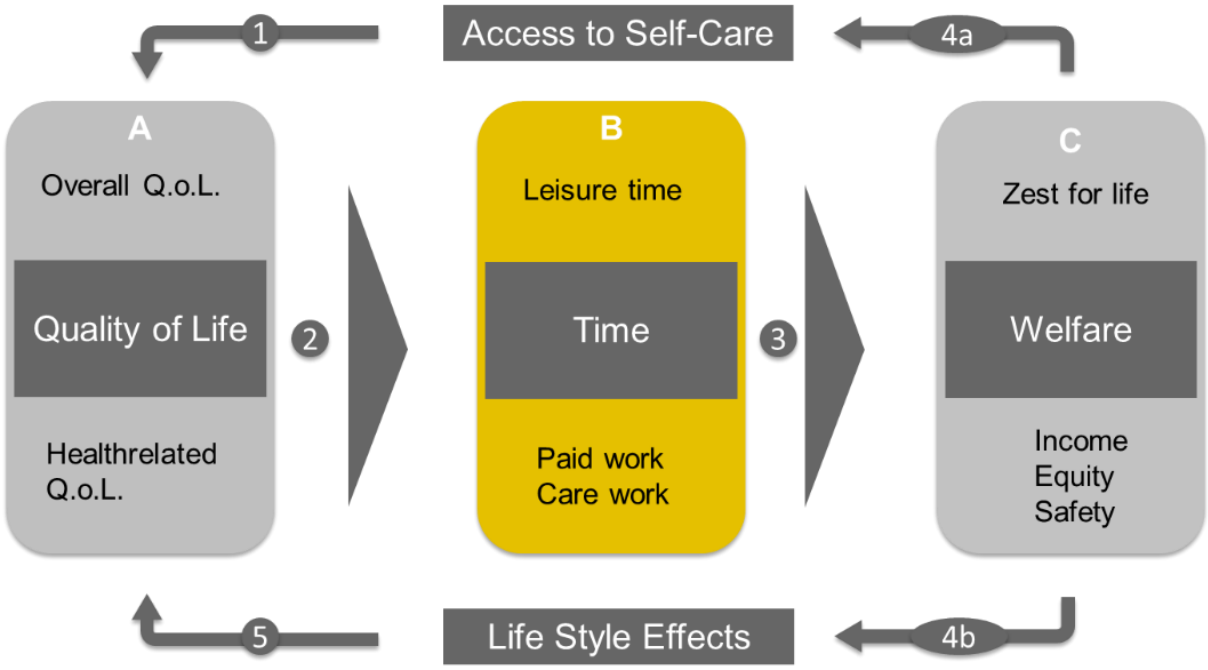


Figure 8: Effects of Access to Self-Care on Health-related Quality of Life

Access to self-care and non-prescription medicines directly improves the health-related quality of life of individuals experiencing self-treatable symptoms and common health conditions. Timely symptom management may reduce pain, discomfort and functional limitations and may therefore improve both physical and psychological well-being.

At the same time, health-related quality of life is closely interconnected with broader dimensions of overall life satisfaction. Improvements in health status may positively affect emotional well-being, social participation and the subjective perception of quality of life more generally.

Step 2: Effects on Time Use, Daily Functioning and Leisure

Improved health status and quality of life substantially influence individuals' ability to manage time and daily activities. In particular, health-related quality of life directly affects the extent to which individuals are able to participate in paid work, unpaid care work and other essential responsibilities of everyday life.

Beyond productivity-related effects, improved health and well-being also influence the ability to engage in leisure activities, recreation and social interaction. Access to self-care may therefore contribute not only to economic functioning, but also to broader dimensions of human flourishing and life enjoyment.

Step 3: Effects on Income, Equality and Social Security

The positive effects of self-care on functional ability and work participation may directly influence individual income and economic stability. This aspect is particularly relevant in regions where income protection systems, sick-pay arrangements or social insurance mechanisms are weak or absent. In such settings, even short-term illness may immediately reduce household income and economic security.

Consequently, improved access to self-care may contribute to maintaining income-generating capacity and preserving economic participation. In broader societal terms, this may also reduce health-related socio-economic inequalities and contribute to greater equity in both health outcomes and social opportunities.

At the same time, improved economic stability and reduced vulnerability may strengthen individuals' sense of personal and social security. Through the combined effects on health, leisure opportunities and socio-economic participation, self-care may therefore also positively influence general life satisfaction and subjective well-being.

Step 4a: Feedback Effects on Access to Self-Care

The welfare and income effects described above will consequently positively influence the original conditions for access to self-care. Individuals with higher levels of economic stability and social participation are generally better able to afford OTC medicines, access health information and engage in preventive or self-responsible health behaviour.

In this sense, access to self-care initiates a reinforcing cycle in which improvements in health, welfare and socio-economic participation further strengthen the ability of individuals to utilise self-care effectively.

Steps 4b/ 5: Lifestyle Effects and Long-Term Health Outcomes

Improved welfare conditions will in addition ultimately affect lifestyle-related behaviours. Better socio-economic conditions and higher levels of well-being are frequently associated with healthier lifestyles, improved health behaviour and greater capacity for preventive action.

Given the well-established relationship between lifestyle factors and long-term health outcomes, these indirect effects may further improve both general and health-related quality of life over time. Accordingly, access to self-care may contribute not only to short-term symptom management, but also to broader and more sustainable improvements in population health.

Broader Welfare Implications and Relevance for Universal Health Coverage

Although the effects described above originate at the individual level, their implications extend far beyond the micro perspective. From the viewpoint of welfare economics and the utilitarian tradition that continues to shape large parts of health economic evaluation and public policy, improvements in individual welfare contribute, ceteris paribus, to increases in overall societal welfare.

Consequently, the effects of improved access to self-care are not limited to healthcare system efficiency or cost savings, but also encompass broader societal objectives related to welfare maximisation, equity and social participation.

Last but not least, improved access to self-care directly supports the global objective of Universal Health Coverage (UHC). Expanding access to self-care enables larger parts of the population to obtain at least basic forms of healthcare support and symptom management, irrespective of geographical location, healthcare infrastructure or socio-economic status.

In this regard, self-care may contribute to broadening and deepening effective access to healthcare at the population level. Particularly in resource-constrained healthcare systems, strengthening access to self-care therefore represents a potentially important complementary strategy for advancing UHC, improving health equity and increasing the resilience and sustainability of healthcare systems worldwide. This applies to a particularly significant extent in the context of prevention within self-care. The specific relationship between access to preventive self-care products and the objective of UHC is examined in greater detail in Chapter 4.

3. Self-Care and Quality of Life

Understanding how self-care contributes to individual and population well-being requires a clear conceptual foundation of quality of life, health-related quality of life (HRQoL), and their role in health economics. Modern health research increasingly recognizes that health outcomes cannot be captured solely through clinical indicators; instead, they must reflect how individuals experience symptoms, functioning, autonomy, and daily life. This shift has elevated HRQoL to a central position in evaluating both clinical interventions and self-directed health practices.

The following chapter provides an overview of different concepts of quality of life and their relevance within social science, health economic and health policy research. Against the background of increasing international attention to patient-centered outcomes, quality of life has become an important conceptual and analytical dimension in the evaluation of healthcare interventions and healthcare systems.

Building upon this conceptual foundation, the chapter subsequently discusses the relevance and applicability of quality-of-life concepts for the assessment of health-related effects associated with self-care and self-care. In this context, particular attention is given to the question of how health-related quality-of-life effects generated through self-care can be measured and evaluated in a scientifically robust and internationally comparable manner.

Within this framework, the concept of QALYs is introduced and discussed as a central methodological approach for quantifying health-related utility effects generated through self-care interventions and the use of non-prescription medicines (GSCF Socio-Economic Research Report, 2022; May et al., 2023b). As one of the most widely established outcome measures in international health economics and health technology assessment (HTA), QALYs provide an important basis for linking clinical and quality-of-life outcomes with economic evaluation and healthcare decision-making.

The second subchapter of this thematic section builds upon the QALY estimates presented in Part I of the report regarding the health gains currently achieved through the treatment of common health conditions within the framework of self-care. These quantified health effects are subsequently subjected to a monetary valuation approach. More specifically, the analysis estimates the monetary value of the health gains generated through self-care based on societal willingness-to-pay concepts commonly applied in health economic evaluation and healthcare priority setting.

The third subchapter analyses the extent to which health gains achieved through self-care and OTC medicines - measured in QALYs - can be generated in a cost-effective manner. The assessment is conducted against the background of internationally applied cost-effectiveness thresholds that are commonly used within healthcare systems to evaluate whether the relationship between healthcare costs and health outcomes can be regarded as socially acceptable and economically efficient.

Taken together, the analyses presented in this chapter aim to extend the understanding of self-care beyond traditional healthcare utilisation and cost-containment perspectives by integrating broader concepts of individual utility, welfare and value generation into the evaluation of self-care systems.

3.1. The Relevance of Quality of Life and QALYs for Self-Care Assessment

This chapter outlines key concepts of quality of life and their relevance for the evaluation of self-care and self-care. It further introduces QALYs as a central approach for measuring and valuing health-related outcomes associated with self-care interventions.

3.1.1. Conceptual Foundations of Health-Related Quality of Life

Health-related quality of life has become a central concept in health outcomes research and policy evaluation, reflecting the shift from a purely biomedical model toward a biopsychosocial perspective (Miron Canelo et al., 2022). HRQoL is a multidimensional construct encompassing physical, psychological, and social domains and focuses specifically on those areas of life influenced by health, thereby distinguishing it from broader definitions of quality of life (QoL). It is measured primarily through patient-reported outcome measures (PROMs), which capture individuals' subjective perceptions of their health status and functioning without interpretation by clinicians or researchers (Piontek et al., 2024).

This patient-centered approach is particularly relevant in the context of self-care, where individuals manage their health outside formal healthcare settings. HRQoL thus serves as both a theoretical and applied construct, grounded in the biopsychosocial model and operationalized through structured, subjective assessments. It has become a core outcome in clinical research and health services evaluation, providing insights into how people experience and adapt to illness or health-related challenges and representing the patient's perspective on the effectiveness of both medical interventions and self-directed health practices. This foundational chapter establishes the theoretical basis for HRQoL by defining the concept, distinguishing it from related constructs, and outlining its key dimensions and applications, thereby setting the stage for examining its relevance in the context of self-care across diverse settings.

Although often used interchangeably, HRQoL, quality of life, and well-being represent distinct concepts.

Well-being

Well-being is the broadest concept, integrating individual, social, economic, and environmental determinants of health (WHO, 2021). It encompasses QoL and HRQoL and reflects meaning, purpose, resilience, equity, sustainability, and the ability of individuals and communities to thrive. Certain self-care practices, such as the use of vitamins, minerals, and supplements, are increasingly linked to holistic well-being (Gheonea et al., 2023).

Quality of Life

QoL is broader than HRQoL and defined by the WHO as an individual's "perception of their position in life within their cultural and value context, in relation to goals, expectations, and concerns" (WHO, 2025). Modern perspectives describe QoL as a two-dimensional concept including:

- Internal dimension: self-perception and personal evaluation
- External dimension: social connectedness and cultural context (Cai et al., 2021).

The following table illustrates the hierarchical relationship between well-being, QoL, and HRQoL and highlights their core dimensions.

Aspect	HRQoL	QoL	Well-being
Scope	Narrow: focuses on health aspects such as functioning, symptoms, and treatment	Broader: covers all life areas beyond health (e.g., goals, relationships, values)	Broadest: extends to societal, environmental, and economic dimensions
Key Components	Physical, psychological, and social health; treatment impact	Subjective life perception; cultural context; relationships	Positive state, meaning and purpose; societal contribution, resilience, equity
Perspective	Patient-centered: individual's experience of illness and care	Individual-centered: life satisfaction within cultural context	Individual & societal: thriving, collective well-being, sustainability

Table 2: Relationship and Core Dimensions of HRQoL, QoL and Well-being

In summary, HRQoL represents a subset of QoL, while QoL itself is embedded within the broader concept of well-being. Distinguishing these concepts is essential for valid measurement and application in research, clinical practice, and policy.

3.1.1.1. HRQoL as a Framework for Evaluating Self-Care Interventions

Self-care plays an increasingly important role in global health systems and encompasses the actions individuals take to promote health, prevent disease, and manage illness with or without professional support (WHO, 2022) In this context, preventive and therapeutic self-care interventions – including nutritional supplementation, hygiene practices, vaccination support, and early symptom management – may contribute substantially to maintaining health-related quality of life and reducing future disease burden.

Many self-care interventions primarily influence subjective and functional outcomes rather than mortality. Their benefits are often reflected in symptom relief, improved daily functioning, enhanced autonomy, and perceived well-being, all of which represent central dimensions of HRQoL. Consequently, HRQoL provides a particularly relevant framework for evaluating the broader effects of self-care beyond conventional clinical indicators.

The relevance of this perspective varies across health system contexts. In high-income settings, self-care is frequently associated with greater convenience, patient empowerment, and more efficient use of healthcare resources. In low-income settings, where access to formal healthcare services may be limited, self-care can represent one of the few feasible options for disease prevention and symptom management, thereby directly influencing functioning, productivity, and overall well-being (May et al., 2023). Against this background, HRQoL offers a valuable conceptual framework for examining how self-care practices affect individuals' lived experiences of health across diverse settings.

3.1.1.2. Relevance in Research, Health Care, and Health Policy

Health-related quality of life (HRQoL) has become an increasingly important outcome in both clinical research and routine healthcare. It is widely regarded as the most relevant patient-reported outcome (PRO) for capturing treatment effects from the patient's perspective (Valsecchi & Di Maio, 2025). Beyond clinical research, HRQoL is institutionally embedded in national health technology assessment and reimbursement frameworks across multiple countries. In Germany, HRQoL is embedded normatively in the Social Code and used as a benchmark for evaluating the benefit of medical interventions (Piontek et al., 2024). In England, the National Institute for Health and Care Excellence (NICE) uses QALYs, based on survival and health-related quality of life, as the reference metric for assessing cost-effectiveness. Similar approaches are used by the Haute Autorité de Santé (HAS) in France, the Canadian Agency for Drugs and Technologies in Health (CADTH) in Canada, and the Pharmaceutical Benefits Advisory Committee (PBAC) in Australia (Australian Government, 2008; CADTH, 2017; HAS, 2018; NICE, 2025).

In practical applications, HRQoL is increasingly incorporated into treatment guidelines and serves as a core outcome in health technology assessment and quality-of-care evaluations. In the United Kingdom, for example, HRQoL data – most commonly derived from the EQ-5D – is used to calculate QALYs in health technology assessments, with utility values based on population preferences informing policy decisions by institutions such as the National Institute for Health and Care Excellence (NICE) (Rowen et al., 2023). Yet, despite the availability of numerous PROMs for specific conditions, the methodological quality of these instruments varies considerably, indicating a need for further refinement and validation (Mokkink et al., 2024). Routine electronic assessments of HRQoL using standardized PROMs offer a promising approach to addressing these methodological challenges by promoting standardization, increasing transparency in measurement, and ensuring the systematic inclusion of the patient perspective in clinical practice. In addition, they facilitate more personalized treatment planning and enable consistent monitoring of health outcomes over time (Piontek et al., 2024). These advantages are particularly relevant in light of growing efforts to assess health outcomes not only in clinical settings, but also in the context of self-care and individual health management.

3.1.2. Common Instruments for Measuring Health-Related Quality of Life

As outlined already, there is a conceptual ambiguity between well-being, QoL, and HRQoL which also extends to the instruments used for their measurement. A variety of high-quality PROMs have been developed to assess HRQoL, differing in structure, length, dimensionality, and target populations (Churruca et al., 2021).

In the context of self-care and self-care, HRQoL questionnaires should fulfill specific requirements to ensure they accurately capture relevant outcomes. They must be useful for assessing self-treatable conditions by effectively measuring short-term, self-limiting conditions common

in therapeutic self-care. Furthermore, they should be capable of capturing subjective perceptions, remaining sensitive to perceived improvements in well-being even in the absence of objective clinical change. Instruments should offer different versions, including shorter or acute formats (e.g., 1-week recall) and adaptations for various populations, thereby increasing their flexibility.

For integration into economic evaluations, they should allow translation into QALYs through utility score derivation. Additionally, questionnaires must be sensitive to preventive self-care, capable of the assessment of effects associated with disease prevention and the attenuation of disease progression or long-term effects subtle changes associated with practices such as the use of vitamins, minerals, and supplements (VMS). To ensure practicality, they should impose a low respondent burden, being brief, easy to administer, and simple to interpret in both clinical and population-based contexts. Finally, a clear domain structure is essential, with distinct differentiation between physical, mental, and social dimensions to avoid misinterpretation and facilitate accurate assessment.

3.1.2.1. Generic PROMs for HRQoL Assessment

PROMs can be classified as generic or condition-specific instruments. Generic tools, such as the SF-36, EQ-5D, and WHOQOL, are designed for use across different populations and diseases. They are widely used to integrate patients' perspectives into healthcare evaluation and decision-making (Churruca et al., 2021). However, conceptual overlap between HRQoL, general health, and QoL may complicate interpretation and comparability of results (Costa et al., 2021).

SF-36 Health Survey

The Short Form 36 (SF-36) is one of the most widely used instruments for measuring HRQoL internationally (Miron Canelo et al., 2022). It assesses eight domains covering:

- Physical functioning and role limitations
- Social functioning
- Mental health and vitality
- Pain and general health perceptions

Scores are aggregated into a Physical Component Summary (PCS) and a Mental Component Summary (MCS) (Kaplan & Hays, 2022). The instrument is available in standard (4-week) and acute (1-week) versions and can also generate SF-6D utility values for QALY estimation (Mukuria et al., 2025).

Relevance for Self-Care

The SF-36 is particularly relevant for evaluating self-care and self-care, especially due to its acute version, which is suitable for short-term and self-limiting conditions. Its broad structure supports assessment of symptom relief and functional improvement.

EQ-5D

The **EQ-5D** is a generic PROM assessing five dimensions:

- Mobility
- Self-care
- Usual activities

- Pain/discomfort
- Anxiety/depression

It also includes the EQ-VAS, a visual analogue scale for overall health perception (EuroQol Research Foundation, 2019). The instrument is available in 3-level, 5-level, and youth versions.

Relevance for Self-Care

Due to its short and simple structure, the EQ-5D is practical for self-administration and routine monitoring in self-care contexts. However, it is generally less suitable for self-treatable conditions and OTC-related self-care, as it may lack sensitivity for mild or short-term conditions (Shaw et al., 2024).

WHOQOL-100 and WHOQOL-BREF

The WHOQOL instruments assess QoL from a broad and subjective perspective, emphasizing cultural context, personal goals, and social circumstances (WHO, 1998). They measure:

- Physical health
- Psychological health
- Independence
- Social relationships
- Environment
- Spirituality/personal beliefs

The WHOQOL-100 provides detailed assessments across 100 items, while the WHOQOL-BREF is a shorter 26-item version for quicker administration.

Relevance for Self-Care / Self-Care

The WHOQOL tools are only partially suitable for assessing HRQoL in self-care and self-care contexts. Their broad focus may limit sensitivity to short-term symptom changes, but they are valuable for evaluating long-term lifestyle, preventive behaviors, and overall well-being.

3.1.3. Relation to Health Economic Concepts: QALYs and the Role of Non-Prescription Medication

Health-Related Quality of Life is closely linked to the widely used metric of QALYs in health economics. QALYs combine both the quantity and quality of life gained through a health intervention into a single value, where one QALY represents one year lived in perfect health (May et al., 2020). Utility values, typically ranging from 0 (equivalent to death) to 1 (perfect health), are derived from HRQoL assessments and used to evaluate the cost-effectiveness of interventions across clinical and public health contexts (Whitehead & Ali, 2010). Because many self-care interventions primarily influence symptom burden, daily functioning, autonomy, and subjective well-being rather than mortality, QALYs provide a particularly relevant framework for capturing the broader benefits of evidence-based self-care interventions, including OTC treatments and selected supplements.

In contrast, global health and low-income settings more frequently rely on Disability-Adjusted Life Years (DALYs), which primarily focus on reductions in disease burden and premature

mortality (Bertram et al., 2021). The methodological differences between QALY- and DALY-based frameworks are therefore important when evaluating self-care interventions across diverse healthcare and socioeconomic contexts.

HRQoL provides the most suitable framework to assess these impacts because it captures both subjective well-being and functional health outcomes, dimensions directly influenced by effective self-care practices. For example, evidence-based use of OTC medication to relieve recurrent symptoms (e.g., pain, allergies, or gastrointestinal issues) can reduce discomfort, improve sleep, enhance productivity, and enable greater participation in daily life, thereby raising utility scores and potential QALY gains.

The following table compares the main methodological characteristics of QALYs and DALYs, including their conceptual focus, applications, and relevance in different healthcare and public health contexts.

Comparison of QALY- and DALY-based frameworks in health economic evaluation		
Aspect	**QALYs (Quality-Adjusted Life Years)**	**DALYs (Disability-Adjusted Life Years)**
Primary purpose	Measure health gains and improvements in quality of life	Measure disease burden and health losses
Core concept	Combines life expectancy with health-related quality of life	Combines premature mortality and disability
Scale / interpretation	0 = death, 1 = perfect health	Higher DALYs = greater disease burden
Methodological focus	Value gained from healthcare interventions	Health lost due to disease or disability
Key outcomes assessed	Functioning, autonomy, quality of life	Mortality, morbidity, disability
Use in prevention	Quantifies avoided future quality-of-life losses	Quantifies reductions in disease burden
Economic relevance	Evaluates cost-effectiveness and value for money	Supports prioritisation of public health interventions
Typical public health context	Chronic diseases, long-term care, treatment evaluation	Infectious diseases, severe morbidity, limited healthcare access

Table 3: Comparison of the main methodological Characteristics between QALYs and DALYs

However, important limitations in QALY methodology need to be addressed. Utility scores are often based on general population preferences, which may not fully reflect individual perceptions of benefit from non-prescription medication (Sawhney et al., 2023). Furthermore, while QALYs are commonly applied to high-cost, life-saving interventions, they are less frequently used to assess the cumulative value of low-cost, high-frequency self-care strategies, despite their widespread impact on public health and personal autonomy.

Ethical concerns remain regarding QALY-based evaluations, as commonly used utility measures such as the EQ-5D may underestimate subjective improvements in well-being experienced through self-care practices, particularly among individuals with chronic conditions (Schneider, 2022). Consequently, meaningful quality-of-life gains may remain insufficiently captured, highlighting the need for broader integration of PROMs and real-world evidence into HRQoL assessment and utility estimation (Schneider, 2022).

Overall, the concept of QALYs, based on well-established HRQoL data, offers a valuable framework for assessing the health and economic impact of non-prescription, evidence-based self-care. These interventions, though often excluded from formal cost-utility analyses, can contribute meaningfully to population health and individual well-being, especially when assessed through patient-centered and context-sensitive metrics. Among the available concepts, HRQoL remains the most appropriate for capturing the outcomes of self-care, as it directly reflects how individuals perceive and function in their daily lives.

3.1.4. Overview of Studies Examining Common Ailments and HRQoL

The three examples presented below serve to illustrate the concepts outlined above and demonstrate that corresponding evidence and studies also exist for common health conditions that are typically treatable within the framework of self-care.

Shimamoto et al. (2021): Menstrual Symptoms and HRQoL in Working Women (Japan)

This large cross-sectional study (n = 6,048) examined the impact of menstrual symptoms on HRQoL among working women using the EQ-5D-3L. The study found substantial reductions in utility scores, particularly associated with abdominal pain, headache, and depressed mood, indicating significant physical and psychological burden. These findings demonstrate that recurrent but self-limiting conditions can generate measurable HRQoL losses relevant for QALY-based evaluations and workplace health policies. In the context of self-care, the study highlights the importance of accessible symptom management strategies for improving daily functioning and well-being (Shimamoto et al., 2021).

Caballer et al. (2012): Allergic Rhinitis and HRQoL in Primary Care (Spain)

This multicenter observational study (n = 616) assessed HRQoL and productivity loss associated with allergic rhinitis in primary care using the SF-36 and Work Productivity and Activity (WPAI) instruments. Patients with allergic rhinitis showed HRQoL impairments and productivity losses comparable to or exceeding those observed in hypertension and diabetes. The findings underline that even non-severe, highly prevalent common ailments can substantially affect daily functioning and work productivity. This is particularly relevant for self-care and self-care, as allergic rhinitis can often be effectively managed through OTC treatments and early symptom control (Caballer et al., 2012).

Ashina et al. (2021): Tension-Type Headache and HRQoL (Denmark)

This population-based study (n = 547) investigated the effect of tension-type headache (TTH) on HRQoL using the SF-12. Both episodic and chronic TTH were associated with reduced physical and mental HRQoL, with poorer self-rated health and depression identified as key correlates. The study demonstrates that common headache disorders can significantly impair well-being despite being classified as common ailments. These findings support the relevance

of effective self-care and self-care approaches for symptom management and quality-of-life improvement (Ashina et al., 2021).

May/ Bauer et al. (2026)

This health economic modelling study examined the effects of hyoscine butylbromide (HBB, Buscopan®) self-care for functional abdominal cramping pain (FACP) across four countries (Argentina, Germany, Mexico, and the United Kingdom). Using a decision-analytic model, the study assessed health-related quality of life (HRQoL), productivity and socioeconomic outcomes associated with treatment compared to no treatment. The analysis demonstrated an annual gain of 0.03 QALYs per patient, corresponding to approximately 10 additional healthy days per year. Furthermore, substantial reductions in absenteeism and presenteeism as well as significant welfare and productivity gains were observed. The findings illustrate that treatment of recurrent but self-limiting gastrointestinal conditions through self-care can generate measurable HRQoL improvements and considerable societal benefits, supporting the relevance of self-care within health economic and public health frameworks (May et al., 2026).

Synthesis and Relevance to Self-Care

Collectively, these studies demonstrate that common, self-limiting conditions such as menstrual symptoms, allergic rhinitis, and tension-type headaches can significantly impair HRQoL and productivity. The findings emphasize the importance of self-care and self-care strategies, as timely symptom management may reduce functional limitations, improve daily well-being, and potentially decrease healthcare burden.

HRQoL has become an increasingly important concept in health outcomes research and policy evaluation. While instruments such as the SF-36 and EQ-5D are widely used, research on the impact of common ailments on HRQoL remains limited despite the high prevalence of these conditions. Understanding how MAs affect HRQoL is essential for strengthening the evidence base for self-care and self-care strategies, which are increasingly recognized as important components of patient-centered healthcare systems.

3.1.5. Framework for the economic valuation of QALYs

The monetary valuation of QALYs provides a methodological bridge between the health gains measured through utility-based instruments and the economic frameworks used to inform resource allocation decisions. While the previous section introduced QALYs as a metric for quantifying health-related quality-of-life effects, this section outlines how those QALY gains are translated into monetary estimates that can inform healthcare priority setting and reimbursement decisions. Without such a valuation step, health gains measured in QALYs remain abstract outcome measures that cannot be directly compared against the costs of delivering an intervention.

The economic valuation of QALYs is commonly based on willingness-to-pay (WTP) approaches. A WTP threshold represents the maximum amount a healthcare system or society is willing to pay for one additional QALY gained. Conceptually, the threshold reflects a judgment about the opportunity cost of healthcare spending: if an intervention generates one QALY at a cost below the threshold, the health gained is considered to outweigh the health forgone by displacing other activities; if the cost per QALY exceeds the threshold, the intervention is unlikely to represent an efficient use of resources (Thokala et al., 2018). These thresholds can

be estimated through demand-side approaches, such as contingent valuation surveys or discrete choice experiments that elicit societal preferences for health gains, or through supply-side approaches that derive thresholds from the observed opportunity cost of healthcare expenditure within a given system.

Historically, international health economic evaluations have frequently applied GDP-based threshold approaches. According to the widely cited WHO recommendations, interventions generating one additional QALY or DALY at a cost below one to three times GDP per capita may be considered cost-effective, with thresholds below one times GDP per capita interpreted as highly cost-effective (Robinson et al., 2017). The origins of this benchmark lie in the WHO Commission on Macroeconomics and Health; it was subsequently adopted by the WHO-CHOICE programme as a broad categorisation tool rather than a precise decision rule (Bertram et al., 2021).

Despite its widespread use, the GDP-based approach has been subject to increasing criticism. Empirical estimates of opportunity-cost-based thresholds suggest values far below the conventional one to three times GDP range. Woods et al. (2016), for example, estimated that in Malawi the threshold consistent with health opportunity cost falls between 1% and 51% of GDP per capita. Critics further argue that GDP-based thresholds insufficiently reflect actual budget constraints and may overstate what healthcare systems, particularly in low-income settings, can realistically afford (Chi et al., 2020). The WHO itself has moved away from recommending GDP-based thresholds as decision rules, and the current WHO-CHOICE programme presents cost-effectiveness results without applying a fixed threshold, allowing decision-makers to assess trade-offs directly (Bertram et al., 2021).

Beyond the choice of threshold, a central methodological tool in cost-effectiveness analysis is the incremental cost-effectiveness ratio (ICER), which compares the additional cost of an intervention with the additional health benefit it generates relative to a comparator. The ICER is calculated as:

$$ICER = \frac{C_{intervention} - C_{comparator}}{E_{intervention} - E_{comparator}}$$

where costs are measured in monetary units and effects are measured in QALYs (or, in some contexts, DALYs). The resulting ratio is compared against the selected threshold: an ICER below the threshold indicates that the intervention offers good value for money, while an ICER above it suggests that the additional health benefit may not justify the additional cost. For example, if a new treatment costs $500 more per patient than standard care and generates 0.02 additional QALYs, the ICER would be $25,000 per QALY gained; whether this represents acceptable value depends on whether the relevant threshold lies above or below that figure. ICER calculations rely on assumptions of marginal analysis, linearity of costs and effects, and appropriate specification of the comparator (Thokala et al., 2018). In practice, ICER estimates are subject to uncertainty arising from parameter variation and sampling variability, which is commonly addressed through probabilistic sensitivity analysis and the presentation of cost-effectiveness acceptability curves.

Taken together, WTP thresholds and ICER analysis provide the core methodological framework for translating QALY gains into comparable economic estimates. While GDP-based benchmarks remain in use for international comparisons, the trend toward context-specific, opportunity-cost-based thresholds reflects growing recognition that the monetary value of a

QALY gain depends on the resource constraints and health priorities of the setting in which it is generated.

3.2. Monetary Valuation of QALYs Generated Through Self-Care

Within the framework of the EcoSoc 1.0 study, health-related quality-of-life effects resulting from the treatment of common health conditions with non-prescription medicines were quantified for the first time at the global level. In the EcoSoc 2.0 study, these estimates were comprehensively updated using the latest available data (GSCF Socio-Economic Research Report, 2022; May et al., 2023b).

In the following subchapters, these utility effects of self-care — measured in QALYs — are used as the basis for a monetary valuation of the health benefits generated through self-care interventions and self-care.

3.2.1. Framework and Calculation of QALY in EcoSoc 1.0

An increase in the quality of life in a more restricted sense can, in principle, always result from self-care if the intensity of a health condition is reduced or its duration is shortened. In contrast, a loss of quality of life due to the occurrence of certain health conditions can be avoided through preventive measures. This may occur within the scope of the Self-Care First concept if the availability of over-the-counter preparations without the need for a physician consultation facilitates faster and/or earlier treatment of health conditions. Besides health effects, the time saved by the patient by not having to visit a physician could also improve an individual's overall quality of life.

Considerably more significant, however, are the gains in health-related quality of life that can be achieved when treatment becomes possible through self-care in the first place, especially through access to over-the-counter preparations. This corresponds to self-responsible treatment as defined under the Treatment Rate concept. As self-care is not to be seen as an alternative to medical treatment in this situation, but as an alternative to the choice to "wait & see", all symptom relief represents a net increase in health-related quality of life. Considering the extremely high number of STCs worldwide for which self-care is effectively the only treatment option, the quality-of-life effects in the context of the Treatment Rate concept are quantitatively of great importance.

As a measure for the quantitative assessment of health-related quality of life, the EcoSoc 1.0 study used the concept of QALYs, which is described above (GSCF Socio-Economic Research Report, 2022; May et al., 2023b).

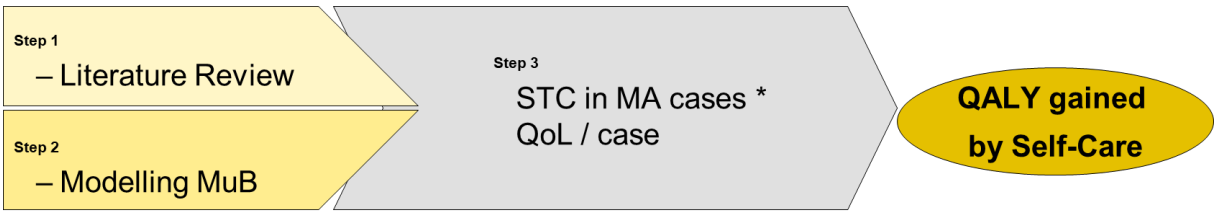


Figure 9: Calculation of QALY gained by Self-care in cases of MA in EcoSoc. 1.0

As the calculation of the effects of self-care on patients' productivity is conceptually and methodologically closely linked to the assessment of quality-of-life effects, both aspects are briefly outlined together in the following context.

In the Treatment Rate concept, the market data set resulting from step 1 was used to calculate productivity which is expressed as gained working days per country. This was calculated in step 2 by multiplying STC cases per country in the Treatment Rate concept with the gained productivity per case:

Formula *Treatment Rate* per Country Group

$$Market\ data\ set\ \times Treatment\ Rate\ share\ =\ Treatment\ Rate\ volume$$

The above formula is applied to each country depending on their Country Group. In order to get the total values per region, the corresponding country volumes are added up:

Formula *Treatment Rate* per Region

$$\sum_{Group\ A}^{Group\ C} (Market\ data\ set\ \times Treatment\ Rate\ share)$$

For the number of productive days gained and QALY gained, it is assumed that the average number of STC cases is directly associated with the number of OTC packs sold. Additionally, it is estimated that the duration of an untreated STC case is three days while the duration of an STC case treated with OTC products is shortened by 50%. Therefore, based on expert knowledge, existing data and literature, one and a half productive days can be gained through STC treated with OTC products. The aforementioned assumptions can be considered to be rather conservative.

In the final step the quality of life gained in terms of QALYs was calculated. Results from expert knowledge and a targeted literature search supported the assumption that a 10% increase in QALYs can be achieved through self-care worldwide and three qualities of life days are gained per OTC pack in the context of STCs Watson et al., 2015; Dineen-Griffin et al., 2020). At this point, it should be emphasised that regardless of the location in the world of an individual, the change in QALYs remains more or less the same as the effect of an OTC product on an STC case is always equivalent.

3.2.2. Calculating the monetary value of self-care-generated QALYs

The analysis builds upon the QALY estimates generated in the previous EcoSoc 2.0 study. In the original study (EcoSoc 1.0), the health-related quality-of-life gains associated with self-care interventions and OTC medicines were quantified in terms of QALYs (GSCF Socio-Economic Research Report, 2022; May et al., 2023b). The objective of the present analysis is to expand this approach by estimating the corresponding monetary value of these QALYs across different countries and healthcare settings.

Within health economics, monetary valuation of QALYs is commonly performed using WTP thresholds. For the present analysis, country-specific thresholds were estimated using three GDP-based scenarios derived from the historically applied WHO benchmark range of one to three times GDP per capita (Robinson et al., 2017). Although these GDP-based thresholds have been criticized for potentially overestimating affordability and not fully reflecting health opportunity costs, particularly in low-income countries (Woods et al., 2016; Ochalek et al.,

2018), they remain widely used for international comparison and exploratory economic modelling.

To account for cross-country differences in economic capacity, country-specific thresholds were estimated using three GDP-based threshold scenarios:

GDP-based threshold scenarios used for monetary valuation of QALYs	
Threshold Scenario	**Calculation**
Conservative scenario	1× GDP per capita
Base-case scenario	2× GDP per capita
Upper-bound scenario	3× GDP per capita

Table 4: GDP-based threshold scenarios used for monetary valuation of QALYs

The multiplier of 2x GDP per capita was used as the primary assumption throughout the analysis. This approach was selected because it represents the midpoint of the historically applied WHO threshold range between one- and three-times GDP per capita and therefore provides a balanced intermediate scenario between conservative and more permissive threshold assumptions (Robinson et al., 2017). In addition, the use of the midpoint multiplier allows greater comparability across countries and regions while avoiding reliance exclusively on either highly restrictive or highly permissive valuation assumptions.

The monetary value of QALYs generated through self-care was calculated by multiplying the estimated QALYs by the corresponding country-specific threshold value:

$$\text{Monetary Value of QALYs} = QALYs \times (GDP\ per\ capita \times Multiplier)$$

Using this approach, three separate monetary valuation scenarios were calculated for each country based on the 1×, 2×, and 3× GDP-per-capita thresholds.

Importantly, the present analysis maintained the original QALY methodology from the EcoSoc 1.0 study to ensure comparability across countries and regions. The original analysis did not differentiate QALY estimates according to differences in healthcare access, disease burden, healthcare expenditure, or income level between high-income and low-income countries. Consequently, the same underlying QALY estimates were applied throughout the present valuation analysis.

The resulting calculations provide an estimate of the monetary value currently generated through self-care interventions under existing healthcare conditions (“status quo”). In addition, the same methodological framework allows estimation of the potential future monetary value associated with additional QALYs that could be generated through expanded access to self-care interventions and OTC medicines.

The valuation results are presented separately for:

- global regions,
- high-income countries (Group A),
- middle-income countries (Group B),
- and low-income countries (Group C)

Region	Total QALYs	Monetary Value (1× GDP)	Monetary Value (2× GDP)	Monetary Value (3× GDP)
North America	1mn	104,450,522,944	208,901,045,887	313,351,568,831
Europe & Central Asia	4mn	111,666,184,725	223,332,369,449	334,998,554,174
East Asia & Pacific	6mn	82,522,114,705	165,044,229,409	247,566,344,114
Latin America & Caribbean	3mn	20,503,146,575	41,006,293,149	61,509,439,724
Middle East & North Africa	2mn	13,319,203,780	26,638,407,559	39,957,611,339
South Asia	7mn	15,987,592,231	31,975,184,461	47,962,776,692
Sub-Saharan Africa	2mn	**3,742,396,549**	7,484,793,098	11,227,189,647

Table 5: Monetary valuation of QALYa generated through self-care by global region

The table above demonstrates substantial regional variation in the estimated monetary value of QALYs generated through self-care interventions. Regions with higher GDP per capita, particularly North America and Europe & Central Asia, show markedly higher monetary valuations due to higher willingness-to-pay thresholds and greater economic capacity. In contrast, lower monetary values observed in regions such as Sub-Saharan Africa and South Asia primarily reflect lower GDP-based thresholds rather than lower societal relevance of self-care interventions. These findings illustrate the strong influence of economic context on the monetary valuation of health-related quality-of-life gains.

Income Group	Total QALYs	Monetary Value (1× GDP)	Monetary Value (2× GDP)	Monetary Value (3× GDP)
Group A	5 mn	244,175,000,000	488,350,000,000	732,525,000,000
Group B	10 mn	90,376,500,000	180,753,000,000	271,129,500,000
Group C	8mn	17,639,592,325	35,279,184,649	52,918,776,974

Table 6: Monetary valuation of QALYs generated through self-care by country income group

The above table further highlights the relationship between national income level and the estimated monetary value of QALYs generated through self-care. High-income countries (Group A) account for the highest overall monetary valuation, reflecting substantially higher GDP-based willingness-to-pay thresholds. Middle-income countries (Group B) demonstrate intermediate valuation levels, whereas low-income countries (Group C) show considerably lower monetary estimates despite potentially substantial health benefits. This pattern suggests that GDP-based valuation approaches may underestimate the broader societal value of self-care interventions in resource-constrained settings where access to formal healthcare remains limited.

The results show that the monetary value of QALYs generated through self-care differs substantially across regions and income groups. This reflects differences in economic capacity, since the valuation is based on GDP-related willingness to pay thresholds. The 2× GDP scenario represents the main estimate, while the 1× and 3× scenarios illustrate the range of possible valuations.

3.3. Cost-Effectiveness Analysis of Self-Care

Building on the monetary valuation of QALY gains presented in the previous section, the following analysis shifts the perspective from absolute value to relative efficiency. Cost-effectiveness analysis compares the costs of generating health gains through self-care interventions against the value of those gains, assessed against international willingness-to-pay benchmarks. This approach allows the assessment of whether self-care and OTC medicines represent an efficient use of both individual and societal resources across different healthcare settings.

3.3.1. Methodological framework and evaluation of cost-effectiveness of Self-Care with non-prescription medicines

Based on the monetary valuation of QALYs presented in Section 3.1.5, the present analysis subsequently evaluated the cost-effectiveness of self-care interventions across countries and healthcare settings. Cost-effectiveness analysis is commonly used within health economics to assess whether health interventions provide sufficient health gains relative to their associated costs. The ICER represents the additional cost required to achieve one additional unit of health benefit, such as one QALY or DALY gained.

The following figure summarises the methodological framework for the valuation of QALYs outlined in the preceding subsection and the corresponding conceptual approach used to assess and calculate the cost-effectiveness of preventive self-care interventions.

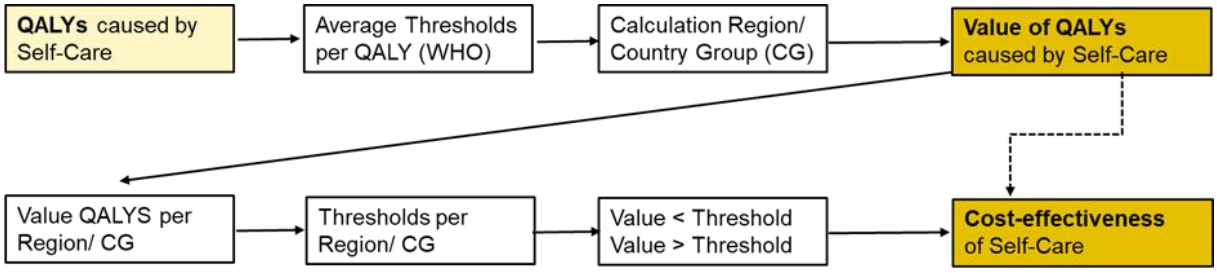


Figure 10: Methodological approach to the monetary valuation of QALYs in the context of self-care and the assessment of cost-effectiveness

In the present analysis, the ICER was estimated for each country by comparing the treatment costs associated with self-care interventions with the monetized value of the corresponding QALY gains. The base-case analysis applied the threshold scenario of 2× GDP per capita, while the alternative threshold assumptions (1× and 3× GDP per capita) were additionally considered as sensitivity scenarios.

To facilitate interpretation and international comparison, countries were categorized according to the ratio between the calculated ICER and the corresponding national cost-effectiveness

threshold. These categories formed the basis for the comparative global cost-effectiveness map.

Country Classification based on ICER relative to cost-effectiveness threshold		
Category	**ICER / Threshold**	**Interpretation**
4	< 0.25	Very cost-effective
3	0.25 – 0.5	Cost-effective
2	0.5 – 1	Borderline
1	> 1	Not cost-effective

Table 7: Country Classification based on ICER relative to cost-effectiveness threshold

The resulting global cost-effectiveness classification demonstrates a clear relationship between national economic capacity and the estimated cost-effectiveness of self-care interventions. High-income countries in North America, Europe, and parts of East Asia were predominantly classified as “very cost-effective” or “cost-effective.” This reflects higher willingness-to-pay thresholds, greater healthcare expenditure, and stronger healthcare infrastructure, allowing interventions to remain well within acceptable economic ranges.

Middle-income countries displayed more heterogeneous patterns, reflecting differences in healthcare financing, healthcare access, pricing structures, and national threshold levels. Regions such as Latin America and parts of Asia showed a mixture of cost-effectiveness categories, indicating transitional healthcare system characteristics and varying economic capacity.

In contrast, many low-income countries, particularly in Sub-Saharan Africa, were concentrated in the “borderline” or “not cost-effective” categories. This pattern is primarily driven by substantially lower cost-effectiveness thresholds resulting from low GDP per capita and severe healthcare budget constraints. Consequently, interventions in these settings must generate very large health gains at extremely low cost in order to remain below national thresholds.

Global Cost-Effectiveness Classification of Self-Care Interventions					
Regional overview					
Region	**Countries**	**Avg Threshold**	**Avg ICER**	**Median ICER/Threshold**	**Orange countries**
Sub-Saharan Africa	44	4.24	4.46	132,5%	25
South Asia	6	4.01	2.99	45,8%	2
Latin America & Caribbean	22	20.64	6.88	33,1%	2
East Asia & Pacific	18	41.72	5.98	27,3%	3
Europe & Central Asia	45	60.30	9.88	21,7%	1
Middle East & North Africa	18	37.88	5.83	21,6%	2
North America	2	136.21	15.57	12,5%	0

Table 8: Global Cost-Effectiveness Classification of Self-Care Interventions

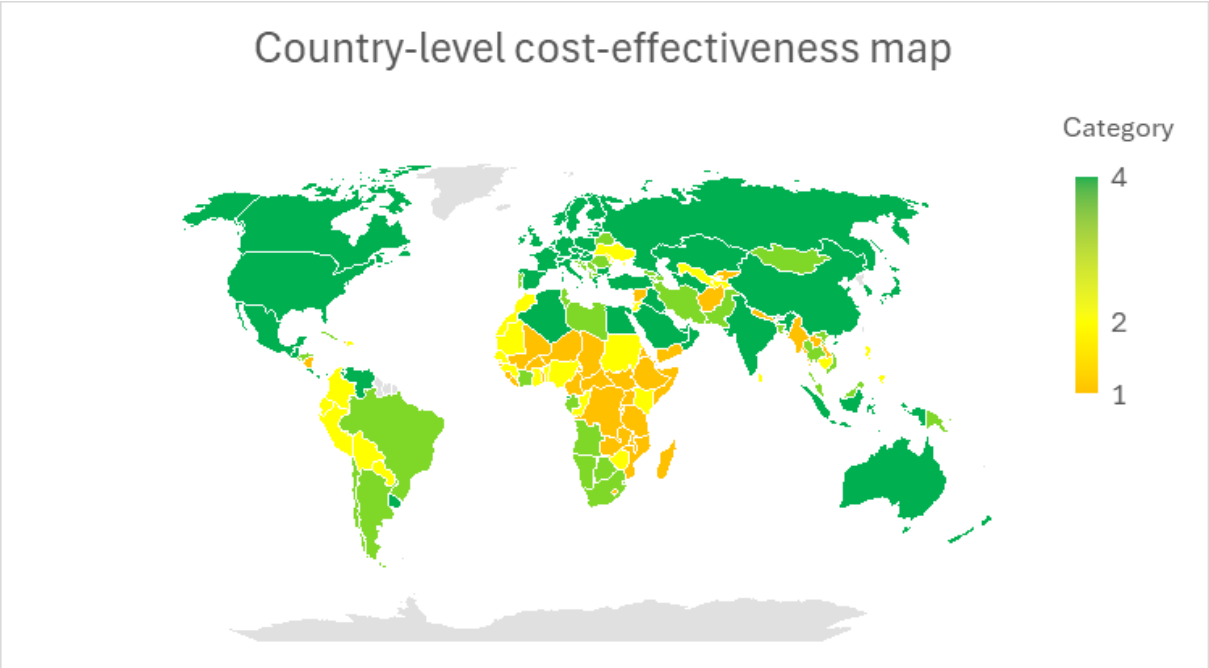


Figure 11: Global cost-effectiveness classification of self-care interventions based on ICER-to-threshold ratios

The map illustrates the relative cost-effectiveness of self-care interventions across countries based on the ratio between the ICER and the respective national threshold. A clear global pattern emerges. High-income countries in North America, Europe, and parts of East Asia are predominantly classified as “very cost-effective” or “cost-effective” (dark and light green). This reflects higher willingness to pay thresholds, greater healthcare expenditure, and stronger healthcare system capacity, allowing interventions to remain well within acceptable economic ranges.

Middle-income countries display a more heterogeneous distribution, reflecting differences in healthcare financing, healthcare access, pricing structures, and national threshold levels. Regions such as Latin America and parts of Asia show a mixture of cost-effectiveness categories, indicating transitional healthcare system characteristics and varying economic capacity.

In contrast, many low-income countries, particularly in Sub-Saharan Africa, are concentrated in the “borderline” or “not cost-effective” categories (yellow to orange). This pattern is primarily driven by substantially lower cost-effectiveness thresholds resulting from low GDP per capita and severe healthcare budget constraints. Consequently, interventions in these settings must generate very large health gains at extremely low cost in order to remain below national thresholds.

At the same time, selected OTC and self-care interventions in low-income countries may function as high-impact public health tools. Evidence from global health frameworks such as Disease Control Priorities, 3rd edition (DCP3) and WHO-CHOICE suggests that interventions such as oral rehydration solutions (ORS), zinc supplementation, deworming treatments, vitamin A supplementation, iron and folic acid supplementation during pregnancy, and insecticide-treated mosquito nets (ITNs) can achieve extremely low costs per DALY averted and rank among the most cost-effective public health interventions in resource-constrained settings.

Illustrative cost-effectiveness of selected public health interventions			
Intervention	**Illustrative cost per Disability-Adjusted Life Year (DALY) averted (USD)**	**General classification**	**Source**
ORS (oral rehydration solutions)	~70–150	Very cost-effective	Robberstad et al. 2004; DCP3 RMNCH Ch. 9
Zinc supplementation for diarrheal diseases	~10–100	Very cost-effective	Robberstad et al. 2004; DCP3 RMNCH Ch. 9
Deworming treatments	~10–150	Very cost-effective	Lo et al. 2015; DCP3 NTD Ch. 17
Vitamin A supplementation	~4–100	Very cost-effective	DCP3 RMNCH Ch. 8; GiveWell 2024
Iron/Folic acid supplementation during pregnancy	~15–115	Very cost-effective	WHO MMS Technical Report 2021
Insecticide-treated mosquito nets (ITNs)	~5–31	Extremely cost-effective	DCP2 Table 21.6; DCP3 rankings

Table 9: Illustrative cost-effectiveness of selected public health interventions

At the same time, direct comparisons between OTC effectiveness across income settings should be interpreted cautiously. The present analysis is largely based on QALY evidence derived from high-income countries, whereas global health evaluations in low-income countries more commonly rely on Disability-Adjusted Life Years. While QALYs primarily capture gains in quality of life and functioning, DALYs focus more strongly on reductions in disease burden and premature mortality. Consequently, the same intervention may generate substantially different measured benefits depending on the surrounding healthcare context, disease burden, and availability of alternative treatment options.

An important consideration in interpreting these findings is that the role and impact of self-care interventions differ fundamentally across healthcare settings. In many low-income countries, access to OTC products and self-care interventions is strongly constrained by limited purchasing power and restricted healthcare access. As a result, self-care is often concentrated on a relatively small number of essential indications, treatment situations, and products associated with comparatively high health gains and high cost-effectiveness.

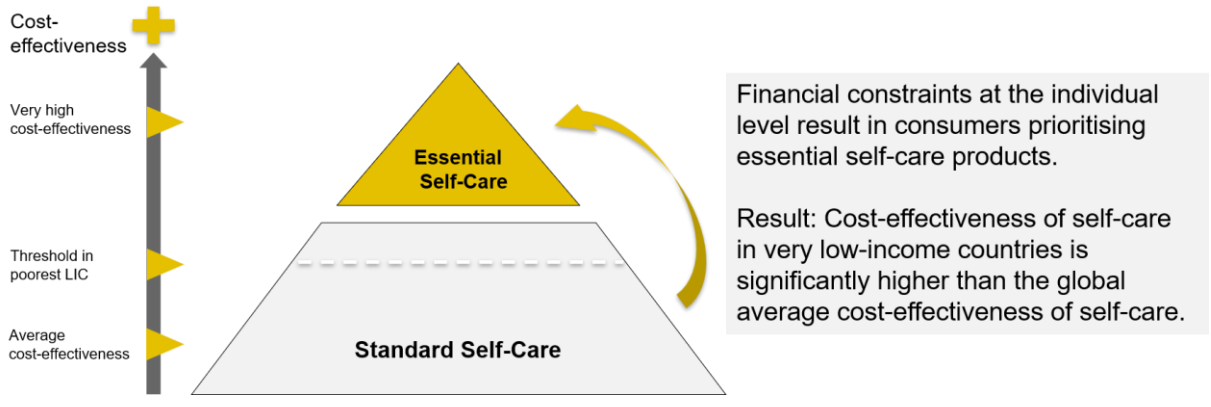


Figure 12: Prioritisation and cost-effectiveness of self-care in very low-income settings

This differs substantially from utilization patterns in high-income countries, where OTC use also includes many low-impact, convenience-oriented, or lifestyle-related products. The QALY estimates applied in the original EcoSoc 1.0 analysis, however, were based on average OTC utilization patterns and therefore reflect the broader average across all OTC applications rather than the selective high impact use frequently observed in low-income settings.

For example, the use of paracetamol in cases of severe fever or acute pain may generate substantially larger quality-of-life improvements than the use of products intended primarily for mild symptom relief, such as Echinacea preparations or zinc products used for shortening uncomplicated common colds. Similarly, essential self-care interventions targeting diarrheal diseases, malnutrition, or infectious diseases may produce disproportionately large health gains in resource-constrained settings. Consequently, the present analysis may underestimate the true societal and health economic value of self-care interventions in low-income countries.

3.3.2. Challenges and limitations of cost-effectiveness analyses in self-care

Several limitations should be considered when interpreting the results of this analysis. First, the study applies QALY estimates derived primarily from evidence generated in high-income countries and uses these estimates across all countries included in the analysis. As a result, differences in disease burden, healthcare access, treatment alternatives, and healthcare system capacity between high-income and low-income countries are not fully captured.

A further limitation relates to the comparability of QALY- and DALY-based evaluation frameworks. While high-income countries commonly rely on QALYs to assess gains in quality of life and health outcomes, low-income countries and global health frameworks more frequently use DALYs, which focus on reducing disease burden and premature mortality. As a result, direct comparisons across settings should be interpreted cautiously.

In addition, the use of GDP-based thresholds represents a simplification of actual healthcare decision-making processes. Although GDP-per-capita thresholds are widely used for international comparisons, they may not adequately reflect true health opportunity costs, budget constraints, or national healthcare priorities, particularly in resource-constrained settings.

Finally, self-care interventions themselves are highly heterogeneous. The present analysis does not fully differentiate between well-being-oriented OTC products commonly used in high-income countries and high-impact public health interventions frequently used in low-income settings. Consequently, aggregated global averages may obscure important differences in the actual population health impact of specific self-care interventions across countries and healthcare systems.

3.4. Interpretation and Conclusions: Self-Care and Quality of Life

The preceding conceptual analysis of different approaches to measuring quality of life has demonstrated that self-care interventions may potentially influence multiple dimensions of individual well-being and quality of life. In accordance with their intended therapeutic purpose and regulatory approval, non-prescription medicines primarily aim to improve health-related quality of life by alleviating symptoms and functional limitations associated with common health

conditions. In a broader perspective, these improvements may subsequently also contribute to overall quality of life, individual well-being and general life satisfaction.

Within health economics and health outcomes research (HEOR), however, primary emphasis is typically placed on health-related quality of life. This is largely due to the fact that reimbursement and resource allocation decisions within publicly financed healthcare systems are generally based on external clinical evidence of high methodological quality, preferably derived from RCTs. Consequently, health economic evaluations in healthcare policy commonly rely on standardised and internationally comparable health-related outcome measures.

In the context of self-care, where healthcare expenditures are typically borne directly by consumers rather than public payers, broader utility concepts may also possess methodological relevance. From an economic perspective, consumers' willingness to pay for OTC medicines already implies the existence of a subjectively perceived utility associated with the use of such products. Under the assumption of rational consumer behaviour, this willingness to pay may itself be interpreted as evidence for the existence of individual utility gains.

Nevertheless, the present analysis deliberately follows the established methodological standards of international health economics and pharmaceutical economics by focusing primarily on health-related quality of life. In this context, the Quality-Adjusted Life Year (QALY) is widely regarded as the international gold standard for measuring health-related utility effects and changes in health status resulting from healthcare interventions.

The QALY effects associated with the treatment of common health conditions through self-care were already quantified within the framework of EcoSoc 1.0 and were updated in the first part of the present report (EcoSoc 2.0, see Section 3.2). Building upon these results, the present analysis now extends the evaluation by translating these quantified health gains into monetary terms for the first time.

The central contribution of this approach lies in the fact that not only indirect economic effects of self-care - such as healthcare cost savings and welfare gains - can now be quantified, but also the direct health-related benefits experienced by patients themselves can be expressed as monetary equivalents.

For this purpose, the analysis applies valuation thresholds based on national gross national income (GNI) per capita levels, consistent with WHO-related recommendations frequently used in international health economic evaluation to approximate societal willingness to pay for one additional QALY within a given country context. In practical terms, this approach assigns a monetary value to health gains generated through self-care that corresponds to the level of value implicitly accepted for publicly financed healthcare interventions within the respective healthcare system.

This methodology creates a common and internationally comparable framework for evaluating the health benefits of pharmaceutical interventions, irrespective of whether medicines are obtained through physician prescription or used within self-care and self-care settings.

Particularly for policymakers, healthcare decision-makers and international stakeholders, this approach facilitates a more direct comparison between the value generated by self-care interventions and other healthcare measures competing for limited healthcare resources.

The results indicate that, from the perspective of consumers and patients themselves, OTC medicines frequently demonstrate a highly favourable relationship between health-related utility gains and treatment costs. In many cases, the monetary value of the health gains generated through self-care substantially exceeds the actual costs incurred for the corresponding OTC products.

This relationship becomes even more apparent in the subsequent analytical step, which evaluates the cost-effectiveness of self-care interventions involving OTC medicines. For this purpose, the costs required to generate one additional QALY through self-care were compared with the country-specific willingness-to-pay thresholds for one QALY across all countries included in the study sample (n = 155).

According to internationally established health economic principles, an intervention is considered cost-effective if the costs per additional QALY remain below the respective societal willingness-to-pay threshold.

Based on this framework, self-care and self-care with OTC products were found to be cost-effective across all global regions as well as within the aggregated country groups of HICs, MICs and LICs. Only a limited number of countries at the very lower end of the global income distribution, particularly several countries in Sub-Saharan Africa, did not formally meet the defined cost-effectiveness threshold under the initial model assumptions.

However, additional analyses and conceptual considerations indicate that this finding is primarily attributable to methodological limitations associated with applying an average representative self-care case to extremely low-income settings. Under conditions of severe household budget constraints, the utilisation of OTC medicines tends to be concentrated on a very limited number of highly essential products and urgent treatment situations.

Precisely in these highly selective treatment situations, however, it appears plausible that the health gains achieved through self-care are substantially above average. Consequently, the actual cost-effectiveness of self-care interventions in the poorest countries may be systematically underestimated within standardised average-case modelling approaches.

Finally, it should be noted that all analyses and calculations presented in this chapter exclusively relate to the curative use of OTC medicines within self-care settings. The conceptual framework applied here cannot be transferred directly to preventive self-care interventions, as preventive self-care scenarios are methodologically more complex and considerably more heterogeneous in nature.

The exemplary analysis of preventive self-care interventions, including their potential cost-effectiveness implications, is therefore addressed separately in the following chapter.

4. The Role of Self-Care and Over-the-Counter Medicines in Prevention

Prevention is a fundamental pillar of public health and plays a central role in addressing the growing burden of diseases, particularly non-communicable diseases (NCDs), while also contributing to the control of communicable diseases, improving population health outcomes, and ensuring the sustainability of healthcare systems. In line with guidance from the World Health

Organization, there is increasing recognition that effective prevention requires not only clinical interventions but also approaches that empower individuals to actively manage their own health across the life course. In this context, self-care and OTC medicines have emerged as important components of prevention-oriented health systems. WHO frameworks on self-care interventions and NCD prevention highlight their potential to expand access to care, support early intervention, and reduce pressure on healthcare systems. At the same time, self-care practices also play a role in the prevention and management of communicable diseases, for example through adequate symptom management, hygiene-related behaviors, and early treatment. By enabling individuals to take informed decisions about their health, these interventions can complement formal healthcare services and contribute to prevention across different stages of the disease continuum.

The following chapter first outlines the conceptual foundations of prevention in public health. It then examines how self-care interventions, particularly OTC medicines, can contribute to prevention. Subsequently, these relationships are illustrated through selected examples supported by clinical and health economic evidence. Finally, conclusions are drawn regarding the specific role and significance of prevention within the context of self-care, particularly in distinction to the treatment of symptoms and diseases using OTC medicines.

4.1. Prevention in Public Health and the Role of Self-Care Interventions

This section introduces prevention as a core concept in public health and outlines its relevance for improving population health outcomes across different disease areas. It provides the conceptual foundation for understanding how preventive interventions operate along the continuum of disease and highlights their importance for research, practice, and policy. In doing so, it also establishes a basis for analyzing the role of self-care interventions, particularly OTC medicines, as accessible, low-threshold tools that can support prevention across different stages of the health - disease continuum.

4.1.1. Conceptual Foundations of Prevention in Public Health

Prevention is a core principle of public health and a central mechanism for improving population health outcomes across diverse disease areas. It is grounded in the concept of the natural history of disease, which describes the progression from exposure to risk factors, through subclinical and clinical stages, to outcomes such as recovery, disability, or death. Preventive interventions aim to interrupt this progression at different points, either by reducing exposure to risk factors, detecting disease at an early stage, or limiting its consequences once established (Keyes et al., 2026).

The WHO defines prevention as “measures to reduce the occurrence of risk factors, prevent the occurrence of disease, to arrest its progress and reduce its consequences once established” (WHO, 2021a, p.5). This definition highlights that prevention extends beyond avoiding disease onset to include early intervention and mitigation of disease impact. In contemporary public health, prevention is increasingly understood as a continuum of interventions across the life course (Mikkelsen et al., 2019).

This perspective is relevant for both communicable and non-communicable diseases, although their relative importance varies across regions and health systems. Infectious diseases remain

a major concern, particularly in low- and middle-income countries, requiring sustained efforts in vaccination, hygiene, and surveillance (WHO, n.d.). At the same time, NCDs represent a growing share of global morbidity and mortality, particularly in ageing populations (Vos et al., 2020). As a result, prevention strategies must address both acute and chronic disease burdens simultaneously and adapt to different epidemiological and socioeconomic contexts.

Recent analyses by the OECD further underline the growing impact of chronic diseases, highlighting that they remain a major driver of healthcare expenditure and productivity losses across high-income countries. Importantly, investments in prevention, particularly targeting modifiable risk factors, generate greater health and economic returns than treatment-focused approaches alone (OECD, 2026).

Modern prevention frameworks also recognize that disease risk is shaped by a complex interaction of biological, behavioral, social, environmental, and structural determinants (Brownson et al., 2009). Consequently, prevention is not only a clinical or behavioral concept but also a policy-relevant and system-oriented strategy, closely linked to broader health system goals such as Universal Health Coverage UHC, health equity, and sustainability (WHO & UNICEF, 2018).

4.1.2. Distinction from Related Concepts

To ensure conceptual clarity, prevention must be distinguished from related public health concepts that operate at different levels and with different objectives.

Health promotion takes a broader perspective by addressing the underlying determinants of health, including social, economic, and environmental conditions, and aims to empower individuals and communities (WHO, 2021a). While prevention focuses more specifically on reducing the risk or impact of defined diseases, health promotion addresses upstream determinants of health and wellbeing (WHO, 1986).

Disease control refers to efforts to reduce the incidence, prevalence, or severity of diseases through surveillance, case management, and targeted interventions (Christensen, 2001). It is particularly relevant in the context of communicable diseases, where rapid response to outbreaks is essential (Hellewell et al., 2020). Compared to prevention, disease control is often more reactive, although both approaches are closely interconnected.

Health protection focuses on safeguarding populations from external threats such as environmental hazards, occupational risks, and infectious disease outbreaks through regulatory and policy measures (WHO EMRO, n.d.). It plays a key role in population-level risk mitigation and complements prevention strategies.

These concepts are complementary and often overlap in practice, but prevention retains a distinct role in targeting specific disease pathways and risk factors within a broader public health framework (Caron et al., 2024).

4.1.3. Levels of Prevention

The preventive health strategies are divided into separate phases, each of which is intended to intervene at particular stages of the history of the disease with the ultimate goal of preventing the emergence of a disease and alleviating the complications of the disease that has already appeared (AbdulRaheem, 2023).

These preventive measures are traditionally divided into primordial, primary, secondary and tertiary prevention, and the newer concept of quaternary prevention is also central in modern-day healthcare (Brodersen et al., 2014). It should be noted that the categorization of preventive measures may be subject to context, and these lines may also be uncertain and vague. The modern prevention models identify five levels that each cover various points in the health-disease continuum and demand certain intervention strategies.

4.1.3.1. Primordial Prevention

Primordial prevention focuses on social, economic, and environmental determinants of disease risk factors that accentuate populations in an underlying state. The level deals with root causes including poverty, access to education, quality of the environment, and social inequities prior to the development of risk factors in population (AbdulRaheem, 2023).

Primordial prevention, often directed towards children, seeks to reduce exposure to risk factors in early life to affect the underlying developmental stage of disease. They can be exemplified by policies that support healthy urbanism, extensive tobacco control laws, educational programs that deter the adoption of risk factors, and social policies that consider income inequality and environmental justice (WHO, 2024a).

From a global perspective, primordial prevention is relevant for both communicable and non-communicable diseases. Structural determinants such as housing, sanitation, and environmental exposures influence infectious disease transmission, while also shaping long-term risks for chronic diseases (WHO, 2016; WHO, 2018).

Self-care plays an indirect role at this level, primarily through health literacy, behavioral norms, and community engagement that influence long-term risk exposure (WHO, 2022a).

4.1.3.2. Primary Prevention

Primary prevention aims at the prevention of the onset of an illness in healthy people by modifying risk factors and enhancing protective factors. Some of the interventions used are vaccination programs, dietary counselling, promoting physical activities, environmental changes that lower exposure to disease-causing agents and behavioural interventions that encourage healthy lifestyle uptake (Keyes et al., 2025).

This tier is the traditional prevention model of preventing disease before it occurs by directly engaging those at risk and the population at risk. It is highly relevant for both communicable diseases, where vaccination and hygiene measures are essential, and for non-communicable diseases, where behavioral risk factors play a dominant role (WHO, EMRO, n.d.; WHO, 2021a).

WHO identifies a range of highly cost-effective primary prevention interventions (“Best Buys”), particularly for NCDs, targeting risk factors such as tobacco use, unhealthy diets, and physical inactivity (WHO, 2024a).

Self-care is central at this level. According to WHO, self-care enables individuals to promote health and prevent disease through informed behaviors, lifestyle changes, and the use of accessible interventions such as OTC medicines (WHO, 2019).

4.1.3.3. Secondary Prevention

Secondary prevention entails early detection and intervention of the disease to avert disease progression and complications by screening, surveillance and early treatment programs (Santaballa et al., 2020).

The major approaches are population-based screening programs, regular health examinations, diagnostic tests on asymptomatic diseases and timely response to pre-clinical disease conditions. Secondary prevention methods such as mammography screening of breast cancer, colonoscopy of colorectal cancer, and regular blood pressure monitoring are examples of detecting diseases at an earlier stage when treatment is more effective (Jackson et al., 2024).

This level is particularly important for non-communicable diseases, where early detection significantly improves outcomes and reduces long-term healthcare costs (OECD, 2026). However, it is equally relevant for communicable diseases, where early identification and response can limit transmission and improve outbreak control (WHO, 2022a).

Self-care contributes through symptom recognition, self-monitoring, and early care-seeking behavior, increasingly supported by digital health tools and pharmacy-based services (WHO, 2019).

4.1.3.4. Tertiary Prevention

Tertiary prevention involves treating existing diseases to prevent complications, reduce disability, improve quality of life, and prevent recurrence of the disease by optimizing therapy, rehabilitation, and controlling lifetime disease (Keyes et al., 2026).

This tier involves full rehabilitation, systematic programs on chronic disease management, prescription adherence, and measures to avoid disease progression or subsequent complications. It is particularly relevant for chronic diseases but also applies to communicable diseases with long-term consequences (AbdulRaheem, 2023).

WHO highlights the importance of integrated care and long-term disease management in reducing complications and improving quality of life (WHO & UNICEF, 2018).

Self-care is central at this level, as individuals are responsible for day-to-day disease management, including medication adherence, symptom control, and lifestyle adjustments (WHO, 2022a).

4.1.3.5. Quaternary Prevention

Quaternary prevention is the most recently articulated level of prevention and addresses a distinct challenge: protecting individuals from overmedicalisation, excessive healthcare intervention, and iatrogenic injury (AbdulRaheem, 2023). While primary, secondary, and tertiary prevention focus on preventing disease, detecting it early, or managing its consequences, quaternary prevention asks whether the medical intervention itself may cause more harm than good.

This tier considers risks such as unnecessary diagnostic tests, overdiagnosis (identifying conditions that would never cause symptoms), adverse effects of treatment, and healthcare-associated infections. The relevance of quaternary prevention has grown substantially as the evidence on medical overuse has accumulated. For example, widespread antibiotic prescribing for self-limiting viral infections contributes to antimicrobial resistance without clinical benefit; routine imaging for nonspecific low back pain leads to incidental findings and invasive follow-

up procedures without improving outcomes; and overtreatment of certain screen-detected conditions can result in harm that outweighs the preventive benefit (Keyes et al., 2025).

While the WHO does not formally define quaternary prevention as a separate category in its prevention framework, the concept is closely aligned with established WHO priorities on rational use of medicines, patient safety, and avoidance of harm in healthcare delivery (WHO, 2017). It also connects to broader efforts in health systems to reduce low-value care and to implement Choosing Wisely-type initiatives that discourage unnecessary procedures.

Self-care contributes to this level by promoting appropriate healthcare utilization, informed decision-making, and responsible use of OTC medicines, although safe implementation requires appropriate guidance and integration into health systems (WHO, 2022a).

Figure 13 illustrates the five levels of modern prevention across the health–disease continuum: primordial, primary, secondary, tertiary, and quaternary prevention. It demonstrates how targeted interventions at different stages contribute to improved public health outcomes, ranging from the prevention of risk factors to early detection, rehabilitation, and the avoidance of overmedicalization.

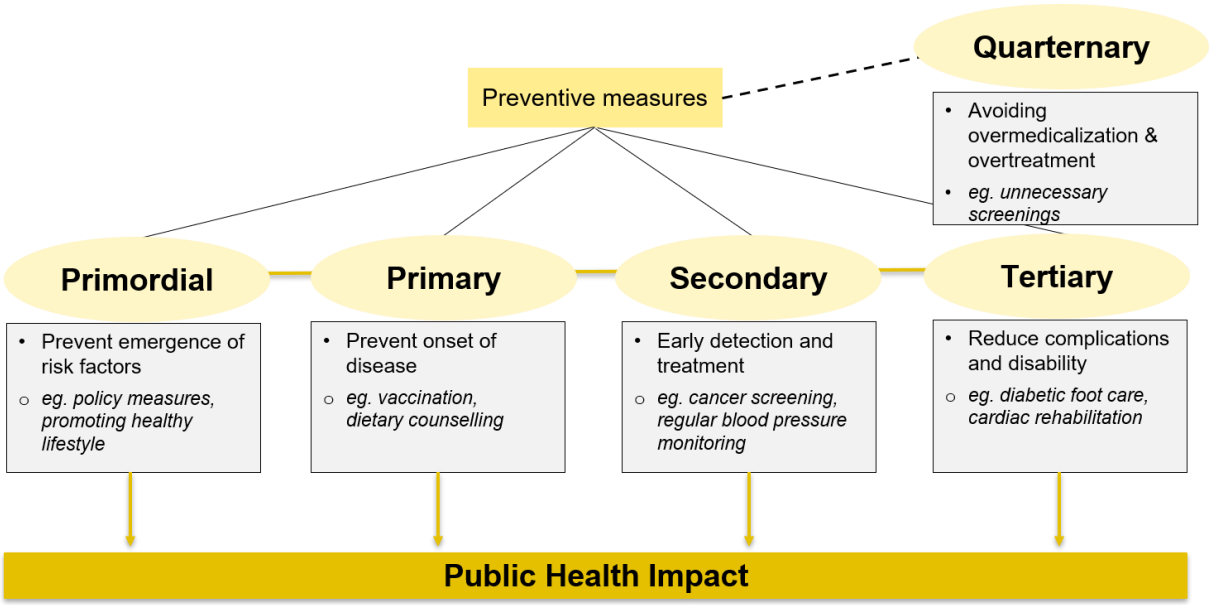


Figure 14: Multilevel Prevention and Its Impact on Public Health

4.1.4. Relevance in Research, Practice, and Policy

Prevention plays a critical role across research, clinical practice, and health policy, particularly in light of the increasing burden of both chronic and infectious diseases. Health systems worldwide face growing pressures due to demographic changes, epidemiological transitions, and rising healthcare costs. Chronic diseases account for a substantial proportion of healthcare expenditure globally, reinforcing the importance of prevention as a cost-containment and health improvement strategy (OECD, 2022). Economic analyses consistently demonstrate that prevention can yield substantial returns on investment through reduced healthcare utilization, improved productivity, and long-term health gains. For example, the WHO estimates that scaling up cost-effective interventions for NCDs could generate significant health and economic benefits, including reductions in premature mortality, fewer DALYs, and gains in healthy life years (WHO, 2021b). Similarly, OECD analyses highlight that prevention strategies targeting

major risk factors provide greater long-term value than treatment-focused approaches alone (OECD, 2025).

From a policy perspective, prevention is closely linked to the objectives of UHC, as it supports equitable access to care, reduces unmet need, and enhances system sustainability (WHO & UNICEF, 2018). Effective prevention strategies also contribute to reducing health inequalities by addressing disparities in risk exposure and access to services (Marmot et al., 2010).

4.1.5. Integration of Self-Care in Prevention and Its Public Health and Economic Relevance

Within modern prevention frameworks, self-care represents an important mechanism for extending prevention beyond formal healthcare systems. The World Health Organization defines self-care as “the ability of individuals, families and communities to promote health, prevent disease, maintain health, and cope with illness and disability with or without the support of a health care provider” (WHO, 2019). Self-care supports prevention through health maintenance, early symptom recognition, and disease management, increasingly facilitated by digital health technologies that improve monitoring, personalized interventions, and access to preventive services (De La Torre et al., 2025).

By providing accessible, low-threshold interventions, including OTC medicines, self-care can reduce barriers to care, support early intervention, and complement formal healthcare services (WHO, 2019). This is particularly relevant in the context of NCDs, where long-term management and lifestyle modification are essential, but also in communicable diseases through hygiene practices and early treatment.

From a public health and health economic perspective, self-care interventions play an increasingly important role in prevention by enabling early, accessible, and continuous management of health risks. Their evaluation therefore extends beyond clinical effectiveness to include their contribution to reducing disease burden, avoiding downstream healthcare utilization, and improving system efficiency.

At the same time, the economic value of self-care is closely linked to its ability to shift care from resource-intensive settings to low-threshold, cost-efficient interventions at the individual level. By preventing disease progression, reducing complications, and supporting self-management, self-care contributes to improved population health outcomes and the sustainability of healthcare systems. As such, self-care is increasingly recognized as a key component of people-centered and prevention-oriented health systems, contributing to improved access, system efficiency, and the broader goals of Universal Health Coverage (WHO, 2022a).

Building on this understanding of the role of self-care in prevention and its relevance for public health and health systems, the following section explores how these principles are reflected in practice through selected examples of OTC-based interventions, highlighting their preventive effects alongside their clinical and health economic implications.

4.2. Preventive effects in selected self-care conditions – Illustrative Examples

The following section examines the contribution of selected OTC self-care interventions to disease prevention through targeted examples. Building on the previously outlined framework of primary, secondary, tertiary, and quaternary prevention, and excluding primordial prevention, which addresses structural and societal determinants largely beyond the scope of individual product use, it analyzes how these interventions enable individuals to actively manage health risks and prevent disease progression at the individual level.

The analysis is aligned with the objectives of UHC, focusing on interventions that are accessible, scalable, and cost-effective, and that can expand preventive care beyond formal healthcare systems. Where data are available, the examples illustrate the health economic benefits and cost-effectiveness of preventive self-care measures, with particular attention to interventions that generate measurable health and economic value. The analysis further considers whether each intervention is especially relevant in low-income countries (LICs) or high-income countries (HICs), and how it contributes to reducing disease burden, avoiding downstream healthcare costs, and enhancing system efficiency.

The following table provides an overview of the different levels of prevention and assigns specific examples from the field of self-care interventions to each level. The examples highlighted in the table are examined in greater detail in the following sections.

PHASE OF PREVENTION	GOAL	SELF-CARE EXAMPLES
Primary Prevention	Prevent disease onset	• **Fluoride Toothpaste** • **Nicotine Replacement Therapy (NRT)** • **Sunscreen** • **Antifungals** • Hand and Surface Hygiene • Condoms • Vitamin D (supplementation)
Secondary Prevention	Early detection and treatment	• **Oral Rehydration Solution (ORS)** • **Antifungals** • Antiseptic wound cleaning • Anti-allergy self-care products • PDE5 inhibitors
Tertiary Prevention	Reduce complications and improve quality of life	• **Oral Rehydration Solution (ORS)** • **Antifungals** • Non-prescription pain medications
Quaternary Prevention	Avoid overtreatment and unnecessary interventions	• **Responsible self-care** • **Reduced antibiotic misuse** • Non-prescription medicines for sore throat/upper respiratory infections

Table 10: Types of Prevention & OTC Self-Care Examples

4.2.1. Illustrative Example I: Smoking Cessation with Nicotine Replacement Therapy

Tobacco use remains one of the leading preventable causes of morbidity and mortality worldwide and represents a major risk factor for NCDs, including cardiovascular diseases, chronic obstructive pulmonary disease (COPD), and multiple cancers. The WHO estimates that tobacco use causes more than 7 million deaths annually, including approximately 1.6 million attributable to second-hand smoke exposure, and contributes substantially to DALYs globally

(WHO, 2025c). Despite widespread awareness of these harms, cessation remains challenging due to the addictive nature of nicotine and the complex behavioral and physiological mechanisms underlying dependence (WHO, 2024c).

Nicotine replacement therapy (NRT) addresses these challenges by delivering controlled doses of nicotine to alleviate withdrawal symptoms and cravings, thereby facilitating behavioral change. Robust evidence from systematic reviews and meta-analyses confirms that NRT significantly increases quit rates compared to placebo or no treatment, establishing it as a key pharmacological tool within comprehensive tobacco control strategies (Hartmann-Boyce et al., 2018; WHO, 2024c).

From a prevention perspective, NRT-supported cessation functions primarily as **primary prevention** among disease-free smokers by reducing the risk of tobacco-related NCDs. In individuals with existing conditions such as COPD or cardiovascular disease, cessation also carries secondary and tertiary prevention relevance by slowing disease progression, reducing complications, and lowering mortality (USDHHS, 2020; WHO, 2024c). This classification reflects tobacco use as an upstream determinant of NCDs and underscores the capacity of cessation interventions to influence health outcomes across the full disease continuum.

The benefits of cessation extend well beyond the individual level. At the population level, reduced smoking prevalence lowers second-hand smoke exposure, decreases healthcare expenditures, and increases economic productivity (Goodchild et al., 2017; WHO, 2025c). Scaling effective cessation interventions is therefore integral to public health strategies aimed at reducing the NCD burden.

NRT is further aligned with the principles of Universal Health Coverage (UHC). The WHO Framework Convention on Tobacco Control (FCTC) emphasizes integrating cessation support, including pharmacotherapy such as NRT, into national health systems to ensure broad and equitable access as part of comprehensive tobacco control measures (WHO FCTC, 2019; WHO, 2024c). Since tobacco use is one of the largest preventable health risks globally, reducing the smoking-related disease burden through accessible NRT directly contributes to greater health equity and social justice. By combining individual empowerment, evidence-based treatment, and system-level accessibility, NRT plays a critical role in advancing global public health goals in the context of NCD prevention and UHC. By reducing one of the major global health risks, successful smoking cessation contributes to greater health equity and, consequently, to improved social justice at the population level.

4.2.1.1. Specific Characteristics of Nicotine Replacement Therapy in Self-Care

NRT is globally recognized for its well-established safety and efficacy profile and is predominantly classified as a medicinal product across major regulatory frameworks. In the United States, NRT products are approved as OTC medicines by the FDA (Food and Drug Administration), with three forms (gum, patch, lozenge) available without a prescription and two forms (nasal spray, inhaler) requiring a prescription (Congressional Research Service, 2020). In the European Union, NRT products are regulated as medicinal products with either pharmacy-only or OTC availability depending on formulation and national regulations (European Medicines Agency, 2008).

Beyond the US and EU, NRT is also widely accessible without prescription. In Australia, nicotine gum, patches, and lozenges are available OTC from pharmacies (healthdirect Australia,

2023). In Canada, NRT gum, patch, and lozenge are regulated as natural health products with pharmacy-level OTC access, while newer formats (e.g., nicotine pouches) are restricted to behind-the-pharmacy-counter sale (Health Canada, 2024). In the United Kingdom, all NRT forms are classified as General Sales List medicines, available in supermarkets without a prescription (Medicines and Healthcare products Regulatory Agency, 2021).

This regulatory status is central to NRT's function as a self-care-oriented intervention. As a rule, most formulations are available without a prescription, enabling individuals to initiate and manage quit attempts independently of clinical settings -- a critical feature given that successful cessation often requires multiple attempts and sustained engagement over time (U.S. Department of Health and Human Services, 2020). This OTC low-threshold access supports repeated and flexible use -- in contrast to prescription-only status, which would effectively preclude many individuals from using NRT at all -- aligning with the WHO definition of self-care as the ability of individuals to promote health and prevent disease with or without the support of healthcare professionals (WHO, 2019).

By enabling timely, independent access to evidence-based cessation support, NRT translates prevention strategies into accessible, real-world practice. It exemplifies how pharmacological interventions within self-care frameworks can empower individuals, strengthen population-level prevention, and complement formal healthcare services within broader public health strategies

4.2.1.2. Preventive Effects of Nicotine Replacement Therapy Based on Health Economic Evidence

From a health economic perspective, the relevance of NRT lies in its ability to increase smoking cessation rates at comparatively low intervention costs. Robust evidence shows that NRT improves long-term abstinence compared with placebo or no NRT, providing the clinical basis for its economic value (Hartmann-Boyce et al., 2018). Since tobacco-related diseases generate substantial downstream costs for health systems and societies, even modest improvements in quit rates can translate into relevant long-term savings and health gains. Global estimates indicate that smoking-attributable diseases impose a considerable economic burden through direct healthcare expenditure and productivity losses (Goodchild et al., 2017).

Economic evaluations support the view that NRT can represent good value for money when assessed over a longer time horizon. Wang et al. analysed NRT in a “cut down to quit” approach and found that NRT-supported smoking reduction and cessation can be cost-effective in terms of quality-adjusted life years (QALYs), particularly among smokers who would otherwise be unlikely to attempt abrupt cessation (Wang et al., 2008).

The economic value of NRT is closely linked to avoided future disease burden rather than immediate cost savings alone. Smoking cessation reduces future risks of major tobacco-related conditions, including cardiovascular disease, COPD, and several cancers, which are associated with high treatment costs and productivity losses (USDHHS, 2020; Goodchild et al., 2017). Therefore, the health economic argument for NRT depends on a long-term perspective: short-term expenditure on cessation support may be offset by gains in QALYs, reduced morbidity, lower demand for treatment of smoking-related diseases, and preserved productivity.

The figure illustrates the health and economic benefits of smoking cessation by showing the reduced long-term risks of major tobacco-related diseases, including cardiovascular disease,

COPD, and cancer. In addition, it highlights the associated economic advantages, such as lower treatment costs and reduced productivity losses.

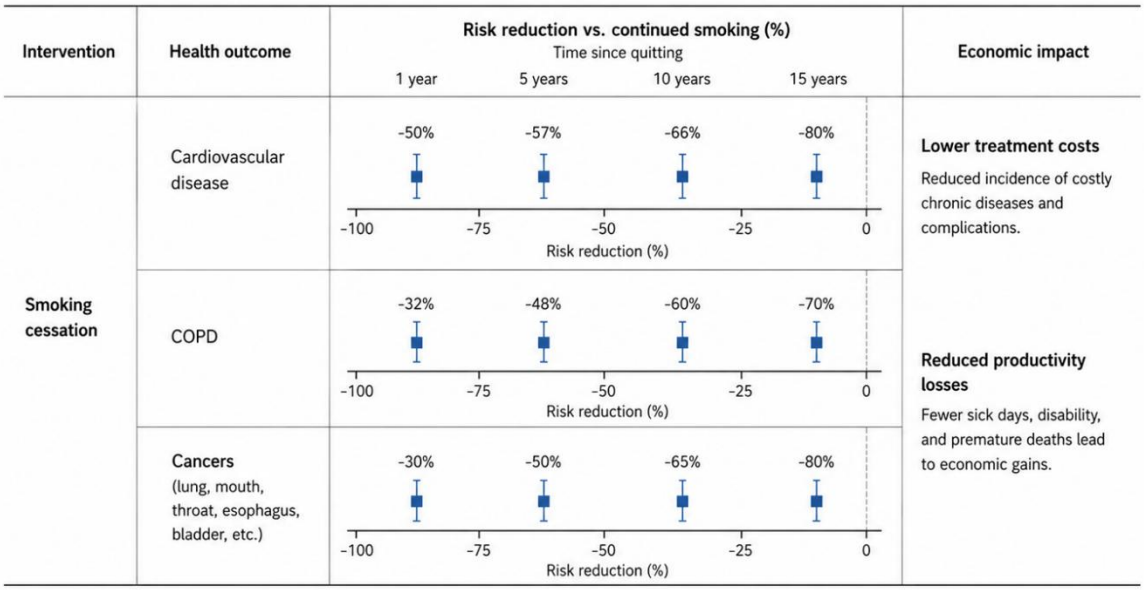


Figure 15: Long-term health and economic effects of smoking cessation (U.S. Department of Health and Human Services, 2020)

Overall, NRT can be understood as a prevention-oriented intervention with a favourable health economic rationale. Its value lies not primarily in reducing acute healthcare use, but in increasing successful cessation and thereby contributing to long-term reductions in tobacco-related disease costs. The available evidence supports NRT as an economically relevant component of tobacco control, especially when evaluated in relation to long-term health gains, avoided NCD burden, and productivity effects (Hartmann-Boyce et al., 2018; Wang et al., 2008; Goodchild et al., 2017).

The following figure presents the model structure developed by May and Bauer for the estimation of incremental outcome and cost effects associated with NRT. In the subsequent stages of the analysis, this framework is populated with empirical data and model assumptions to quantify the respective health and economic effects attributable to NRT.

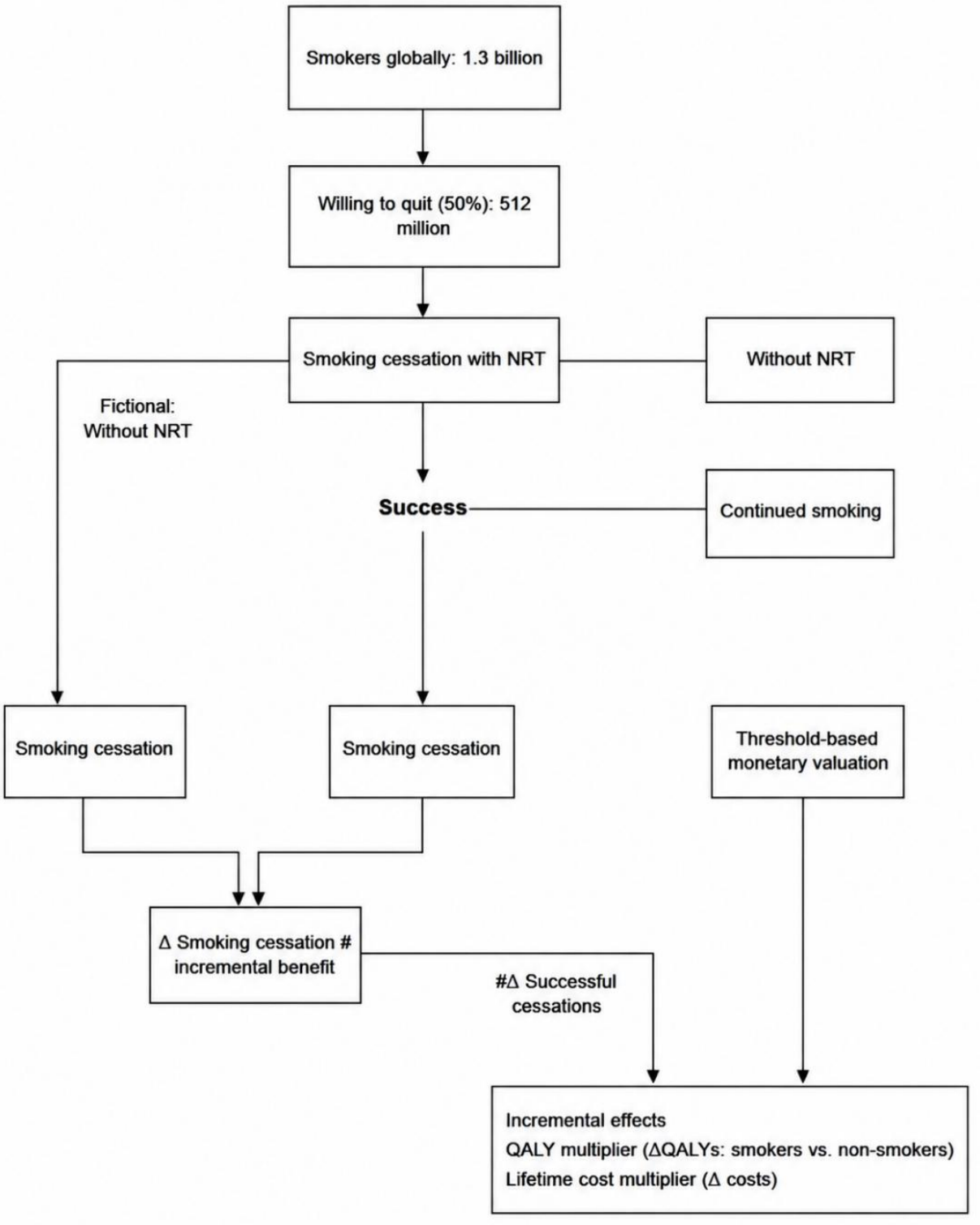


Figure 16: Model structure for estimating incremental health outcomes and cost effects associated with NRT

According to the WHO (2024), there are approximately 1.3 billion smokers worldwide. Of these, nearly 60% express a willingness to quit smoking, corresponding to around 750 million individuals. However, willingness to quit does not necessarily translate into active cessation behavior. Based on estimates from VanFrank et al. (2024) and Piper et al. (2016), only around 50% of

smokers willing to quit actively attempt smoking cessation, resulting in approximately 625 million quit attempts globally in the status quo scenario.

Among smokers attempting to quit, it is assumed that 25% use Nicotine Replacement Therapy (NRT), corresponding to approximately 156.25 million individuals. Evidence from Hautmann-Bayce (2018) and Concrete indicates that smoking cessation success rates are significantly higher when NRT is used. The estimated quit success rate with NRT is approximately 15%, compared to 8% without NRT support. Applying these rates suggests that NRT generates approximately 23.44 million successful quitters, whereas without NRT only around 12.50 million smokers would successfully quit. Consequently, the use of NRT contributes to approximately 10.94 million additional non-smokers in the status quo scenario.

The future scenario assumes a moderate increase in smoking cessation engagement and NRT adoption. Specifically, the number of smokers actively trying to quit is projected to increase by 4%, from 625 million to 650 million individuals. At the same time, NRT utilization is assumed to rise from 25% to 35% of all quit attempts, increasing the number of NRT users to approximately 227.5 million smokers.

Using the same success-rate assumptions, approximately 34.13 million smokers would successfully quit with NRT, compared to 18.20 million without NRT, resulting in around 15.93 million additional non-smokers attributable to NRT use in the future scenario.

Beyond the direct public health impact, smoking cessation also generates substantial long-term health benefits. Based on estimates from Doll et al. (2004), Jha et al. (2013), Thomas et al. (2021), and Wang et al. (2008), each successful smoking cessation is associated with approximately 8 life years gained (LYG) and 1.2 QALYs. Accordingly, the status quo scenario results in approximately 87.5 million life years gained and 13.1 million QALYs, while the future scenario increases these outcomes to approximately 127.4 million life years gained and 19.1 million QALYs.

From an economic perspective, the societal value of these QALY gains can be estimated using a willingness-to-pay threshold equivalent to two times GDP per capita. In addition, smoking cessation produces substantial healthcare cost savings. Based on Coyte et al. (2018), average healthcare savings are estimated at approximately 5,000 USD per successful smoking cessation case. Consequently, the status quo scenario generates approximately 54.7 billion USD in healthcare savings, while the future scenario increases potential savings to approximately 79.65 billion USD.

	Status Quo	**Future Scenario**
Smokers globally	1.3 bn	1.3 bn
Smokers willing to quit	750 mn	750 mn
Smokers trying to quit	625 mn	Assumption: 650 mn (+4%)
Quit attempts with NRT	Assumption: 25% ->156,25mn	Assumption: 35% ->227,5mn
Success rate with/without NRT	NRT:15% without: 8%	NRT: 15% without: 8%

	Status Quo	Future Scenario
Additional non-smokers through NRT globally	11 mn	16 mn
ΔLYG/ΔQALY	**LYG**=87.520.000 **QALY**=13.128.000	**LYG** =127,44mn **QALY**=19,116mn
Value of QALY gained	13.128.000 $ * Threshold (2*GDP per capita)	19.116.000 $ * Threshold (2 * GDP per capita)
Cost savings Healthcare Systems (HIC Cost)	54.700.000.000 $	79.650.000.000 $

Table 11: Calculation of incremental health outcomes and cost effects associated with NRT

An explicit calculation of the incremental effects of smoking cessation with nicotine replacement therapy (NRT) in the setting of a high-income country (Germany) was conducted by Wasem, Jung and May et al. (Wasem et al., 2008). The methodology and key findings are summarised below.

The authors developed a decision-analytic health economic model comparing NRT-supported smoking cessation with quit attempts without pharmacological support. The objective of the analysis was to quantify the long-term health and economic effects associated with successful smoking cessation. The model incorporated major smoking-related diseases, including coronary heart disease, chronic obstructive pulmonary disease (COPD), and other tobacco-associated morbidity and mortality outcomes.

The results demonstrated that NRT significantly increases the probability of successful long-term smoking cessation and thereby generates substantial long-term health gains. At the same time, considerable savings in direct medical costs were identified. Overall, the analysis showed a high level of cost-effectiveness of NRT within the German healthcare system, with the additional intervention costs being substantially offset by the resulting long-term health and economic benefits. The authors concluded that smoking cessation supported by NRT represents a highly efficient intervention not only from a public health perspective, but also from a health economic standpoint.

4.2.1.3. Implications for Self-Care-Based Prevention

NRT is an evidence-based intervention for reducing the burden of tobacco-related disease. It significantly increases the likelihood of successful smoking cessation and thereby contributes to the prevention of chronic diseases.

In the context of prevention, NRT can formally be classified as a measure of secondary prevention. Functionally, however, it also fulfils a primary preventive role by preventing the development of smoking-related diseases. The fact that NRT products are predominantly available worldwide as non-prescription medicines within the framework of self-care plays a crucial role in explaining their outstanding preventive relevance. Experiences following the switch of NRT products from prescription-only to OTC status in many countries have consistently demonstrated that simple and rapid accessibility is a key driver for the actual uptake of NRT by smokers attempting to quit. In other words, it is precisely the OTC availability of NRT products that enables them to save millions of lives worldwide each year by supporting smoking cessation attempts.

Accordingly, NRT within the framework of self-care represents a highly effective and economically efficient preventive intervention with substantial global public health potential.

Health economic analyses consistently demonstrate that NRT is cost-effective — and in many settings even cost-saving. Based on the available effectiveness data, the cost-effectiveness of NRT was initially demonstrated using a decision-analytic modelling approach applied to the global smoking population. The analysis showed that the use of NRT leads to substantial reductions in both direct medical costs and broader societal costs. Remarkably, the "NRT strategy" represents the comparatively rare health economic constellation in which gains in life expectancy and quality of life can be achieved simultaneously with net cost savings. Only very few medical or pharmaceutical interventions demonstrate such a favourable combination of health and economic outcomes.

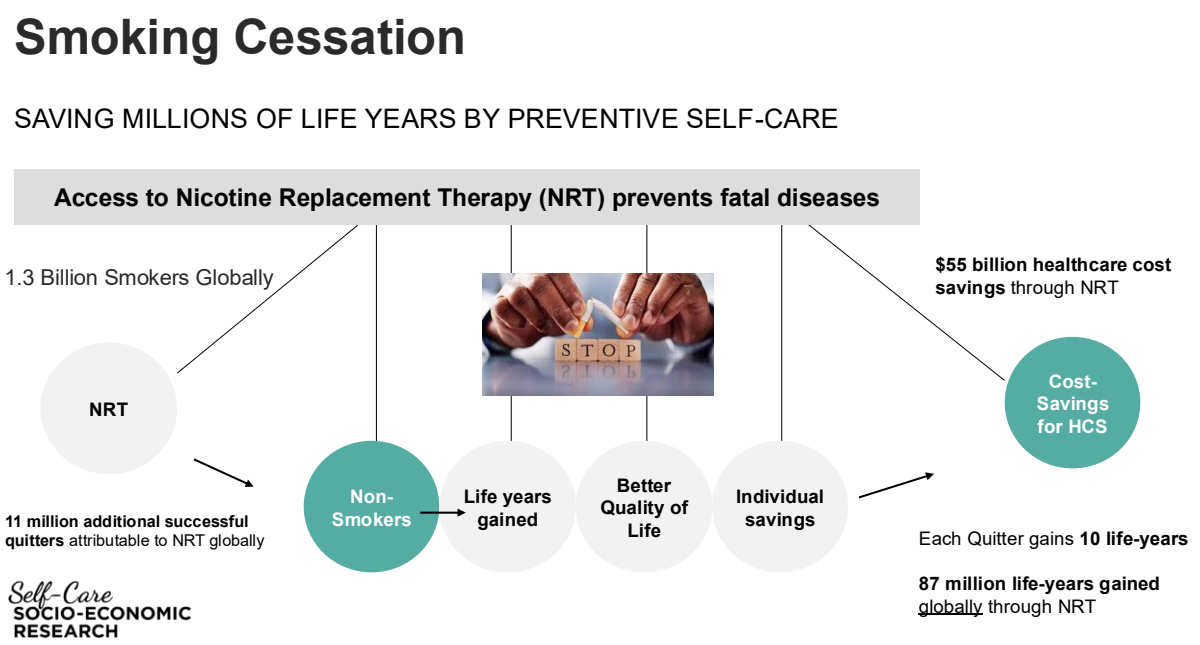


Figure 17: Smoking Cessation - Saving Millions of Life Years by preventive Self-Care

The figure above summarises the key aspects of NRT use in smoking cessation as well as selected core input parameters and calculation results in an illustrative overview

4.2.2. Illustrative Example II: Oral Health and the Prevention of Dental Caries

Fluoride toothpaste represents a highly effective, evidence-based, and cost-efficient intervention for the prevention of dental caries, the most prevalent NCD worldwide (Toumba et al., 2019; Bernabé et al., 2025). Its value lies primarily in its role as a **primary preventive** measure: by targeting disease at its earliest stage, it prevents onset before clinical manifestation rather than managing its consequences (Hofbauer et al., 2022).

Poor oral health and untreated caries are associated with chronic inflammation, impaired nutrition, reduced quality of life, and increased risk factors linked to other NCDs, including impaired glycaemic control in diabetes (Giacaman et al., 2022; Jevdjevic & Listl, 2024). Given that oral diseases affect nearly 3.5 billion people globally and contribute substantially to healthcare expenditure (WHO, 2022b), preventive interventions in this area represent an important opportunity to improve both individual and population health outcomes.

4.2.2.1. Specific Characteristics of Fluoride Toothpaste in Self-Care

Fluoride toothpaste is characterized by its routine use, broad accessibility, and preventive mode of action (Jullien, 2021). Its efficacy is based on promoting enamel remineralization and inhibiting cariogenic processes, enabling continuous, individual-level prevention without reliance on healthcare infrastructure. This makes it a scalable, low-threshold self-care intervention that complements formal healthcare systems and is particularly suitable for population-wide implementation (Chaudhary et al., 2018; WHO, 2022b).

4.2.2.2. Preventive Effects of Fluoride Toothpaste Based on Health Economic Evidence

Health economic evidence consistently demonstrates that fluoride toothpaste combines strong clinical effectiveness with low implementation costs. Regular use is associated with an average 24% reduction in dental caries compared with non-fluoride toothpaste, with higher fluoride concentrations yielding greater preventive effects (Marinho et al., 2003). Using the WHO-CHOICE methodology, model-based cost-effectiveness analyses express the efficiency of fluoride toothpaste in terms of cost per DALY averted and identify a high likelihood that it provides good value for money, particularly in settings where market prices are low -- while confirming that cost-effectiveness is strongly price-dependent (Hofbauer et al., 2022).

Because the burden of oral conditions is expressed primarily through years lived with disability rather than mortality, even moderate reductions in caries incidence can yield meaningful population-level gains. Given that untreated dental caries affects approximately 2.5 billion people worldwide, the aggregate health economic impact of sustained preventive use is substantial (WHO, 2022b; Bernabé et al., 2025).

Fluoride toothpaste also contributes to avoiding costly downstream treatments. By reducing the incidence and progression of dental caries, it lowers the need for restorative procedures, extractions, and emergency dental care (Atkins et al., 2016). The relevance of this effect is underscored by the scale of the global economic burden: the economic burden of oral conditions was estimated at approximately USD 710 billion in 2019, comprising around USD 387 billion in direct treatment costs and USD 323 billion in indirect productivity losses (Jevdjevic & Listl, 2024).

Beyond direct treatment costs, oral diseases generate substantial indirect economic consequences. Adachi et al. (2024) document that oral health problems are associated with lost work and school hours and measurable productivity losses. Each additional decayed tooth increased the risk of presenteeism (working while impaired) by 12% (OR 1.12). Low oral health-related quality of life showed a stronger association, with 2.5-fold higher odds of absenteeism (OR 2.48) and a 5-fold higher odds of presenteeism (OR 5.00). These findings suggest that the economic impact of poor oral health extends well beyond treatment costs, and that prevention through fluoride toothpaste may help preserve both oral health-related quality of life and workplace productivity.

However, realizing these benefits depends critically on affordability. Evidence from 78 countries shows that fluoride toothpaste is strongly affordable in high-income countries and relatively affordable in upper-middle-income countries, but strongly unaffordable in lower-middle-income and low-income countries. The WHO defines fluoride toothpaste as affordable when less than one day of labour is needed to purchase the recommended annual supply per person, based on the daily wage of the lowest-paid unskilled government worker -- and monitors this as a dedicated oral health indicator. This affordability gap highlights that the health economic potential of fluoride toothpaste as a preventive self-care intervention can only be fully realized if access and affordability are systematically addressed within UHC frameworks (WHO, 2022b).

Overall, the combination of high effectiveness, low implementation costs where affordable, scalability, and broad applicability results in a highly favourable economic profile -- with substantial potential to reduce the global burden of oral diseases while improving system efficiency, sustainability, and equity (Hofbauer et al., 2022).

The table below summarises key health economic evidence on fluoride toothpaste across clinical effectiveness, cost-effectiveness, disease burden, downstream treatment savings, productivity losses, and affordability.

Category	Effect	Finding / Value	Source
Clinical effectiveness	Caries-preventive effect vs. non-fluoride toothpaste	24 % caries reduction on average; higher fluoride concentration = greater effect	Marinho et al., 2003
Cost-effectiveness	Cost-benefit ratio (WHO-CHOICE methodology)	High likelihood of good value for money, especially at low market prices; strongly price-dependent	Hofbauer et al., 2022
Disease burden	Global prevalence of untreated caries	Approximately 2.5 billion people affected; burden primarily through YLDs (years lived with disability), not mortality	WHO, 2022b; Bernabé et al., 2025
Direct treatment costs	Avoidance of downstream treatments (restorations, extractions, emergency care)	Relevant cost savings by reducing caries incidence and progression – e.g., caries treatment $1,467/child, full mouth reconstruction $9,349/child in a high-risk population (Alaska Native children)	Atkins et al., 2016
Global economic burden	Total cost of oral diseases worldwide (2019)	Approximately USD 710 billion total: USD 387 billion direct costs + USD 323 billion productivity losses	Jevdjevic & Listl, 2024
Contextual ranking	Rank of oral diseases in health expenditure comparison	Rank 3 in the EU (behind diabetes and cardiovascular disease)	Jevdjevic & Listl, 2024
Productivity losses	Absenteeism: association with poor oral health-related quality of life	OR 2.48 – 2.5-fold higher odds of absenteeism with low oral health-related quality of life	Adachi et al., 2024
Productivity losses	Presenteeism (reduced performance at work): association with poor oral health-related quality of life	OR 5.00 – 5-fold higher odds of presenteeism with low oral health-related quality of life	Adachi et al., 2024
Productivity losses	Presenteeism: association with number of decayed teeth	OR 1.12 – each additional decayed tooth increases presenteeism risk by 12 %	Adachi et al., 2024
Affordability & access	Affordability of fluoride toothpaste by income group (78 countries)	Strongly affordable in high-income countries; strongly unaffordable in low- and lower-middle-income countries (WHO threshold: < 1 daily wage per year per person)	WHO, 2022b
Overall assessment	Health economic profile of fluoride toothpaste	Highly favourable cost-benefit profile: high effectiveness, low cost (where affordable), scalable – with potential to relieve health systems	Hofbauer et al., 2022

Table 12: Overview of health economic evidence on fluoride toothpaste – key findings and sources

4.2.2.3. Implications for Self-Care-Based Prevention

Fluoride toothpaste makes a concrete and well-evidenced contribution to prevention across multiple dimensions. At the individual level, it directly reduces caries onset through enamel remineralization, inhibition of cariogenic processes, and reduction of bacterial activity. Beyond oral health, it contributes indirectly to healthier ageing, improved nutrition, better glycaemic control in diabetes, and a reduced systemic health burden (Giacaman et al., 2022; Jevdjevic & Listl, 2024). At the population level, given that untreated dental caries affects approximately 2.5 billion people globally, even moderate reductions in incidence translate into substantial health gains (WHO, 2022b; Bernabé et al., 2025).

As a self-care intervention, fluoride toothpaste delivers these preventive effects continuously and without requiring professional involvement or healthcare infrastructure, enabling sustained disease control at low cost and supporting a shift towards prevention-oriented models of care (Watt et al., 2019). By reducing disease incidence and limiting progression to more severe conditions, it also contributes to avoiding downstream treatment costs and to improved system efficiency.

Despite the substantial global burden of oral diseases, oral healthcare remains insufficiently integrated into many health systems and is frequently excluded from essential benefit packages, with access highly unequal particularly in low- and middle-income countries (WHO, 2022b). This gap underscores the relevance of accessible, cost-effective self-care interventions within UHC frameworks: the full preventive potential of fluoride toothpaste can only be realized where it is affordable and accessible, making affordability a necessary condition for translating its preventive benefits into population health gains (Gkekas et al., 2022). The WHO Global Oral Health Strategy and the Bangkok Declaration accordingly emphasize a stronger focus on preventive, population-based approaches as a prerequisite for achieving UHC (WHO, 2022b; WHO, 2025a). Overall, fluoride toothpaste demonstrates how a routinely applied self-care product can generate meaningful preventive value, reduce disease burden, and support more prevention-oriented, equitable, and sustainable health systems (GSCF, 2025).

The figure below illustrates how fluoride toothpaste contributes not only to the prevention of dental caries, but also indirectly supports broader health outcomes through improved oral health, nutrition, wellbeing, and reduced systemic disease burden:

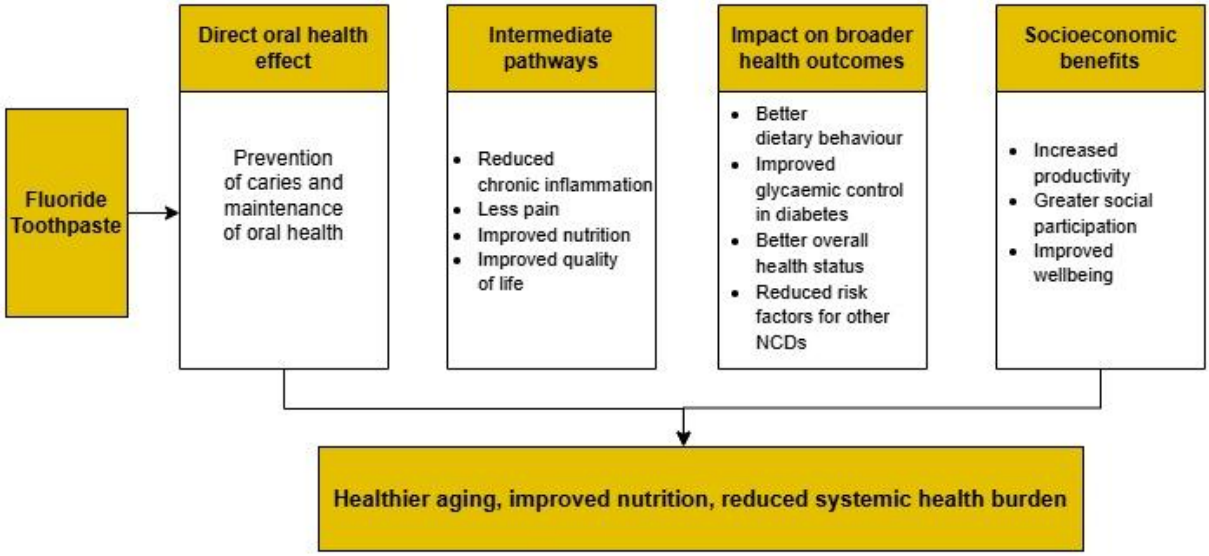


Figure 18: Indirect preventive effects of fluoride toothpaste on broader health outcomes

4.2.3. Illustrative Example III: Erectile Dysfunction, Access to PDE5 Inhibitors, and Implications for Prevention of NCDs

Erectile dysfunction (ED) is a highly prevalent condition and an important component of men's health within the broader context of NCDs. It is closely associated with cardiovascular disease, diabetes mellitus, and other chronic conditions, and is increasingly recognized as an early clinical marker of underlying vascular pathology (Montorsi et al., 2003; Vlachopoulos et al., 2013). Phosphodiesterase-5 inhibitors (PDE5i), including sildenafil and tadalafil, are established as first-line therapies with well-documented efficacy and acceptable safety profiles (Smith et al., 2013).

However, access varies across regulatory settings, ranging from prescription-only to pharmacist-led or non-prescription availability (May et al., 2025). This variation is highly relevant from a prevention perspective, because lower access barriers may increase treatment seeking and healthcare contact, creating opportunities to detect and manage underlying cardiovascular and metabolic risk factors (May et al., 2025; Lee et al., 2021; Bell et al., 2020). In this sense, ED management can extend beyond symptom control and contribute to **secondary prevention** by facilitating early risk identification (Jackson et al., 2010). Improving access to treatment is therefore closely aligned with the objectives of UHC, particularly in reducing unmet need and addressing gender-specific barriers to care (May et al., 2025; Lee et al., 2021).

4.2.3.1. Specific Characteristics of PDE5 Inhibitors in Self-Care

PDE5 inhibitors represent a pharmacological intervention with a well-established efficacy and safety profile (Smith et al., 2013; Andersson, 2018). While many countries maintain prescription-only status, others have introduced pharmacist-led or non-prescription access models, positioning these therapies at the interface between clinical care and self-care (May et al., 2025; Lee et al., 2021; Bell et al., 2020).

In several countries, including the United Kingdom, Ireland, Poland, Norway, Switzerland, and New Zealand, PDE5 inhibitors are available through pharmacy-based access models

without a prior physician prescription, typically supported by pharmacist-led screening protocols (May et al., 2025). These models enable individuals to initiate treatment more autonomously while maintaining professional oversight.

4.2.3.2. Preventive Effects of PDE5 Inhibitors Based on Cross-Country Evidence

Recent cross-country evidence by May und Bauer (May et al., 2025) provides important insights into how regulatory access influences treatment uptake and healthcare engagement. In a large-scale survey across Germany, Norway, Poland, and Switzerland (n ≈ 10,000), substantial differences in PDE5 inhibitor use were observed despite similar prevalence rates of ED. The following figure illustrates the study design of the survey:

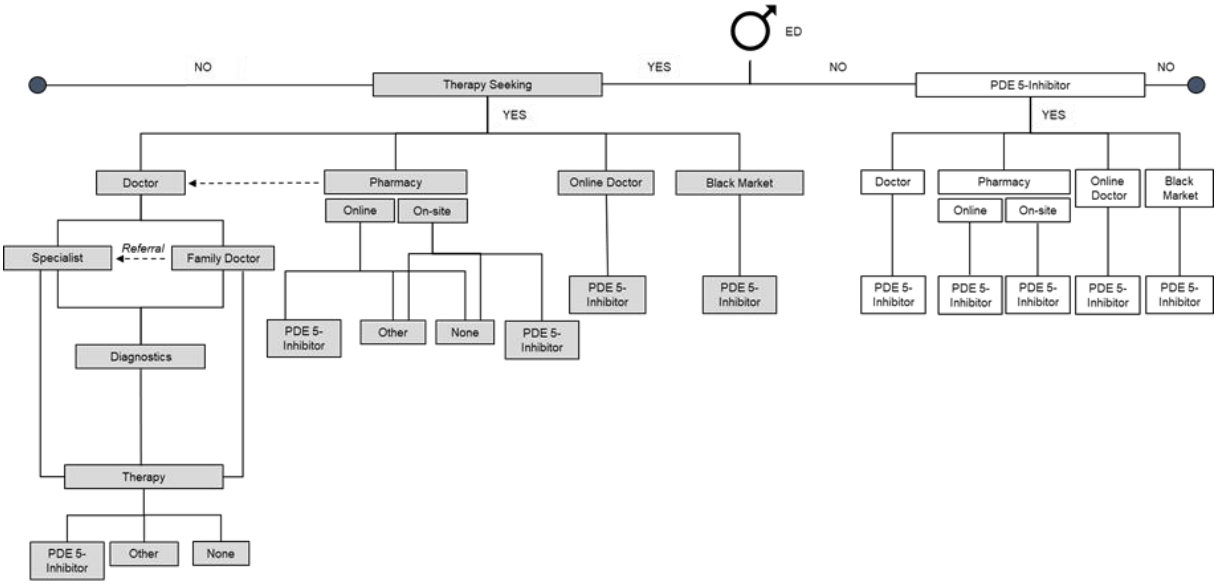


Figure 19: Study design (May et al., 2025)

In Germany, where PDE5 inhibitors are available exclusively by prescription, 22.2% of men with ED reported using these medications. In contrast, significantly higher utilization was observed in Norway (41.5%) and Switzerland (30.4%), both of which offer more flexible access models. In Poland, 24.1% of participants reported use, slightly above Germany but without a statistically significant difference (May et al., 2025).

These findings indicate that access conditions are a key determinant of treatment uptake. Importantly, facilitated access was also associated with higher engagement with healthcare professionals. In countries with pharmacy-based access, a larger proportion of men consulted pharmacists, who frequently served as the first point of contact and played a role in guiding care pathways. Crucially, pharmacist involvement did not replace physician care but complemented it. A substantial proportion of individuals who consulted pharmacists were subsequently referred to physicians, indicating that pharmacy-based access can function as an effective entry point into the healthcare system (Lee et al. 2021). This supports early detection and appropriate management of underlying conditions (Vlachopoulos et al. 2013).

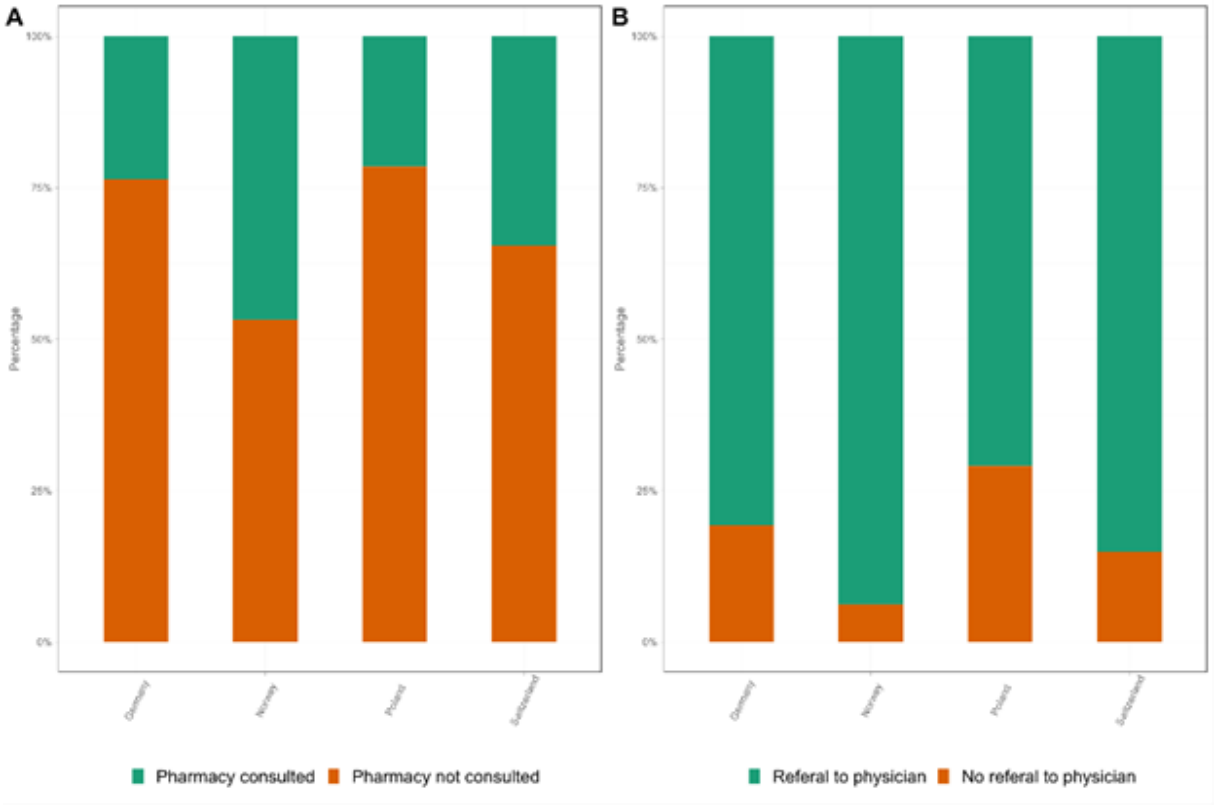


Figure 20: Proportion of pharmacy consultations and physician referrals in Germany, Norway, Poland, and Switzerland (May et al., 2025)

Figure 24 shows the proportion of pharmacy consultations and physician referrals in all four countries: Germany, Norway, Poland, and Switzerland. (A) Proportion of participants who consulted a pharmacist (green) versus those who did not consult a pharmacist (orange). (B) Proportion of participants who were referred by the pharmacist to a physician (green) versus those who were not referred to a physician (orange).

From a prevention perspective, these dynamics are highly relevant. While PDE5 inhibitors do not directly prevent disease onset, their use within accessible care pathways can contribute to secondary prevention by enabling earlier diagnosis of NCDs. Increased healthcare contact triggered by ED treatment may facilitate timely identification and management of comorbidities, particularly cardiovascular disease (Vlachopoulos et al., 2013).

Concerns regarding inappropriate use appear limited. The study shows that the use of PDE5 inhibitors without clinical indication was rare across all countries, suggesting that increased accessibility does not necessarily lead to misuse when embedded in regulated systems (May et al., 2025).

Overall, the evidence demonstrates that the preventive value of PDE5 inhibitors is shaped less by their pharmacological properties alone and more by how access pathways are structured and integrated into healthcare systems. Lower access barriers can improve treatment uptake, reduce stigma-related delays, and strengthen links to formal care (Rasmussen et al., 2020, Kirby et al., 2011).

4.2.3.3. Implications for Self-Care-Based Prevention

The case of PDE5 inhibitors illustrates how self-care enabled interventions can contribute to prevention beyond their direct therapeutic effects. By lowering access barriers and providing

alternative entry points into the healthcare system, pharmacy-based and non-prescription access models can increase healthcare engagement, particularly among populations affected by stigma or reluctance to seek medical care.

In the context of ED, this has important implications for secondary prevention of NCDs. Earlier treatment initiation and increased interaction with healthcare professionals can facilitate the detection of underlying chronic conditions and support timely intervention. This highlights the role of access design as a determinant of preventive impact.

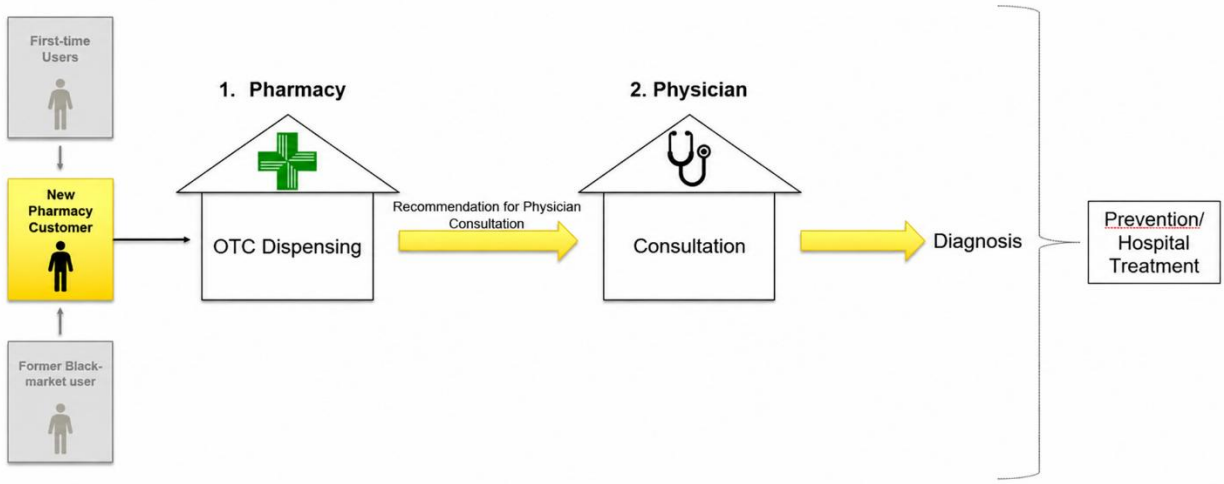


Figure 21: Treatment Pathway of PDE5i Users Among New Pharmacy Customers

From a health systems perspective, such models can improve efficiency by shifting initial care to lower-threshold settings while maintaining appropriate referral mechanisms. Within a UHC-oriented framework, improving access to PDE5 inhibitors may contribute to reducing unmet need, strengthening prevention-oriented care pathways, and supporting population health outcomes.

4.2.4. Illustrative Example IV: Antifungal Self-Care and Early Intervention in Infectious Disease Control

Superficial fungal infections, including dermatophytoses and candidiasis, are among the most prevalent infectious diseases worldwide and affect a substantial proportion of the global population across all income settings. Although these conditions are generally not life-threatening, they are associated with considerable morbidity, impaired quality of life, and, if left untreated, the risk of progression, recurrence, and transmission to other individuals (Hay et al., 2014). From a public health perspective, they therefore represent a relevant burden of communicable disease.

In contrast to many other infectious conditions, superficial fungal infections are frequently self-recognizable and amenable to early treatment, which positions them particularly well within self-care frameworks. The availability of topical antifungal medicines without prescrip-

tion enables individuals to initiate treatment promptly at the onset of symptoms, thereby interrupting the natural course of disease and reducing the likelihood of spread and persistence (Benedict et al., 2022; Gupta & Cooper, 2008). This is consistent with broader evidence indicating that self-care interventions can improve access to timely treatment and reduce pressure on formal healthcare systems (WHO, 2019; IQVIA, 2024).

Within the established framework of prevention, antifungal self-care interventions are best understood as a form of

- **secondary prevention**, as they enable **early detection and immediate treatment** of localized infections.
- At the same time, they contribute to **tertiary prevention** by **reducing recurrence and chronicity**.
- Importantly, in communicable diseases such as fungal infections, early treatment may also reduce transmission to others. While antifungal use is therefore primarily classified as secondary prevention at the individual level, it can exert indirect **primary preventive effects at the population level** by limiting exposure and interrupting transmission pathways.
- In addition, from a system perspective, antifungal self-care can be interpreted as **contributing to quaternary prevention**, as the availability of safe and effective over-the-counter treatments helps to avoid unnecessary medicalization, reduce avoidable physician consultations, and limit the use of more intensive or systemic therapies in cases that can be adequately managed through self-care.

In the context of UHC, the availability of effective self-care interventions such as OTC antifungals supports equitable access to treatment, reduces delays in care, and contributes to more efficient resource allocation within healthcare systems (WHO, 2019; WHO & UNICEF, 2018).

4.2.4.1. Specific Characteristics of Antifungal Products in Self-Care

Topical antifungal medicines used in self-care are characterized by a well-established efficacy and safety profile, supported by decades of clinical and over-the-counter use (Gupta & Cooper, 2008; Hay et al., 2014). Active substances such as clotrimazole, miconazole, and terbinafine are typically indicated for mild to moderate, localized infections and are associated with minimal systemic absorption, resulting in a low risk of systemic adverse effects. Across most global markets, these products are available as non-prescription medicines for clearly defined indications, particularly for conditions that are easily recognizable by patients. This regulatory positioning reflects a favorable benefit–risk balance and aligns with health policy approaches that promote self-care as a means of improving access and system efficiency (WHO, 2019).

A key concern is antifungal resistance and inappropriate use. The current literature suggests that OTC topical antifungals should not be assumed to be universally low-risk for AMR, especially since unnecessary prescribing, poor diagnostic accuracy, prolonged use, and antifungal-corticosteroid combinations may contribute to resistance selection and treatment failure (Lockhart et al., 2023; Benedict et al., 2024). Topical antifungals are suitable for self-care

when used appropriately, within limited indications, and alongside stewardship-oriented patient education and referral when symptoms are atypical, recurrent, or severe (Falotico & Lipner, 2022; Lockhart et al., 2023).

4.2.4.2. Preventive Effects of Antifungal Self-Care Based on Health Economic Evidence

The preventive value of antifungal self-care lies primarily in its capacity to enable early intervention, thereby interrupting disease progression and limiting transmission. Untreated superficial fungal infections can spread to adjacent body areas or to other individuals, particularly in shared environments (Leung et al., 2023). Delays in treatment – such as those associated with prescription-only access – can lead to prolonged disease duration, increased risk of spread, and higher likelihood of transmission to others (Leung et al., 2023; Kovitwanichkanont & Chong, 2019). In contrast, low-threshold OTC access facilitates immediate treatment initiation, which is associated with faster symptom resolution and reduced duration of infectiousness, consistent with broader evidence on non-prescription medicines for self-limiting conditions (Hope et al., 2020).

From a broader health-economic perspective, the scale of the clinical need is immense: in 2021, there were approximately 1.73 billion incident cases of fungal skin diseases globally – roughly 1 in 5 people worldwide – representing a 68% increase since 1990 (Qin et al., 2024). In the United States alone, the economic burden of fungal diseases was estimated at $11.5 billion in 2019, including $7.5 billion in direct medical costs and $870 million in productivity losses from approximately 2.1 million missed workdays (Benedict et al., 2022). Dermatophytoses alone accounted for over 4.7 million outpatient visits and $1.2 billion in total, including indirect, costs (Benedict et al., 2019). Antifungal self-care can substantially reduce both direct and indirect costs associated with these conditions (Hay et al., 2014; Benedict et al., 2019). Early treatment through accessible OTC pathways reduces disease chronicity, recurrence, and the risk of progression requiring systemic antifungal therapy – which carries higher costs, longer treatment duration, and increased risks of adverse events and resistance (Leung et al., 2023). Preventive economic benefits also arise from reduced transmission in households, workplaces, sports facilities, and other shared environments, thereby limiting secondary cases and associated downstream healthcare costs (Leung et al., 2023; IQVIA, 2024).

Recent health economic evidence further demonstrates that non-prescription access to antifungal medicines reduces avoidable physician consultations and contributes to lower healthcare system burden, while pharmacy-supported self-care pathways generate additional indirect economic benefits through reduced productivity losses and faster return to normal daily activities (IQVIA, 2024). Regulated OTC access was also shown to support more efficient allocation of healthcare resources by shifting management of common and self-recognizable fungal infections to lower-threshold care settings.

The table summarises key figures on the burden of fungal skin diseases. The data illustrate the enormous scale of the clinical need and the substantial economic consequences, underscoring the relevance of accessible, low-threshold treatment options.

Indicator	Value	Source
Global incidence (2021)	**1.73 billion cases (~1 in 5 people)**	Qin et al., 2024
Increase since 1990	**+68 %**	Qin et al., 2024
Age-standardized DALY rate	**43.39 per 100,000**	Qin et al., 2024
Share of total skin disease DALYs	**~8 %**	Qin et al., 2024
US: total economic burden (2019)	**$11.5 billion**	Benedict et al., 2022
US: direct medical costs	**$7.5 billion**	Benedict et al., 2022
US: productivity losses	**$870 million (~2.1 million missed workdays)**	Benedict et al., 2022
US: dermatophytosis costs	**$1.2 billion (4.7 million outpatient visits)**	Benedict et al., 2019

Table 13: Burden of fungal skin diseases

4.2.4.3. Implications for Self-Care-Based Prevention

Antifungal medicines in self-care represent a distinct example of prevention-oriented intervention within communicable diseases. Their primary contribution lies in secondary prevention through early detection and timely treatment. At the same time, they can exert indirect primary preventive effects at the population level by reducing transmission and limiting exposure. The evidence demonstrates that OTC antifungal products are effective, safe, and associated with a low risk of resistance when used appropriately. Their accessibility enables rapid treatment initiation, which reduces disease progression, recurrence, and spread. From a health system perspective, they contribute to improved efficiency by reducing unnecessary doctor consultations and enabling more targeted use of healthcare resources.

In the context of Universal Health Coverage, antifungal self-care illustrates how low-threshold, scalable interventions can expand access to care while supporting system sustainability. By enabling individuals to manage common infectious conditions independently, such interventions complement formal healthcare services and contribute to more resilient health systems.

Overall, this case study highlights that the preventive value of self-care extends beyond non-communicable diseases and includes communicable conditions where early intervention plays a critical role. Antifungal OTC medicines therefore provide a strong example of how self-care can generate both public health and economic benefits through improved access, timely treatment, and efficient resource utilization.

4.2.5. Illustrative Example V: Oral Rehydration Solutions (ORS) in the Prevention of Diarrhea-Related Complications

Acute diarrhea is one of the most common conditions worldwide and remains a major contributor to morbidity across all age groups. While often self-limiting, it poses a significant risk of dehydration, particularly among vulnerable populations such as young children, older adults, and individuals with comorbidities. If not managed appropriately, dehydration can lead to severe complications, hospitalization, and, in extreme cases, mortality (WHO, 2024b; Liu et al., 2016).

From a public health perspective, the clinical relevance of diarrhea lies less in the infection itself than in its potential progression to dehydration and associated complications. This makes early and effective management critical. Oral rehydration solutions (ORS) directly address this risk by restoring fluid and electrolyte balance and are therefore central to preventing disease progression (Posovszky et al., 2020).

Diarrhea is particularly well suited to self-care-based management, as symptoms are typically recognizable, and treatment can be initiated immediately. The widespread availability of ORS as a non-prescription intervention enables rapid response at the onset of symptoms, thereby interrupting the progression from mild illness to severe dehydration. In this sense, ORS represents a prototypical example of a self-care intervention that contributes to prevention - not by avoiding disease onset, but by preventing complications and reducing the need for higher-level care (WHO, 2019).

Within the framework of prevention, ORS is primarily associated with

- **secondary prevention**, as it interrupts disease progression early.
- At the same time, it contributes to **tertiary prevention** by reducing the severity of outcomes and preventing complications such as hospitalization.
- From a system perspective, it may also contribute to **quaternary prevention** by reducing unnecessary medicalization and avoiding inappropriate use of more intensive treatments.

4.2.5.1. Specific Characteristics of ORS in Self-Care

Oral rehydration solutions are characterized by a well-established efficacy and safety profile and are widely recommended as first-line treatment for acute diarrhoea (Posovszky et al., 2020). Their primary function is the rapid restoration of fluids and electrolytes, directly addressing the underlying physiological imbalance caused by fluid loss. A defining feature of ORS is its simplicity and usability. It can be administered without medical supervision, requires minimal health literacy, and is suitable for use across diverse population groups. This makes it particularly effective in self-care contexts, where early intervention is critical.

ORS is typically available over the counter at low cost and is stable under a wide range of storage conditions, facilitating large-scale distribution. Its accessibility enables immediate initiation of treatment, which is essential in preventing dehydration (Cellucci, 2025).

Unlike many pharmacological treatments, ORS does not primarily act on symptoms but on the underlying cause of complications. This mechanism distinguishes it as a preventive intervention rather than purely symptomatic therapy (Manfredi et al, 2025).

4.2.5.2. Preventive Effects of ORS Based on Scientific and Health Economic Evidence

ORS is a simple, accessible self-care intervention that prevents serious complications from acute diarrhoea. Extensive evidence demonstrates that oral rehydration solution significantly reduces the risk of dehydration and associated complications. By restoring fluid and electrolyte balance, ORS prevents progression to severe disease, reduces the need for hospitalization, and lowers mortality, particularly among children under five years of age in low- and middle-income countries (Munos et al., 2010; Posovszky et al., 2020). At 100 % coverage, ORS could prevent up to 93% of diarrhoea deaths (Munos et al., 2010).

Since the introduction and scale-up of oral rehydration therapy, global under-five mortality from diarrhoeal diseases has declined dramatically. Historical estimates describe a fall from more than 5 million deaths annually to approximately 500,000, while more recent modelling estimates a decline from 2.7 million under-five diarrhoeal deaths in 1980 to around 0.5 million in 2015 (Black et al., 2019). Importantly, ORS alone accounted for 36.2 % of the total reduction in diarrhoea mortality over the full 35-year period, underscoring its singular contribution to child survival. Current UNICEF estimates indicate that diarrhoea still kills nearly 450,000 children under five each year, highlighting the continued relevance of ORS (UNICEF Supply Division, 2025).

The effectiveness of ORS is closely linked to its accessibility. As a self-care intervention, it enables immediate treatment initiation without reliance on healthcare infrastructure or physician access. WHO and UNICEF estimate that widespread ORS coverage could prevent a substantial proportion of avoidable diarrheal deaths globally, particularly in settings with limited healthcare infrastructure (UNICEF, n.d.; WHO, 2024b).

Despite these advances, coverage remains incomplete. ORS use in low- and middle-income countries rose from 0 % in 1980 to 44 % in 2015 (Reiner et al., 2019). Yet half of children with diarrhoea still do not receive ORS. Closing the coverage gap to 90 % could prevent an additional 75 % of the deaths that still occur today – meaning nearly all remaining preventable deaths could be avoided (Wolfheim et al., 2019).

From a health-economic perspective, the impact of ORS is substantial. By preventing dehydration and severe disease, ORS reduces the need for costly healthcare services, including physician consultations, emergency care, intravenous fluid therapy, and hospital admissions. This shift from higher-cost clinical care to low-cost, community-based management represents a major efficiency gain for healthcare systems (Zubairi et al., 2024).

Economic analyses consistently identify ORS as one of the most cost-effective interventions in global health, with intervention costs reflecting the full delivery and implementation costs of the program rather than the price of the ORS product alone (Hutton et al., 2007). In WHO-based analyses, ORS has been estimated at around US$150 per DALY averted, while ORS plus zinc can be substantially cheaper, at roughly US$10 to US$50 per DALY averted depending on setting and delivery model (WHO, 2007; Horton et al., 2015). This also makes ORS a good example of how OTC products can be used within broader, population-based health programs to achieve large public health gains at low cost (Hutton et al., 2007; Horton et al., 2015).

The economic burden of diarrheal disease is substantial, particularly in low- and middle-income countries (LMICs), where recurrent diarrheal episodes contribute to healthcare expenditure, productivity losses, and long-term developmental impacts. ORS therefore generates not only direct healthcare savings but also important indirect economic benefits. By enabling rapid recovery and preventing severe illness, ORS reduces caregiver burden, minimizes absenteeism from work and school, and lowers long-term health consequences associated with untreated dehydration and malnutrition (Baral et al., 2020; Al Fidah et al., 2025).

Another important economic aspect is the reduction of inappropriate treatment pathways. In the absence of accessible ORS, individuals may seek more expensive or unnecessary treatments, including inappropriate antibiotic use, intravenous therapies, or hospital-based care. This is particularly relevant given global concerns regarding antimicrobial resistance. Widespread availability of ORS supports rational treatment choices, reduces avoidable antibiotic consumption in self-limiting diarrheal illnesses, and contributes to more efficient use of healthcare resources (Rhee et al., 2019; El-Khoury et al., 2016).

At the system level, ORS contributes to improved healthcare resource allocation by shifting care to lower-cost and community-based settings while reducing pressure on healthcare infrastructure, particularly in resource-constrained environments. Its combination of very low cost, scalability, strong clinical effectiveness, and substantial mortality reduction makes ORS one of the clearest examples of a highly cost-effective self-care intervention with major public health impact (Zubairi et al., 2024; UNICEF, 2025).

The Table gives an overview of the scientific and health economic evidence on ORS – from clinical efficacy and coverage trends to cost-effectiveness and the remaining prevention opportunity:

Category	Finding / Value	Source
Clinical efficacy (potential)	ORS could prevent up to 93 % of diarrhoea deaths at 100 % coverage	Munos et al., 2010
Impact (achieved)	ORS alone accounted for 36.2 % of the total reduction in diarrhoea mortality over 35 years	Black et al., 2019
Mortality decline	Under-5 deaths from ~5 million → ~500,000 per year (historical); from 2.7 million (1980) to ~0.5 million (2015) (modelling)	Black et al., 2019
Current mortality	~450,000 children under 5 still die from diarrhoea annually	UNICEF Supply Division, 2025
Coverage progress	ORS use in LMICs rose from 0 % (1980) to 44 % (2015)	Reiner et al., 2019
Coverage gap	Half of children with diarrhoea still do not receive ORS	Wolfheim et al., 2019
Opportunity	Closing coverage to 90 % could prevent an additional 75 % of remaining deaths	Wolfheim et al., 2019

Category	Finding / Value	Source
Cost-effectiveness (WHO)	~$150 per DALY (ORS alone); $10–$50 per DALY (ORS + zinc)	WHO, 2007; Horton et al., 2015
Cost-effectiveness (general)	ORS as one of the most cost-effective interventions in global health	Hutton et al., 2007
Health system savings	Reduced physician visits, emergency care, IV fluids, hospital admissions	Zubairi et al., 2024
Indirect economic benefits	Reduced caregiver burden, absenteeism (work/school), long-term consequences of dehydration and malnutrition	Baral et al., 2020; Al Fidah et al., 2025
Antibiotic reduction	ORS access reduces unnecessary antibiotic use in self-limiting diarrheal illness	Rhee et al., 2019; El-Khoury et al., 2016
System level	Health system relief through shift to low-cost, community-based care	Zubairi et al., 2024; UNICEF, 2025

Table 14 Overview of scientific and health economic evidence on ORS

4.2.5.3. Implications for Self-Care-Based Prevention

The ORS example illustrates with particular clarity how a self-care intervention can generate substantial preventive value – not by averting the onset of disease, but by interrupting its progression to serious, costly, and potentially fatal complications.

At the individual level, ORS contributes primarily to secondary prevention by enabling immediate response to acute diarrhoea before dehydration sets in. Its defining preventive mechanism is the closure of the time gap between symptom onset and effective treatment: because ORS is available without prescription, at low cost, and without requiring healthcare infrastructure, individuals and caregivers can act at the earliest possible stage. This immediacy is the central driver of its clinical impact. Beyond secondary prevention, ORS reduces the severity and duration of illness and prevents progression to hospitalization or systemic complications, thereby contributing to tertiary prevention at the individual level. From a system perspective, widespread ORS availability also serves a quaternary preventive function by reducing recourse to unnecessary, higher-intensity interventions – including inappropriate antibiotic use and intravenous rehydration therapy – in cases that can be effectively managed through self-care (Rhee et al., 2019; El-Khoury et al., 2016).

What makes ORS exceptional within this framework is the scale at which these individual-level preventive effects aggregate into population-level impact. The mortality data are among the most compelling in global health: ORS alone accounted for over a third of the total reduction in under-five diarrheal mortality over 35 years (Black et al., 2019), demonstrating that a non-prescription self-care product can function as a primary driver of communicable disease mortality reduction at global scale. The remaining coverage gap – with half of affected children still not receiving ORS – further underscores that the preventive potential of this intervention is determined less by its clinical properties than by its accessibility (Wolfheim et al., 2019).

This points to a broader principle that the ORS case exemplifies: for self-care interventions targeting acute, rapidly progressing conditions, access is prevention. Low-threshold availability directly translates into earlier treatment initiation, which in turn determines clinical outcomes. Barriers to access – whether regulatory, economic, or infrastructural – therefore have measurable preventive costs, reflected in avoidable morbidity, mortality, and healthcare utilization.

From a health system perspective, ORS demonstrates that effective prevention does not require complex or costly interventions. Its cost-effectiveness, scalability, and capacity to shift care to community-based settings make it a model example of how self-care can simultaneously serve individual therapeutic needs and systemic prevention goals. In the context of Universal Health Coverage, ORS illustrates how expanding access to simple, evidence-based self-care tools can generate population-wide preventive gains while reducing pressure on formal healthcare infrastructure – particularly in resource-constrained settings where the gap between need and supply is greatest (WHO, 2024b; UNICEF Supply Division, 2025).

4.2.6. Illustrative Example VI: Sunscreen and the Prevention of Skin Cancer

Sunscreen represents a highly effective, evidence-based, and cost-efficient intervention for the prevention of skin cancer, the most common form of cancer globally (Urban et al., 2021). Its value lies primarily in its role as a **primary preventive** measure: by reducing exposure to ultraviolet (UV) radiation, the single most important modifiable cause of skin cancer, it prevents carcinogenesis at its earliest stage rather than managing its consequences (Green et al., 2011; Sander et al., 2020).

Skin cancer, comprising melanoma, basal cell carcinoma (BCC), and cutaneous squamous cell carcinoma (SCC), accounts for approximately 6.64 million new cases annually worldwide, with the age-standardized incidence rate rising by an estimated 1.94% per year from 1990 to 2021 (Zhou et al., 2025). The associated burden of disability-adjusted life years (DALYs) was 2.89 million in 2021 (Zhou et al., 2025). Given that the great majority of skin cancers are attributable to UV radiation exposure, preventive interventions in this area represent an important opportunity to improve both individual and population health outcomes while reducing the substantial economic burden on health systems (Neale et al., 2023).

4.2.6.1. Specific Characteristics of Sunscreen in Self-Care

Sunscreen is characterized by its routine use, broad accessibility, and preventive mode of action. Its efficacy is based on absorbing, reflecting, or scattering UV radiation, both UVB and UVA thereby preventing DNA damage, photoaging, and immunosuppression that drive skin carcinogenesis (Sander et al., 2020). Broad-spectrum formulations with SPF ≥ 15 filter at least 93% of UVB radiation, while SPF 50 filters approximately 98% (Green & Williams, 2007). Sunscreen enables continuous, individual-level prevention without reliance on healthcare infrastructure, making it a scalable, low-threshold self-care intervention that complements formal healthcare systems and is suitable for population-wide implementation (Singh et al., 2024).

In most countries, including Europe and Japan, sunscreens are classified as cosmetics, in the United States and Canada as OTC (Over the Counter) drugs, while in Australia as therapeutic drugs (Perugini et al., 2019). This regulatory status distinguishes sunscreen from many other preventive interventions discussed in this report, such as NRT or PDE5 inhibitors, which require varying degrees of pharmacist involvement or prescription pathways in

several countries. The cosmetic classification means that sunscreen is available in supermarkets, convenience stores, and online platforms without any healthcare gatekeeping, making it one of the most accessible self-care products globally. Furthermore, long-term sunscreen use is considered a safe preventive approach. While laboratory studies show that sunscreen can impair cutaneous vitamin D synthesis, clinical trials and observational studies in real-world settings suggest that this effect is minimal in healthy individuals, though supplementation may be warranted for at-risk populations (Passeron et al., 2019). This low-threshold access is a critical enabler of population-wide prevention, as it eliminates structural barriers to uptake and aligns with the WHO definition of self-care as the ability of individuals to promote health and prevent disease with or without the support of healthcare professionals (WHO, 2019).

4.2.6.2. Preventive Effects of Sunscreen Based on Health Economic Evidence

Health economic evidence consistently demonstrates that sunscreen, particularly when used daily, combines strong clinical effectiveness with low implementation costs. The landmark Nambour Skin Cancer Prevention Trial, the only population-based randomized controlled trial (RCT) of sunscreen and skin cancer outcomes, enrolled 1,621 adults in Queensland, Australia, randomized to daily application of broad-spectrum SPF 16 sunscreen versus discretionary use over 4.5 years, with follow-up extending more than a decade (Green et al.,1999). Daily sunscreen use reduced SCC tumor incidence by 38% during the intervention period (rate ratio 0.61; 95% CI 0.46–0.81), a benefit that persisted in 8-year follow-up (van der Pols et al., 2006). For melanoma, the 10-year post-trial follow-up found a 50% reduction in new primary melanomas (HR 0.50; 95% CI 0.24–1.02) and a 73% reduction in invasive melanomas (HR 0.27; 95% CI 0.08–0.97; p = 0.045) in the daily sunscreen group (Green et al., 2011). The largest observational study outside Australia, the Norwegian Women and Cancer (NOWAC) cohort of 143,844 women, confirmed that use of SPF ≥ 15 sunscreen significantly reduced melanoma risk (HR 0.67; 95% CI 0.53–0.83) compared with SPF < 15 use, and estimated that universal use of SPF ≥ 15 could reduce total melanoma incidence in this population by 18% (Ghiasvand et al., 2016). Recent clinical reviews and consensus updates (Sander et al., 2020; Nicholson et al., 2025) further support these findings, reinforcing that regular sunscreen use reduces skin cancer risk, even though individual observational studies often face challenges with confounding by indication.

Because the burden of skin cancers is expressed through both mortality and years lived with disability, even moderate incidence reductions at the population level can yield meaningful health and economic gains. The global incidence of skin cancers continues to rise, and the burden of NMSC is projected to increase by at least 1.5 times from 2020 to 2044 (Hu et al., 2022).

Sunscreen use also contributes to avoiding costly downstream treatments. By reducing the incidence and progression of SCC and melanoma, it lowers the need for surgical excisions, sentinel lymph node biopsies, systemic therapies (including immunotherapies and targeted therapies), radiation, and long-term follow-up. Cost-effectiveness modelling demonstrates that systematic daily sunscreen use at the population level prevents substantially more new skin tumours and melanoma deaths, and saves more healthcare costs, than early detection strategies alone (Gordon et al., 2020). The relevance of this effect is underscored by the scale of the economic burden: in Australia, total direct government costs for newly diagnosed skin cancer patients were AU$824 million in 2021 (Gordon et al., 2022). In the Netherlands,

skin cancer costs rose from €278 million in 2007 to €465 million in 2017 and are projected to reach €1.35 billion by 2030 (Noels et al., 2020).

Beyond direct treatment costs, skin cancers generate substantial indirect economic consequences. Ortega-Ortega et al. (2022) estimated the average productivity loss per premature death from melanoma at €450,694 across 31 European countries, with total cancer-related lost productivity reaching €104.6 billion in Europe in 2018. A COVID-19-related delay in melanoma diagnosis across Europe led to an estimated 111,464 years of life lost and $7.65 billion in additional costs (Maul et al., 2024). These findings suggest that the economic impact of skin cancer extends well beyond treatment costs, and that prevention through sunscreen may help preserve both health-related quality of life and workplace productivity.

Cost-effectiveness analyses further support the economic case for sunscreen. While Hirst et al. (2012) established the long-term value of sunscreen promotion, more recent modeling by Gordon et al. (2020) confirms it provides good value under WHO-CHOICE methodology, with a favorable profile that depends on sunscreen pricing. A systematic review by Collins et al. (2024a) confirmed that primary prevention interventions for skin cancer are consistently cost-effective across multiple settings and study designs. At the program level, the SunSmart Western Australia program was shown to prevent 13,728 keratinocyte cancers, 636 melanomas, and 46 melanoma deaths per 100,000 population over 20 years, with an estimated return on investment of AU$8.70 for every AU$1 invested and a 90.1% likelihood of being cost-effective (Collins et al., 2024b).

However, realizing these benefits depends critically on adherence and access. The efficacy of sunscreen is strongly influenced by application thickness, frequency of reapplication, and the SPF used. In real-world settings, application is frequently insufficient, most individuals apply only 20–50% of the amount used in clinical trials, substantially reducing the effective SPF achieved (Sander et al., 2020). While sunscreen is generally affordable in high-income countries, availability and affordability remain more limited in lower-income settings.

At the same time, the epidemiological distribution of skin cancer is heavily concentrated in high-income countries, particularly Australia, New Zealand, and parts of Europe and North America, where sunscreen affordability is not the primary barrier (Zhou et al., 2025). In these settings, the main challenges relate to behavioural adherence, insufficient public health messaging, and the underintegration of sun protection into preventive care pathways. In low- and middle-income countries, by contrast, skin cancer prevention receives limited policy attention due to competing health priorities, even though UV exposure remains significant in many tropical and subtropical regions (Urban et al., 2021). This dual context underscores that the health economic potential of sunscreen as a preventive self-care intervention depends not only on product affordability but also on context-specific strategies addressing adherence, awareness, and integration within UHC frameworks.

The table below summarises key health economic evidence on sunscreen across clinical effectiveness, cost-effectiveness, disease burden, downstream treatment savings, productivity losses, and economic return.

Category	Effect	Finding / Value	Source
Clinical effectiveness (Melanoma prevention)	Reduction in melanoma risk with regular sunscreen use	In the only RCT with 10-year follow-up: • 50% reduction in primary melanoma (HR 0.50; 95% CI 0.24-1.02) • 73% reduction in invasive melanoma (HR 0.27; 95% CI 0.08-0.97)	Green et al., 2011 ;
Clinical effectiveness (Broader skin cancer prevention)	Sunscreen reduces SCC incidence and overall skin cancer risk; confirmed by systematic reviews	• 38% SCC reduction in 4.5-year RCT (RR 0.61; 95% CI 0.46–0.81); • ~40% sustained reduction at 8 years (RR 0.62; 95% CI 0.38–0.99). • Recent clinical reviews confirm protection against SCC and melanoma	Green et al., 1999 ; van der Pols et al., 2006 ; Sander et al., 2020; Nicholson et al., 2025 ;
Clinical effectiveness (observational)	Risk reduction with higher SPF in large prospective cohort	• ~30% reduced melanoma risk with SPF ≥ 15 vs. lower SPF (HR 0.67; 95% CI 0.53–0.83); • population-attributable fraction 18%	Ghiasvand et al., 2016 (NOWAC study)
Disease burden	Global skin cancer incidence, DALYs, and economic impact of diagnostic delays	• 6.64 million cases globally (2021) • 2.89 million DALYs • Age-standardized incidence rate (ASIR) rising at 1.94% per year (1990–2021) • COVID-19-related delay in diagnosis led to 111,464 years of life lost (YLL) and $7.65 billion USD in additional costs	Zhou et al., 2025; Maul et al., 2024
Direct treatment costs	Cost per patient and national economic burden	• AU$824 million total (Australia, 2021); • €465 million (Netherlands, 2017), • projected €1.35 billion by 2030	Gordon et al., 2022; Noels et al., 2020
Cost-effectiveness	Cost-benefit of daily sunscreen vs. early detection	• Prevention more effective and cost-saving than early detection alone; • favourable profile under WHO-CHOICE methodology	Hirst et al., 2012; Gordon et al., 2020; Collins et al., 2024a

Productivity losses	Lost productivity from melanoma premature death (Europe)	• Based on 2018 data across 31 European countries: • €450,694 per premature melanoma death	Ortega-Ortega et al., 2022
Economic return on investment	Population-level sun protection program (SunSmart WA)	• AU$8.70 return per AU$1 invested; • 90.1% likelihood cost-effective; 636 melanomas, • 46 deaths prevented per 100,000 over 20 years	Collins et al., 2024b
Overall assessment	Health economic profile of sunscreen	• Highly favourable cost-benefit profile: • strong evidence for SCC and melanoma prevention, • potential to reduce health system burden, • scalable self-care intervention	Sander et al., 2020; Collins et al., 2024a

Table 15: Key health economic evidence on sunscreen

4.2.6.3. Implications for Self-Care-Based Prevention

Sunscreen makes a concrete and well-evidenced contribution to prevention across the primary, secondary, and tertiary levels of the established prevention framework. Within the established prevention framework, sunscreen functions primarily as primary prevention by preventing skin cancer onset before it occurs. It also contributes to secondary prevention by reducing actinic keratoses, which are precancerous lesions with potential for malignant transformation, and to tertiary prevention by reducing recurrence risk in individuals with prior skin cancer history. At the individual level, it directly reduces SCC incidence, melanoma risk, and actinic keratosis development through UV absorption and reflection, inhibition of photocarcinogenesis, and reduction of cumulative DNA damage (Green et al., 1999).

Beyond skin cancer, it contributes to healthier ageing by preventing photoaging. A predefined analysis of the Nambour trial confirmed that regular sunscreen use over 4.5 years can arrest signs of skin aging caused by photodamage (Sander et al., 2020). At the population level, given that global skin cancer incidence is rising with over 6.6 million new cases annually, even moderate incidence reductions through regular sunscreen use translate into substantial health gains and treatment cost savings (Zhou et al., 2025).

As a self-care intervention, sunscreen delivers these preventive effects continuously and without requiring professional involvement or healthcare infrastructure, enabling sustained disease control at low cost and supporting a shift towards prevention-oriented models of care (Gordon et al., 2020). By reducing disease incidence and limiting progression to more severe conditions, it also contributes to avoiding costly downstream treatments, including surgical excisions, systemic therapies, radiotherapy, and long-term follow-up, and to improved system efficiency.

Despite the growing global burden of skin cancer, sunscreen promotion remains insufficiently integrated into many health systems and is frequently underemphasised in public health policy. This gap underscores the relevance of accessible, cost-effective self-care interventions within UHC frameworks: the full preventive potential of sunscreen can only be realized where it is affordable, accessible, and consistently used. Addressing this gap will therefore require health systems worldwide to consider embedding sunscreen promotion more firmly into preventive care strategies. Greater investment in public education, improved affordability, and integration into primary health care settings could represent meaningful steps toward realising sunscreen's full preventive potential.

The figure below illustrates how regular sunscreen use contributes not only to the prevention of skin cancer, but also indirectly supports broader health outcomes through reduced photoaging, improved quality of life, and reduced systemic disease burden:

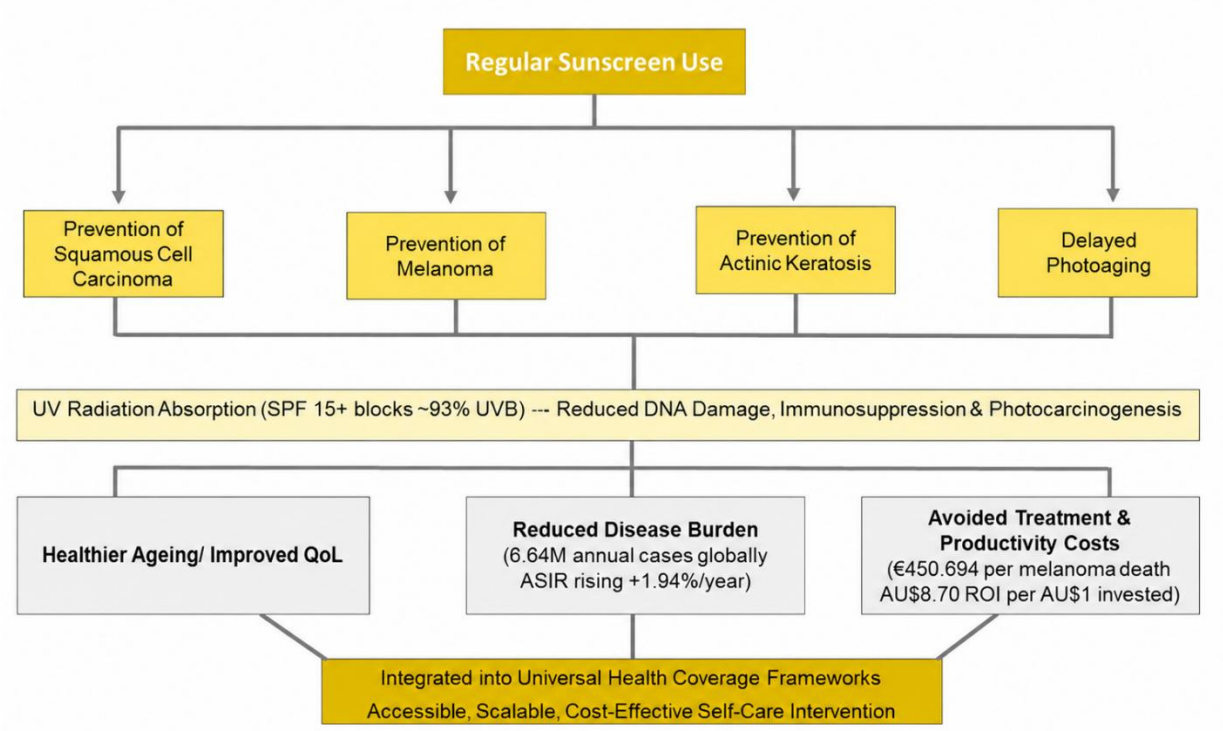


Figure 22: Preventive effects of sunscreen on broader health outcomes (Green et al. (1999, 2011); Sander et al. (2020); Neale et al. (2023); Zhou et al. (2025); Ortega-Ortega et al. (2022); Collins et al. (2024a, 2024b))

Overall, sunscreen demonstrates how a routinely applied self-care product can generate meaningful preventive value, reduce disease burden across multiple skin cancer types, and support more prevention-oriented, equitable, and sustainable health systems

4.2.7. Illustrative Example VII: Responsible self-care instead of overtreatment, reducing unnecessary interventions such as antibiotic overuse

In the previous illustrative examples, the preventive effects of specific self-care interventions and non-prescription products were examined in relation to selected health conditions and

risk factors. However, beyond the preventive benefits of individual interventions, the concept of responsible self-care itself may also be understood as a form of prevention.

In particular, responsible self-care contributes to quaternary prevention by reducing unnecessary healthcare utilization, avoiding overtreatment, and supporting more rational and efficient use of healthcare resources.

Quaternary prevention refers to actions aimed at protecting individuals from overmedicalization and unnecessary medical interventions that may provide limited benefit while increasing the risk of adverse effects, treatment burden, healthcare costs, and system inefficiencies (Martins et al., 2018; Alber et al., 2017). Within increasingly resource-constrained healthcare systems, this dimension of prevention has gained growing importance. Rising healthcare utilization, workforce shortages, demographic change, and the increasing prevalence of chronic diseases place substantial pressure on health systems globally (WHO, 2022a). Against this background, responsible self-care represents an important complementary mechanism that can help prevent avoidable healthcare consumption while maintaining health outcomes and individual well-being, particularly where access to formal healthcare is constrained (May et al., 2023a).

The global evidence base underlying this report (EcoSoc 1.0/ 2.0 Data) demonstrates that responsible self-care already contributes substantially to reducing pressure on healthcare systems worldwide. According to the updated GSCF Economic and Social Impact analysis, self-care currently generates approximately USD 144 billion in annual health system savings and frees around 2.20 billion physician hours globally each year (GSCF, 2026). These effects are not solely attributable to individual products or disease-specific interventions but also reflect the broader preventive value of responsible self-care as a healthcare approach in itself.

Responsible self-care enables individuals to appropriately manage common and self-limiting conditions, engage in prevention, maintain health, and make informed healthcare decisions without unnecessary reliance on formal medical services. In this sense, self-care contributes directly to **quaternary prevention** by

- avoiding unnecessary physician consultations,
- unnecessary prescribing,
- overtreatment and
- inappropriate escalation of care.

Responsible self-care complements formal healthcare systems by helping to preserve clinical capacity and enabling healthcare professionals to focus on patients with more severe or complex medical needs.

A concrete and clinically significant example of this relationship is the contribution of responsible self-care to reducing antibiotic overuse. When individuals can responsibly manage common, self-limiting conditions such as acute diarrhea or uncomplicated respiratory infections with appropriate non-prescription products (e.g., ORS or nasal decongestants), this often removes the trigger for medical consultations that might otherwise result in unnecessary antibiotic prescribing. ORS (see chapter 4.2.5), for instance, has been shown to reduce inappropriate antibiotic use in diarrheal illness by providing effective symptomatic management without the need for antimicrobial therapy (Rhee et al., 2019; El-Khoury et al., 2016). Since a sub-

stantial proportion of outpatient antibiotic consumption is attributable to mild, often viral infections, responsible self-care helps slow the development of antimicrobial resistance, avoid adverse drug effects, and preserve the effectiveness of these essential medicines (Godman et al., 2021). In this sense, reducing antibiotic overuse represents a concrete example of how self-care contributes to quaternary prevention by delivering individual health benefits while simultaneously protecting the population-level effectiveness of antimicrobial therapies.

4.2.7.1. Effects of Responsible Self-Care in Quaternary Prevention Based on Scientific Evidence

Scientific evidence increasingly supports the view that responsible self-care contributes to prevention not only through disease reduction, but also through avoidance of unnecessary medical interventions. This is particularly relevant for the management of self-limiting conditions where formal medical treatment may not be clinically necessary (May et al., 2023a, WHO, 2019)

The data generated within the EcoSoc 2.0 analysis and the associated systematic evaluations demonstrate that self-care using non-prescription medicines can reduce physician workload, improve healthcare access, shorten recovery times, and maintain productivity and quality of life across different healthcare settings. Importantly, these benefits arise partly because self-care enables appropriate management outside formal healthcare structures, thereby reducing unnecessary healthcare utilization (GSCF, 2026).

This preventive effect is particularly visible in high-income healthcare systems, where self-care often functions as the first treatment option for common conditions instead of physician consultation. In these contexts, responsible self-care may prevent unnecessary use of physician time, avoid excessive diagnostic procedures, and reduce inappropriate prescribing for conditions that can be safely managed through evidence-based self-care approaches (May et al., 2023a).

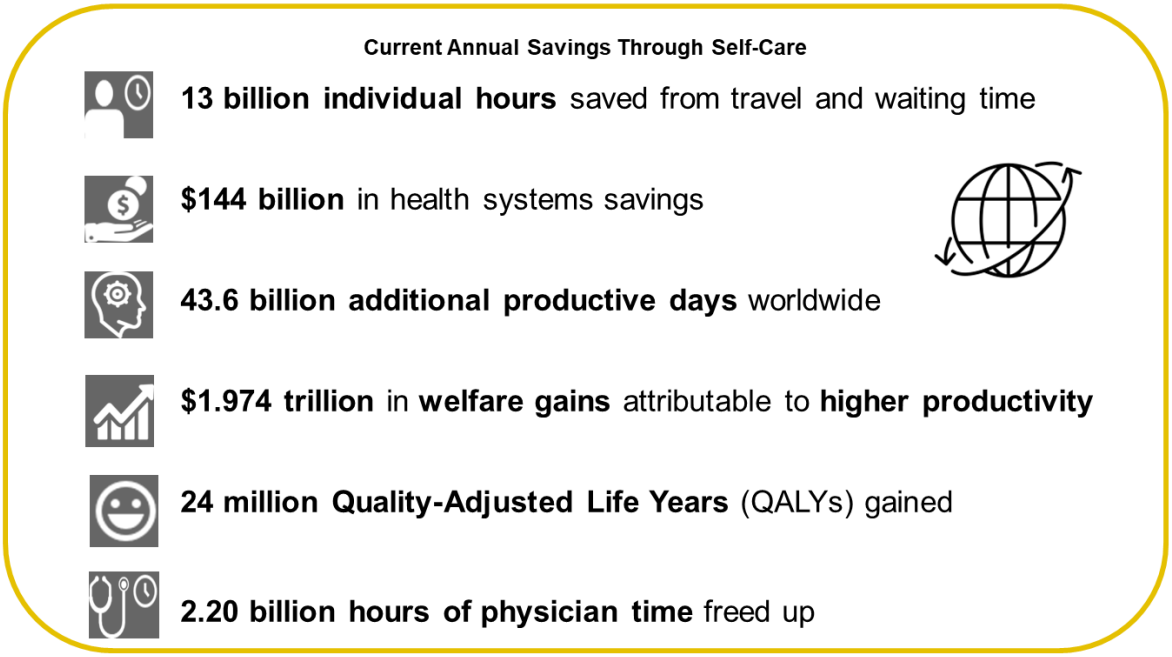


Figure 23: Current annual savings through self-care

A central example of quaternary prevention is antibiotic overuse, because it illustrates how unnecessary medical interventions may generate avoidable harm despite limited clinical benefit, particularly through adverse drug effects and antimicrobial resistance (Martins et al., 2018; Godman et al., 2021). However, the drivers of inappropriate antibiotic use differ substantially between high-income countries (HICs) and LMICs, and so do the mechanisms through which self-care may contribute to quaternary prevention.

In HICs, quaternary prevention in the context of antibiotic use focuses primarily on reducing overtreatment within highly medicalized healthcare systems. Antibiotics are frequently prescribed for viral respiratory infections and other self-limiting conditions where clinical benefit is limited or absent, driven by patient expectations, diagnostic uncertainty, and time pressure in primary care (Sijbom et al., 2023; Germeni et al., 2018). Responsible self-care supported by health literacy, pharmacist counselling, and evidence-based non-prescription symptom management (e.g., analgesics, decongestants, nasal saline irrigation) can reduce avoidable physician consultations and the associated demand for antibiotics. In this setting, self-care contributes to quaternary prevention by helping to prevent unnecessary prescribing, overtreatment, and the downstream harms of inappropriate antibiotic use.

In LMICs, the challenge is qualitatively different. Antibiotics are frequently obtained without prescription and used inappropriately due to limited diagnostic capacity, weak regulatory enforcement, restricted access to professional healthcare, and low health literacy (Sulis et al., 2020; Cabral et al., 2024). Here, the problem is not overmedicalization in a resource-rich system but rather unsafe medication use in a resource-constrained one. Responsible self-care contributes to quaternary prevention not by reducing physician consultations (which are often inaccessible), but by offering evidence-based, non-prescription alternatives to antibiotic self-care. When individuals can manage symptoms of self-limiting conditions such as acute diarrhoea (with ORS) or uncomplicated respiratory infections (with antipyretics and supportive care) without resorting to antibiotics obtained informally, the risk of adverse drug effects, unnecessary treatment burden, and antimicrobial resistance is reduced.

Thus, in both settings, responsible self-care supports quaternary prevention, though the specific mechanism differs preventing overprescribing in HICs and preventing unsafe self-use in LMICs.

Overall, the example of antibiotic overuse demonstrates that responsible self-care itself represents an important mechanism of quaternary prevention. Across both HICs and LICs, self-care contributes to prevention not only by supporting health and symptom management, but also by reducing unnecessary medical interventions and avoidable healthcare-related harm. While the specific challenges differ across healthcare settings, responsible self-care consistently supports more rational healthcare utilization, antibiotic stewardship, and prevention-oriented healthcare systems.

Figure 24 schematically illustrates the effects of quaternary prevention in the context of antibiotic overuse for common colds.

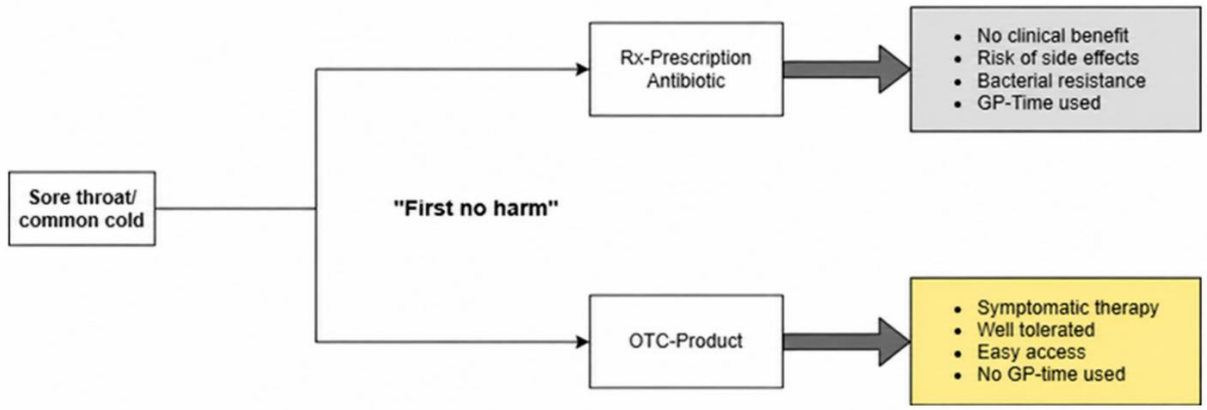


Figure 24: Example Quaternary Prevention: Reducing Unnecessary Antibiotic Overuse

4.2.7.2. Implications for Self-Care-Based Prevention

The evidence presented in this section establishes responsible self-care as a structural contributor to quaternary prevention – not merely as a side effect of individual therapeutic interventions, but as an inherent property of the self-care approach itself. Where individuals can appropriately manage common and self-limiting conditions outside formal healthcare structures, the cascade of unnecessary consultations, diagnostic procedures, prescriptions, and escalating treatments is interrupted at its origin.

The scale of this effect is substantial. Self-care currently generates approximately USD 144 billion in annual health system savings and frees around 2.20 billion physician hours globally each year (GSCF, 2026). These figures reflect not only the therapeutic value of specific OTC products but the broader preventive value of a healthcare approach that systematically reduces avoidable medicalization.

Antibiotic overuse illustrates this mechanism with particular clarity and crucially demonstrates that the quaternary preventive contribution of self-care is context-dependent in its mechanism but universal in its direction. In high-income countries, responsible self-care – supported by health literacy, pharmacist counselling, and effective OTC symptom management – reduces avoidable consultations for viral respiratory infections and self-limiting conditions that are the primary drivers of inappropriate outpatient prescribing (Sijbom et al., 2023; Germeni et al., 2018). The preventive target here is overprescribing within a highly medicalized system.

In low- and middle-income countries, the mechanism is different but the quaternary logic holds: when accessible, evidence-based self-care alternatives such as ORS or supportive respiratory care are available, individuals are less likely to resort to informal antibiotic self-care in the absence of professional healthcare access (Rhee et al., 2019; El-Khoury et al., 2016; Sulis et al., 2020).

In both settings, self-care prevents avoidable harm – adverse drug effects, treatment burden, and the erosion of antimicrobial effectiveness – while preserving individual health outcomes.

This dual-context applicability points to a broader principle: quaternary prevention through self-care is not a phenomenon of affluent, overmedicalized systems alone. It operates wherever the availability of appropriate, evidence-based self-care options displaces a more harm-

ful alternative – whether that alternative is an unnecessary prescription in a resource-rich primary care setting or informal antibiotic use in a resource-constrained one. The common denominator is the availability of responsible self-care as a credible first-line option, supported by sufficient health literacy, accessible non-prescription products, and structured pharmacy or community-level guidance (May et al., 2023a; WHO, 2019).

From a health system perspective, the quaternary preventive value of self-care reinforces its role within Universal Health Coverage frameworks. By preserving clinical capacity, reducing avoidable healthcare utilization, and enabling healthcare professionals to focus on patients with genuine medical need, responsible self-care contributes to system sustainability in a way that complements rather than competes with formal care. The evidence presented across this section demonstrates that this contribution is not incidental – it is a predictable and scalable consequence of expanding access to responsible, evidence-based self-care. Protecting and promoting this role requires sustained investment in health literacy, pharmacy-based counselling infrastructure, and regulatory frameworks that enable access to appropriate OTC options while maintaining stewardship standards (Godman et al., 2021; GSCF, 2026).

4.3. Results and Conclusions on the role of Self Care in Prevention

The present analysis demonstrates that preventive self-care measures - particularly those involving OTC medicines - make a substantial contribution to public health that is frequently underestimated in health policy debate. Across all four levels of prevention - from primary through secondary and tertiary to quaternary prevention, self-care offers effective entry points for reducing the burden of disease, preserving healthcare system resources, and sustainably improving individual quality of life.

From a health economics perspective, it is worth emphasising that the **leverage effect of preventive** selfcare typically far exceeds that of curative self-treatment. While curative self-care primarily substitutes for Physician consultations and prescription medicines, preventive measures can avoid far more profound downstream costs - including reductions in inpatient treatment and the prevention of work incapacity. Such measures frequently prove not merely cost-effective but represent a dominant strategy, generating net savings at the level of health systems, society, and individual users alike. Among the examples presented above, this leverage effect becomes particularly evident in the cases of *smoking cessation with NRT and oral health promotion through toothpaste* use. In both cases, only comparatively small investments in OTC products are required to generate exceptionally large returns on investment in the form of gained life years and net cost savings for public healthcare systems.

A further key advantage of preventive self-care lies in its **low-threshold accessibility**. Since preventive measures can often be implemented without recourse to healthcare professionals, a structural access barrier is overcome, one that has traditionally hindered the uptake of preventive offerings. This is of particular benefit to vulnerable population groups and low-income countries, where preventive approaches frequently represent the only realistic option for improving public health. The example of *OTC-antifungal medicines* specifically underlines this aspect. Particularly in LIC settings, fungal infections frequently remain untreated if appropriate medicines are not easily accessible without a physician prescription. However, even in HICs with comparatively well-developed public healthcare systems, prescription-only status

may constitute a substantial barrier to access, as demonstrated by the example of PDE5 inhibitors. In this context, improved access through an Rx-to-OTC switch may indirectly even contribute significantly to the prevention of cardiovascular diseases by facilitating earlier detection of cardiovascular risk factors and promoting timely medical intervention.

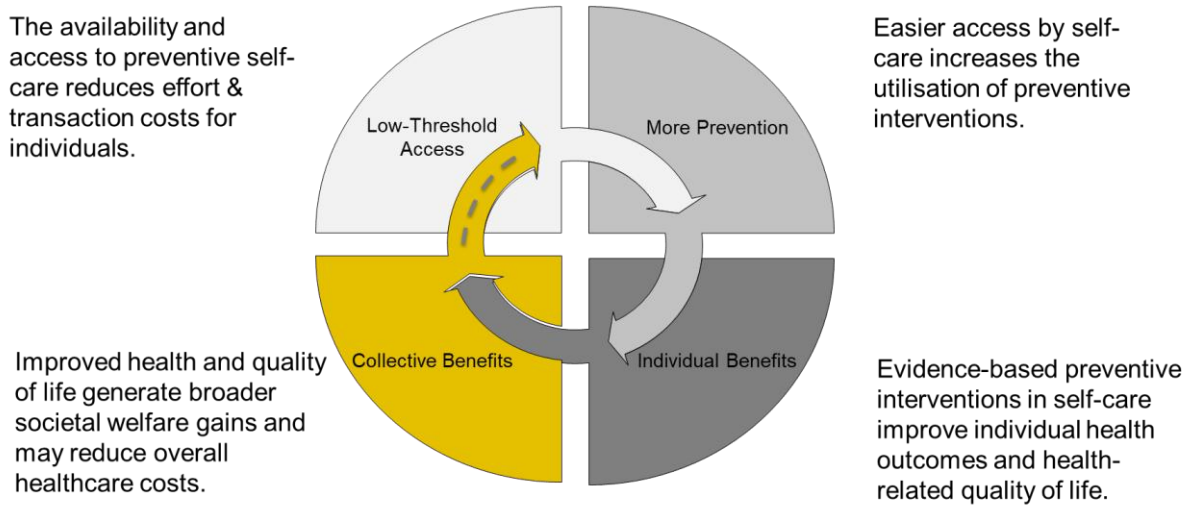


Figure 25: Self-care: Effects of Low-Threshold Access to Prevention

Preventive self-care also makes a meaningful contribution to **Universal Health Coverage** (UHC). A particularly striking example in this context is access to *oral rehydration solutions* (ORS) for the treatment and prevention of severe outcomes associated with diarrhoeal diseases. Over the past 30 years, the annual number of deaths caused by diarrhoeal diseases has declined from approximately 2.7 million to below 0.5 million worldwide. A substantial proportion of the lives saved were those of children, which further underlines the contribution of preventive self-care interventions to improving health equity, equal opportunities and social justice at the global level. More general by reducing the incidence and prevalence of both communicable and non-communicable diseases, resources within the healthcare system are freed up for the benefit of a broader population, both directly, through fewer people falling ill, and indirectly, through increased treatment capacity for more serious cases. In the following figure, these two impact dimensions of preventive self-care interventions are conceptualised as direct and indirect effects.

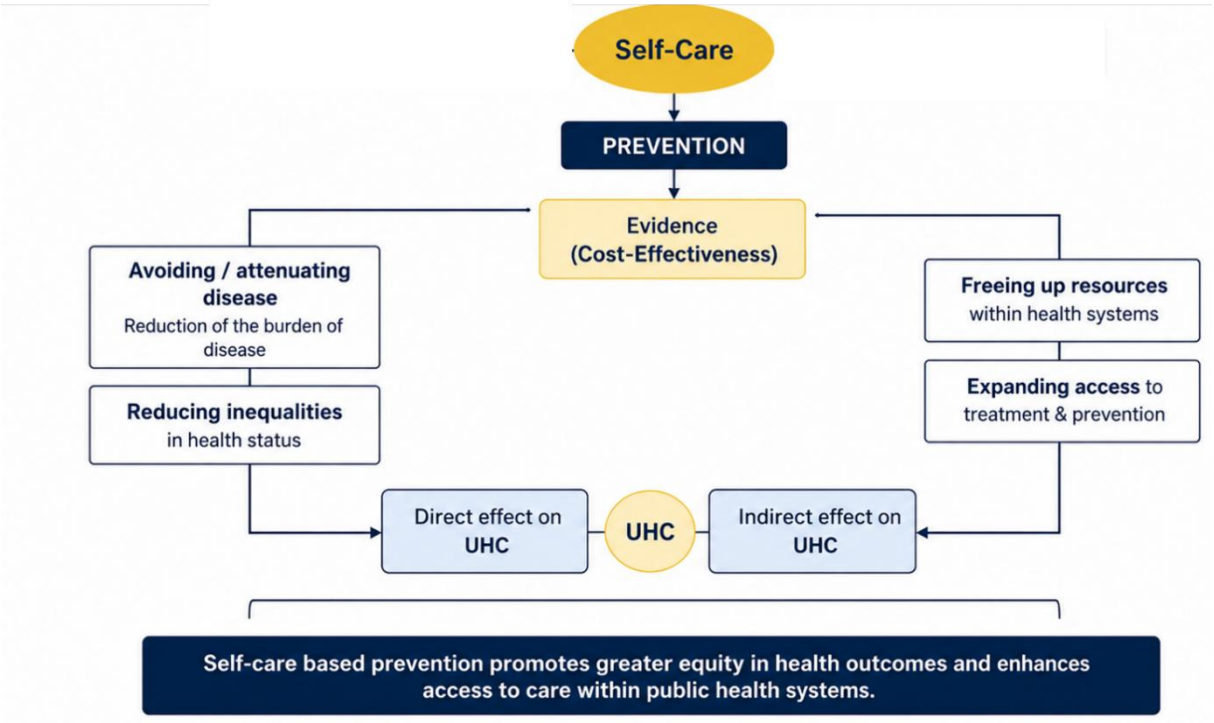


Figure 26: Contribution of preventive self-care to Universal Health Coverage

From a **health policy standpoint**, it can be concluded that the systematic integration of preventive self-care measures into public support programmes appears warranted on both economic and healthcare provision grounds. Since individual decision-making, particularly among lower-income populations, is often characterised by high present bias, and since prevention by its nature involves no immediate experience of suffering, uptake of worthwhile preventive measures is structurally insufficient without targeted incentive structures. Economic instruments combined with education and awareness campaigns to promote preventive self-care can effectively address this dilemma and thus represent an efficient lever for strengthening public health.

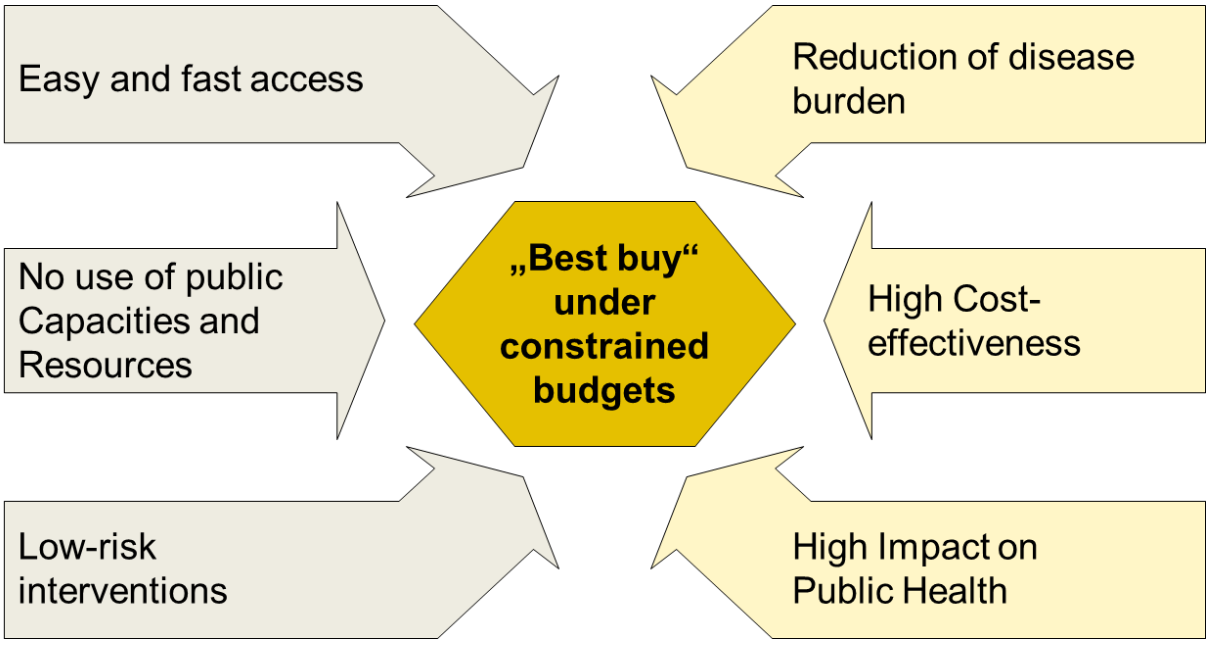


Figure 27: What is the specific value of self-care in prevention?

Finally, the above figure summarises the principal factors determining the specific value of self-care in the context of prevention. This value derives both from the inherent characteristics of self-care interventions and OTC-Products (left side in light grey) and from the broader health economic implications associated with the role of self-care within prevention-oriented healthcare systems (left side in light yellow). Ultimately - and this was demonstrated by the practical examples discussed above - preventive interventions within the framework of self-care frequently represent a **"best buy"** both for individuals and for healthcare systems. In other words, substantial health gains can often be achieved with comparatively limited resource utilisation. In some cases, such as ORS, oral care interventions and smoking cessation, the preventive approaches described may even generate net cost savings. This implies that the respective preventive intervention not only leads directly to gains in quality of life and life expectancy, but simultaneously releases healthcare capacities and financial resources that can subsequently be allocated to other healthcare investments and priorities

Finally, the **concept of quaternary prevention** should be highlighted, as it effectively integrates the key characteristics and mechanisms of both treatment and prevention within the framework of self-care and thereby turns self-care itself into a preventive concept. A central element of quaternary prevention is that responsible self-care helps to avoid the overuse and misuse of services within public healthcare systems. In this way, the health-related consequences of resource and capacity constraints within healthcare systems can be mitigated, while direct harm resulting from unnecessary medical interventions — such as side effects or antimicrobial resistance caused by the inappropriate prescription of antibiotics for viral infections — can be prevented.

Due to its overarching and non-indication-specific character, the concept of quaternary prevention also provides a conceptual link between the health economic relief effects of self-care analysed in *EcoSoc 1.0* (updated in *EcoSoc 2.0*), and the broader discussion of prevention presented in the preceding sections of Part I of this report.

5. Overall Conclusions and Outlook

The final conclusion and outlook will be added following a joint discussion of the results. This is intended to ensure that the interpretation of the findings and the outlook are optimally aligned with the further context in which the expert report will be used.

The substantive findings and assessments of the expert report remain unaffected by this.

6. List of References

AbdulRaheem, Y. (2023). Unveiling the Significance and Challenges of Integrating Prevention Levels in Healthcare Practice. Journal of Primary Care & Community Health, 14, 21501319231186500. https://doi.org/10.1177/21501319231186500

Adachi, N., Sugimoto, K., Suzuki, H., & Shinada, K. (2025). Influence of oral health status on absenteeism and presenteeism as indices of work productivity loss. Journal of Dental Sciences, 20(2), 794–801. https://doi.org/10.1016/j.jds.2024.09.029

AESGP. (2024a). AESGP ACTIVITY REPORT 2024. Association of the European Self-Care Industry (AESGP). https://aesgp.eu/content/uploads/2025/06/05.07-AESGP-annual-report-2024_LAST-VERSION.pdf

AESGP. (2024b). AESGP ACTIVITY REPORT 2024 -Celebrating 60 years of self-care. Association of the European Self-Care Industry (AESGP). https://aesgp.eu/content/uploads/2025/06/05.07-AESGP-annual-report-2024_LAST-VERSION.pdf

Al Fidah, M. F., Islam, M. R., Amin, R., Nuzhat, S., Ahmed, T., & Faruque, A. S. G. (2025). Cost of diarrhoea: A household perspective from seven countries in the Global Enteric Multicentre Study (GEMS). BMJ Paediatrics Open, 9(1), e003622. https://doi.org/10.1136/bmjpo-2025-003622

Alber, K., Kuehlein, T., Schedlbauer, A., & Schaffer, S. (2017). Medical overuse and quaternary prevention in primary care – A qualitative study with general practitioners. BMC Family Practice, 18(1), 99. https://doi.org/10.1186/s12875-017-0667-4

Andersson, K. (2018). PDE5 inhibitors – pharmacology and clinical applications 20 years after sildenafil discovery. British Journal of Pharmacology, 175(13), 2554–2565. https://doi.org/10.1111/bph.14205

Ashina, S., Buse, D. C., Bjorner, J. B., Bendtsen, L., Lyngberg, A. C., Jensen, R. H., & Lipton, R. B. (2021). Health-related quality of life in tension-type headache: A population-based study. Scandinavian Journal of Pain, 21(4), 778–787. https://doi.org/10.1515/sjpain-2020-0166

Atkins, C. Y., Thomas, T. K., Lenaker, D., Day, G. M., Hennessy, T. W., & Meltzer, M. I. (2016). Cost-effectiveness of preventing dental caries and full mouth dental reconstructions among Alaska Native children in the Yukon–Kuskokwim delta region of Alaska. Journal of Public Health Dentistry, 76(3), 228–240. https://doi.org/10.1111/jphd.12141

Australian Government. (2008). AMWG Interim Report to Government—Attachment A. Australian Government Department of Health, Disability and Ageing. https://www.pbs.gov.au/info/general/working-groups/amwg/amwg-interim-report-attachment-a

Baral, R., Nonvignon, J., Debellut, F., Agyemang, S. A., Clark, A., & Pecenka, C. (2020). Cost of illness for childhood diarrhea in low- and middle-income countries: A systematic review of evidence and modelled estimates. BMC Public Health, 20(1), 619. https://doi.org/10.1186/s12889-020-08595-8

Bauer, C., May, U., Pham, T.-K., Giulini-Limbach, C., & Schneider-Ziebe, A. (2022). The Global Social and Economic Value of Self-Care. https://www.selfcarefederation.org/sites/default/files/media/documents/2022-08/GSCF%20Socio-Economic%20Research%20Report%2028072022.pdf

Bell, C., Hadi, M. A., Khanal, S., & Paudyal, V. (2021). Prescribing patterns and costs associated with erectile dysfunction drugs in England: A time trend analysis. BJGP Open, 5(2), bjgpopen20X101145. https://doi.org/10.3399/bjgpopen20X101145

Benedict, K., Gold, J. A. W., Wu, K., & Lipner, S. R. (2022). High Frequency of Self-Diagnosis and Self-Treatment in a Nationally Representative Survey about Superficial Fungal Infections in Adults—United States, 2022. Journal of Fungi, 9(1), 19. https://doi.org/10.3390/jof9010019

Benedict, K., Jackson, B. R., Chiller, T., & Beer, K. D. (2019). Estimation of Direct Healthcare Costs of Fungal Diseases in the United States. Clinical Infectious Diseases, 68(11), 1791–1797. https://doi.org/10.1093/cid/ciy776

Benedict, K., Smith, D. J., Chiller, T., Lipner, S. R., & Gold, J. A. W. (2024). ------Topical Antifungal Prescribing for Medicare Part D Beneficiaries—United States, 2021. MMWR. Morbidity and Mortality Weekly Report, 73(1), 1–5. https://doi.org/10.15585/mmwr.mm7301a1

Benedict, K., Whitham, H. K., & Jackson, B. R. (2022). Economic Burden of Fungal Diseases in the United States. Open Forum Infectious Diseases, 9(4), ofac097. https://doi.org/10.1093/ofid/ofac097

Bernabe, E., Marcenes, W., Abdulkader, R. S., Abreu, L. G., Afzal, S., Alhalaiqa, F. N., Al-Maweri, S., Alsharif, U., Anyasodor, A. E., Arora, A., Asgary, S., Ashraf, T., Balasubramanian, M., Banakar, M., Barrow, A., Bashiri, A., Belay, S. A., Belgaumi, U. I., Berhie, A. Y., … Kassebaum, N. J. (2025). Trends in the global, regional, and national burden of oral conditions from 1990 to 2021: A systematic analysis for the Global Burden of Disease Study 2021. The Lancet, 405(10482), 897–910. https://doi.org/10.1016/S0140-6736(24)02811-3

Bertram, M. Y., Lauer, J. A., Stenberg, K., & Edejer, T. T. T. (2021). Methods for the Economic Evaluation of Health Care Interventions for Priority Setting in the Health System: An Update From WHO CHOICE. International Journal of Health Policy and Management, 1. https://doi.org/10.34172/ijhpm.2020.244

Bertsche, T., Alexa, J. M., Eickhoff, C., & Schulz, M. (2023). Self-care and self-medication as central components of healthcare in Germany – on the way to evidence-based pharmacy. Exploratory Research in Clinical and Social Pharmacy, 9, 100257. https://doi.org/10.1016/j.rcsop.2023.100257

Black, R., Fontaine, O., Lamberti, L., Bhan, M., Huicho, L., El Arifeen, S., Masanja, H., Walker, C. F., Mengestu, T. K., Pearson, L., Young, M., Orobaton, N., Chu, Y., Jackson, B., Bateman, M., Walker, N., & Merson, M. (2019). Drivers of the reduction in childhood diarrhea mortality 1980-2015 and interventions to eliminate preventable diarrhea deaths by 2030. Journal of Global Health, 9(2), 020801. https://doi.org/10.7189/jogh.09.020801

Black, R., Laxminarayan, R., Temmerman, M., & Walker, N. (Eds). (2016). Disease Control Priorities, Third Edition (Volume 2): Reproductive, Maternal, Newborn, and Child Health. The World Bank. https://doi.org/10.1596/978-1-4648-0348-2

Brodersen, J., Schwartz, L. M., & Woloshin, S. (2014). Overdiagnosis: How cancer screening can turn indolent pathology into illness. APMIS, 122(8), 683–689. https://doi.org/10.1111/apm.12278

Brownson, R. C., Fielding, J. E., & Maylahn, C. M. (2009). Evidence-Based Public Health: A Fundamental Concept for Public Health Practice. Annual Review of Public Health, 30(1), 175–201. https://doi.org/10.1146/annurev.publhealth.031308.100134

Caballer, B. D. L. H., Rodríguez, M., Fraj, J., Cerecedo, I., Antolín-Amérigo, D., & Colas, C. (2012). Allergic Rhinitis and Its Impact on Work Productivity in Primary Care Practice and a Comparison with Other Common Diseases: The Cross-sectional Study to Evaluate Work Productivity in Allergic Rhinitis Compared with Other Common Diseases (CAPRI) Study. American Journal of Rhinology & Allergy, 26(5), 390–394. https://doi.org/10.2500/ajra.2012.26.3799

Cabral, C., Zhang, T., Oliver, I., Little, P., Yardley, L., & Lambert, H. (2024). Influences on use of antibiotics without prescription by the public in low- and middle-income countries: A systematic review and synthesis of qualitative evidence. JAC-Antimicrobial Resistance, 6(5), dlae165. https://doi.org/10.1093/jacamr/dlae165

CADTH (Ed.). (2017). Guidelines for the Economic Evaluation of Health Technologies: Canada (4th Edition). https://www.cda-amc.ca/sites/default/files/pdf/guidelines_for_the_economic_evaluation_of_health_technologies_canada_4th_ed.pdf

Cai, T., Verze, P., & Bjerklund Johansen, T. E. (2021). The Quality of Life Definition: Where Are We Going? Uro, 1(1), 14–22. https://doi.org/10.3390/uro1010003

Caron, R. M., Noel, K., Reed, R. N., Sibel, J., & Smith, H. J. (2024). Health Promotion, Health Protection, and Disease Prevention: Challenges and Opportunities in a Dynamic Landscape. AJPM Focus, 3(1), 100167. https://doi.org/10.1016/j.focus.2023.100167

Cellucci, M. (2025). Oral Rehydration Therapy. Merck Manual Professional Edition. https://www.merckmanuals.com/professional/pediatrics/dehydration-and-fluid-therapy-in-children/oral-rehydration-therapy

Chaudhary, D., Patthi, B., Singla, A., Gupta, R., Muchhal, M., Kumar, J. K., Prasad, M., & Dhama, K. (2018). The Anticariogenic Efficacy of 5000 ppm Fluoridated Toothpaste: A Systematic Review. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. https://doi.org/10.7860/JCDR/2018/26732.11135

Chi, Y.-L., Blecher, M., Chalkidou, K., Culyer, A., Claxton, K., Edoka, I., Glassman, A., Kreif, N., Jones, I., Mirelman, A. J., Nadjib, M., Morton, A., Norheim, O. F., Ochalek, J., Prinja, S., Ruiz, F., Teerawattananon, Y., Vassall, A., & Winch, A. (2020). What next after GDP-based cost-effectiveness thresholds? Gates Open Research, 4, 176. https://doi.org/10.12688/gatesopenres.13201.1

Christensen, J. (2001). Epidemiological Concepts Regarding Disease Monitoring and Surveillance. Acta Veterinaria Scandinavica, 42(S1), S11. https://doi.org/10.1186/1751-0147-42-S1-S11

Churruca, K., Pomare, C., Ellis, L. A., Long, J. C., Henderson, S. B., Murphy, L. E. D., Leahy, C. J., & Braithwaite, J. (2021). Patient-reported outcome measures (PROMs): A review of generic and condition-specific measures and a discussion of trends and issues. Health Expectations: An International Journal of Public Participation in Health Care and Health Policy, 24(4), 1015–1024. https://doi.org/10.1111/hex.13254

Costa, D. S. J., Mercieca-Bebber, R., Rutherford, C., Tait, M.-A., & King, M. T. (2021). How is quality of life defined and assessed in published research? Quality of Life Research, 30(8), 2109–2121. https://doi.org/10.1007/s11136-021-02826-0

Coyle, K., Coyle, D., Lester-George, A., West, R., Nemeth, B., Hiligsmann, M., Trapero-Bertran, M., Leidl, R., Pokhrel, S., & on behalf of the EQUIPT Study Group. (2018). Development and application of an economic model (EQUIPTMOD) to assess the impact of smoking cessation. Addiction, 113(S1), 7–18. https://doi.org/10.1111/add.14001

De La Torre, K., Min, S., Lee, H., & Kang, D. (2025). The Application of Preventive Medicine in the Future Digital Health Era. Journal of Medical Internet Research, 27, e59165. https://doi.org/10.2196/59165

Dineen-Griffin, S., Vargas, C., Williams, K. A., Benrimoj, S. I., & Garcia-Cardenas, V. (2020). Cost utility of a pharmacist-led minor ailment service compared with usual pharmacist care. Cost Effectiveness and Resource Allocation, 18(1), 24. https://doi.org/10.1186/s12962-020-00220-0

Doll, R., Peto, R., Boreham, J., & Sutherland, I. (2004). Mortality in relation to smoking: 50 years' observations on male British doctors. BMJ, 328(7455), 1519. https://doi.org/10.1136/bmj.38142.554479.AE

El-Khoury, M., Banke, K., & Sloane, P. (2016). Improved Childhood Diarrhea Treatment Practices in Ghana: A Pre-Post Evaluation of a Comprehensive Private-Sector Program. Global Health: Science and Practice, 4(2), 264–275. https://doi.org/10.9745/GHSP-D-16-00021

European Medicines Agency. (2008). Guideline on the development of medicinal products for the treatment of smoking (CHMP/EWP/369963/05). https://www.ema.europa.eu/en/documents/scientific-guideline/guideline-development-medicinal-products-treatment-smoking_en.pdf

EuroQol Research Foundation. (2019). EQ-5D-5L User Guide. https://euroqol.org/wp-content/uploads/2023/11/EQ-5D-5LUserguide-23-07.pdf

Falotico, J. M., & Lipner, S. R. (2022). Updated Perspectives on the Diagnosis and Management of Onychomycosis. Clinical, Cosmetic and Investigational Dermatology, Volume 15, 1933–1957. https://doi.org/10.2147/CCID.S362635

FDA. (2020). Regulation of Tobacco Products (R45867). Congressional Research Service. https://www.everycrsreport.com/files/2020-02-07_R45867_c0363df8256760a09d6e06daac9dfb3c3d5b85ce.pdf

FDA. (2024). Nonprescription Drug Product with an Additional Condition for Nonprescription Use. U.S. Food & Drug Administration. https://www.fda.gov/drugs/over-counter-otc-nonprescription-drugs/nonprescription-drug-product-additional-condition-nonprescription-use

GBD 2017 Oral Disorders Collaborators, Bernabe, E., Marcenes, W., Hernandez, C. R., Bailey, J., Abreu, L. G., Alipour, V., Amini, S., Arabloo, J., Arefi, Z., Arora, A., Ayanore, M. A., Bärnighausen, T. W., Bijani, A., Cho, D. Y., Chu, D. T., Crowe, C. S., Demoz, G. T., Demsie, D. G., Kassebaum, N. J. (2020). Global, Regional, and National Levels and Trends in Burden of Oral Conditions from 1990 to 2017: A Systematic Analysis for the Global Burden of Disease 2017 Study. Journal of Dental Research, 99(4), 362–373. https://doi.org/10.1177/0022034520908533

Germeni, E., Frost, J., Garside, R., Rogers, M., Valderas, J. M., & Britten, N. (2018). Antibiotic prescribing for acute respiratory tract infections in primary care: An updated and expanded meta-ethnography. British Journal of General Practice, 68(674), e633–e645. https://doi.org/10.3399/bjgp18X697889

Gheonea, T. C., Oancea, C.-N., Mititelu, M., Lupu, E. C., Ioniță-Mîndrican, C.-B., & Rogoveanu, I. (2023). Nutrition and Mental Well-Being: Exploring Connections and Holistic Approaches. Journal of Clinical Medicine, 12(22), 7180. https://doi.org/10.3390/jcm12227180

Giacaman, R. A., Fernández, C. E., Muñoz-Sandoval, C., León, S., García-Manríquez, N., Echeverría, C., Valdés, S., Castro, R. J., & Gambetta-Tessini, K. (2022). Understanding dental caries as a non-communicable and behavioral disease: Management implications. Frontiers in Oral Health, 3, 764479. https://doi.org/10.3389/froh.2022.764479

Gkekas, A., Varenne, B., Stauf, N., Benzian, H., & Listl, S. (2022). Affordability of essential medicines: The case of fluoride toothpaste in 78 countries. PLOS ONE, 17(10), e0275111. https://doi.org/10.1371/journal.pone.0275111

Godman, B., Egwuenu, A., Haque, M., Malande, O. O., Schellack, N., Kumar, S., Saleem, Z., Sneddon, J., Hoxha, I., Islam, S., Mwita, J., Do Nascimento, R. C. R. M., Dias Godói, I. P., Niba, L. L., Amu, A. A., Acolatse, J., Incoom, R., Sefah, I. A., Opanga, S., Seaton, R. A. (2021). Strategies to Improve Antimicrobial Utilization with a Special Focus on Developing Countries. Life, 11(6), 528. https://doi.org/10.3390/life11060528

Good country practices in the implementation of WHO FCTC Article 14 and its guidelines. (2019). WHO. https://www.bing.com/search?q=Good+country+practices+in+the+implementation+of+WHO+FCTC+Article+14+and+its+guidelines&cvid=79a4aaf71a4e4a7ebf24c6aed4efd99a&gs_lcrp=EgRlZGdlKgYIABBFGDkyBggAEEUYOTIG-CAEQRRg9MggIAhDpBxj8VTIHCAMQ6wcYQNIBCDEzMTVqMGo0qAIIsAIB&FORM=ANAB01&PC=U531

Goodchild, M., Nargis, N., & Tursan d'Espaignet, E. (2018). Global economic cost of smoking-attributable diseases. Tobacco Control, 27(1), 58–64. https://doi.org/10.1136/tobaccocontrol-2016-053305

GSCF. (2021). Self-care Readiness Index. Global Self-Care Federation. https://www.selfcarefederation.org/sites/default/files/media/documents/2021-09/Self-Care%20Readiness%20Index%20Report%20170921.pdf

GSCF. (2022). Self-Care Readiness Index 2.0. Global Self-Care Federation. https://www.selfcarefederation.org/sites/default/files/2024-10/self-care-readiness-index-report-2022-05122022-v2.pdf

GSCF. (2025). Brushing Beyond the Margins: Making Oral Health a Pillar of Global Health. GLOBAL SELF-CARE FEDERATION. https://www.selfcarefederation.org/sites/default/files/media/documents/2025-05/VF_19_05_25_GSCF%20Oral%20Health%20Policy%20Brief.pdf

GSCF. (2026). Self-Care Can Unlock 50% More Economic and Societal Benefits by 2040. https://www.selfcarefederation.org/sites/default/files/media/documents/2026-03/GSCF%20Socio-Economic%20Research%202026%20Brochure%20270226.pdf

Gupta, A. K., & Cooper, E. A. (2008). Update in Antifungal Therapy of Dermatophytosis. Mycopathologia, 166(5–6), 353–367. https://doi.org/10.1007/s11046-008-9109-0

Hartmann-Boyce, J., Chepkin, S. C., Ye, W., Bullen, C., & Lancaster, T. (2018). Nicotine replacement therapy versus control for smoking cessation. Cochrane Database of Systematic Reviews, 2019(1). https://doi.org/10.1002/14651858.CD000146.pub5

HAS. (2018). Évaluation des technologies de santé à la HAS: Place de la qualité de vie. Haute Autorité de Santé. https://www.has-sante.fr/jcms/c_2883073/fr/evaluation-des-technologies-de-sante-a-la-has-place-de-la-qualite-de-vie

Hay, R. J., Johns, N. E., Williams, H. C., Bolliger, I. W., Dellavalle, R. P., Margolis, D. J., Marks, R., Naldi, L., Weinstock, M. A., Wulf, S. K., Michaud, C., J.L. Murray, C., & Naghavi,

M. (2014). The Global Burden of Skin Disease in 2010: An Analysis of the Prevalence and Impact of Skin Conditions. Journal of Investigative Dermatology, 134(6), 1527–1534. https://doi.org/10.1038/jid.2013.446

healthdirect Australia. (2023). Medicines to treat nicotine dependence. https://www.healthdirect.gov.au/medicines-to-treat-nicotine-dependence

Health Canada / Government of Canada. (2024). Supplementary Rules Respecting Nicotine Replacement Therapies Order. https://gazette.gc.ca/rp-pr/p2/2024/2024-08-28/html/sordors169-eng.html

Hellewell, J., Abbott, S., Gimma, A., Bosse, N. I., Jarvis, C. I., Russell, T. W., Munday, J. D., Kucharski, A. J., Edmunds, W. J., Sun, F., Flasche, S., Quilty, B. J., Davies, N., Liu, Y., Clifford, S., Klepac, P., Jit, M., Diamond, C., Gibbs, H., … Eggo, R. M. (2020). Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. The Lancet Global Health, 8(4), e488–e496. https://doi.org/10.1016/S2214-109X(20)30074-7

Hofbauer, T., Coughlan, J., Gierth, J., Gkekas, N., Listl, S., Pattamatta, M., & Põld, A. (2022). Towards Better Oral Health Prevention: The Value for Money of Fluoride Toothpaste. European Journal of Public Health, 32(Supplement_3), ckac131.026. https://doi.org/10.1093/eurpub/ckac131.026

Hope, D. L., Woods, P., Mey, A., Kelly, F. S., Townshend, J., Baumann-Birkbeck, L. M., & King, M. A. (2020). Australian pharmacists: Ready for increased non-prescription medicines reclassification. International Journal of Pharmacy Practice, 28(3), 246–254. https://doi.org/10.1111/ijpp.12594

Hutton, G., Haller, L., & Bartram, J. (2007). Global cost-benefit analysis of water supply and sanitation interventions. Journal of Water and Health, 5(4), 481–502. https://doi.org/10.2166/wh.2007.009

IQVIA. (2019). IQVIA MIDAS® and IQVIA CH Customized Insights Database (MAT 12/2019) [Data set]

IQVIA (with Silva, S., Rusli, S. N., Saraf, S., Husain, D. Z., Narayanan, S. L., Rupani, V., & Pansubkul, B.). (2024). Final Report of Health Economic Study on Impact of Reverse-Switching Antifungal and Antiviral Non-Prescription Medicines. Association of the European Self-Care Industry (AESGP). https://aesgp.eu/content/uploads/2024/08/01FINA1.pdf

Jackson, G., Boon, N., Eardley, I., Kirby, M., Dean, J., Hackett, G., Montorsi, P., Montorsi, F., Vlachopoulos, C., Kloner, R., Sharlip, I., & Miner, M. (2010). Erectile dysfunction and coronary artery disease prediction: Evidence-based guidance and consensus: Erectile dysfunction and coronary artery disease prediction. International Journal of Clinical Practice, 64(7), 848–857. https://doi.org/10.1111/j.1742-1241.2010.02410.x

Jackson, S. L., Lekiachvili, A., Block, J. P., Richards, T. B., Nagavedu, K., Draper, C. C., Koyama, A. K., Womack, L. S., Carton, T. W., Mayer, K. H., Rasmussen, S. A., Trick, W. E., Chrischilles, E. A., Weiner, M. G., Podila, P. S. B., Boehmer, T. K., Wiltz, J. L., & on behalf of PCORnet Network Partners. (2024). Preventive Service Usage and New Chronic Disease Diagnoses: Using PCORnet Data to Identify Emerging Trends, United States, 2018–2022. Preventing Chronic Disease, 21, 230415. https://doi.org/10.5888/pcd21.230415

Jevdjevic, M., & Listl, S. (2025). Global, Regional, and Country-Level Economic Impacts of Oral Conditions in 2019. Journal of Dental Research, 104(1), 17–21. https://doi.org/10.1177/00220345241281698

Jha, P., Ramasundarahettige, C., Landsman, V., Rostron, B., Thun, M., Anderson, R. N., McAfee, T., & Peto, R. (2013). 21st-Century Hazards of Smoking and Benefits of Cessation in the United States. New England Journal of Medicine, 368(4), 341–350. https://doi.org/10.1056/NEJMsa1211128

Jullien, S. (2021). Prophylaxis of caries with fluoride for children under five years. BMC Pediatrics, 21(S1), 351. https://doi.org/10.1186/s12887-021-02702-3

Kaplan, R. M., & Hays, R. D. (2022). Health-Related Quality of Life Measurement in Public Health. Annual Review of Public Health, 43(1), 355–373. https://doi.org/10.1146/annurev-publhealth-052120-012811

Keyes, D., Turfe, H., & Das, J. (2026). Prevention Strategies. In StatPearls. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK537222/?report=reader#_NBK537222_pubdet_

Kirby, M. G., Schnetzler, G., Zou, K. H., & Symonds, T. (2011). Prevalence and detection rate of underlying disease in men with erectile dysfunction receiving phosphodiesterase type 5 inhibitors in the United Kingdom: A retrospective database study: Detection of underlying disease in men prescribed a PDE5i. International Journal of Clinical Practice, 65(7), 797–806. https://doi.org/10.1111/j.1742-1241.2011.02693.x

Kovitwanichkanont, T., & Chong, A. (2019). Superficial fungal infections. Australian Journal of General Practice, 48(10), 706–711. https://doi.org/10.31128/AJGP-05-19-4930

Lee, L. J., Maguire, T. A., Maculaitis, M. C., Emir, B., Li, V. W., Jeffress, M., Li, J. Z., Zou, K. H., Donde, S. S., & Taylor, D. (2021). Increasing access to erectile dysfunction treatment via pharmacies to improve healthcare provider visits and quality of life: Results from a prospective real-world observational study in the United Kingdom. International Journal of Clinical Practice, 75(4). https://doi.org/10.1111/ijcp.13849

Leung, A. K., Barankin, B., Lam, J. M., Leong, K. F., & Hon, K. L. (2023). Tinea pedis: An updated review. Drugs in Context, 12, 1–16. https://doi.org/10.7573/dic.2023-5-1

Leung, A. K., & Hon, K. L. (2021). Paediatrics: How to manage viral gastroenteritis. Drugs in Context, 10, 1–11. https://doi.org/10.7573/dic.2020-11-7

Liu, L., Oza, S., Hogan, D., Chu, Y., Perin, J., Zhu, J., Lawn, J. E., Cousens, S., Mathers, C., & Black, R. E. (2016). Global, regional, and national causes of under-5 mortality in 2000–15: An updated systematic analysis with implications for the Sustainable Development Goals. The Lancet, 388(10063), 3027–3035. https://doi.org/10.1016/S0140-6736(16)31593-8

Lockhart, S. R., Chowdhary, A., & Gold, J. A. W. (2023). The rapid emergence of antifungal-resistant human-pathogenic fungi. Nature Reviews Microbiology, 21(12), 818–832. https://doi.org/10.1038/s41579-023-00960-9

Manfredi, M., Marcianò, G., Iuliano, S., Leo, F., & Gallelli, L. (2025). Racecadotril in the management of diarrhea: An underestimated therapeutic option? Therapeutic Advances in Gastroenterology, 18, 17562848241310423. https://doi.org/10.1177/17562848241310423

Marinho, V. C., Higgins, J., Logan, S., & Sheiham Deceased, A. (2003). Fluoride toothpastes for preventing dental caries in children and adolescents. Cochrane Database of Systematic Reviews, 2016(11). https://doi.org/10.1002/14651858.CD002278

Marmot, M., Allen, J., Goldblatt, P., Boyce, T., McNeish, D., Grady, M., & Geddes, I. (2010). Fair society, healthy lives: The Marmot Review. Strategic review of health inequalities in England post-2010. https://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review/fair-society-healthy-lives-exec-summary-pdf.pdf

Martins, C., Godycki-Cwirko, M., Heleno, B., & Brodersen, J. (2018). Quaternary prevention: Reviewing the concept: Quaternary prevention aims to protect patients from medical harm. European Journal of General Practice, 24(1), 106–111. https://doi.org/10.1080/13814788.2017.1422177

May, U., Bauer, C., Schneider-Ziebe, A., & Giulini-Limbach, C. (2023a). Self-Medication in Europe: Economic and Social Impact on Individuals and Society. Gesundheitsökonomie & Qualitätsmanagement, 28(06), 298–310. https://doi.org/10.1055/a-2089-5142

May, U., Bauer, C., Schneider-Ziebe, A., & Giulini-Limbach, C. (2023b). Self-care with non-prescription medicines to improve health care access and quality of life in low- and middle-income countries: Systematic review and methodological approach. 11. https://www.frontier-sin.org/journals/public-health/articles/10.3389/fpubh.2023.1220984/full

May, U., Giulini-Limbach, C., & Schneider-Ziebe, A. (2020). Quality-Adjusted Life Years (QA-LYs)—Ihre Bedeutung in der Evaluation medizinischer Therapien (No. 43; pp. 322–328). Deutscher Apothekerverlag. https://www.mmp-online.de/heftarchiv/2020/08/quality-adjusted-life-years-qalys-ihre-bedeutung-in-der-evaluation-medizinischer-therapien.html

May, U., Werthner, Q., Weigmann, H., & Bauer, C. (2025). Exploring Patient Pathways and Care Situations in Men With Erectile Dysfunction in Different PDE-5 Inhibitor Regulatory Settings. International Journal of Public Health, 70, 1608529. https://doi.org/10.3389/ijph.2025.1608529

Medicines and Healthcare products Regulatory Agency. (2021, October 29). Guidance for licensing electronic cigarettes and other inhaled nicotine-containing products as medicines. https://www.gov.uk/government/publications/licensing-procedure-for-electronic-cigarettes-as-medicines

Mikkelsen, B., Williams, J., Rakovac, I., Wickramasinghe, K., Hennis, A., Shin, H.-R., Farmer, M., Weber, M., Berdzuli, N., Borges, C., Huber, M., & Breda, J. (2019). Life course approach to prevention and control of non-communicable diseases. BMJ, l257. https://doi.org/10.1136/bmj.l257

Miron Canelo, J. A., Lorenzo Gómez, M.-F., Iglesias De Sena, E., & Celia Fernández Martín, L. (2022). Modifiers of Health-Related Quality of Life by Biological, Psychological and Social Factors. In J. Mullings, S. Arbor, M. Cumbay, & T. Paul (Eds), Health-Related Quality of Life—Measurement Tools, Predictors and Modifiers. IntechOpen. https://doi.org/10.5772/intechopen.97451

Mokkink, L. B., Elsman, E. B. M., & Terwee, C. B. (2024). COSMIN guideline for systematic reviews of patient-reported outcome measures version 2.0. Quality of Life Research, 33(11), 2929–2939. https://doi.org/10.1007/s11136-024-03761-6

Montorsi, P., Montorsi, F., & Schulman, C. C. (2003). Is Erectile Dysfunction the “Tip of the Iceberg” of a Systemic Vascular Disorder? European Urology, 44(3), 352–354. https://doi.org/10.1016/S0302-2838(03)00307-5

Mosegui, G. G., Vianna, C. M., Rodrigues, M. S., Valle, P. M., & Silva, F. V. (2019). Cost-effectiveness analysis of oral rehydration therapy compared to intravenous rehydration for acute gastroenteritis without severe dehydration treatment. Journal of Infection and Public Health, 12(6), 816–821. https://doi.org/10.1016/j.jiph.2019.05.001

Mukuria, C., Rowen, D., Mulhern, B., McDool, E., Kharroubi, S., Bjorner, J. B., & Brazier, J. E. (2025). The Short Form 6 Dimensions (SF-6D): Development and Evolution. Applied Health Economics and Health Policy, 23(1), 19–33. https://doi.org/10.1007/s40258-024-00919-8

Munos, M. K., Walker, C. L. F., & Black, R. E. (2010). The effect of oral rehydration solution and recommended home fluids on diarrhoea mortality. International Journal of Epidemiology, 39(suppl_1), i75–i87. https://doi.org/10.1093/ije/dyq025

Murray, C. J. L., Aravkin, A. Y., Zheng, P., Abbafati, C., Abbas, K. M., Abbasi-Kangevari, M., Abd-Allah, F., Abdelalim, A., Abdollahi, M., Abdollahpour, I., Abegaz, K. H., Abolhassani, H., Aboyans, V., Abreu, L. G., Abrigo, M. R. M., Abualhasan, A., Abu-Raddad, L. J., Abushouk, A. I., Adabi, M., … Lim, S. S. (2020). Global burden of 87 risk factors in 204 countries and territories, 1990–2019: A systematic analysis for the Global Burden of Disease Study 2019. The Lancet, 396(10258), 1223–1249. https://doi.org/10.1016/S0140-6736(20)30752-2

NICE. (2025). Guide to the methods of technology appraisal 2013. https://www.nice.org.uk/process/pmg9/resources/guide-to-the-methods-of-technologyappraisal-2013-pdf-2007975843781

Nomura, K., Kitagawa, Y., Yuda, Y., & Takano-Ohmuro, H. (2016). Medicine reclassification processes and regulations for proper use of over-the-counter self-care medicines in Japan. Risk Management and Healthcare Policy, Volume 9, 173–183. https://doi.org/10.2147/RMHP.S98099

Ochalek, J., Lomas, J., & Claxton, K. (2018). Estimating health opportunity costs in low-income and middle-income countries: A novel approach and evidence from cross-country data. BMJ Global Health, 3(6), e000964. https://doi.org/10.1136/bmjgh-2018-000964

OECD. (2022). Investing in health systems to protect society and boost the economy: Priority investments and order-of-magnitude cost estimates (abridged version) (OECD Policy Responses to Coronavirus (COVID-19)) [OECD Policy Responses to Coronavirus (COVID-19)]. Organisation for Economic Co-operation and Development. https://doi.org/10.1787/94ba313a-en

OECD. (2025). Health at a Glance 2025: OECD Indicators. OECD Publishing. https://doi.org/10.1787/8f9e3f98-en

OECD. (2026). The Health and Economic Benefits of Tackling Non-Communicable Diseases. OECD Health Policy Studies. https://doi.org/10.1787/e20cbbc3-en

Piontek, K., Baalmann, A.-K., Feißel, A., & Apfelbacher, C. (2024). Gesundheitsbezogene Lebensqualität: Konzept, Messung und Anwendungsfelder. Die Dermatologie, 75(5), 392–399. https://doi.org/10.1007/s00105-024-05327-6

Posovszky, C., Buderus, S., Claßen, M., Lawrenz, B., Keller, K.-M., & Koletzko, S. (2020). Acute Infectious Gastroenteritis in Infancy and Childhood. Deutsches Ärzteblatt International. https://doi.org/10.3238/arztebl.2020.0615

Qin, Q., Su, J., Liu, J., Chen, R., Wei, W., Yuan, Z., Lai, S., Duan, R., Lai, J., Ye, L., Liang, H., & Jiang, J. (2024). Global, regional, and national burden of fungal skin diseases in 204 countries and territories from 1990 to 2021: An analysis of the global burden of disease study 2021. Mycoses, 67(8), e13787. https://doi.org/10.1111/myc.13787

Rasmussen, S., Balasubramaniam, K., Jarbøl, D. E., Søndergaard, J., & Haastrup, P. F. (2020). Socioeconomic status and barriers for contacting the general practitioner when bothered by erectile dysfunction: A population-based cross-sectional study. BMC Family Practice, 21(1), 166. https://doi.org/10.1186/s12875-020-01238-2

Rhee, C., Aol, G., Ouma, A., Audi, A., Muema, S., Auko, J., Omore, R., Odongo, G., Wiegand, R. E., Montgomery, J. M., Widdowson, M.-A., O'Reilly, C. E., Bigogo, G., & Verani, J.

R. (2019). Inappropriate use of antibiotics for childhood diarrhea case management—Kenya, 2009–2016. BMC Public Health, 19(S3), 468. https://doi.org/10.1186/s12889-019-6771-8

Robinson, L. A., Hammitt, J. K., Chang, A. Y., & Resch, S. (2017). Understanding and improving the one and three times GDP per capita cost-effectiveness thresholds. Health Policy and Planning, 32(1), 141–145. https://doi.org/10.1093/heapol/czw096

Rowen, D., Mukuria, C., Bray, N., Carlton, J., Cooper, S., Longworth, L., Meads, D., O'Neill, C., & Yang, Y. (2023). UK Valuation of EQ-5D-5L, a Generic Measure of Health-Related Quality of Life: A Study Protocol. Value in Health, 26(11), 1625–1635. https://doi.org/10.1016/j.jval.2023.08.005

Santaballa, A., Pinto, Á., Balanyà, R. P., Ramírez Merino, N., Martín, I. R., Grau, S. S., Fombella, J. P. B., Cano, J. M., González, C. H., & Bayo, J. (2020). SEOM clinical guideline for secondary prevention (2019). Clinical and Translational Oncology, 22(2), 187–192. https://doi.org/10.1007/s12094-020-02302-0

Sawhney, T., Dobes, A., & O'Charoen, S. (2023). QALYs: The Math Doesn't Work. Journal of Health Economics and Outcomes Research, 20–13. https://doi.org/10.36469/jheor.2023.83387

Schneider, P. (2022). The QALY is ableist: On the unethical implications of health states worse than dead. Quality of Life Research, 31(5), 1545–1552. https://doi.org/10.1007/s11136-021-03052-4

Shaw, C., Longworth, L., Bennett, B., McEntee-Richardson, L., & Shaw, J. W. (2024). A Review of the Use of EQ-5D for Clinical Outcome Assessment in Health Technology Assessment, Regulatory Claims, and Published Literature. The Patient - Patient-Centered Outcomes Research, 17(3), 239–249. https://doi.org/10.1007/s40271-023-00662-7

Shimamoto, K., Hirano, M., Wada-Hiraike, O., Goto, R., & Osuga, Y. (2021). Examining the association between menstrual symptoms and health-related quality of life among working women in Japan using the EQ-5D. BMC Women's Health, 21(1), 325. https://doi.org/10.1186/s12905-021-01462-7

Short, S. E., & Mollborn, S. (2015). Social determinants and health behaviors: Conceptual frames and empirical advances. Current Opinion in Psychology, 5, 78–84. https://doi.org/10.1016/j.copsyc.2015.05.002

Sijbom, M., Büchner, F. L., Saadah, N. H., Numans, M. E., & De Boer, M. G. J. (2023). Determinants of inappropriate antibiotic prescription in primary care in developed countries with general practitioners as gatekeepers: A systematic review and construction of a framework. BMJ Open, 13(5), e065006. https://doi.org/10.1136/bmjopen-2022-065006

Smith, W. B., McCaslin, I. R., Gokce, A., Mandava, S. H., Trost, L., & Hellstrom, W. J. (2013). PDE5 inhibitors: Considerations for preference and long-term adherence: PDE5 inhibitors. International Journal of Clinical Practice, 67(8), 768–780. https://doi.org/10.1111/ijcp.12074

Soulakova, J. N., & Crockett, L. J. (2016). Unassisted Quitting and Smoking Cessation Methods Used in the United States: Analyses of 2010–2011 Tobacco Use Supplement to the Current Population Survey Data. Nicotine & Tobacco Research, ntw273. https://doi.org/10.1093/ntr/ntw273

Sulis, G., Adam, P., Nafade, V., Gore, G., Daniels, B., Daftary, A., Das, J., Gandra, S., & Pai, M. (2020). Antibiotic prescription practices in primary care in low- and middle-income countries: A systematic review and meta-analysis. PLOS Medicine, 17(6), e1003139. https://doi.org/10.1371/journal.pmed.1003139

Thokala, P., Ochalek, J., Leech, A. A., & Tong, T. (2018). Cost-Effectiveness Thresholds: The Past, the Present and the Future. PharmacoEconomics, 36(5), 509–522. https://doi.org/10.1007/s40273-017-0606-1

Toumba, K. J., Twetman, S., Splieth, C., Parnell, C., Van Loveren, C., & Lygidakis, N. A. (2019). Guidelines on the use of fluoride for caries prevention in children: An updated EAPD policy document. European Archives of Paediatric Dentistry, 20(6), 507–516. https://doi.org/10.1007/s40368-019-00464-2

UNICEF. (2025). Oral rehydration salts and zinc. United Nations Children's Fund. https://www.unicef.org/supply/oral-rehydration-salts-and-zinc

UNICEF. (n.d.). Childhood diseases. United Nations Children's Fund. https://www.unicef.org/health/childhood-diseases

U.S. Department of Health and Human Services. (2020). Smoking Cessation A Report of the Surgeon General. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. https://www.hhs.gov/sites/default/files/2020-cessation-sgr-full-report.pdf

Valsecchi, A. A., & Di Maio, M. (2025). Association Between Health-Related Quality of Life Measures and Survival Endpoints in Oncology Clinical Trials and in Clinical Decision Making: A Narrative Review. Pharmaceutical Medicine, 39(3), 171–182. https://doi.org/10.1007/s40290-025-00568-9

VanFrank, B. (2024). Adult Smoking Cessation—United States, 2022. MMWR. Morbidity and Mortality Weekly Report, 73. https://doi.org/10.15585/mmwr.mm7329a1

Vlachopoulos, C. V., Terentes-Printzios, D. G., Ioakeimidis, N. K., Aznaouridis, K. A., & Stefanadis, C. I. (2013). Prediction of Cardiovascular Events and All-Cause Mortality With Erectile Dysfunction: A Systematic Review and Meta-Analysis of Cohort Studies. Circulation: Cardiovascular Quality and Outcomes, 6(1), 99–109. https://doi.org/10.1161/CIRCOUTCOMES.112.966903

Vos, T., Lim, S. S., Abbafati, C., Abbas, K. M., Abbasi, M., Abbasifard, M., Abbasi-Kangevari, M., Abbastabar, H., Abd-Allah, F., Abdelalim, A., Abdollahi, M., Abdollahpour, I., Abolhassani, H., Aboyans, V., Abrams, E. M., Abreu, L. G., Abrigo, M. R. M., Abu-Raddad, L. J., Abushouk, A. I., … Murray, C. J. L. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: A systematic analysis for the Global Burden of Disease Study 2019. The Lancet, 396(10258), 1204–1222. https://doi.org/10.1016/S0140-6736(20)30925-9

Wagner, Z., Zutshi, R., Asiimwe, J. B., & Levine, D. (2022). The cost-effectiveness of community health workers delivering free diarrhoea treatment: Evidence from Uganda. Health Policy and Planning, 37(1), 123–131. https://doi.org/10.1093/heapol/czab120

Wang, D., Connock, M., Barton, P., Fry-Smith, A., Aveyard, P., & Moore, D. (2008). 'Cut down to quit' with nicotine replacement therapies in smoking cessation: A systematic review of effectiveness and economic analysis. Health Technology Assessment, 12(2). https://doi.org/10.3310/hta12020

Wasem, J., Jung, M., May, U., Ochotta, T., Hessel, F., Wegner, C., Gutsch, A., & Neumann, A. (2008). Nutzen und Kosteneffektivität der Nikotinersatztherapie zur Raucherentwöhnung—Eine entscheidungsanalytische Modellierung der direkten medizinischen Kosten. Gesundheitsökonomie & Qualitätsmanagement, 13(2), 99–108. https://doi.org/10.1055/s-2007-963541

Watson, M. C., Ferguson, J., Barton, G. R., Maskrey, V., Blyth, A., Paudyal, V., Bond, C. M., Holland, R., Porteous, T., Sach, T. H., Wright, D., & Fielding, S. (2015). A cohort study of influences, health outcomes and costs of patients' health-seeking behaviour for minor ailments from primary and emergency care settings. BMJ Open, 5(2), e006261. https://doi.org/10.1136/bmjopen-2014-006261

Watt, R. G., Daly, B., Allison, P., Macpherson, L. M. D., Venturelli, R., Listl, S., Weyant, R. J., Mathur, M. R., Guarnizo-Herreño, C. C., Celeste, R. K., Peres, M. A., Kearns, C., & Benzian, H. (2019). Ending the neglect of global oral health: Time for radical action. The Lancet, 394(10194), 261–272. https://doi.org/10.1016/S0140-6736(19)31133-X

Whitehead, S. J., & Ali, S. (2010). Health outcomes in economic evaluation: The QALY and utilities. British Medical Bulletin, 96(1), 5–21. https://doi.org/10.1093/bmb/ldq033

WHO (with Wolf, J., Prüss-Ustün, A., Carvalán, C., Bos, R., & Neira, M.). (2016). Preventing disease through healthy environments: A global assessment of the burden of disease from environmental risks (2nd ed). World health organization.

WHO. (n.d.a). Health promotion. World Health Organization. https://www.who.int/health-topics/health-promotion

WHO. (n.d.b). Our work: Communicable and noncommunicable diseases, and mental health. World Health Organization. https://www.who.int/our-work/communicable-and-noncommunicable-diseases-and-mental-health

WHO. (n.d.c). Self-care for health and well-being. https://www.who.int/health-topics/self-care

WHO. (1948). Constitution of the World Health Organisation. https://apps.who.int/gb/bd/pdf/bd47/en/constitution-en.pdf

WHO. (1998). WHOQOL User Manual. https://iris.who.int/bitstream/handle/10665/77932/WHO_HIS_HSI_Rev.2012.03_eng.pdf?sequence=1

WHO. (2017). Medication Without Harm. World Health Organization. https://www.who.int/publications/i/item/WHO-HIS-SDS-2017.6

WHO. (2018). Housing impacts health: New WHO guidelines on housing and health. World Health Organization. https://www.who.int/news/item/26-11-2018-housing-impacts-health-new-who-guidelines-on-housing-and-health

WHO. (2019). WHO consolidated guideline on self-care interventions for health: Sexual and reproductive health and rights. World Health Organization.

WHO. (2021a). Health Promotion Glossary of Terms 2021 (1st ed). World Health Organization. https://iris.who.int/server/api/core/bitstreams/96da8799-4938-4d66-b171-04770ed4b243/content

WHO. (2021b). Saving Lives, Spending Less: The Case for Investing in Noncommunicable Diseases (1st ed). World Health Organization. https://iris.who.int/server/api/core/bitstreams/ac85a63e-2a16-4eec-8ae8-147b9c686f8c/content

WHO. (2022). WHO guideline on self-care interventions for health and well-being, 2022 revision. WHO.

WHO. (2022). WORKING FOR HEALTH 2022–2030 ACTION PLAN. https://iris.who.int/server/api/core/bitstreams/b7d4995f-09ee-437d-b6e2-8a97c210fb18/content

WHO. (2022a). WHO Guideline on Self-Care Interventions for Health and Well-being, 2022 Revision (1st ed). World Health Organization. https://iris.who.int/items/e23b7ac7-7685-46d3-8bcc-bab65d798033

WHO. (2022b). Global oral health status report. World Health Organization (WHO). https://iris.who.int/server/api/core/bitstreams/dd9c07d6-9b29-4f94-8fb7-4c2d44906109/content

WHO. (2024a). Tackling NCDs: Best buys and other recommended interventions for the prevention and control of noncommunicable diseases, 2nd ed. World Health Organization. https://www.who.int/publications/i/item/9789240091078

WHO. (2024b). Diarrhoeal disease. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease

WHO. (2024c). WHO clinical treatment guideline for tobacco cessation in adults. World Health Organization.

WHO. (2025). WHOQOL: Measuring Quality of Life. https://www.who.int/toolkits/whoqol

WHO. (2025). The selection and use of essential medicines. https://iris.who.int/server/api/core/bitstreams/e1ba8eb2-28a4-49cb-8e97-4ae69d8af915/content

WHO. (2025a). Bangkok Declaration – No Health Without Oral Health [Technical document]. WHO. https://cdn.who.int/media/docs/default-source/ncds/mnd/oral-health/bangkok-declaration-oral-health.pdf?sfvrsn=15957742_26&download=true

WHO. (2025b). Oral health fact sheet [Fact Sheet]. WHO. https://www.who.int/news-room/fact-sheets/detail/oral-health

WHO. (2025c). Tobacco. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/tobacco

WHO EMRO. (n.d.). Health protection, including management of environmental, food, toxicological and occupational safety. World Health Organization Regional Office for the Eastern Mediterranean. https://www.emro.who.int/about-who/public-health-functions/health-protection.html

WHO & UNICEF. (2007). Oral rehydration salts [Guideline]. World Health Organization & UNICEF. https://www.who.int/publications/i/item/WHO-FCH-CAH-06.1

WHO & UNICEF. (2018). Primary health care: Transforming vision into action—Operational framework. World Health Organization and the United Nations Children's Fund (UNICEF). https://www.who.int/docs/default-source/primary-health/gcphc---operational-framework---v-13---web-version-(1).pdf?sfvrsn=6fe6badd_4

Wolfheim, C., Fontaine, O., & Merson, M. (2019). Evolution of the World Health Organization's programmatic actions to control diarrheal diseases. Journal of Global Health, 9(2), 020802. https://doi.org/10.7189/jogh.09.020802

Woods, B., Revill, P., Sculpher, M., & Claxton, K. (2016). Country-Level Cost-Effectiveness Thresholds: Initial Estimates and the Need for Further Research. Value in Health, 19(8), 929–935. https://doi.org/10.1016/j.jval.2016.02.017

World Bank & World Health Organization. (2017). Tracking Universal Health Coverage: 2017 Global Monitoring Report. World Health Organization.

Zubairi, M. B. A., Naqvi, S. K., Ali, A. A., Sharif, A., Salam, R. A., Hasnain, Z., Soofi, S., Ariff, S., Nisar, Y. B., & Das, J. K. (2024). Low-osmolarity oral rehydration solution for childhood diarrhoea: A systematic review and meta-analysis. Journal of Global Health, 14, 04166. https://doi.org/10.7189/jogh.14.04166