



NHSMUN

WHA

BACKGROUND GUIDE

Secretary-General
Terry Wang

Director-General
Jordan Baker

Delegate Experience
Nastasja Vásquez

Global Partnerships
Daniela Maciel
Sebastian Jimenez

Under-Secretaries-General

Nachiketh Anand
Alina Castillo

Seonghyun Chang
Naina Dhawan
Ximena Faz

Kellie Fernandez
Grace Harb

Adiva Ara Khan
Anshul Magal
Analucia Tello
Sofia Velasco
Renata Venzor

Dear Delegates,

Welcome to the World Health Assembly for NHSMUN 2025! I'm Karyn Fu and I'll be serving as your Director for Session I. I'm very excited to meet you all in committee and hear all of your creative solutions for these topics. If you have any questions as you read this Background Guide and prepare for debate, please don't hesitate to reach out!

A little bit more about me—I'm originally from Manhattan Beach, California, just outside of Los Angeles. I'm currently a sophomore at Rice University in Houston, Texas, pursuing a dual degree in Biological Sciences and Social Policy Analysis, with minors in Data Science and Medical Humanities, on a pre-medical track. I'm involved in the American Medical Women's Association, Biokind (a healthcare data science club), and our Rice Women's Resource Center on campus. I also research prostate cancer at MD Anderson and health criminology research at UT Health Houston. In my free time, I love discovering new music, exploring Houston, going to the gym, and watching reality TV.

This will be my second year working as NHSMUN staff and my eighth year doing MUN. Last year, I served as the Assistant Director for the Commission on Science and Technology for Development! I also had the privilege of attending NHSMUN as a delegate during my junior year of high school. It was the biggest conference I'd ever attended, and I remember the nervous excitement some of y'all might be experiencing now. I also remember leaving the conference as a better debater, public speaker, and leader. I hope to make our committee a similarly rewarding learning experience. In turn, I encourage you to step outside of your comfort zone during committee and take advantage of the unique, diverse environment NHSMUN fosters.

Ed, our Session II director, and I have chosen interesting, pertinent global health topics that we are excited to see you debate. The Background Guides we have prepared should provide foundational knowledge on which you can perform further research and brainstorm solutions. We ultimately hope these Background Guides will inspire you to delve deeper into these topics and gain a very thorough understanding of the issues at hand. Again, we encourage you to use me and Edward as a resource during your debate preparation process and reach out if you have any questions.

I look forward to hearing about the innovative, intelligent solutions you all devise in the coming months, and I can't wait to see you in committee in March!

Best,

Karyn Fu
World Health Assembly Director
Session I
nhsmun.wha@imuna.org



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Hello,

I am so excited to welcome you all to the World Health Assembly (WHA) this year! My name is Edward Hagerman, and I will be your Director for Session II of the WHA at NHSMUN 2025. This is my second year as a NHSMUN staff member, serving as an Assistant Director for the second session of UN-Habitat last year. As a high school delegate, I attended conferences hosted at the University of Toronto through 2020-2023. I also assisted as a chair for MACMUN at McMaster University in 2024. I was born and raised in Etobicoke, Ontario, with almost all my family in Ontario or spread around Canada.

I'm a second-year student at McMaster University in Hamilton, Ontario, studying Integrated Science, pursuing a specialization in mathematics and statistics. Outside of university, I am an enormous baseball fan. I have been watching the MLB's best team from birth, the Toronto Blue Jays! Outside of watching my team occasionally embarrass itself in the postseason, I spend a lot of my time working in baseball as an umpire. I also love to read, especially classical literature and history. One of my favorite novels is *Organs of Sense* by Adam Ehrlich Sachs. I believe that it is a chronically underappreciated book. My favorite author is Dostoyevsky. For those of you interested in an engaging but dense read, *The Idiot* and *Karamazov Brothers* are must-reads!

I've been involved with Model UN since ninth grade and have never enjoyed an extracurricular activity so thoroughly before. The opportunity to meet like-minded people and engage with them in debate on interesting topics and issues is something I continue to enjoy. Model UN has given so much to me, helping me improve my confidence, public speaking, and knowledge of the world around us. I cannot wait to see all of you find your unique solutions to the topics at hand. I know there is a lot to be discussed, and I am excited to see how each of you, individually and as blocs, navigate these issues. If you have any questions as we move closer to the conference, do not hesitate to contact me. I will see you all at the conference in March!

Best,

Edward Hagerman
World Health Assembly Director
Session II
nhsmun.wha@imuna.org



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A Note on the NHSMUN Difference

Esteemed Faculty and Delegates,

Welcome to NHSMUN 2025! We are Terry Wang and Jordan Baker, and we are this year's Secretary-General and Director-General. Thank you for choosing to attend NHSMUN, the world's largest and most diverse Model United Nations conference for secondary school students. We are thrilled to welcome you to New York City in March.

As a space for collaboration, consensus, and compromise, NHSMUN strives to transform today's brightest thinkers, speakers, and collaborators into tomorrow's leaders. Our organization provides a uniquely tailored experience for all through innovative and accessible programming. We believe that an emphasis on education through simulation is paramount to the Model UN experience, and this idea permeates throughout numerous aspects of the conference:

Realism and accuracy: Although a perfect simulation of the UN is never possible, we believe that one of the core educational responsibilities of MUN conferences is to educate students about how the UN System works. Each NHSMUN committee is a simulation of a real deliberative body so that delegates can research what their country has said in the committee. Our topics are chosen from the issues currently on the agenda of that committee (except historical committees, which take topics from the appropriate time period). We also strive to invite real UN, NGO, and field experts into each committee through our committee speakers program. Moreover, we arrange meetings between students and the actual UN Permanent Mission of the country they are representing. Our delegates have the incredible opportunity to conduct first-hand research, asking thought-provoking questions to current UN representatives and experts in their respective fields of study. These exclusive resources are only available due to IMUNA's formal association with the United Nations Department of Global Communications and consultative status with the Economic and Social Council. No other conference goes so far to deeply immerse students into the UN System.

Educational emphasis, even for awards: At the heart of NHSMUN lies education and compromise. Part of what makes NHSMUN so special is its diverse delegate base. As such, when NHSMUN distributes awards, we strongly de-emphasize their importance in comparison to the educational value of Model UN as an activity. NHSMUN seeks to reward students who excel in the arts of compromise and diplomacy. More importantly, we seek to develop an environment in which delegates can employ their critical thought processes and share ideas with their counterparts from around the world. Given our delegates' plurality of perspectives and experiences, we center our programming around the values of diplomacy and teamwork. In particular, our daises look for and promote constructive leadership that strives towards consensus, as real ambassadors do in the United Nations.

Debate founded on strong knowledge and accessibility: With knowledgeable staff members and delegates from over 70 countries, NHSMUN can facilitate an enriching experience reliant on substantively rigorous debate. To ensure this high quality of debate, our staff members produce detailed, accessible, and comprehensive topic guides (like the one below) to prepare delegates for the nuances inherent in each global issue. This process takes over six months, during which the Directors who lead our committees develop their topics with the valuable input of expert contributors. Because these topics are always changing and evolving, NHSMUN also produces update papers intended to bridge the gap of time between when the background guides are published and when committee starts in March. As such, this guide is designed to be a launching point from which delegates should delve further into their topics. The detailed knowledge that our Directors provide in this background guide through diligent research aims to increase critical thinking within delegates at NHSMUN.

Extremely engaged staff: At NHSMUN, our staffers care deeply about delegates' experiences and what they take away from their time at NHSMUN. Before the conference, our Directors and Assistant Directors are trained rigorously through hours of workshops and exercises both virtual and in-person to provide the best conference experience possible. At the conference,

delegates will have the opportunity to meet their dais members prior to the first committee session, where they may engage one-on-one to discuss their committees and topics. Our Directors and Assistant Directors are trained and empowered to be experts on their topics and they are always available to rapidly answer any questions delegates may have prior to the conference. Our Directors and Assistant Directors read every position paper submitted to NHSMUN and provide thoughtful comments on those submitted by the feedback deadline. Our staff aims not only to tailor the committee experience to delegates' reflections and research but also to facilitate an environment where all delegates' thoughts can be heard.

Empowering participation: The UN relies on the voices of all of its member states to create resolutions most likely to make a meaningful impact on the world. That is our philosophy at NHSMUN too. We believe that to properly delve into an issue and produce fruitful debate, it is crucial to focus the entire energy and attention of the room on the topic at hand. Our Rules of Procedure and our staff focus on making every voice in the committee heard, regardless of each delegate's country assignment or skill level. Additionally, unlike many other conferences, we also emphasize delegate participation after the conference. MUN delegates are well researched and aware of the UN's priorities, and they can serve as the vanguard for action on the Sustainable Development Goals (SDGs). Therefore, we are proud to connect students with other action-oriented organizations to encourage further work on the topics.

Focused committee time: We feel strongly that face-to-face interpersonal connections during debate are critical to producing superior committee experiences and allow for the free flow of ideas. Ensuring policies based on equality and inclusion is one way in which NHSMUN guarantees that every delegate has an equal opportunity to succeed in committee. In order to allow communication and collaboration to be maximized during committee, we have a very dedicated administrative team who work throughout the conference to type up, format, and print draft resolutions and working papers.

As always, we welcome any questions or concerns about the substantive program at NHSMUN 2025 and would be happy to discuss NHSMUN pedagogy with faculty or delegates.

Delegates, it is our sincerest hope that your time at NHSMUN will be thought-provoking and stimulating. NHSMUN is an incredible time to learn, grow, and embrace new opportunities. We look forward to seeing you work both as students and global citizens at the conference.

Best,

Terry Wang
Secretary-General

Jordan Baker
Director-General

A Note on Research and Preparation

Delegate research and preparation is a critical element of attending NHSMUN and enjoying the debate experience. We have provided this Background Guide to introduce the topics that will be discussed in your committee. We encourage and expect each of you to critically explore the selected topics and be able to identify and analyze their intricacies upon arrival to NHSMUN in March.

The task of preparing for the conference can be challenging, but to assist delegates, we have updated our [Beginner Delegate Guide](#) and [Advanced Delegate Guide](#). In particular, these guides contain more detailed instructions on how to prepare a position paper and excellent sources that delegates can use for research. Use these resources to your advantage. They can help transform a sometimes overwhelming task into what it should be: an engaging, interesting, and rewarding experience.

To accurately represent a country, delegates must be able to articulate its policies. Accordingly, NHSMUN requires each delegation (the one or two delegates representing a country in a committee) to write a position paper for each topic on the committee's agenda. In delegations with two students, we strongly encourage each student to research each topic to ensure that they are prepared to debate no matter which topic is selected first. More information about how to write and format position papers can be found in the NHSMUN Research Guide. To summarize, position papers should be structured into three sections:

I: Topic Background – This section should describe the history of the topic as it would be described by the delegate's country. Delegates do not need to give an exhaustive account of the topic, but rather focus on the details that are most important to the delegation's policy and proposed solutions.

II: Country Policy – This section should discuss the delegation's policy regarding the topic. Each paper should state the policy in plain terms and include the relevant statements, statistics, and research that support the effectiveness of the policy. Comparisons with other global issues are also appropriate here.

III. Proposed Solutions – This section should detail the delegation's proposed solutions to address the topic. Descriptions of each solution should be thorough. Each idea should clearly connect to the specific problem it aims to solve and identify potential obstacles to implementation and how they can be avoided. The solution should be a natural extension of the country's policy.

Each topic's position paper should be **no more than 10 pages** long double-spaced with standard margins and font size. **We recommend 3–5 pages per topic as a suitable length.** The paper must be written from the perspective of your assigned country and should articulate the policies you will espouse at the conference.

Each delegation is responsible for sending a copy of its papers to their committee Directors via [myDais](#) on or before **February 21, 2025**. If a delegate wishes to receive detailed feedback from the committee's dais, a position must be submitted on or before **January 31, 2025**. The papers received by this earlier deadline will be reviewed by the dais of each committee and returned prior to your arrival at the conference.

Complete instructions for how to submit position papers will be sent to faculty advisers via email. If delegations are unable to submit their position papers on time, please contact us at info@imuna.org.

Delegations that do not submit position papers will be ineligible for awards.

Committee History

The World Health Organization (WHO) was established on April 7, 1948, with the initial aim of serving as an international health organization.¹ To achieve this goal, the WHO Constitution divides the organization into three organs: The World Health Assembly (WHA), The Executive Board, and the Secretariat.² The WHA serves as the main legislative body, consisting of not more than three delegates representing each member state in the United Nations (UN).³ Its main functions are to “determine the policies of the Organization, appoint the Director-General, supervise financial policies, and review and approve the proposed programme budget,” alongside a host of other financial, legislative, and public health duties.³ Some of the legislation that the WHA has the power to discuss how to enact include sanitary and quarantine procedures, disease nomenclatures, and standards for diagnostic procedures and biological goods.⁴

Similar to other organs outside the Security Council, the WHA has no mandate-issuing authority. Therefore, the WHA’s work primarily consists of legislative recommendations to member states and setting goals for the WHO. There is a very distinct set of decision-making rules for guideline development groups to ensure impartial and respectful dialogue when debating.⁵ Guideline development groups meet to decide for or against intervention in certain cases, considering the benefits and harm that the UN’s intervention may cause to respective countries. However, in instances of global pandemics, the WHA has the power to declare global health emergencies—a power granted to it by the International Health Regulations (IHR) passed in 2007.⁶ Examples include the Ebola outbreak in 2013 and the COVID-19 Pandemic that started in 2020. Along with other member states that prioritize international collaboration, WHO discusses their perspective on a specific health agenda arranged by the Executive Board.⁷ Its power comes from dialogue discussions between the member states. The total number of member states of this committee is 194.⁸

It has been observed that since the foundation of the World Health Organization, public health challenges have been reduced and even eradicated as a result of the efforts of such organizations. Some of the most memorable milestone achievements are the acceleration of the discovery of antibiotics, the elaboration of the International Health Regulations, and the successful smallpox eradication following a 12-year global vaccination campaign. Despite the WHA’s infrastructural capabilities, logistical or bureaucratic challenges can sometimes arise. For instance, during the COVID-19 pandemic, many critics emerged concerning the slow decision-making. Despite its limitations, the organization has proven the importance of its existence and the relevance of international cooperation.

1 “History,” WHO, accessed September 23, 2023, <https://www.who.int/about/history>.

2 WHO, “History.”

3 “World Health Assembly,” WHO, accessed September 23, 2023, <https://www.who.int/about/governance/world-health-assembly>.

4 WHO, “History.”

5 “Basic Documents,” World Health Organization, accessed September 23, 2023, https://apps.who.int/gb/bd/pdf_files/BD_49th-en.pdf.

6 “Hosted Partnerships,” WHO, accessed September 23, 2023, <https://www.who.int/about/collaboration/partnerships/hosted-partnerships>.

7 WHO, “History.”

8 WHO, “Constitution of The World Health Organization,” <https://apps.who.int/gb/bd/PDF/bd47/EN/constitution-x.pdf?ua=1>.



WHA

NHSMUN 2025

TOPIC A: MITIGATING HIGH LEVELS OF EXPOSURE TO CARCINOGENIC AGENTS

Photo Credit: Lamiot

Introduction

Cancer is a leading cause of death worldwide, causing nearly every one in six deaths and approximately ten million deaths annually.¹ Over two-thirds of new cancer cases and deaths are from developing countries and more than half of countries worldwide struggle to address the burden of cancer correctly.² In the next few years, cancer is predicted to become more significant, likely seeing a 77 percent increase in cases from 2022 to 2050.³ Between 30 percent and 50 percent of cancer cases can be prevented by avoiding exposure to cancer-causing substances. Minimizing the exposure to such substances represents an issue with vast potential to decrease the global cancer burden.⁴

Carcinogens are toxic substances, agents, and chemicals that may increase someone’s risk of developing malignant tumors that lead to cancer. Scientists have identified over 100 carcinogens, each with varying degrees of carcinogenicity.⁵ Carcinogenicity is defined as the degree of cancer-causing potential of a substance.⁶ This includes substances that are widely known as toxic, like lead and tobacco, as well as lesser-known ones, like some plastics and cosmetics.⁷ Carcinogens can lead to cancer by causing damage to an individual’s DNA (the genetic material). Many of these damages can be repaired by the human body. When an individual has too much exposure to carcinogens, the damages accumulate and the body eventually cannot repair all of the damages incurred. At that point, carcinogen exposure becomes cancerous.

Whether someone exposed to carcinogens develops cancer depends on several other factors: the intensity of exposure, length of exposure, and route of exposure. An individual may not be diagnosed with cancer until later in life, years or decades after carcinogen exposure began.⁸ Humans are exposed to carcinogens in all aspects of their lives—in their homes,

workplaces, play areas, foods, water, and personal belongings.⁹

Possible routes of exposure include inhalation and ingestion, through the skin. High levels of exposure over a long time increase the risk of cancer.¹⁰

It is important to recognize carcinogen exposure can never be fully eliminated, nor does it need to be because of the previously mentioned repair mechanisms of the body. Carcinogen exposure should be decreased to medically safe levels, at which the human body is still able to repair any damage caused and cancer does not develop. This involves ensuring people are exposed to lower levels of carcinogens for shorter periods of time, tackling carcinogens in each possible exposure pathway.¹¹

It is also important to recognize that many carcinogenic agents have additional harmful effects outside of cancer. For example, air pollution is also linked to stroke, heart disease, chronic obstructive pulmonary disease, pneumonia, and cataracts.¹²

Asbestos can also cause asbestosis and pleural disease of

1 WHO, “Cancer,” Who.int (World Health Organization: WHO, February 3, 2022), <https://www.who.int/news-room/fact-sheets/detail/cancer>.

2 WHO, “1 in 2 Countries Unprepared to Prevent and Manage Cancers,” Who.int (World Health Organization: WHO, February 2013), <https://www.who.int/news/item/01-02-2013-1-in-2-countries-unprepared-to-prevent-and-manage-cancers>.

3 WHO, “Global Cancer Burden Growing, amidst Mounting Need for Services,” Who.int (World Health Organization: WHO, February 2024), <https://www.who.int/news/item/01-02-2024-global-cancer-burden-growing-amidst-mounting-need-for-services>.

4 WHO, “Cancer.”

5 Cleveland Clinic, “Carcinogens: What They Are and Common Types,” Cleveland Clinic, 2023, <https://my.clevelandclinic.org/health/articles/25081-carcinogens>.

6 Cleveland Clinic, “Carcinogens: What They Are and Common Types.”

7 “Agents Classified by the IARC Monographs, Volumes 1–136,” WHO, 2022, <https://monographs.iarc.who.int/agents-classified-by-the-iarc/>.

8 Cleveland Clinic, “Carcinogens: What They Are and Common Types.”

9 Dana Hashim and Paolo Boffetta, “Occupational and Environmental Exposures and Cancers in Developing Countries,” *Annals of Global Health* 80, no. 5 (December 13, 2014): 393–93, <https://doi.org/10.1016/j.aogh.2014.10.002>.

10 “Carcinogens: What They Are and Examples,” City of Hope, June 2023, <https://www.cancercenter.com/risk-factors/carcinogens>.

11 Jessica L Barnes et al., “Carcinogens and DNA Damage,” *Biochemical Society Transactions* 46, no. 5 (October 4, 2018): 1213–24, <https://doi.org/10.1042/bst20180519>.

12 “Health Impacts,” WHO, 2024, <https://www.who.int/teams/environment-climate-change-and-health/air-quality-energy-and-health/health-impacts>.

the lungs.¹³ Arsenic is additionally an eye, nose, and throat irritant.¹⁴ Many of these other health effects increase the impact of cancer diagnosis, making death or severe disease more likely.¹⁵ Efforts to limit exposure to carcinogens will not only have important effects on the global cancer burden but also the burden of many other non-communicable diseases. This makes carcinogen exposure regulation an issue area that must be addressed.

Overall, it is evident that exposure to carcinogens is a threat to humans across the world. In order to effectively address this issue, the World Health Assembly (WHA) must promote international collaboration that effectively addresses a diverse range of topics concerning carcinogens.

History and Description of the Issue

Classifying Carcinogens

The International Agency for Research on Cancer (IARC), an intergovernmental agency of the World Health Organization, is leading carcinogen research, discovery and classification.¹⁶ They have defined many ways to classify carcinogens, depending on the context in which carcinogens are being discussed.

First, carcinogenic agents can be sorted by type: physical, biological, or chemical.¹⁷ Physical carcinogens are solid materials that can induce cancer through their physical properties. This includes Ultraviolet (UV) light, which is harmful energy from the sun, and ionization, which means that a molecule gains a positive or negative charge. It also includes

X-ray radiation, the formal term for energy moving through space, as well as repeated injury to the body.¹⁸ Biological carcinogens are living organisms—bacteria, viruses, parasites, and more—that can cause cancer. An important example of a biological carcinogen is the Human Papillomavirus (HPV), a sexually transmitted infection that causes over 90 percent of anal cancers and nearly all cases of cervical cancer.¹⁹ In total, biological carcinogens count for approximately 13 percent of cancers diagnosed in 2018.²⁰ The main focus of debate will be on the last type of carcinogen: chemical carcinogens. These types of carcinogens are chemicals that can cause cancer. Some examples of this category include tobacco, alcohol, asbestos, aflatoxins, and arsenic.²¹ Lifestyle choices, such as physical inactivity, obesity, and poor diet, are sometimes considered an additional category in this classification scheme.²²

Chemical carcinogens can be further sub-classified by their carcinogenic mechanism of action. Genotoxic agents are ones that directly interact with DNA to cause cancer-causing changes. This category accounts for approximately 25 percent of chemical carcinogens.²³ Non-genotoxic agents are carcinogens that do not directly interact with DNA. They instead cause cancer through hormones, increasing or decreasing the expression of certain genes, or suppressing immune system responses.²⁴ However, when considering interventions to limit carcinogen exposure, it is often most helpful to categorize carcinogens through the lens of how humans are exposed to them.

Carcinogens can also be categorized by how they are created: naturally occurring or human-generated. Naturally occurring carcinogens include UV radiation, viruses, and radon. Since

13 “Health Effects of Asbestos | Asbestos | ATSDR,” CDC, July 26, 2022, https://www.atsdr.cdc.gov/asbestos/health_effects_asbestos.html.

14 “Formaldehyde and Your Health | ATSDR,” CDC, 2018, <https://www.atsdr.cdc.gov/formaldehyde/>.

15 “Risk Factors for Cancer,” Cancer.gov (Cancer.gov, December 23, 2015), <https://www.cancer.gov/about-cancer/causes-prevention/risk>.

16 “IARC’s Mission: Cancer Research for Cancer Prevention,” WHO, 2024, <https://www.iarc.who.int/about-iarc-mission/>.

17 “Carcinogens: What They Are and Common Types,” Cleveland Clinic, June 19, 2023, <https://my.clevelandclinic.org/health/articles/25081-carcinogens>.

18 Morando Soffritti, Franco Minardi, and Cesare Maltoni, *Physical Carcinogens*, Nih.gov (BC Decker, 2024), <https://www.ncbi.nlm.nih.gov/books/NBK13884/>.

19 “HPV and Cancer,” Cancer.gov, October 18, 2023, <https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-and-cancer>.

20 WHO, “Cancer,” WHO, February 3, 2022, <https://www.who.int/news-room/fact-sheets/detail/cancer>.

21 Cleveland Clinic, “Carcinogens: What They Are and Common Types.”

22 SJ Curry et al., *Lifestyle Behaviors Contributing to the Burden of Cancer*, Nih.gov (National Academies Press (US), 2020), <https://www.ncbi.nlm.nih.gov/books/NBK223925/>.

23 Paula A Oliveira and Ana I Faustino-Rocha, “Chemical Carcinogens,” *Springer EBooks*, January 1, 2023, 1–23, https://doi.org/10.1007/978-3-030-80962-1_121-1.

24 Lya G Hernández et al., “Mechanisms of Non-Genotoxic Carcinogens and Importance of a Weight of Evidence Approach,” *Mutation Research. Reviews in Mutation Research* 682, no. 2-3 (September 1, 2009): 94–109, <https://doi.org/10.1016/j.mrrev.2009.07.002>.

these types of carcinogens cannot be eliminated from the environment, there must be a focus on both minimizing exposure and decreasing the effects of exposure. Minimizing exposure involves reducing the time an individual is exposed to a carcinogen. Decreasing the effects of exposure means lowering the intensity of exposure for an individual. For many carcinogens, duration and intensity of exposure both contribute to the risk of a carcinogen.²⁵

UV radiation from the Sun is a simple example. It is not possible to get rid of the Sun entirely, so experts recommend individuals wear hats or seek shade on sunny days (to minimize exposure) and wear sunscreen (to decrease the effects of exposure). In contrast, human-generated carcinogens can be removed from the environment through proper regulation. Such substances include exhaust fumes and chemicals created by industrial processes.²⁶ Thus, there must be additional interventions focused on decreasing the creation of these carcinogens.

The most widely used classification system is the IARC’s

Carcinogen Classifications. These classifications are shown in table 1. They classify carcinogenic agents by their proven and potential harm to human health.²⁷ To make these classifications, the IARC relies on animal studies and surveys with humans previously exposed to the substance. Animal studies involve exposing animals, often rodents, to the carcinogen being studied and assessing its impact on their health. This raises interesting questions regarding the ethics of such studies and whether there are better ways to assess carcinogenicity. Still, there are currently no widespread alternatives to animal and human cohort studies for determining carcinogenicity.²⁸

Table 1: IARC Carcinogen Classifications^{29, 30,31}

There have been recent controversies in the IARC’s classification of certain substances. Most notably, with glyphosate, a chemical found in many pesticides including Roundup. Roundup is currently the most widely used herbicide in the world.³² In 2015, the IARC classified glyphosate in Group 2A: Probably Carcinogenic to Humans. This classification

25 WHO, “Cancer.”

26 “Carcinogen,” Genome.gov, 2024, <https://www.genome.gov/genetics-glossary/Carcinogen>.

27 “Agents Classified by the IARC Monographs, Volumes 1–136,” WHO, 2022, <https://monographs.iarc.who.int/agents-classified-by-the-iarc/>.

28 “Tumor Immunology,” Elsevier eBooks, January 1, 2014, 423–55, <https://doi.org/10.1016/b978-0-12-385245-8.00016-9>.

29 “Agents Classified by the IARC Monographs, Volumes 1–136.”

30 “IARC Monographs on the Identification of Carcinogenic Hazards to Humans PREAMBLE IARC Monographs Preamble,” 2019, <https://monographs.iarc.who.int/wp-content/uploads/2019/07/Preamble-2019.pdf>.

31 “Carcinogens | Common Carcinogens, IARC Classifications,” Drugwatch.com, September 5, 2023, <https://www.drugwatch.com/health/cancer/carcinogens/>.

32 Eva Novotny, “Glyphosate, Roundup and the Failures of Regulatory Assessment,” *Toxics* 10, no. 6 (June 13, 2022): 321–21, <https://doi.org/10.3390/toxics10060321>.

Table 1: IARC Carcinogen Classifications

Group	What it Means	Examples
Group 1: Carcinogenic to Humans	Strong/sufficient evidence of carcinogenicity in humans and animals	Tobacco, processed meats, asbestos, talc (129 carcinogens total)
Group 2A: Probably Carcinogenic to Humans	At least two of the following: Limited evidence of carcinogenicity in humans, sufficient evidence of carcinogenicity in animals, exhibits key carcinogen characteristics	Steroids, night shift work, glyphosate (pesticide), high temperature frying (96 carcinogens total)
Group 2B: Possibly Carcinogenic to Humans	One of the following: Limited evidence of carcinogenicity in humans, sufficient evidence of carcinogenicity in animals, exhibits key carcinogen characteristics	Aloe vera, gasoline, pickled vegetables, welding fumes (321 carcinogens total)
Group 3: Not Classifiable as to its carcinogenicity to humans	Inadequate evidence of carcinogenicity in humans	Coffee, printing inks, polyethylene (plastic), static magnetic fields (499 carcinogens total)

was made based on “limited” evidence of cancer in humans, “sufficient” evidence of cancer in experimental animals, and “strong” evidence for genotoxicity.³³ A genotoxin is a substance that can damage DNA and can lead to genetic changes that could potentially cause cancer.³⁴ Although the IARC is the leading global body for carcinogen classification, many other independent agencies exist that do similar work. This includes the United States’ Environmental Protection Agency, Health Canada, and the European Food Safety Authority.³⁵ Other organs of the UN such as the Food and Agriculture Organization and the International Atomic Energy Agency also conduct research on the carcinogenicity of a substance.

The controversies around glyphosate arose because other agencies have reached different classification conclusions than the IARC. The Environmental Protection Agency, Health Canada, and European Food Safety Authority all concluded glyphosate is likely not carcinogenic to humans. The Australian Pesticides and Veterinary Medicine Authority said it is “considered safe to use when the instructions on the label are followed.”³⁶ Yet, in 2019, researchers at the University of Washington found using glyphosate increases the risk of non-Hodgkin lymphoma by 41 percent, in line with the IARC’s classification.³⁷ Nevertheless, in a 2016 assessment of carcinogenicity through dietary exposure, a joint meeting of experts from the Food and Agriculture Organization and World Health Organization Core Assessment Group on Pesticide Residues concluded glyphosate is “unlikely to pose a carcinogenic risk to humans.”³⁸ Research done into the process

behind these classifications found these differences were likely due to the choice to include unpublished regulatory studies and the type of exposure studied (dietary and/or occupational).³⁹

Glyphosate is just one example of many that highlight the confusing global disparities present in carcinogen classification. There are also controversies regarding the classification of arsenic, chromium, and nickel.⁴⁰ The result is growing criticism of the IARC’s classification methods. Bob Tarone, Biostatistics Director of the International Epidemiology Institute, has said the IARC’s “methods are poorly understood and do not serve the public well.”⁴¹ Others have said the IARC’s processes lack transparency, “scientific rigor,” and often have conflicts of interest because researchers will serve on panels that review their own or their colleagues’ research.⁴² Such differing conclusions from reputable bodies have led to confusion among policymakers and the public when trying to create safety measures and guidelines for glyphosate use. This exemplifies the need for better, standardized practices to classify carcinogens.

Environmental & Occupational Exposure to Carcinogens

All types of exposure to chemical carcinogens can be labeled as “environmental exposure.” This includes exposure in the places we live, work, and play; the food and water we ingest; and the items we use.⁴³ A study in India found carcinogens present in the environment directly and indirectly contribute

org/10.3390/toxics10060321.

33 “IARC Monograph on Glyphosate,” WHO, 2018, <https://www.iarc.who.int/featured-news/media-centre-iarc-news-glyphosate/>.

34 “Glossary: Genotoxic,” Europa.eu, 2024, https://ec.europa.eu/health/scientific_committees/opinions_layman/en/electromagnetic-fields/glossary/ghi/genotoxic-genotoxicity.htm.

35 “Does Glyphosate Cause Cancer? (the Ingredient in Roundup),” City of Hope, February 20, 2024, <https://www.cancercenter.com/community/blog/2021/07/does-glyphosate-cause-cancer>.

36 “Does Glyphosate Cause Cancer? (the Ingredient in Roundup),” City of Hope.

37 “Does Glyphosate Cause Cancer? (the Ingredient in Roundup),” City of Hope.

38 Karnika Bahuguna, “FAO and WHO Joint Body Contradicts IARC’s Finding on Chemicals Posing Carcinogenic Risk,” Down To Earth, May 17, 2016, <https://www.downtoearth.org.in/health/fao-and-who-joint-body-contradicts-iarc-s-finding-on-chemicals-posing-carcinogenic-risk-53985>.

39 Charles M Benbrook, “How Did the US EPA and IARC Reach Diametrically Opposed Conclusions on the Genotoxicity of Glyphosate-Based Herbicides?,” *Environmental Sciences Europe* 31, no. 1 (January 14, 2019), <https://doi.org/10.1186/s12302-018-0184-7>.

40 Carolina Zellino et al., “Carcinogenic Chemicals in Occupational Settings: A Tool for Comparison and Translation between Different Classification Systems,” *ResearchGate* (January 19, 2024), https://www.researchgate.net/publication/377641844_Carcinogenic_Chemicals_in_Occupational_Settings_A_Tool_for_Comparison_and_Translation_between_Different_Classification_Systems.

41 Kate Kelland, “Special Report: How the World Health Organization’s Cancer Agency Confuses Consumers,” Reuters, April 18, 2016, <https://www.reuters.com/article/sustainability/special-report-how-the-world-health-organizations-cancer-agency-confuses-consu-idUSKCN0XFORE/>.

42 Kate Kelland, “Special Report: How the World Health Organization’s Cancer Agency Confuses Consumers.”

43 “How Can Identifying and Measuring Exposures to Environmental Carcinogens Help Prevent Cancer?,” American Association for Cancer Research, June 18, 2019, <https://www.aacr.org/blog/2019/06/18/how-can-identifying-and-measuring-exposures-to-environmental-carcinogens-help-prevent-cancer/>.



farmers on a groundnuts farmland in Ghana.

Credit: Ibn Dagara

to two-thirds of cancer cases.⁴⁴ In addition, exposure to environmental carcinogens is strongly linked to decreased happy life expectancy.⁴⁵ Happy life expectancy is a measure of the number of years the average citizen in a country lives happily, as opposed to life expectancy which only measures the number of years the average citizen lives.⁴⁶ In this context, it is a more useful measure because cancer diagnosis and treatment often significantly decreases quality of life. In recent decades, in developed countries, there has been a decline in cancer diagnoses linked to chemical carcinogen exposure. In developing countries, it is the opposite: cancer diagnoses have only gone up. As countries develop, industrialize, and see growing population sizes, exposure to carcinogens such as asbestos, arsenic, and air pollution only increases.⁴⁷

There are two main forms of environmental carcinogen exposure not listed in other exposure categories: outdoor air pollution and landfills. The IARC has classified outdoor air

pollution as Carcinogenic to Humans (Group 1) and is linked to lung cancer. Outdoor air pollution is created by human activities, such as emissions from industry, power generation, transportation, and normal atmospheric processes. Air pollution's carcinogenicity arises from a mix of several chemical carcinogens including nitrogen dioxide and sulfur dioxide, as well as solid particles and liquid droplets found in the air.⁴⁸

The effect of outdoor air pollution, also referred to as ambient air pollution, on lung cancer is important because lung cancer is the most common cancer diagnosis and the leading cause of cancer death. It sees approximately 2.1 million new cases and 1.8 million deaths annually.⁴⁹ On the same line, tobacco use, another major carcinogen, accounts for more than 80 percent of lung cancer diagnoses.⁵⁰ Still, outdoor air pollution exposure causes approximately 10 percent of diagnoses and is also proven to promote earlier cancer onset and worse outcomes among smokers.⁵¹

⁴⁴ N Srinivas et al., "Environmental Carcinogens and Their Impact on Female-Specific Cancers," *Elsevier EBooks*, January 1, 2021, 249–62, <https://doi.org/10.1016/b978-0-12-822009-2.00015-7>.

⁴⁵ "Exposure to Common Environmental Carcinogens Linked to Decreased Lifespan Happiness," *ScienceDaily*, 2024, <https://www.sciencedaily.com/releases/2024/04/240401142533.htm>.

⁴⁶ Ruut Veenhoven, "Happy Life-Expectancy," *Social Indicators Research* 39, no. 1 (January 1, 1996): 1–58, <https://doi.org/10.1007/bf00300831>.

⁴⁷ Dana Hashim and Paolo Boffetta, "Occupational and Environmental Exposures and Cancers in Developing Countries," *Annals of Global Health* 80, no. 5 (December 13, 2014): 393–93, <https://doi.org/10.1016/j.aogh.2014.10.002>.

⁴⁸ IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, 1988, <https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Outdoor-Air-Pollution-2015>.

⁴⁹ Michelle C Turner et al., "Outdoor Air Pollution and Cancer: An Overview of the Current Evidence and Public Health Recommendations," *CA: A Cancer Journal for Clinicians* 70, no. 6 (August 25, 2020): 460–79, <https://doi.org/10.3322/caac.21632>.

⁵⁰ Michelle C Turner et al., "Outdoor Air Pollution and Cancer: An Overview of the Current Evidence and Public Health Recommendations," *Annals of Oncology* 20, no. 2

⁵¹ P Vineis and W Xun, "The Emerging Epidemic of Environmental Cancers in Developing Countries," *Annals of Oncology* 20, no. 2

The carcinogenicity of outdoor air pollution is not uniform around the world. In 2019, 99 percent of the world's population lived in places with air pollution levels higher than WHO-recommended thresholds. These thresholds are set to levels where exposure becomes hazardous to human health. Thus according to these thresholds, 99 percent of the world's population is exposed to hazardous, carcinogenic levels of air pollution. Despite the universality of outdoor air pollution exposure, 89 percent of premature deaths from exposure to air pollution were in developing countries.⁵² This is explained by the compounding effects of carcinogen exposure. In developing countries, individuals are more likely to have pre-existing diseases, like tuberculosis and hepatitis B, that worsen the effects of carcinogens. Because developing countries often have less regulation of carcinogens, individuals are more likely to be exposed to a larger number of them through other exposure pathways. This makes exposure to outdoor air pollution especially threatening in these regions.⁵³

Carcinogens present in illegal landfill sites further highlight this difference in carcinogen exposure and effects between developed and developing countries. Illegal landfill sites often contain IARC Group 1 chemical carcinogens.⁵⁴ These sites are more frequently present in developing countries and are often closer to residential areas because of less strict regulations and “dumping” of waste. The FAO estimates 120,000 of the 500,000 tonnes of toxic waste produced globally are “dumped” and stored in Africa.⁵⁵ Many big industrial polluters are moving out of developed countries to developing countries where there are less regulations and pushback on pollution.⁵⁶

These inequities are present within different groups in countries as well. In a study of six highly developed and wealthy countries, researchers found carcinogen exposure is higher among socially and/or economically disadvantaged populations. This includes low-income peoples, minority races, immigrants, and same-sex couples. These exposure patterns explain the strong correlation between race and/or socioeconomic status and cancer risk.⁵⁷ It is important to keep such patterns of uneven carcinogen exposure in mind as other categories of exposure and their impacts on human health are explored.

One subtype of exposure is occupational and workplace exposure. Occupational cancer can be defined as cancers that arise due to exposure to carcinogens in the workplace. The WHO estimated that occupational exposure accounts for between 4 percent and 40 percent of global cancer illnesses.⁵⁸

The IARC has found 165 possible occupational carcinogens, such as combustion products, dusts, metals, and other industrial chemicals. Work patterns, like night shift work, have also been defined as carcinogenic. Night shift work can disrupt the natural cycle of biologic systems which can harm the systems that prevent cancer in the body.⁵⁹ Exposure is greatest among farmers, drivers, miners, and transportation workers, and greater in men than women.⁶⁰ The specific types of cancers caused by occupational exposure vary based on the specific carcinogen the worker was exposed to, but the most common occupational cancers are lung cancer, mesothelioma (cancer of organ lining tissue), bladder cancer, and non-melanoma skin cancers.⁶¹ Table 2 provides a more detailed

(February 1, 2009): 205–12, <https://doi.org/10.1093/annonc/mdn596>.

52 World Health Organization, “Ambient (Outdoor) Air Pollution,” WHO, December 19, 2022, [https://www.who.int/news-room/factsheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/factsheets/detail/ambient-(outdoor)-air-quality-and-health).

53 Pier Mannucci and Massimo Franchini, “Health Effects of Ambient Air Pollution in Developing Countries,” *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health* 14, no. 9 (September 12, 2017): 1048–48, <https://doi.org/10.3390/ijerph14091048>.

54 “List of Classifications,” WHO, 2024, <https://monographs.iarc.who.int/list-of-classifications>.

55 P Vineis and W Xun, “The Emerging Epidemic of Environmental Cancers in Developing Countries.”

56 Kristian Larsen, Ela Rydz, and Cheryl E Peters, “Inequalities in Environmental Cancer Risk and Carcinogen Exposures: A Scoping Review,” *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health* 20, no. 9 (May 4, 2023): 5718–18, <https://doi.org/10.3390/ijerph20095718>.

57 Kristian Larsen, Ela Rydz, and Cheryl E Peters, “Inequalities in Environmental Cancer Risk and Carcinogen Exposures: A Scoping Review.”

58 “PAHO/WHO Warns of Health Risks from Occupational Exposure to Chemical Carcinogens,” Paho.org, April 28, 2014, <https://www.paho.org/en/news/28-4-2014-pahowho-warns-health-risks-occupational-exposure-chemical-carcinogens>.

59 Christina C. Lawson, Elizabeth A. Whelan, and Tania Carreon, “Recent News about Night Shift Work and Cancer: What Does it Mean for Workers?” Center for Disease Control, April 27, 2021, <https://blogs.cdc.gov/niosh-science-blog/2021/04/27/nightshift-cancer/>.

60 “Workplace Cancer,” Cancer.org.au, 2014, <https://www.cancer.org.au/cancer-information/causes-and-prevention/workplace-cancer>.

61 Balázs Adám, Alberto Modenese, and Tom Loney, “Editorial: Occupation and Cancer: New Insights into Burden, Risk Factors, and Prevention,” *Frontiers in Public Health* 11 (January 4, 2024), <https://doi.org/10.3389/fpubh.2023.1343952>.

overview of the most common occupational carcinogens, workplaces they are present in, and cancers they cause. When considering solutions to reduce the occupational cancer burden, one must address the specific carcinogens that cause the most harm as well as broader processes that perpetuate all forms of occupational exposure.

Table 2: Most Common Occupational Carcinogens⁶²

The 2016 Global Burden of Disease study helps better detail the burden of occupational cancers. Researchers found that occupational carcinogen exposure causes 350,000 deaths annually and 7.2 million disability-adjusted life years (DALYs) lost. Disability-adjusted life years is a measure of the number of years lost due to ill-health, disability, or early death.⁶³ Occupational cancer also represents approximately four percent of all cancer deaths. Mortality rates are highest among men and people aged 55-79 years. The highest mortality rates are seen in high-income regions, like Western Europe, United

States, Japan, and China, and the lowest rates are seen in sub-Saharan Africa. This phenomenon may, in part, be due to lack of information and underreporting from countries. Most deaths in developed countries are due to asbestos exposure whereas deaths in developing countries are due to silica and diesel engine exhaust.^{64, 65}

In recent years, the effects of occupational carcinogens has increased as the proportion of workers being exposed increases. An aging labor force has also contributed to this increase.⁶⁶ Only occupational exposure to asbestos has decreased.⁶⁷ Another factor to consider is the long latency period of carcinogens. This means that workers who were once exposed to a carcinogen will likely only show illness decades later. Once the cancer disease process has begun, the worker will forever be at higher risk of cancer, even when they are no longer exposed to the carcinogen (i.e. switching jobs, retiring).⁶⁸

When considering these facts and figures, it is important

62 Na Li et al., “Association of 13 Occupational Carcinogens in Patients with Cancer, Individually and Collectively, 1990-2017,” *JAMA Network Open* 4, no. 2 (February 18, 2021): e2037530–30, <https://doi.org/10.1001/jamanetworkopen.2020.37530>.
 63 “Global and Regional Burden of Cancer in 2016 Arising from Occupational Exposure to Selected Carcinogens: A Systematic Analysis for the Global Burden of Disease Study 2016,” *Occupational and Environmental Medicine* 77, no. 3 (February 13, 2020): 151–59, <https://doi.org/10.1136/oemed-2019-106012>.
 64 “Global and Regional Burden of Cancer in 2016 Arising from Occupational Exposure to Selected Carcinogens: A Systematic Analysis for the Global Burden of Disease Study 2016.”
 65 Na Li et al., “Association of 13 Occupational Carcinogens in Patients with Cancer, Individually and Collectively, 1990-2017.”
 66 “Global and Regional Burden of Cancer in 2016 Arising from Occupational Exposure to Selected Carcinogens: A Systematic Analysis for the Global Burden of Disease Study 2016.”
 67 Na Li et al., “Association of 13 Occupational Carcinogens in Patients with Cancer, Individually and Collectively, 1990-2017.”
 68 World Health Organization, *Cancer Control*, 2007, <https://www.who.int/publications/i/item/occupational-carcinogens-assessing-the-environmental-burden-of-disease-at-national-and-local-levels>.

Table 2: Most Common Occupational Carcinogens

Carcinogen (In order of decreasing cancer cases caused)	Cancers Caused ⁷¹	Common Workplaces/Occupations ⁷²
Asbestos	Mesothelioma, Lung, Larynx, Ovarian	Aerospace, Cement, Automotive Repair/Maintenance, Construction, Glass Production, Mining, Petroleum Refinement, Sheet-Metal
Silica	Lung	Silicon Production, Ceramics, Construction, Electronics Production, Glass Production, Uranium Mining, Iron/Steel, Petroleum Refinement
Diesel Engine Exhaust	Lung	Automotive Repair/Maintenance, Transportation Workers, Construction
Nickel	Lung, Nasal Cavity	Iron/Steel, Welding, Petroleum Refinement
Arsenic	Skin, Lung, Bladder	Glass Production, Mining, Smelting, Handling of Arsenic-containing Pesticides, Wool Fiber Production

* All listed substances are IARC Group 1 carcinogens

to remember occupational carcinogen exposure is not well documented in developing countries. This, in part, can be attributed to the large informal economy present in the developing world.⁶⁹ Informal workers are people working in industries that are neither taxed nor monitored by the government. This includes food stands, domestic workers, and gig workers. The ILO estimates approximately 60 percent of the global workforce participates in this type of work.⁷⁰ Even though informal workers are an important part of any economy, the lack of government oversight over their workplaces means such workers may face extremely high, unregulated levels of carcinogen exposure. For example, approximately 40 percent of the workplaces of informal workers in Zimbabwe contain carcinogens.⁷¹

Although occupational carcinogen exposure may be associated with “blue-collar” jobs involving manual labor and physical work, many high-skill, high-paying jobs also contain carcinogen exposure. For example, medical personnel are routinely exposed to low-dose radiation when caring for

patients. Research found such exposure increased cancer risk and elevated cancer death rate by over 50 percent.⁷² Women in managerial professions also have the highest risk of developing breast cancer, likely due to stress and other lifestyle carcinogens.⁷³

To better understand the exposure of workers, occupational cancers present in a profession experiencing preventable, prolonged exposure to several carcinogens will be analyzed. The best example for this are jobs related to agriculture. Agricultural workers are regularly exposed to carcinogenic pesticides, diesel fuel exhaust, metals, organic solvents, silica, wood dusts, and solar radiation, all of which are IARC Group 1 carcinogens. Exposure to solar radiation and diesel engine exhaust are most common, with over 85 percent of agricultural workers exposed to both. Recognizing the work day of agricultural workers, these exposure patterns make sense because workers spend many hours working outside in fields without sun protection, alongside machinery, like tractors, that produce large amounts of exhaust fumes.⁷⁴

69 Vilma Santana and Fatima Ribeiro, “Occupational Cancer Burden in Developing Countries and the Problem of Informal Workers,” *Environmental Health* 10, no. Suppl 1 (January 1, 2011): S10–10, <https://doi.org/10.1186/1476-069x-10-s1-s10>.

70 “Five Things to Know about the Informal Economy,” IMF, July 28, 2021, <https://www.imf.org/en/News/Articles/2021/07/28/na-072821-five-things-to-know-about-the-informal-economy>.

71 Vilma Santana and Fatima Ribeiro, “Occupational Cancer Burden in Developing Countries and the Problem of Informal Workers.”

72 “UC Irvine-Led Study Links Low-Dose Radiation to Higher Cancer Risk,” UCI News, 2023, <https://news.uci.edu/2023/08/16/uc-irvine-led-study-links-low-dose-radiation-to-higher-cancer-risk/>.

73 Balázs Ádám, Alberto Modenese, and Tom Loney, “Editorial: Occupation and Cancer: New Insights into Burden, Risk Factors, and Prevention,” *Frontiers in Public Health* 11 (January 4, 2024), <https://doi.org/10.3389/fpubh.2023.1343952>.

74 Ellie Darcey et al., “Prevalence of Exposure to Occupational Carcinogens among Farmers,” *Rural and Remote Health*, August 27, 2018,

A woman at home preparing food by an open fire fuelled by logs

Credit: Karan Singh Rathore



As such, farmers are at an elevated risk for skin cancers and melanoma, prostate cancer, brain cancer, non-Hodgkin lymphoma, and myeloma. This is consistent with the carcinogens they are exposed to. Interestingly, they are at an overall lower risk of developing cancer than the general population.⁷⁵ This is thought to be because of high levels of occupational physical activity and lower rates of smoking present among agricultural workers. In analyzing cancers rarely diagnosed in agricultural workers, they all are ones associated with physical inactivity and tobacco usage.⁷⁶ The case of cancer in agricultural workers illustrates the intersectionality of carcinogen exposure and cancer-preventing activities. In addressing occupational exposure, it has become a must to decrease exposure to cancer-causing carcinogens while promoting cancer-preventing occupational functions.

Carcinogens in the Home

Carcinogens found in the home can be sorted into three categories: household air pollution, radon, and asbestos. Household air pollution refers to air pollution contained in the household, often created by the use of polluting home fuels, namely, solid fuels and the use of gas stoves. Solid fuels include kerosene, a fuel used for stoves, wood, animal dung, coal, and biomass. The World Health Organization estimates the burning of solid fuels for household cooking and heating is still practiced by three billion people worldwide, or 40 percent of the world's population.⁷⁷ Comparing households

burning solid fuels with those using natural gas, the IARC found burning solid fuels leads to a 90 percent higher risk of developing esophageal cancer, 80 percent higher risk of developing gastric cancer, 25 percent higher risk of developing colon cancer, and 64 percent higher risk of developing lung cancer.⁷⁸

The IARC classified household coal combustion as a Group 1 human carcinogen and biomass combustion as a Group 2A probable human carcinogen.⁷⁹ Ultimately, the concentration of smoke and carcinogens present in the home from solid fuel combustion far exceed WHO guidelines for outdoor and household air pollution. For perspective, household air pollution exposure is roughly as consequential as smoking tobacco, excluding the effects of nicotine in tobacco.⁸⁰

Household air pollution was responsible for approximately 3.2 million deaths in 2020 alone.⁸¹ This includes 237,000 deaths of children under the age of five.⁸² In developing countries, this represents 3.7 percent of all deaths.⁸³ Although people assume air pollution exposure more often occurs outdoors, 70 percent of exposure actually happens in the home.⁸⁴ Exposure to household air pollution is also much more potent, at a concentration of 30,000 $\mu\text{g}/\text{m}^3$ compared to 300–5000 $\mu\text{g}/\text{m}^3$.⁸⁵ Carcinogens in household air pollution are absorbed through the respiratory and digestive tracts. Thus, exposure to such pollution increases risk of esophageal, gastric, colon, and lung cancers.⁸⁶ With lung cancer specifically, an estimated

<https://doi.org/10.22605/rrh4348>.

75 Ellie Darcey et al., "Prevalence of Exposure to Occupational Carcinogens among Farmers."

76 Kayo Togawa et al., "Cancer Incidence in Agricultural Workers: Findings from an International Consortium of Agricultural Cohort Studies (AGRICOH)," *Environment International* 157 (December 1, 2021): 106825–25, <https://doi.org/10.1016/j.envint.2021.106825>.

77 Mahdi Sheikh et al., "Household Fuel Use and the Risk of Gastrointestinal Cancers: The Golestan Cohort Study."

78 International Agency for Research on Cancer, "Indoor Burning of Biomass and Kerosene Fuels Is Associated with Higher Risk of Developing Several Types of Digestive Cancers," World Health Organization, June 17, 2020, <https://www.iarc.who.int/featured-news/indoor-burning-of-biomass-and-kerosene-fuels-is-associated-with-higher-risk-of-developing-several-types-of-digestive-cancers/>; H. Dean Hosgood et al., "In-Home Coal and Wood Use and Lung Cancer Risk: A Pooled Analysis of the International Lung Cancer Consortium," *Environmental Health Perspectives* 118, no. 12 (December 1, 2010): 1743–47, <https://doi.org/10.1289/ehp.1002217>.

79 H. Dean Hosgood et al., "In-Home Coal and Wood Use and Lung Cancer Risk: A Pooled Analysis of the International Lung Cancer Consortium."

80 John R Balmes, "Household Air Pollution from Domestic Combustion of Solid Fuels and Health," *the Journal of Allergy and Clinical Immunology/Journal of Allergy and Clinical Immunology/the Journal of Allergy and Clinical Immunology* 143, no. 6 (June 1, 2019): 1979–87, <https://doi.org/10.1016/j.jaci.2019.04.016>.

81 World Health Organization, "Household Air Pollution," World Health Organization, December 15, 2023, <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>.

82 World Health Organization, "Household Air Pollution."

83 Dana Hashim and Paolo Boffetta, "Occupational and Environmental Exposures and Cancers in Developing Countries," *Annals of Global Health* 80, no. 5 (December 13, 2014): 393, <https://doi.org/10.1016/j.aogh.2014.10.002>.

84 Dana Hashim and Paolo Boffetta, "Occupational and Environmental Exposures and Cancers in Developing Countries."

85 Omolola Okunromade et al., "Air Quality and Cancer Prevalence Trends across the Sub-Saharan African Regions during 2005–2020," *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health* 19, no. 18 (September 9, 2022): 11342–42, <https://doi.org/10.3390/ijerph191811342>.

86 Mahdi Sheikh et al., "Household Fuel Use and the Risk of Gastrointestinal Cancers: The Golestan Cohort Study," *Environmental Health*

90,000 of the 200,000 lung cancer deaths in developing countries are credited to household air pollution exposure.⁸⁷

There are many populations that are more at risk for household air pollution exposure from solid fuels. For instance, household burning of solid fuels is much more prevalent in developing regions like South Asia, Latin America, and Africa.⁸⁸ The impact of such practices on cancer development is higher in developing countries.⁸⁹ Households burning coal in Asia are 4.93 times more likely to develop lung cancer compared to non-solid fuel households. The worldwide average is only 1.64 times more likely.⁹⁰ This difference holds true with non-smokers and women, indicating it is a result of regional differences, not other lifestyle risk factors.⁹¹ There is some evidence that this disparity may be a result of tuberculosis, a disease which intensifies the consequences of household air pollution, because tuberculosis is more prevalent in developing countries.⁹² It is also important to note there is relatively little research to quantify exposure in developing countries, so these statistics likely underestimate the true burden of these carcinogens.⁹³ Women and children are also most vulnerable to the carcinogenic effects of household air pollution from solid fuels. This is because these groups are traditionally responsible for household chores, meaning they have more exposure to these carcinogens.⁹⁴

Around the world, 49 percent of rural communities use solid fuels, compared to 14 percent in urban communities.⁹⁵ Rural

communities in developing countries almost exclusively use solid fuels.⁹⁶ They often rely on such fuels because they are cheaper and available. In developing countries, overall risk of cancer is likely higher in urban areas because people are both exposed to carcinogens from solid fuel combustion and air pollution from industrial factory buildings.⁹⁷

There are several proven solutions to household air pollution exposure from solid fuel combustion; yet they are difficult and sometimes costly to implement. The best solution is use of “clean” fuels, fuel sources that emit lower levels of air pollution. This includes renewable energy, liquefied petroleum gas, and natural gas. By 2030, WHO estimates 2.1 billion people will still lack access to clean fuels.⁹⁸ Another intervention is the installation of chimneys in households using solid fuels. In a study conducted by the Tehran University of Medical Sciences of households in Iran, burning such fuels with a chimney present lowered risk of developing digestive cancers.⁹⁹ Even opening windows and doors for ventilation proves to lower cancer risk. Still, it is difficult for regions that experience harsh weather conditions to have such ventilation, thus explaining the direct correlation between experience of harsh weather and amount of households exposed to indoor air pollution in developing countries.¹⁰⁰

When considering clean fuel alternatives, it is also important to determine whether the fuel is better than solid fuels. A good example can be seen with Chevron, one of the world’s largest

Perspectives 128, no. 6 (June 1, 2020), <https://doi.org/10.1289/ehp5907>.

87 P. Vineis and W. Xun, “The Emerging Epidemic of Environmental Cancers in Developing Countries,” *Annals of Oncology* 20, no. 2 (February 1, 2009): 205–12, <https://doi.org/10.1093/annonc/mdn596>.

88 H. Dean Hosgood et al., “In-Home Coal and Wood Use and Lung Cancer Risk: A Pooled Analysis of the International Lung Cancer Consortium.”

89 H. Dean Hosgood et al., “In-Home Coal and Wood Use and Lung Cancer Risk: A Pooled Analysis of the International Lung Cancer Consortium.”

90 H. Dean Hosgood et al., “In-Home Coal and Wood Use and Lung Cancer Risk: A Pooled Analysis of the International Lung Cancer Consortium.”

91 H. Dean Hosgood et al., “In-Home Coal and Wood Use and Lung Cancer Risk: A Pooled Analysis of the International Lung Cancer Consortium.”

92 Dana Hashim and Paolo Boffetta, “Occupational and Environmental Exposures and Cancers in Developing Countries,” *Annals of Global Health* 80, no. 5 (December 13, 2014): 393, <https://doi.org/10.1016/j.aogh.2014.10.002>.

93 Dana Hashim and Paolo Boffetta, “Occupational and Environmental Exposures and Cancers in Developing Countries.”

94 World Health Organization, “Household Air Pollution,” World Health Organization, December 15, 2023, <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>.

95 World Health Organization, “Household Air Pollution.”

96 International Agency for Research on Cancer, “Indoor Burning of Biomass and Kerosene Fuels Is Associated with Higher Risk of Developing Several Types of Digestive Cancers,” World Health Organization, June 17, 2020, <https://www.iarc.who.int/featured-news/indoor-burning-of-biomass-and-kerosene-fuels-is-associated-with-higher-risk-of-developing-several-types-of-digestive-cancers/>.

97 Dana Hashim and Paolo Boffetta, “Occupational and Environmental Exposures and Cancers in Developing Countries.”

98 World Health Organization, “Household Air Pollution.”

99 Mahdi Sheikh et al., “Household Fuel Use and the Risk of Gastrointestinal Cancers: The Golestan Cohort Study,” *Environmental Health Perspectives* 128, no. 6 (June 2020): 067002, <https://doi.org/10.1289/ehp5907>.

100 Dana Hashim and Paolo Boffetta, “Occupational and Environmental Exposures and Cancers in Developing Countries,” *Annals of Global Health* 80, no. 5 (December 13, 2014): 393, <https://doi.org/10.1016/j.aogh.2014.10.002>.

oil and gas companies. They recently announced an initiative to create a “climate-friendly” fuel from discarded plastics. It was then found that production of this fuel is extremely toxic; one in four people exposed to this fuel over their lifetime could develop cancer.¹⁰¹ In the United States, where this fuel was planned to be produced, the communities within three miles of the refinery are primarily low income and Black. This is another example of uneven distribution of the cancer burden within a country.¹⁰²

Carcinogen exposure from household air pollution is also widely experienced in developed countries through the second primary home fuel: gas stoves. Gas stoves release benzene, both when in use and when turned off. Benzene is an IARC Group 1 human carcinogen that is linked to higher risk of blood cell cancers. A study conducted by Stanford University found gas stoves release benzene at a level higher than that of secondhand smoke from tobacco. Even though gas stoves are common in households in developed countries, they are not as hazardous because households in developed countries often have better ventilation, including above-stove ventilation hoods. Burning solid fuels is still much more carcinogenic.¹⁰³

The second source of carcinogens in the home is radon. This is a naturally occurring, radioactive, odorless, and colorless gas. Radon is the second leading cause of lung cancer worldwide, behind smoking.¹⁰⁴ The IARC has classified it as a Group 1 human carcinogen.¹⁰⁵ Radon is created by the natural decay

of uranium and radium, a process occurring in nearly all rocks and soils.¹⁰⁶ Through cracks in floors and walls, radon can be released into a home. This is an issue that is very common and affects old and new homes alike. In the United States, one in fifteen homes are estimated to have radon levels above what is recommended.¹⁰⁷

Kits to test home radon levels can be as cheap as USD 10. Simple fixes like increased ventilation, sealing cracks in floors and walls, and covering exposed earth can also reduce radon levels by up to 99 percent.¹⁰⁸ The issue of radon exposure in the home is not caused by a lack of solutions but rather lack of awareness and government regulation. No country has regulations to prevent radon leakage into homes and only 12 percent provide radon education to building professionals.^{109,}

As with many other carcinogens, there is an uneven distribution of radon exposure worldwide. Rural populations are exposed to up to 31 percent more radon than urban populations.¹¹¹ Additionally, radon is a bigger threat in areas vulnerable to climate change. Currently, 3.3 million people in Canada, Alaska, Greenland, and Russia live on frozen permafrost. As climate change drives its melting, radon previously trapped by the permafrost will be released into homes.¹¹²

A 2015 American Institute for Cancer Research survey found an average of only 59 percent of Americans are aware that radon is carcinogenic.¹¹³ That number drops to 37 percent

101 Sharon Lerner, “This ‘Climate-Friendly’ Fuel Comes with an Astronomical Cancer Risk,” ProPublica, February 23, 2023, <https://www.propublica.org/article/chevron-pascagoula-pollution-future-cancer-risk>.

102 Sharon Lerner, “This ‘Climate-Friendly’ Fuel Comes with an Astronomical Cancer Risk.”

103 Jeff Brady, “Gas Stoves Pollute Homes with Benzene, Which Is Linked to Cancer,” NPR, June 16, 2023, <https://www.npr.org/2023/06/16/1181299405/gas-stoves-pollute-homes-with-benzene-which-is-linked-to-cancer>.

104 “Radon in Homes, Schools and Buildings | US EPA,” US EPA, November 27, 2018, <https://www.epa.gov/radtown/radon-homes-schools-and-buildings>.

105 Vladimir Tarakanov, “What Is Radon and How Are We Exposed to It?,” IAEA, August 18, 2023, <https://www.iaea.org/newscenter/news/what-is-radon-and-how-are-we-exposed-to-it>.

106 “Radon in Homes, Schools and Buildings | US EPA.”

107 “Radon in Homes, Schools and Buildings | US EPA.”

108 “About Radon,” HUD.gov / U.S. Department of Housing and Urban Development (HUD), 2021, https://www.hud.gov/program_offices/healthy_homes/healthyhomes/radon.

109 Alexandra Giraldo-Osorio et al., “Residential Radon in Central and South America: A Systematic Review,” *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health* 17, no. 12 (June 24, 2020): 4550–50, <https://doi.org/10.3390/ijerph17124550>.

110 “More Countries Act against Exposure to Radon and Associated Cancer Risks,” WHO, February 4, 2021, <https://www.who.int/news/item/04-02-2021-more-countries-act-against-exposure-to-radon-and-associated-cancer-risks>

111 Selim M Khan et al., “Rural Communities Experience Higher Radon Exposure versus Urban Areas, Potentially due to Drilled Groundwater Well Annuli Acting as Unintended Radon Gas Migration Conduits,” *Scientific Reports* 14, no. 1 (February 26, 2024), <https://doi.org/10.1038/s41598-024-53458-6>.

112 PBS News, “How Climate Change Is Putting Millions at Risk of Radon Exposure,” PBS News, May 18, 2022, <https://www.pbs.org/newshour/science/how-climate-change-is-putting-millions-at-risk-of-radon-exposure>.

113 Thea Evans, “Radon: A Public Health Issue That Hurts the Poor the Most (July-August 2016),” Indiana.edu, 2016, <https://www.incontext.indiana.edu/2016/july-aug/article2.asp>.

in low-income communities and rises to 85 percent in high-income communities.¹¹⁴ Knowledge of radon carcinogenicity directly facilitates a household's ability to prevent exposure, thus illustrating the source of socioeconomic disparities of radon exposure levels.¹¹⁵

The final main carcinogen present in homes is asbestos. Asbestos is an IARC Group 1 human carcinogen that is linked to lung cancer and mesothelioma.¹¹⁶ It was historically used as a building material because of its insulation and fire retardant properties. If left undisturbed, asbestos is generally harmless. However, when asbestos fibers are released into the air during product use, demolition work, or construction, a cancer risk arises. Asbestos is also impossible to identify unless labeled, so it is difficult for people to know if their home contains asbestos.¹¹⁷

Over 50 countries have restricted or banned asbestos use, but homes constructed before the 1970s may still contain asbestos.¹¹⁸ In recent decades, asbestos use has been increasing in developing countries because of its affordability and availability. Countries often prioritize economic growth over human health. Russia, China, and Brazil lead in global asbestos mining. Brazil recently banned asbestos. Efforts to create bans in other countries have been met with much resistance from powerful asbestos companies.^{119, 120} Asbestos companies have also pushed a narrative that chrysotile, a form of asbestos, is safe to use to justify their continued asbestos

mining. The WHO and IARC have found chrysotile is also carcinogenic and should be banned.¹²¹

Carcinogens in the Diet

Diet is another important dimension in which carcinogen exposure can be reduced. People are exposed to carcinogens when consuming “unhealthy” foods as well as when consuming food and water contaminated with chemical carcinogens. Lifestyle factors like weight gain and obesity can be carcinogenic. A large number of interconnected, complex eating habits can lead to weight gain, making it too broad to discuss. This debate will focus on foods that directly interact with the body to cause cancer. In other words, foods that are directly carcinogenic, as defined by the IARC. For example, red meats (beef, pork, lamb, etc.) have been linked to colorectal cancer, processed meats to colorectal and stomach cancers, Chinese-style salted fish to nasopharyngeal cancer, and pickled foods to gastric cancer.^{122, 123}

Another common dietary carcinogen is aflatoxins. This is a group of chemical carcinogens produced by molds that grow on certain crops, like peanuts, maize, and tree nuts.¹²⁴ An estimated 500 million people worldwide are exposed to high levels of aflatoxins.¹²⁵ In turn, aflatoxin exposure is responsible for 30 percent of liver cancer diagnoses worldwide and over triples the risk of developing liver cancer.^{126, 127} Aflatoxins grow best in regions with hot, damp climates and poor storage facilities.¹²⁸ This includes sub-Saharan Africa and South-East

114 Thea Evans, “Radon: A Public Health Issue That Hurts the Poor the Most (July-August 2016).”

115 Thea Evans, “Radon: A Public Health Issue That Hurts the Poor the Most (July-August 2016).”

116 “Learn about Asbestos | US EPA,” US EPA, March 5, 2013, <https://www.epa.gov/asbestos/learn-about-asbestos>.

117 Asbestos Exposure, “Guide to Asbestos in the Home: What Does Asbestos Look Like?,” Mesothelioma Center - Vital Services for Cancer Patients & Families, June 19, 2024, <https://www.asbestos.com/exposure/home/>.

118 Mesothelioma, “How Asbestos Is Used Worldwide | List of Countries Affected,” Mesothelioma Center - Vital Services for Cancer Patients & Families, June 20, 2024, <https://www.asbestos.com/mesothelioma/worldwide/>.

119 Mesothelioma, “How Asbestos Is Used Worldwide | List of Countries Affected.”

120 Gary Cohn, “Asbestos Hurts Developing Nations the Most | Mesothelioma.com,” Mesothelioma.com, February 17, 2016, <https://www.mesothelioma.com/blog/asbestos-hurts-developing-nations-the-most/>.

121 Tom Greenwell, “How the Asbestos Industry Targeted Developing Countries – and What Might Be Done about It • inside Story,” Inside Story, April 12, 2017, <https://insidestory.org.au/how-the-asbestos-industry-targeted-developing-countries-and-what-might-be-done-about-it/>.

122 Gina Van Thomme, “5 Foods and Drinks Linked to Cancer,” MD Anderson Cancer Center, November 2, 2023, <https://www.mdanderson.org/cancerwise/5-foods-and-drinks-linked-to-cancer.h00-159623379.html>.

123 Arthur Tau, “Group 1 Carcinogens in Food – Are You Eating Them?,” Centre for Food Safety, October 6, 2018, https://www.cfs.gov.hk/english/multimedia/multimedia_pub/multimedia_pub_fsf_115_02.html.

124 Arthur Tau, “Group 1 Carcinogens in Food – Are You Eating Them?.”

125 P Vineis and W Xun, “The Emerging Epidemic of Environmental Cancers in Developing Countries,” *Annals of Oncology* 20, no. 2 (February 1, 2009): 205–12, <https://doi.org/10.1093/annonc/mdn596>.

126 Arthur Tau, “Group 1 Carcinogens in Food – Are You Eating Them?.”

127 P Vineis and W Xun, “The Emerging Epidemic of Environmental Cancers in Developing Countries.”

128 “Wholegrains, Vegetables, Fruit and Cancer Risk - WCRF International,” WCRF International, January 18, 2024, <https://www.wcrf.org/diet-activity-and-cancer/risk-factors/wholegrains-vegetables-fruit-and-cancer-risk/#:~:text=Aflatoxins%20are%20most%20problematic%20>



Ultra-processed foods at grocery store
Credit: Cory Doctorow

Asia. As a result of high aflatoxin contamination levels, liver cancer incidence is also high in these regions.¹²⁹

In recent decades, food processing has become common. Now, over 2,500 chemicals are added to foods to enhance flavor, color, stability, texture, or cost. An additional 12,000 substances are used in the food supply chain in a way that they may unintentionally contaminate foods. This includes food-packaging materials, processing machines, pesticide residues, and drugs given to animals to improve the food they produce.¹³⁰ Government regulations should ensure these chemical additives and contaminants are non-carcinogenic. However, even in areas with robust food regulatory agencies, like the United States and European Union, carcinogenic chemicals often enter the supply chain. In such places, food regulatory agencies conduct independent carcinogenicity assessments and routinely test carcinogen levels in foods. They often have laws and regulations in place to prevent carcinogens from being added to foods. Even so, carcinogens are found in foods because these countries do not have the

capacity (i.e. money, staff members, resources, time) to test foods from every manufacturer possible, nor to have complete oversight over the food manufacturing process. In countries with less regulations, such chemical carcinogens may even be knowingly added to foods because manufacturers believe the profit gain from using these chemicals outweighs the cost to human health.¹³¹ For example, in a test conducted by the nonprofit, Healthy Babies Bright Futures, of 168 baby foods sold in the United States, 95 percent contained lead, 75 percent contained cadmium, and 73 percent contained arsenic.¹³² Arsenic and cadmium are IARC Group 1 carcinogens, and lead is a group 2B carcinogen.¹³³

The most common intentional food additives and their sources are nitrates, nitrites, and butylated hydroxyanisole, in cured meats, potassium bromate in flour, propylparaben in pastries, and titanium dioxide in candies. All are IARC possible human carcinogens. Many of these chemicals are also used as preservatives, raising an important question about balancing carcinogen risk. Illustratively, propionic acid is a

in,are%20high%20in%20these%20countries.

129 “Wholegrains, Vegetables, Fruit and Cancer Risk - WCRF International.”

130 Research Council, “Food Additives, Contaminants, Carcinogens, and Mutagens,” Nih.gov, 2024, <https://www.ncbi.nlm.nih.gov/books/NBK216714/>.

131 Tetyana Kobets, Benjamin P C Smith, and Gary M Williams, “Food-Borne Chemical Carcinogens and the Evidence for Human Cancer Risk,” *Foods* 11, no. 18 (September 13, 2022): 2828–28, <https://doi.org/10.3390/foods11182828>.

132 Sandee LaMotte, “95% of Tested Baby Foods in the US Contain Toxic Metals, Report Says,” CNN (CNN, October 17, 2019), <https://www.cnn.com/2019/10/17/health/baby-foods-arsenic-lead-toxic-metals-wellness>.

133 “Agents Classified by the IARC Monographs, Volumes 1-123 CAS No. Agent 0 B 0 B 0 B Group Volume Year,” n.d., <https://monographs.iarc.who.int/wp-content/uploads/2018/09/ClassificationsAlphaOrder.pdf>.

common chemical used to kill aflatoxins; however, it is also a possible carcinogen.^{134, 135} Thus, it is important to ensure chemicals used to reduce levels of one carcinogen do not also introduce another carcinogen into the food supply.

Another notable way in which carcinogens contaminate foods is through contact with food packaging. In a study conducted by the nonprofit, Breast Cancer Prevention Partners, analyzing 921 chemicals linked to breast cancer, they found 189 of those chemicals were in contact food in food packaging and during processing.¹³⁶ Across all cancers, 352 food packaging materials were found to be carcinogenic.¹³⁷ The main concern with food packaging materials is that their chemical carcinogens include per- and polyfluoroalkyl substances (PFAS), also known as “forever” chemicals. This is the chemical used in coating for paper wrappers, plastic containers, and aluminum foil.¹³⁸ When PFAS are ingested, it takes the body a long time to break down and digest them. This means PFAS easily accumulates in human bodies and stays in them for a longer period of time. This increases intensity and duration of exposure, thus exponentially increasing cancer risk.¹³⁹ PFAS are also another example of regulatory shortcomings for dietary carcinogens. In testing 13 food packaging products that claim to have reduced PFAS levels, all 13 products still had detectable PFAS levels, with over half exceeding the 20 parts per million (ppm) regulatory standard. Testing also found the presence of two PFAS that are, supposedly, no longer manufactured in the United States because of known cancer risks.¹⁴⁰

The growing popularity of food processing has also paved the way for the creation of ultra-processed foods. Ultra-processed foods are foods that have been significantly altered using industrial processes.¹⁴¹ This includes ice cream, sausage, potato chips, and breakfast cereals. In the United Kingdom, over 50 percent of the calories an average person consumes are from ultra-processed foods. This is because ultra-processed foods are often cheap, accessible, and ready-to-eat.^{142, 143} Ultra-processed foods can also be hard to avoid. In the United States, approximately 71 percent of the food supply is ultra-processed.¹⁴⁴ However, such foods both lack nutritional value and increase the risk of cancer.¹⁴⁵ A study found people who consume 10 percent more ultra-processed foods have a 23 percent higher risk of developing head and neck cancer and 24 percent higher risk of developing esophageal adenocarcinoma.¹⁴⁶

Dietary carcinogens also often enter the body through drinking water. The most common drinking water carcinogen is arsenic, an IARC Group 1 carcinogen that causes non-melanoma skin cancers, liver cancer, bladder cancer, and lung cancer. The predominant source of arsenic exposure overall is also drinking water.¹⁴⁷ Over 200 million people worldwide drink water with arsenic levels higher than the WHO’s recommended 10 mg/L. In many developing countries, this high arsenic concentration is known and tolerated because drinking water is less accessible. In Bangladesh, for example, arsenic concentrations of up to 50 mg/L are accepted per government regulations. As a result, arsenic causes 5-10 percent of Bangladesh’s cancer deaths. In

134 “Mycotoxin Prevention and Control in Foodgrains - Control of Aflatoxin in Maize,” Fao.org, 2024, <https://www.fao.org/4/x5036e/x5036E0s.htm>.

135 “2-(2,4-DICHLOROPHENOXY) PROPIONIC ACID,” n.d., <https://www.nj.gov/health/eoh/rtkweb/documents/fs/3076.pdf>.

136 “Food Packaging Chemicals,” Breast Cancer Prevention Partners (BCPP), June 21, 2024, <https://www.bcpp.org/resource/food-packaging-chemicals/>.

137 “Hazardous Chemicals in Food Packaging Make Harmful Consequences ‘Highly Likely,’” CIEH, 2018, <https://www.cieh.org/ehn/food-safety-integrity/2022/july/hazardous-chemicals-in-food-packaging-make-harmful-consequences-highly-likely/>.

138 Katherine Bourzac, “61 Unexpected PFAS ‘Forever Chemicals’ Found in Food Packaging,” *Scientific American*, March 19, 2024, <https://www.scientificamerican.com/article/61-unexpected-pfas-forever-chemicals-found-in-food-packaging/>.

139 “Food Packaging Chemicals.”

140 Kevin Loria, “Dangerous PFAS Chemicals Are in Your Food Packaging,” *Consumer Reports*, March 24, 2022, <https://www.consumerreports.org/health/food-contaminants/dangerous-pfas-chemicals-are-in-your-food-packaging-a3786252074/>.

141 Kevin Loria, “Dangerous PFAS Chemicals Are in Your Food Packaging.”

142 British Heart Foundation, “Ultra-Processed Foods,” Bhf.org.uk (British Heart Foundation, December 4, 2024), <https://www.bhf.org.uk/informationsupport/heart-matters-magazine/news/behind-the-headlines/ultra-processed-foods>.

143 “Ultra-Processed Foods Are Associated with Increased Risk of Cancer and Cardiometabolic Multimorbidity,” WHO, 2023, <https://www.iarc.who.int/news-events/ultra-processed-foods-are-associated-with-increased-risk-of-cancer-and-cardiometabolic-multimorbidity/>.

144 Sandee LaMotte, “Study Finds Growing Evidence of Link between Ultraprocessed Food and Cancer,” *CNN*, November 22, 2023, <https://www.cnn.com/2023/11/22/health/ultraprocessed-food-cancer-wellness/index.html>.

145 British Heart Foundation, “Ultra-Processed Foods.”

146 Sandee LaMotte, “Study Finds Growing Evidence of Link between Ultraprocessed Food and Cancer.”

147 P Vincen and W Xun, “The Emerging Epidemic of Environmental Cancers in Developing Countries,” *Annals of Oncology* 20, no. 2 (February 1, 2009): 205–12, <https://doi.org/10.1093/annonc/mdn596>.

Chile, drinking arsenic-contaminated water in childhood led to one being 10.6 times more likely to die from liver cancer.¹⁴⁸

Like radon, arsenic is trapped in the ground and can naturally seep into groundwater. However, with arsenic, mining activity greatly increases the natural rate of arsenic release. In many countries, minority and indigenous populations are more likely to live near these mines, both active and abandoned. Thus, they are exposed to significantly higher levels of arsenic.¹⁴⁹ Furthermore, when arsenic-contaminated water is used in food processing or cooking, the cumulative exposure to arsenic further increases.¹⁵⁰

Other major carcinogenic drinking water contaminants include nitrates, chromium-6, and asbestos. Nitrate is an IARC Group 2A probable human carcinogen that increases risk of stomach, esophagus, bladder, brain, colon, rectum, pancreas, and kidney cancer. Risk of cancer is amplified in populations drinking nitrate-contaminated water and eating food with added nitrates, namely processed meats. It is most often a drinking water contaminant in agricultural communities where nitrate is used as a fertilizer, and fertilizer runoff can contaminate water.¹⁵¹

Chromium-6 is an IARC Group 1 human carcinogen that increases risk of stomach cancer.¹⁵² While Chromium-6 can be naturally occurring, industrial projects and natural gas compression stations also produce large quantities of it. When factories improperly dispose of waste containing Chromium-6, it can contaminate groundwater and surface

water.¹⁵³ Chromium-6 is especially dangerous because it is carcinogenic in even extremely small amounts. People drinking water containing 10 parts per billion of Chromium-6 have a 1-in-2000 risk of developing stomach cancer.¹⁵⁴ As a reminder, for reference, WHO standards for arsenic exposure are 10 parts per million.

The risk of asbestos exposure from drinking water is only an issue in water piping systems constructed in the 1930s.¹⁵⁵ In this decade, asbestos-cement pipes were widely used. As these pipes age then break and decay, asbestos fibers are released into the pipe's water supplies.¹⁵⁶

Recent research has shown a final possibly carcinogenic drinking water contaminant is disinfection byproducts. Chlorine is often used to disinfect water. However, it may react with chemicals in the water to unintentionally form these disinfection byproducts. The IARC has not yet evaluated the carcinogenicity of these byproducts but a study in the United States found associations between high disinfection byproduct concentration and development of rectal and bladder cancers.¹⁵⁷ This emerging research illustrates how much care and thought must be put into efforts to lower carcinogen exposure so as to not accidentally introduce new carcinogens.

Carcinogens in Consumer Goods

Consumer goods are any products bought by individuals, ranging from electronics to toys to clothing.¹⁵⁸ Over 100 types of consumer goods contain at least one, more often multiple,

148 Dana Hashim and Paolo Boffetta, "Occupational and Environmental Exposures and Cancers in Developing Countries," *Annals of Global Health* 80, no. 5 (December 13, 2014): 393, <https://doi.org/10.1016/j.aogh.2014.10.002>.

149 Meeri Kim, "How Environmental Exposures Affect Cancer Risk: Q+a with Ana Navas-Acien, MD, PhD," Herbert Irving Comprehensive Cancer Center (HICCC) - New York, April 19, 2023, <https://www.cancer.columbia.edu/news/how-environmental-exposures-affect-cancer-risk-q-ana-navas-acien-md-phd>.

150 Dana Hashim and Paolo Boffetta, "Occupational and Environmental Exposures and Cancers in Developing Countries," *Annals of Global Health* 80, no. 5 (December 13, 2014): 393, <https://doi.org/10.1016/j.aogh.2014.10.002>.

151 "Water Contaminants and Cancer Risk: Arsenic, Disinfection Byproducts, and Nitrate," Cancer.gov (Cancer.gov, 2023), <https://dceg.cancer.gov/research/what-we-study/drinking-water-contaminants>.

152 "What Is Chromium-6? Here's What You Need to Know," Environmental Working Group, March 3, 2022, <https://www.ewg.org/news-insights/news/2022/03/what-chromium-6-heres-what-you-need-know>.

153 Tommy Stricklin, "7 Potential Cancer-Causing Contaminants in Tap Water – and How to Remove Them," SpringWell Water Filtration Systems, July 7, 2020, <https://www.springwellwater.com/7-potential-cancer-causing-contaminants-in-tap-water/>.

154 Ian James, "California Sets Limit for Chromium-6 in Drinking Water," Los Angeles Times, April 18, 2024, <https://www.latimes.com/environment/story/2024-04-18/california-chromium-6-water>.

155 Emily Walsh, "A Hidden Carcinogen in Water: How the SDGs Can Help," Iisd.org, July 9, 2018, <https://sdg.iisd.org/commentary/guest-articles/a-hidden-carcinogen-in-water-how-the-sdgs-can-help/>.

156 Emily Walsh, "A Hidden Carcinogen in Water: How the SDGs Can Help."

157 Tommy Stricklin, "7 Potential Cancer-Causing Contaminants in Tap Water – and How to Remove Them," SpringWell Water Filtration Systems, July 7, 2020, <https://www.springwellwater.com/7-potential-cancer-causing-contaminants-in-tap-water/>.

158 Dana Smith, "Common Consumer Products Contain Multiple Toxic Chemicals, New Study Shows (Published 2023)," The New York Times, 2024, <https://www.nytimes.com/2023/05/03/well/live/consumer-products-toxic-chemicals.html>.

chemical carcinogens. Since the effects of many of these carcinogens are often dose-dependent, this means individuals can be exposed to low amounts of carcinogens in a large number of items, leading to overall high exposure and high cancer risk.¹⁵⁹ Carcinogens in consumer goods also represent a space that is less regulated than other carcinogen exposure avenues. In the United States, of the 921 breast cancer carcinogens found in consumer goods, almost none were tested for safety before being sold on the market.¹⁶⁰ When consumers then buy the product, they are often unaware it contains carcinogens because these chemicals are generically listed as “fragrance” or “color.”¹⁶¹ There is also a lack of awareness around what is carcinogenic. Consumers often assume carcinogens are chemicals with complex names, but that is often untrue. For instance, coconut oil, which is widely popular and used in several settings, is an IARC Group 2B possible carcinogen—the same classification level as lead.¹⁶²

The majority of consumer goods containing carcinogens are personal care and cosmetic products.¹⁶³ In a separate analysis of facial cosmetic products sold in Europe, all analyzed products contained carcinogens.¹⁶⁴ This is in spite of the fact that the European Union requires all cosmetic products to be approved as entirely safe for consumers. Still, this safety approval process is conducted by the cosmetic manufacturer themselves, not an independent, third-party group or regulatory agency.¹⁶⁵ Considering the large amount of cosmetic products on the market, having a regulatory agency conduct the safety approval likely presented too large of an administrative burden for the

EU.¹⁶⁶ Worldwide, the personal care and cosmetics industry is notoriously under regulated. This leaves room for companies to attach labels like “naturally derived,” “nontoxic,” and “clean” to their products, even when they contain carcinogens. This serves to further mislead consumers and expose them to high levels of carcinogens.¹⁶⁷

In personal care and cosmetic products, the following carcinogens are most prevalent. Formaldehyde, an IARC Group 1 carcinogen, is commonly added in the form of formaldehyde-releasing preservatives.¹⁶⁸ Formaldehyde-releasing preservatives help prevent bacterial growth through the slow, constant release of formaldehyde over time. This translates to consumers being exposed to a constant dose of formaldehyde over a long period of time. Coal tar, a byproduct of coal processing and IARC Group 1 carcinogen, is often found in hair care products. Mineral oils, found in nearly every type of cosmetic as well as hair styling products, contain high levels of polycyclic aromatic hydrocarbons, which is also an IARC Group 1 carcinogen.¹⁶⁹ Finally, acne-treatment products with benzoyl peroxide were found to also contain benzene, an IARC Group 1 carcinogen, at a level 800 times higher than the concentration limit.¹⁷⁰

Products with fragrances also contain a number of carcinogens including phthalates, aldehydes, parabens, and aluminum-based salts. While some of these chemicals are purposefully added to enhance fragrance, others are contaminants from the manufacturing process. They are linked to increased incidence of breast cancer.¹⁷¹ PFAS were also found in 52 percent of

159 Dana Smith, “Common Consumer Products Contain Multiple Toxic Chemicals, New Study Shows (Published 2023).”

160 Dana Smith, “Common Consumer Products Contain Multiple Toxic Chemicals, New Study Shows (Published 2023).”

161 “Hundreds of Chemicals in Everyday Consumer Products May Increase Breast Cancer Risk,” Environmental Working Group, January 17, 2024, <https://www.ewg.org/news-insights/news/2024/01/hundreds-chemicals-everyday-consumer-products-may-increase-breast-cancer>.

162 IARC Working and Agency for, Some Chemicals Present in Industrial and Consumer Products, Food and Drinking-Water, 2013, <https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Some-Chemicals-Present-In-Industrial-And-Consumer-Products-Food-And-Drinking-water-2012>; “List of Classifications,” WHO, 2024, <https://monographs.iarc.who.int/list-of-classifications/>.

163 Dana Smith, “Common Consumer Products Contain Multiple Toxic Chemicals, New Study Shows (Published 2023).”

164 Radosław Balwierz et al., “Potential Carcinogens in Makeup Cosmetics,” International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health 20, no. 6 (March 8, 2023): 4780–80, <https://doi.org/10.3390/ijerph20064780>.

165 “Cosmetics,” Internal Market, Industry, Entrepreneurship and SMEs, 2023, https://single-market-economy.ec.europa.eu/sectors/cosmetics_en.

166 Radosław Balwierz et al., “Potential Carcinogens in Makeup Cosmetics.”

167 Knavul Sheikh, “Many Personal Care Products Contain Harmful Chemicals. Here’s What to Do about It. (Published 2023),” The New York Times, 2024, <https://www.nytimes.com/2023/02/15/well/live/personal-care-products-chemicals.html>.

168 Dana Smith, “Common Consumer Products Contain Multiple Toxic Chemicals, New Study Shows (Published 2023).”

169 “Carcinogens in Cosmetics,” Safe Cosmetics, April 26, 2022, <https://www.safecosmetics.org/chemicals/known-carcinogens/>.

170 Kathleen Wong, “Cancer-Causing Chemical Found in Skincare Brands Including Target, Proactive, Clearasil,” USA TODAY, March 11, 2024, <https://www.usatoday.com/story/money/2024/03/11/carcinogen-linked-popular-acne-products-report/72923255007/>.

171 Zahra Kazemi et al., “Evaluation of Pollutants in Perfumes, Colognes and Health Effects on the Consumer: A Systematic Review,” *Journal*



Cosmetics

Credit: Camilla Perrucci

makeup products sold in the United States and Canada. They were most prevalent in makeup marketed as “long-lasting” and “waterproof,” like mascara and lipstick. 88 percent of products also failed to list the PFAS in their ingredients list.¹⁷² PFAS in such products is especially consequential because PFAS have been proven to be more readily absorbed through membranes close to the eyes, and when women lick their lips, they unintentionally ingest the PFAS in their lipstick.¹⁷³

As with many other carcinogen exposure types, scholars have found people of color have higher carcinogen exposure levels related to personal care and cosmetic goods. It is speculated that this is because women of color use more beauty products with carcinogens than other races. One prominent example is hair relaxers.¹⁷⁴ Use of hair relaxers in particular increases the risk of uterine cancer four times. It also increases the risk of breast cancer. This is attributable to the fact that hair relaxers contain the known carcinogens formaldehyde, phthalates, parabens, and Bisphenol A. In recent years, as populations

in the United States learned of the carcinogenicity of hair relaxers, they began to abandon this product in favor of alternatives, like heat-styling and silicon creams. From 2017 to 2022, hair relaxer use decreased by nine percent.¹⁷⁵ Yet, in African countries, use of hair relaxers is only increasing. The global hair relaxer market is projected to grow from USD 718 million in 2021 to USD 854 million in 2028. Hair relaxers also continue to be marketed to young children as young as six years old.¹⁷⁶

Carcinogens are also very frequently found in consumer goods made of plastics. Micro- and nano-plastics are linked to liver, pancreatic, and biliary tract cancers.¹⁷⁷ The plastic polyvinyl chloride (PVC) is made with vinyl chloride, an IARC Group 1 carcinogen linked to liver cancers, brain and lung cancers, lymphoma, and leukemia. PVC is widely used in several types of products including, but not limited to, clothes, furniture, gift cards, bottle cap liners, safety seals, and toys.

In addition to PVC, children’s toys contain several other

of Environmental Health Science & Engineering 20, no. 1 (February 3, 2022): 589–98, <https://doi.org/10.1007/s40201-021-00783-x>.

172 Sandee LaMotte, “Makeup May Contain Potentially Toxic Chemicals Called PFAS, Study Finds,” CNN, June 15, 2021, <https://www.cnn.com/2021/06/15/health/makeup-toxic-chemicals-wellness/index.html>.

173 Sandee LaMotte, “Makeup May Contain Potentially Toxic Chemicals Called PFAS, Study Finds.”

174 Sandee LaMotte, “Makeup May Contain Potentially Toxic Chemicals Called PFAS, Study Finds.”

175 Susan Smith Richardson and Agatha Gichana, “While Many Black Women in US Abandon Hair Relaxers Linked to Cancer, Sales Climb in African Countries.”

176 Susan Smith Richardson and Agatha Gichana, “While Many Black Women in US Abandon Hair Relaxers Linked to Cancer, Sales Climb in African Countries.”

177 Jacek Baj et al., “Derivatives of Plastics as Potential Carcinogenic Factors: The Current State of Knowledge,” *Cancers* 14, no. 19 (September 24, 2022): 4637–37, <https://doi.org/10.3390/cancers14194637>.

carcinogens. Because many parts of their bodies are not yet fully developed, children are especially susceptible to the carcinogenic effects of chemicals, making this an area of special concern. This is especially true when considering how children play with their toys—often putting toys in their mouths, facilitating ingestion of carcinogens.¹⁷⁸ A study found 85 percent of tested toys contained short-chain chlorinated paraffins, an IARC Group 2B carcinogen. Global output of the tested toys totals over one million tons per year, indicating an incredibly substantial number of children are playing with carcinogenic toys.¹⁷⁹ Many Chinese-manufactured toys are also made with carcinogenic lead paint. Despite lead paint being illegal in several countries, Chinese-manufactured toys are still exported to these countries, often without the importing government doing safety checks before the toys enter the market.¹⁸⁰ In addition, in a study of 26 countries, toys made from recycled plastics often contained the carcinogenic flame retardants OctaBDE, DecaBDE, and HBCD. In fact, 90 percent of examined Rubix Cubes contained OctaBDE and/or DecaBDE.¹⁸¹

The issue of carcinogenicity of recycled plastics is especially problematic in Africa, a region that has become the destination of the world's waste exports. Companies will recycle this exported waste to create toys and other plastic consumer products. However, this recycled plastic is considered “black plastic,” meaning it contains brominated flame retardants.¹⁸² The WHO has already called for the disuse of brominated flame retardants, in part because they are linked to increased risk of breast cancer, but such recycling and creation of black plastic remains rampant.¹⁸³

Before discussing the final consumer product category with high levels of carcinogens—cleaning products—one should

be familiar with the class of chemicals volatile organic compounds (VOCs). VOCs are solid or liquids that turn to gas when exposed to air or sunlight. VOCs can be found in shampoo, lotion, soap, household cleaners, paint removers, art supplies, and more. Adhesives are the most hazardous VOC-containing product, exposing users to over half of the VOCs of concern. The most common VOC in consumer products is benzene, an IARC Group 1 carcinogen. In an analysis of antiperspirants, over half contained benzene. Thinking of VOCs as a form of indoor air pollution can be helpful in understanding the mechanism of VOC exposure. When consumer products containing VOCs are used in the home, as many are intended to, the VOCs release the gas into the home. Lack of proper ventilation leads to high VOC concentration indoors, frequently higher than concentration outdoors.¹⁸⁴

Cleaning products are a major source of VOCs. In fact, general purpose cleaners and laundry detergents contain the highest concentrations of VOCs among consumer products.¹⁸⁵ In testing cleaning products, researchers found concerning levels of VOC emissions from both conventional cleaning products and ones marketed as “green.” This was correlated with increased risk of breast cancer.¹⁸⁶ Furthermore, this source of carcinogen exposure unequally impacts women, who historically are the primary cleaners of a household. In particular, it unevenly impacts women of color, who make up the vast majority of professional house cleaners.¹⁸⁷

Current Status

Case Study: The Regulation of the Tobacco Industry

Tobacco is an IARC Group 1 carcinogen most commonly found

178 “Beyond Lead: Toxins in Toys,” Green America, 2024, <https://www.greenamerica.org/green-living/beyond-lead-toxins-toys>.
 179 Green Science Policy Institute, “Cancer-Causing Chemicals Detected in Toys and Headphones,” Phys.org, April 11, 2023, <https://phys.org/news/2023-04-cancer-causing-chemicals-toys-headphones.html>.
 180 “Beyond Lead: Toxins in Toys.”
 181 Plastic Soup Foundation, “Toxic Chemicals in Toys - Plastic Soup Foundation,” Plastic Soup Foundation, June 3, 2017, <https://www.plasticsoupfoundation.org/en/2017/06/toxic-chemicals-in-toys/>.
 182 “Hazardous Chemicals Found in Plastic Products in Africa | IPEN,” Ipen.org, 2016, <https://ipen.org/documents/hazardous-chemicals-found-plastic-products-africa>.
 183 “The Dangers of Brominated Fire Retardants,” Nachi.org, 2024, <https://www.nachi.org/brominated-fire-retardant-dangers.htm>.
 184 Sandee LaMotte, “Over 5,000 Tons of Dangerous Fumes Escaped from Consumer Products, Study Finds.”
 185 Sandee LaMotte, “Over 5,000 Tons of Dangerous Fumes Escaped from Consumer Products, Study Finds.”
 186 Kelsey Oliver, “Potentially Carcinogenic Chemicals More Associated with Conventional Cleaning Products, but Also with Some,” Berkeley Public Health, January 4, 2023, <https://publichealth.berkeley.edu/news-media/research-highlights/carcinogenic-chemicals-associated-with-both-traditional-and-green-cleaning-products>.
 187 Kelsey Oliver, “Potentially Carcinogenic Chemicals More Associated with Conventional Cleaning Products, but Also with Some.”

in cigarettes.¹⁸⁸ As of January 2024, the WHO estimated there are over 1.25 billion adult tobacco users, with the Southeast Asian and European Region having the highest percentage of tobacco users.¹⁸⁹ When smoking a cigarette, cigar, or pipe, and burning tobacco, over 60 highly carcinogenic substances are released.¹⁹⁰ This is linked to higher incidence of eleven cancers, predominantly lung cancer, and causes 25 percent of all cancers.¹⁹¹ Continued tobacco use after cancer diagnosis also worsens patient outcomes, compared to those who quit using tobacco after cancer diagnosis.¹⁹² Half of all tobacco users die prematurely, whether it be directly or indirectly from tobacco's carcinogenic effects.¹⁹³

It is important to note that tobacco is a lifestyle carcinogen. This means that exposure arises through voluntary lifestyle choices rather than in everyday life like previously discussed ones. Tobacco industry regulation represents one of the few successful, coordinated international efforts to combat carcinogen exposure. Lessons and successes from the regulation of the tobacco industry are valuable and can be translated into efforts to target environmental exposure to carcinogens.

A big concern about the tobacco industry is that state-owned tobacco companies (SOTCs) account for over 40 percent of global production. Being an SOTC means that the government owns, administers, and profits from the tobacco

company.¹⁹⁴ SOTCs present a fundamental conflict between a government's public health goals to eliminate tobacco use and profit incentive to increase tobacco use.¹⁹⁵ The largest tobacco company worldwide is the China National Tobacco Corporation (CNTC).¹⁹⁶ In China, for example, profit incentives from the CNTC blocked the full passage of a national indoor smoking ban.¹⁹⁷ Even in countries without a SOTC, the tobacco industry exerts its influence on government policy through the "revolving-door" strategy and lobbying. The revolving-door refers to the process where government officials work as lobbyists for tobacco companies once out of office, and tobacco company employees take government office.¹⁹⁸

Tobacco industry lobbying is seen in monetary contributions, meals, gifts, and corporate social responsibility activities meant to sway government policies to benefit the industry.¹⁹⁹ Corporate social responsibility activities are highly publicized philanthropic projects meant to create a positive image around tobacco companies, such as anti-poverty initiatives, environmental programs, and donations to disaster relief.²⁰⁰ The consequences of tobacco industry lobbying are extremely evident worldwide. For example, in Kenya, lobbyists from British American Tobacco convinced the government to reverse its 2020 ban on nicotine pouches.²⁰¹ In North Korea, this same company violated American sanctions to continue

188 CDC, National Center, and Office, "Cancer," Nih.gov (Centers for Disease Control and Prevention (US), 2024), <https://www.ncbi.nlm.nih.gov/books/NBK53010/>.

189 WHO, "Tobacco Use Declines despite Tobacco Industry Efforts to Jeopardize Progress," Who.int (World Health Organization: WHO, January 16, 2024), <https://www.who.int/news/item/16-01-2024-tobacco-use-declines-despite-tobacco-industry-efforts-to-jeopardize-progress>.

190 CDC, National Center, and Office, "Cancer."

191 CDC, National Center, and Office, "Cancer."

192 CDC, "Health Effects of Cigarettes: Cancer," Smoking and Tobacco Use, 2024, <https://www.cdc.gov/tobacco/about/cigarettes-and-cancer.html>.

193 WHO, "New WHO Campaign Highlights Tobacco Industry Tactics to Influence Public Health Policies," Who.int (World Health Organization: WHO, November 16, 2023), <https://www.who.int/news/item/16-11-2023-new-who-campaign-highlights-tobacco-industry-tactics-to-influence-public-health-policies>.

194 Scott L Hogg, Sarah E Hill, and Jeff Collin, "State-Ownership of Tobacco Industry: A 'Fundamental Conflict of Interest' or a 'Tremendous Opportunity' for Tobacco Control?."

195 Scott L Hogg, Sarah E Hill, and Jeff Collin, "State-Ownership of Tobacco Industry: A 'Fundamental Conflict of Interest' or a 'Tremendous Opportunity' for Tobacco Control?."

196 Scott L Hogg, Sarah E Hill, and Jeff Collin, "State-Ownership of Tobacco Industry: A 'Fundamental Conflict of Interest' or a 'Tremendous Opportunity' for Tobacco Control?," *Tobacco Control* 25, no. 4 (August 4, 2015): 367–72, <https://doi.org/10.1136/tobaccocontrol-2014-052114>.

197 "How China Became Addicted to Its Tobacco Monopoly," Pulitzer Center, 2023, <https://pulitzercenter.org/stories/how-china-became-addicted-its-tobacco-monopoly>.

198 Christna Watts et al., "How Tobacco Companies Use the Revolving Door between Government and Industry to Influence Policymaking: An Australian Case Study," *Public Health Research & Practice* 33, no. 4 (December 6, 2023), <https://doi.org/10.17061/phrp33122305>.

199 Beth Rotman, Gabrielle Ballweg, and Nichelle Gray, "Exposing Current Tobacco Industry Lobbying, Contributions, Meals, and Gifts," *Tobacco Induced Diseases* 20, no. January (January 21, 2022): 1–3, <https://doi.org/10.18332/tid/144765>.

200 "China National Tobacco Corporation - Tobacco Tactics," Tobacco Tactics, March 24, 2023, <https://tobaccotactics.org/article/china-national-tobacco-corporation/>.

201 "How Lack of Transparency Serves Tobacco Lobbyists - STOP," STOP, February 26, 2024, <https://exposetobacco.org/news/tobacco-industry-lobbyists/>.



Cigarettes burning
Credit: Mostafa Meraji

business with the Democratic People’s Republic of Korea (DPRK).²⁰² The tobacco industry often funds public-policy think tanks and scientific research, like the IMANI Center for Policy & Education in Ghana, to publish pro-tobacco research and policy recommendations.²⁰³

In Australia, 55 percent of tobacco company lobbyists held positions in the Australian government prior to working in the tobacco industry.²⁰⁴ 56 percent of officials moved into or out of government within one year of working in the tobacco industry.²⁰⁵ This “revolving-door” strategy inextricably links the government and the tobacco industry, making it easier for the tobacco industry to influence government policies at the detriment to public health.

Recognizing the prevalence and consequence of tobacco use, as well as the many barriers to decreasing use, in 2005

the WHO adopted the Framework Convention on Tobacco Control (FCTC).²⁰⁶ The FCTC now has 183 parties and is one of the most successful international carcinogen regulatory mechanisms.²⁰⁷ It has become a key component of Sustainable Development Goal Target 3a—strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate. The FCTC urges countries to protect their public health policies from tobacco industry lobbying and influence and encourages a number of tobacco use-deterrence policies. This includes health warning labels on tobacco products, additive bans, and taxes on tobacco.²⁰⁸

The Global Tobacco Industry Interference Index measures country-by-country FCTC implementation efficacy.²⁰⁹ Most effective countries include the United Kingdom, Uganda, Iran, Kenya, and Brazil. These countries have little to no tobacco

202 “United States Obtains \$629 Million Settlement with British American Tobacco to Resolve Illegal Sales to North Korea, Charges Facilitators in Illicit Tobacco Trade,” Justice.gov, April 25, 2023, <https://www.justice.gov/opa/pr/united-states-obtains-629-million-settlement-british-american-tobacco-resolve-illegal-sales>.

203 Tammy Worth, “African Countries Fight for Tobacco Control as Smoking Surges,” Scientific American (Scientific American, June 15, 2023), <https://www.scientificamerican.com/article/african-countries-fight-for-tobacco-control-as-smoking-surges/>.

204 Christna Watts et al., “How Tobacco Companies Use the Revolving Door between Government and Industry to Influence Policymaking: An Australian Case Study.”

205 Christna Watts et al., “How Tobacco Companies Use the Revolving Door between Government and Industry to Influence Policymaking: An Australian Case Study.”

206 “WHO Framework Convention on Tobacco Control Overview,” Who.int, 2021, <https://fctc.who.int/who-fctc/overview>.

207 WHO, “New WHO Campaign Highlights Tobacco Industry Tactics to Influence Public Health Policies,” Who.int (World Health Organization: WHO, November 16, 2023), <https://www.who.int/news/item/16-11-2023-new-who-campaign-highlights-tobacco-industry-tactics-to-influence-public-health-policies>.

208 Joanna E Cohen et al., “Low-Income and Middle-Income Countries Leading the Way with Tobacco Control Policies,” *BMJ Innovations* 8, no. 1 (January 1, 2022): 4–8, <https://doi.org/10.1136/bmjinnov-2021-000857>.

209 “Global Tobacco Index,” Globaltobaccoindex.org, 2019, <https://globaltobaccoindex.org/report-summary>.

industry interference in the government, both in regard to lobbying and revolving door phenomenon. Least effective countries include Japan, Jordan, Bangladesh, and Lebanon.²¹⁰ Countries most effective in implementing the FCTC have also seen the largest decreases in tobacco usage, signaling the success of the FCTC.²¹¹

Many developing countries also serve as good examples of effective FCTC implementation as the FCTC has empowered them to take the global lead in tobacco control.²¹² For example, Timor-Leste, Nepal, and the Maldives have the largest required health warning labels on tobacco packaging. Brazil was the first to ban additives in tobacco products, India was the first to ban smokeless tobacco products, and Mauritius was the first to ban tobacco corporate social responsibility activities.²¹³ Developing countries are able to so effectively implement FCTC recommendations because these recommendations are often low cost, making them very accessible to all countries.²¹⁴

These efforts have been highly successful in decreasing tobacco use. 150 countries currently have decreasing trends of tobacco use.²¹⁵ Tobacco use rates are now one in five, compared to one in three in 2000.²¹⁶ Furthermore, use trends are decreasing at an increasing rate, with use projected to drop by a quarter from 2010 to 2025.²¹⁷ However, the world will still fall short of the WHO's 2025 30 percent decrease goal.²¹⁸

This shortfall is largely due to the continued lobbying of the tobacco industry. In countries who are not parties to the FCTC or only loosely implement it, like Congo, Egypt, Indonesia,

and Jordan, tobacco use has increased in recent years. Tobacco companies have also begun more directly targeting developing countries with their lobbying tactics. These countries were previously able to implement strict tobacco regulations when few people in their country used tobacco and they had relatively low levels of interference from the tobacco industry. However, whether these regulations will remain in place in the current landscape, where 80 percent of smokers live in developing countries and more tobacco money is going to these countries, remains to be seen.^{219,220}

Forms of smokeless tobacco also contain many carcinogenic agents and are as carcinogenic as cigarettes.²²¹ E-cigarettes, which sometimes do not contain tobacco, also release several chemicals known to cause cancer and contain nicotine, which, although not carcinogenic, is highly addictive.²²² The levels of carcinogenic chemicals in e-cigarettes appear to be lower than conventional cigarettes, but levels vary widely by brand and are not regulated.²²³ The long-term consequences and cancers caused by e-cigarettes are also unknown because they are a relatively new product, so there is no long-term health data from e-cigarette users.²²⁴

This case study of the tobacco industry provides several valuable insights for future action against other carcinogens. First, it emphasizes the power and importance of international action against carcinogens, something which has not been seen for many other carcinogens. It also demonstrates the sort of recommendations that can be successful and

210 "Which Countries Do Best — and Worst — at Keeping Big Tobacco out of Politics," NPR, October 21, 2019, <https://www.npr.org/sections/goatsandsoda/2019/10/21/769064973/which-countries-do-best-and-worst-at-keeping-big-tobacco-out-of-politics>.

211 "Which Countries Do Best — and Worst — at Keeping Big Tobacco out of Politics."

212 Joanna E Cohen et al., "Low-Income and Middle-Income Countries Leading the Way with Tobacco Control Policies."

213 Joanna E Cohen et al., "Low-Income and Middle-Income Countries Leading the Way with Tobacco Control Policies."

214 Joanna E Cohen et al., "Low-Income and Middle-Income Countries Leading the Way with Tobacco Control Policies."

215 WHO, "Tobacco Use Declines despite Tobacco Industry Efforts to Jeopardize Progress," Who.int (World Health Organization: WHO, January 16, 2024), <https://www.who.int/news/item/16-01-2024-tobacco-use-declines-despite-tobacco-industry-efforts-to-jeopardize-progress>.

216 WHO, "Tobacco Use Declines despite Tobacco Industry Efforts to Jeopardize Progress."

217 WHO, "Tobacco Use Declines despite Tobacco Industry Efforts to Jeopardize Progress."

218 WHO, "Tobacco Use Declines despite Tobacco Industry Efforts to Jeopardize Progress."

219 Tammy Worth, "African Countries Fight for Tobacco Control as Smoking Surges," Scientific American (Scientific American, June 15, 2023), <https://www.scientificamerican.com/article/african-countries-fight-for-tobacco-control-as-smoking-surges/>.

220 Tobacco in Australia, "10.2 the Global Tobacco Manufacturing Industry - Tobacco in Australia," Tobaccoinaustralia.org.au, 2019, <https://www.tobaccoinaustralia.org.au/chapter-10-tobacco-industry/10-2-the-global-tobacco-manufacturing-industry>.

221 "Harmful Chemicals in Tobacco Products," Cancer.org, 2017, <https://www.cancer.org/cancer/risk-prevention/tobacco/carcinogens-found-in-tobacco-products.html>.

222 "Harmful Chemicals in Tobacco Products," Cancer.org.

223 "Is Vaping Harmful?," Cancer Research UK (CRUK, December 28, 2018), <https://www.cancerresearchuk.org/about-cancer/causes-of-cancer/smoking-and-cancer/is-vaping-harmful>.

224 Gina Van Thomme, "Does Vaping Cause Lung Cancer?," MD Anderson Cancer Center (MD Anderson Cancer Center, January 5, 2024), <https://www.mdanderson.org/cancerwise/does-vaping-cause-lung-cancer.h00-159694389.html>.

widely implemented—low cost, highly accessible, diverse recommendations. Finally, it outlines a framework by which countries can address carcinogens and exposure pathways caused by private companies with a profit incentive to create or add carcinogens to the environment or their products.

Current Global Regulatory Statuses and Recent Findings

Although the WHO works extensively in the cancer issue space, little of its work specifically addresses carcinogen exposure. A greater necessity is especially seen in environmental exposure. The WHO’s cancer work has four main pillars: prevention, early detection, diagnosis and treatment, and palliative care.²²⁵ Only the “prevention” focus area is directly relevant to the debate at hand as mitigating carcinogen exposure prevents cancer incidence.

The first major means by which the WHO addresses carcinogens is through the International Agency for Research on Cancer (IARC), the specialized cancer agency of the WHO.²²⁶ As previously mentioned, the IARC assesses and categorizes the carcinogenicity of substances, publishing its findings in the IARC Monographs.²²⁷ Although this may seem like a trivial task, proper categorization of substances focuses international attention on the most carcinogenic substances. Shedding light on which substances must be addressed and which do not need to. The IARC also identifies exposure pathways of each classified carcinogen, burden of disease caused by each carcinogen, and coordinates research efforts across countries and organizations.²²⁸ Overall, the IARC can be thought of primarily as a scientific research agency, not a policy-making, regulatory, or program administration agency.

In the realm of cancer prevention, the WHO mainly focuses

on preventing cervical and breast cancers.²²⁹ Cervical cancer is a cancer only found in women that is almost entirely preventable with human papillomavirus (HPV) vaccination. And so, the WHO does work in expanding HPV vaccination, especially in low-income, rural areas.²³⁰ With breast cancer, the WHO engages in public health education so people are more aware of breast cancer symptoms and know lifestyle changes they can make to reduce their risk of cancer.²³¹ Unfortunately, WHO cervical cancer initiatives largely do not transfer well to address environmental carcinogen exposure because there is no simple solution, like vaccination. Although education like what is done with breast cancer is important for environmental carcinogen exposure as well, entirely using the WHO’s breast cancer response as a framework for this issue ignores the importance of regulatory solutions.

Nevertheless, the WHO has worked in carcinogen areas relevant to this debate, but to a lesser extent. Beginning with occupational exposure, World Health Assembly resolution WHA60.26, “Workers’ Health: Global Plan of Action,” tackles occupational health as a whole. It has a focus on protecting those in the informal sector, agriculture, small enterprises, and migrant workers.²³² This resolution does not tackle occupational carcinogen exposure specifically, but the recommendations it outlines will be able to decrease exposure. This includes more regular surveillance and detection of disease, empowering companies to better protect workers’ health, and providing pre- and in-service training to prevent exposure to disease-causing agents, including carcinogens.²³³

Expanding upon this resolution, Dr. Andreas Ullrich, the WHO Medical Officer for cancer control, stated “The control of carcinogens in the workplace should be a key component of every national cancer control programme.”²³⁴

225 WHO, “Cancer,” Who.int (World Health Organization: WHO, February 3, 2022), <https://www.who.int/news-room/fact-sheets/detail/cancer>; “Preventing and Treating Cancer,” WHO, 2021, <https://www.who.int/europe/activities/preventing-and-treating-cancer>.

226 “IARC’s Mission: Cancer Research for Cancer Prevention,” Who.int, 2024, <https://www.iarc.who.int/about-iarc-mission/>.

227 “IARC’s Mission: Cancer Research for Cancer Prevention.”

228 “IARC’s Mission: Cancer Research for Cancer Prevention.”

229 “Cancer Prevention and Control in the Context of an Integrated Approach,” 2017, https://apps.who.int/gb/ebwha/pdf_files/WHA70/A70_R12-en.pdf.

230 “Cervical Cancer Elimination Initiative,” WHO, 2022, <https://www.who.int/initiatives/cervical-cancer-elimination-initiative>.

231 “Operational Approach Based on 3 Pillars,” WHO, 2021, <https://www.who.int/initiatives/global-breast-cancer-initiative/operational-approach-based-on-3-pillars>.

232 WHO, “Protecting Workers’ Health,” Who.int (World Health Organization: WHO, November 30, 2017), <https://www.who.int/news-room/fact-sheets/detail/protecting-workers%27-health>.

233 WHO, “Protecting Workers’ Health,” Who.int (World Health Organization: WHO, November 30, 2017), <https://www.who.int/news-room/fact-sheets/detail/protecting-workers%27-health>.

234 WHO, “WHO Calls for Prevention of Cancer through Healthy Workplaces,” Who.int (World Health Organization: WHO, April 27,

To that end, the WHO began supporting countries to develop national carcinogen exposure prevention plans and exposure elimination policy recommendations.²³⁵

Occupational asbestos exposure has also been a main issue area for the WHO. They have come out strongly against the use of any form of asbestos, including chrysotile.²³⁶ World Health Assembly resolution WHA58.22 places a particular emphasis on eliminating asbestos-related cancers.²³⁷ WHA stated eliminating use of asbestos is the most effective intervention.²³⁸ They also push for increased education on safe asbestos substitutes and asbestos containing materials. As well as economic and technological mechanisms to encourage asbestos alternatives. Along with establishing registries of people who have been exposed to asbestos. And creating risk prevention plans to limit exposure when asbestos is removed.²³⁹

The WHO has also made progress in raising awareness to home radon exposure. The WHO first surveyed a country's radon exposure levels in 2005 as part of the WHO International Radon Project. This helped raise awareness around the issue of radon exposure and provide preliminary baselines to compare intervention efficacy.²⁴⁰ While the data collected is valuable, the WHO has done little to decrease radon exposure itself. In 2023, the WHO also issued new guidance on household air pollution and home fuel use.²⁴¹ This provided new recommendations regarding practical alternatives to polluting

home fuels and communication strategies to increase clean fuel adoption, based on most recent scientific data.²⁴²

With regard to carcinogens found in the diet, the WHO established the Foodborne Disease Burden Epidemiology Reference Group (FERG) in 2007 as a technical advisory group focused on foodborne diseases.²⁴³ Most recently, in 2020, WHA resolution WHA73.5 mandated the WHO regularly monitor and report on the global burden of foodborne diseases, one of which are foodborne carcinogens.²⁴⁴

Arsenic, a drinking water carcinogen, has also been named one of the WHO's ten chemicals of major public health concern.²⁴⁵ The WHO provides guidance, performs research, and outlines arsenic concentration guidelines to aid countries in eliminating arsenic. While these efforts have helped decrease arsenic in areas serviced, the program is not expansive enough to help all communities with arsenic-contaminated water. Additionally, the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene monitors progress toward eliminating arsenic in drinking water.²⁴⁶ Their monitoring also informs SDG indicator 6.2.1, proportion of population "safely managed sanitation services."²⁴⁷

New data from the WHO, in collaboration with the International Labor Organization, has also recently deemed working under the sun as a major cause of skin cancer. They found nearly 1 in 3 deaths from non-melanoma skin cancer

2007), <https://www.who.int/news/item/27-04-2007-who-calls-for-prevention-of-cancer-through-healthy-workplaces>.

235 WHO, "WHO Calls for Prevention of Cancer through Healthy Workplaces," Who.int (World Health Organization: WHO, April 27, 2007), <https://www.who.int/news/item/27-04-2007-who-calls-for-prevention-of-cancer-through-healthy-workplaces>.

236 Tom Greenwell, "How the Asbestos Industry Targeted Developing Countries – and What Might Be Done about It • inside Story," Inside Story, April 12, 2017, <https://insidestory.org.au/how-the-asbestos-industry-targeted-developing-countries-and-what-might-be-done-about-it/>.

237 WHO, "Asbestos: Elimination of Asbestos-Related Diseases," Who.int (World Health Organization: WHO, February 15, 2018), <https://www.who.int/news-room/fact-sheets/detail/asbestos-elimination-of-asbestos-related-diseases>.

238 WHO, "Asbestos: Elimination of Asbestos-Related Diseases," Who.int (World Health Organization: WHO, February 15, 2018), <https://www.who.int/news-room/fact-sheets/detail/asbestos-elimination-of-asbestos-related-diseases>.

239 WHO, "Asbestos: Elimination of Asbestos-Related Diseases," Who.int (World Health Organization: WHO, February 15, 2018), <https://www.who.int/news-room/fact-sheets/detail/asbestos-elimination-of-asbestos-related-diseases>.

240 WHO, "More Countries Act against Exposure to Radon and Associated Cancer Risks," Who.int (World Health Organization: WHO, February 4, 2021), <https://www.who.int/news/item/04-02-2021-more-countries-act-against-exposure-to-radon-and-associated-cancer-risks>

241 WHO, "Household Air Pollution," Who.int (World Health Organization: WHO, December 15, 2023), <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>.

242 WHO, "Household Air Pollution."

243 "Foodborne Disease Burden Epidemiology Reference Group (FERG)," Who.int, 2023, [https://www.who.int/groups/foodborne-disease-burden-epidemiology-reference-group-\(ferg\)](https://www.who.int/groups/foodborne-disease-burden-epidemiology-reference-group-(ferg)).

244 "Foodborne Disease Burden Epidemiology Reference Group (FERG)," Who.int, 2023, [https://www.who.int/groups/foodborne-disease-burden-epidemiology-reference-group-\(ferg\)](https://www.who.int/groups/foodborne-disease-burden-epidemiology-reference-group-(ferg)).

245 WHO, "Arsenic," Who.int (World Health Organization: WHO, December 7, 2022), <https://www.who.int/news-room/fact-sheets/detail/arsenic>.

246 WHO, "Arsenic," Who.int (World Health Organization: WHO, December 7, 2022), <https://www.who.int/news-room/fact-sheets/detail/arsenic>.

247 WHO, "Arsenic," Who.int (World Health Organization: WHO, December 7, 2022), <https://www.who.int/news-room/fact-sheets/detail/arsenic>.

Substance	IARC Classification	Usage/Exposure Pathways
Fire-fighting (occupation) ²⁵⁹	Group 1: Carcinogenic to Humans (Previously Group 2B: Possibly Carcinogenic to Humans)	Individuals who have previously or are currently working as a fire-fighter
Anthracene, butyl methacrylate, & dimethyl hydrogen phosphite ²⁶⁰	Group 2B: Possibly Carcinogenic to Humans	Consumer Goods—plastics, dyes and paints, pharmaceutical/healthcare materials
2-Bromopropane ²⁶¹	Group 2A: Probably Carcinogenic to Humans	Occupational—dry cleaning
Acrylonitrile ²⁶²	Group 1: Carcinogenic to Humans	Consumer Goods—fabrics, clothing, carpets, plastics
Talc ²⁶³	Group 2A: Probably Carcinogenic to Humans (for ovarian cancer specifically)	Consumer Goods—cosmetics, body and baby powders
Perfluorooctanoic acid (PFOA) ²⁶⁴	Group 1: Carcinogenic to Humans	Dietary—contaminated water and food
Perfluorooctane sulfonic acid (PFOS) ²⁶⁵	Group 2B: Possibly Carcinogenic to Humans	Dietary—contaminated water and food Occupational—fire-fighting

Table 3: Recent IARC Carcinogen Classifications

stem from this occupational exposure to UV radiation.²⁴⁸

The IARC has also made several new categorizations in the past year. The following represent the most recent and consequential categorizations.

Table 3: Recent IARC Carcinogen Classifications

An IARC advisory group also recently convened in 2024 to decide which carcinogens should be evaluated or reevaluated during 2025-2029.²⁴⁹ Thus far, the WHO has taken a fragmented approach to addressing carcinogens, tackling them carcinogen by carcinogen rather than by broad exposure or carcinogen categories. They also do more work in policy recommendations and guidance and less in direct service and project implementation. Whether this current approach is the most effective approach to solving this issue remains to be seen.

Sustainable Development Goals

The United Nations’ Sustainable Development Goals (SDGs)

248 Giri Viswanathan, “Working in the Sun Creates Large Skin Cancer Risk, UN Agencies Report,” CNN (CNN, November 8, 2023), <https://www.cnn.com/2023/11/08/health/working-in-sun-skin-cancer/index.html>.

249 “IARC at the International Congress on Occupational Health 2024,” Who.int, 2024, <https://www.iarc.who.int/news-events/iarc-at-the-international-congress-on-occupational-health-2024/>.

250 “THE 17 GOALS | Sustainable Development.”

251 “THE 17 GOALS | Sustainable Development.”

252 “THE 17 GOALS | Sustainable Development,” UN, 2015, <https://sdgs.un.org/goals>.

253 “Goal 2 | Department of Economic and Social Affairs,” UN, 2022, <https://sdgs.un.org/goals/goal2#overview>.

254 “Goal 2 | Department of Economic and Social Affairs.”

are the result of the 2030 Agenda for Sustainable Development. Adopted by all UN member states in 2015, this agenda aimed to create a world of peace and prosperity by 2030.²⁵⁰ They outlined seventeen goals, now known as the SDGs, which they believed were fundamental to this envisioned future. These goals built and expanded upon the previous eight Millennium Development Goals.²⁵¹

As previously detailed, carcinogens are a highly intersectional issue because exposure can occur through so many avenues (i.e. in the environment, workplace, home, diet, and consumer goods). And thus, carcinogen exposure mitigation is an element of the majority of the SDGs.²⁵²

SDG 2 aims to achieve Zero Hunger.²⁵³ Carcinogens specifically pertain to SDG 2, Target 2.1: “By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.”²⁵⁴ Aforementioned dietary carcinogens—foods that are directly carcinogenic and food-

borne carcinogens—are still highly prevalent, especially in

developing countries and poor communities. The presence of such carcinogens stands directly in contrast with providing “safe” food for all. Although the primary focus of SDG 2 is the provision of food, in order to completely achieve Target 2.1, one must also eliminate or decrease carcinogenic foods from the global food supply.²⁵⁵ Current indicators and progress updates on this target focus primarily on provision of food rather than “safe, nutritious” food specifically.²⁵⁶

Carcinogen exposure most directly pertains to the next goal, SDG 3: Good Health and Well-Being.²⁵⁷ Target 3.4 states “By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.”²⁵⁸ Cancer is a non-communicable disease, and cancer prevention is primarily only possible by decreasing exposure to carcinogens. Target 3.9 states “By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.”²⁵⁹ Carcinogens are the main class of hazardous chemicals, and many of the indicators for this target relate to routes of carcinogen exposure (i.e. household and outdoor air pollution, water).²⁶⁰ As previously mentioned, Target 3.a also aims to “Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate.”²⁶¹ Again, even though tobacco regulatory mechanisms often do not directly translate to regulatory mechanisms for carcinogens as a whole, they still provide an important precedent and rough framework that could be followed. This target also highlights the WHO’s prioritization of tobacco control ahead of other carcinogens.²⁶² Recent progress updates have not focused on targets 3.4, 3.9, nor 3.a.²⁶³

SDG 7 tackles affordable and clean energy. Target 7.1 hopes

that “By 2030, ensure universal access to affordable, reliable and modern energy services.”²⁶⁴ Indicator 7.1.2—“Proportion of population with primary reliance on clean fuels and technology”—directly pertains to household air pollution, as replacing carcinogen-releasing household fuels with clean fuels would dramatically decrease carcinogen exposure through household air pollution.²⁶⁵ Recent updates found 74 percent of the world now uses clean fuels for cooking. If current progress trends do not improve, 1.8 billion will still be left without access to clean cooking by 2030.²⁶⁶

Target 8.8 of SDG 8, decent work and economic growth, aims to “Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.”²⁶⁷ Thus, this target encompasses mitigating occupational carcinogen exposure to create a safe working environment. Recent data focuses on physical risks workers face in their workplaces, like risk of workplace accident and injury, rather than carcinogen exposure.²⁶⁸

Bloc Analysis

Points of Division

Because there is no one set of international regulations for carcinogenic substances, the level of regulation present varies by country. This both includes regulations for mitigating carcinogen exposure and limiting the release and creation of carcinogens.

Even within a country, regulations often are not uniform across all carcinogenic agents or exposure pathways. Instead, they can be relatively strong in one area while weak in another.

255 “Goal 2 | Department of Economic and Social Affairs.”
 256 “Goal 2 | Department of Economic and Social Affairs.”
 257 “Goal 3 | Department of Economic and Social Affairs,” UN, 2022, <https://sdgs.un.org/goals/goal3>.
 258 “Goal 3 | Department of Economic and Social Affairs.”
 259 “Goal 3 | Department of Economic and Social Affairs.”
 260 “Goal 3 | Department of Economic and Social Affairs.”
 261 “Goal 3 | Department of Economic and Social Affairs.”
 262 “Goal 3 | Department of Economic and Social Affairs.”
 263 “Goal 3 | Department of Economic and Social Affairs.”
 264 “Goal 7 | Department of Economic and Social Affairs,” UN, 2023, <https://sdgs.un.org/goals/goal7>.
 265 “Goal 7 | Department of Economic and Social Affairs.”
 266 “Goal 7 | Department of Economic and Social Affairs.”
 267 “Goal 8 | Department of Economic and Social Affairs,” UN, 2023, <https://sdgs.un.org/goals/goal8#overview>.
 268 “Goal 8 | Department of Economic and Social Affairs.”

Sometimes, these regulations may be purposefully weak in those areas because countries have vested interests in activities that cause carcinogen release or exposure.²⁶⁹ For example, countries prioritizing development and economic growth over strong carcinogen regulations so they can have cheaper building materials or foods. Other times, this difference in regulation strength is unintentional, with countries not realizing a substance is carcinogenic.

Countries also vary in how they approach regulating carcinogens. Some countries choose to regulate carcinogen by carcinogen, tackling individual substances in order of importance. This approach allows for more tailor-made regulations highly specific to a carcinogen, its level of carcinogenicity, exposure pathways, and cancers caused. It is arguably a more burdensome approach because countries are investing a large amount of money and resources into a single carcinogen. The other common approach is to regulate by exposure pathway. This can look like attempts to eliminate all household air pollution by transitioning to clean fuels, or implementing new food packaging materials that do not have any of the carcinogens found in previous materials. Still, this approach may also have drawbacks. Namely, in an attempt to regulate a large number of carcinogens at once, they may not effectively regulate any of them because some carcinogens require highly specific solutions.

As a whole, although all countries should be united in the goal of mitigating carcinogen exposure, differences will arise in existing levels of regulations as well as regulatory approaches and priorities. These existing policies and priorities are largely informed by aforementioned points of divisions.

Countries with Robust Carcinogen Regulations

Countries in this bloc are defined by strong, expansive carcinogen regulations covering both mitigating carcinogen exposure and limiting the release and creation of carcinogens.

Their national acceptable levels of carcinogen exposure are often as strict or even more stringent than WHO guidelines. Furthermore, many of these countries have well-funded government agencies specifically dedicated to the evaluation, monitoring, and regulation of carcinogens. They may conduct their own assessments of carcinogenicity and exposure pathways, independent of the IARC Monographs and classifications. Their regulations are also dynamic and constantly being updated as new information about carcinogenicity is discovered. Overall, this bloc generally has lower levels of carcinogen exposure, carcinogen-linked cancer cases, and deaths attributable to carcinogens.

Even so, countries in this bloc may struggle with the effective and complete implementation of their policies, perhaps lacking the resources or personnel to ensure all industries and households are in compliance with regulatory standards. Countries in this bloc should focus on ensuring minority and vulnerable populations in their country are not experiencing high levels of carcinogen exposure.

In this debate, countries in this bloc should evaluate which of their existing policies are the most effective and can and should be brought to other countries. Their past policies can serve as success stories and examples of what international regulations should look like. This bloc will favor solutions including bold, strong regulations for carcinogens that are supported by robust implementation mechanisms.

The United States is an illustrative example of a country belonging to this bloc. They have two government agencies, the Environmental Protection Agency and Occupational Safety and Health Administration, directly managing carcinogen exposures, conducting independent risk assessments, and deciding on acceptable exposure levels.^{270, 271} These agencies are also highly responsive to new scientific findings, creating new regulations as new carcinogens are found.²⁷² They also have policies in place to reduce the release of carcinogens

²⁶⁹ WHO, “New WHO Campaign Highlights Tobacco Industry Tactics to Influence Public Health Policies,” Who.int (World Health Organization: WHO, November 16, 2023), <https://www.who.int/news/item/16-11-2023-new-who-campaign-highlights-tobacco-industry-tactics-to-influence-public-health-policies>.

²⁷⁰ “Risk Assessment for Carcinogenic Effects | US EPA,” US EPA, May 23, 2014, <https://www.epa.gov/fera/risk-assessment-carcinogenic-effects>.

²⁷¹ “Carcinogens - Standards | Occupational Safety and Health Administration,” Osha.gov, 2015, <https://www.osha.gov/carcinogens/standards>.

²⁷² Ava Kofman, “EPA Finalizes New Standards for Cancer-Causing Chemicals,” ProPublica, April 16, 2024, <https://www.propublica.org/article/epa-finalizes-new-standards-for-cancer-causing-chemicals>.

like pollutants, with a focus on improving exposure equity.²⁷³ The United States generally takes a carcinogen-by-carcinogen approach to regulation. Other countries in this bloc include Canada and countries belonging to the EU.

Countries with Developing Carcinogen Regulations

Countries in this bloc are characterized by having some protections that limit the creation and release of carcinogens and protections from exposure. They may only address a few carcinogenic agents or exposure pathways, whether intentionally or unintentionally.

Countries should critically consider what barriers they have faced to implementing carcinogen regulations and what support they need to create stronger regulations. They should also analyze what the WHO has previously done to help with implementation and which of their policies have previously been successful, as those successes can inform directions of debate in committee. Countries may also consider which carcinogenic agents and/or exposure pathways are of the most importance for them, and in turn, which carcinogens and/or exposure pathways require most immediate attention.

An example of a country in this bloc is Brazil. In 2017, Brazil banned domestic asbestos use and is supporting local miners in transitioning to more sustainable jobs. Yet, they continue asbestos mining for export.²⁷⁴ Furthermore, they have recently faced setbacks in carcinogen regulation implementation. They recently passed a new law that weakens pesticide use regulations and allows for temporary approval of chemicals, before their carcinogenicity has been assessed.²⁷⁵ This repeals the previous 1989 law that requires full assessment of carcinogenicity from health and environmental agencies before approval is given to a chemical.²⁷⁶ The UN Office of the High Commissioner

for Human Rights has even called this policy “a monumental setback for human rights in the country.”²⁷⁷ This case of Brazil also illustrates the dynamic nature of regulations for many countries in this bloc—constantly facing successes, setbacks, and changing guidelines. Other countries in this bloc include Indonesia, South Africa, and Russia.

Countries with Little to No Carcinogen Regulations

Countries in this bloc have little to no protections that limit the creation and release of carcinogens and protections from exposure. This can be caused by a number of reasons including, but not limited to, regulation efforts facing pushback, lack of resources, lack of awareness about the harms of carcinogens, or that carcinogen regulation is simply not a priority. It is important for countries in this bloc to understand what issues plague their carcinogen regulation efforts and whether efforts have been previously made to combat these challenges. They then should identify what support and resources they need to create regulatory mechanisms, as that information may be common to many countries in this bloc. It is also relevant for countries in this bloc to decide which carcinogenic agents and exposure pathways are most consequential for their country to ensure regulations for those agents and pathways are created by committee.

One such example of a country in this bloc is South Sudan. Household air pollution is an especially consequential route of exposure for the South Sudanese, with approximately 90 percent of homes lacking adequate ventilation.²⁷⁸ The vast majority of households also rely on firewood for energy and cooking. The WHO has aided in creating small-scale projects to provide clean fuels to South Sudanese households, but there have been no nationwide regulations or projects to tackle this

273 MATTHEW DALY, “EPA Says Chemical Plants Must Reduce Emissions Likely to Cause Cancer,” AP News (AP News, April 9, 2024), <https://apnews.com/article/epa-chemical-pollution-cancer-environmental-justice-louisiana-3207b752c9e0e9d6e3e7e715be92e8eb>.

274 Thomson Reuters Foundation, “Beset by Legal Battles, Brazil Asbestos Town Eyes a Safer Future,” news.trust.org, 2022, <https://news.trust.org/item/20220125125652-g53za/>.

275 “What Brazil’s ‘Poison Package’ Means for Global Food Supplies | Think Global Health,” Council on Foreign Relations, January 2, 2024, <https://www.thinkglobalhealth.org/article/what-brazils-poison-package-means-global-food-supplies>.

276 “What Brazil’s ‘Poison Package’ Means for Global Food Supplies | Think Global Health,” Council on Foreign Relations, January 2, 2024, <https://www.thinkglobalhealth.org/article/what-brazils-poison-package-means-global-food-supplies>.

277 “What Brazil’s ‘Poison Package’ Means for Global Food Supplies | Think Global Health,” Council on Foreign Relations, January 2, 2024, <https://www.thinkglobalhealth.org/article/what-brazils-poison-package-means-global-food-supplies>.

278 Kuorwel Kuai Kuorwel, Clara S Lumori, and Amegovu K Andrew, “Review of South Sudans Food Safety Status in Relation to Chemical Contaminants,” MOJ Food Processing & Technology 6, no. 1 (February 9, 2018): 113–20, <https://doi.org/10.15406/mojfpt.2018.06.00153>.

issue.²⁷⁹ Aflatoxins in food also present a major health risk in South Sudan.²⁸⁰ They have a weak national surveillance system for food-borne carcinogens.²⁸¹ So, when an outbreak occurs, it is hard to track affected foods and the magnitude of carcinogen spread. Lack of regulation in pesticide use, waste disposal, and food processing also leads to a large number of carcinogens being introduced into the food supply.²⁸² And so, with South Sudan as a case study, it is reasonable to see that people living in these blocs have extremely high levels of exposure, cancer incidence, and death linked to carcinogens. Other countries in this bloc include Yemen, Niger, and Haiti.

In the WHA, delegates have the power to shape global health priorities and create recommendations, programs, and research areas to address high carcinogen exposure. WHA resolutions will not only guide the work of the WHO, but also the policies and goals of all member countries. Delegates in the WHA are expected to craft innovative, scientifically-sound policies and solutions to address the pressing issue of carcinogen exposure.

Committee Mission

The decisions and resolutions of the World Health Organization (WHA) are recommendations only as they are not binding for member states.²⁸³ The implementation of carcinogen exposure regulations is often costly and can slow down rates of economic development. Effective solutions proposed in WHA should include provisions that incentivize member countries to implement their recommendations. This can be anything that advances a country's public health, economic, social, or developmental goals. The WHA is also ultimately guided by public health goals and scientific research.²⁸⁴ Any and all recommendations made by delegates must be grounded in and proven by science. This includes assertions on which carcinogenic agents or exposure pathways to prioritize and solutions proposed. If there is a lack of research in an area delegates deem relevant, the WHA can also encourage the IARC and other agencies of the WHO to pursue scientific research in those areas. The WHA also has the ability to create and dispatch WHO programs that work on the front lines in countries most affected by a given issue, often in collaboration with other UN agencies.

279 "Cooking up a SAFE Solution: Fuel-Efficient Stoves for Displaced Communities in South Sudan," Gender (FAO, October 26, 2016), <https://www.fao.org/gender/insights/insights-detail/Cooking-up-a-SAFE-solution-fuel-efficient-stoves-for-displaced-communities-in-South-Sudan/en>.

280 Kuorwel Kuai Kuorwel, Clara S Lumori, and Amegovu K Andrew, "Review of South Sudans Food Safety Status in Relation to Chemical Contaminants," *MOJ Food Processing & Technology* 6, no. 1 (February 9, 2018): 113–20, <https://doi.org/10.15406/mojfpt.2018.06.00153>.

281 Kuorwel Kuai Kuorwel, Clara S Lumori, and Amegovu K Andrew, "Review of South Sudans Food Safety Status in Relation to Chemical Contaminants," *MOJ Food Processing & Technology* 6, no. 1 (February 9, 2018): 113–20, <https://doi.org/10.15406/mojfpt.2018.06.00153>.

282 Kuorwel Kuai Kuorwel, Clara S Lumori, and Amegovu K Andrew, "Review of South Sudans Food Safety Status in Relation to Chemical Contaminants," *MOJ Food Processing & Technology* 6, no. 1 (February 9, 2018): 113–20, <https://doi.org/10.15406/mojfpt.2018.06.00153>.

283 "World Health Assembly," WHO, 2022, <https://www.who.int/about/governance/world-health-assembly#:~:text=The%20main%20functions%20of%20the,approve%20the%20proposed%20programme%20budget>.

284 "WHO and the WHA an Explainer," WHO 2024, <https://www.who.int/about/governance/world-health-assembly/the-who-and-the-who-an-explainer>.



WHA

NHSMUN 2025



TOPIC B:
ACCESS TO “NON-ESSENTIAL” HEALTHCARE

Photo Credit: Helitak430

Introduction

“Nonessential” healthcare is care often overlooked and seen as less important than other care. However, the definition of “nonessential” healthcare varies between and within countries. For example, during the COVID-19 pandemic, many elective surgeries were deemed “nonessential” and canceled in the United States.¹ Elective surgeries are defined by their ability to be scheduled in advance.² However, this ability to plan or delay an operation does not equate to a less important procedure. Since nonessential healthcare differs from country to country, this committee will focus on five primary sectors of healthcare: family doctor accessibility, oral healthcare, eye healthcare, elder care, and addiction healthcare. These five areas of healthcare have suffered from a lack of attention, requiring increased support from the World Health Assembly (WHA).

Family doctors, also known as primary physicians or general practitioners, focus on the patient’s long-term health monitoring.³ Described often as “cradle to coffin” care, the role of the family doctor is to help detect and prevent diseases, reduce unnecessary hospital visits, and improve patient outcomes. Those with family doctors require 30 percent fewer hospital hours and visits and have a reduced mortality of around 25 percent.⁴ Yet, family doctors are not accessible to many. There is a shortage of family doctors in several parts of the world. In some countries, family doctors are aging out and retiring, and too few medical students replace them.⁵ This forecasted shortage will have disastrous consequences for health systems, especially in regions already seeing large-scale shortages. Oral disease and dentistry have historically been treated as luxuries and are often considered an unimportant part of healthcare. To this day, even countries with developed and robust universal healthcare systems often do not cover oral health.⁶ This has caused an incredible burden on healthcare

systems that are not properly equipped to deal with oral disease. Oral disease is the one type of non-communicable disease that has not been reduced in the last four decades.⁷ This paints a dire picture of the current state of oral healthcare globally, affecting an enormous portion of the world’s population.

Vision care is also often regarded as an unimportant or a luxury aspect of healthcare. This has led to most countries not providing adequate health coverage for vision care, leading to worse outcomes for patients globally.⁸ Visual impairment and blindness are often more damaging in some of the most vulnerable populations, including children and the elderly. Both groups report significant drops in quality of life and higher rates of mental illness, especially depression, while suffering from ailments that are often preventable or easily resolved.⁹ One of these notable examples is cataracts, which are the leading cause of preventable visual impairment around the globe.¹⁰ Resolving cataracts often requires surgery to be

1 Andréa Becker, “It’s Time to Stop Describing Lifesaving Health Care as ‘Elective,’” *Vox*, September 20, 2021, <https://www.vox.com/22678393/elective-surgery-nonessential-trans-gender-affirming-hysterectomy>.

2 Alex Rusciano, “What Is an Elective Surgery?,” *OSF HealthCare Blog* (blog), September 30, 2020, <https://www.osfhealthcare.org/blog/what-is-an-elective-surgery/>.

3 Thomas R. Freeman, “The Origins of Family Medicine: Chapter 1,” in *McWhinney’s Textbook of Family Medicine*, ed. Thomas R. Freeman, 4th ed. (Oxford University Press, 2016), 13, <https://doi.org/10.1093/med/9780199370689.003.0001>.

4 Cathy Ridson, “Analysis: The Impact of Not Having a Family Doctor: Patients Are Worse off, and so Is the Health System,” *Brighter World* (blog), accessed August 3, 2024, <https://brighterworld.mcmaster.ca/articles/analysis-the-impact-of-not-having-a-family-doctor-patients-are-worse-off-and-so-is-the-health-system/>.

5 WHO, “Recognizing the Importance of Family Doctors in Health Care: Perspectives from Central Asia,” World Health Organization, May 22, 2024, <https://www.who.int/europe/news-room/feature-stories/item/recognizing-the-importance-of-family-doctors-in-health-care--perspectives-from-central-asia>.

6 Sara Allin et al., “Do Health Systems Cover the Mouth? Comparing Dental Care Coverage for Older Adults in Eight Jurisdictions,” *Health Policy* 124, no. 9 (September 1, 2020): 998–1007, <https://doi.org/10.1016/j.healthpol.2020.06.015>.

7 WHO, “Landmark Global Strategy on Oral Health Adopted at World Health Assembly 75,” *World Health Organization*, May 28, 2022, <https://www.who.int/news-room/feature-stories/detail/landmark-global-strategy-on-oral-health-adopted-at-world-health-assembly-75>.

8 International Agency for the Prevention of Blindness, “Eye Health and Universal Health Coverage,” The International Agency for the Prevention of Blindness, 2024, <https://www.iapb.org/advocate/eye-health-and-universal-health-coverage/>.

9 Bonifacio Buño and Andrea Kristina Monzon-Pajarillo, “Effects of Visual Impairment on Quality of Life in Children Aged 3-7 Years – Philippine Journal Of Ophthalmology,” *Philippine Journal of Ophthalmology* 44, no. 1 (June 2019): 5.

10 WHO, “Vision Impairment and Blindness,” World Health Organization, August 10, 2023, <https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment>.

delivered quite easily, but it is not available in many countries. In addition, myopia, or short-sightedness, has expanded enormously worldwide. While the condition may seem minor, it can lead to an increase in adult blindness.¹¹ Therefore, health authorities must soon consider the importance of vision care as an integral part of the health system. Elder care is an increasingly important area of healthcare with the world’s aging population.¹² Elder care requires continuous support and funding. Very few parts of the world today have a well-developed and robust elder care system. It is often a patchwork of inadequate private and charitable organizations attempting to plug holes in government programs. One of the largest issues within eldercare has been historically poor working conditions and pay for support staff. Many eldercare facilities suffer from staff shortages, resulting in the remaining staff being overworked. This further worsens staff retention and support for the elderly.

Lastly, addiction care faces many stigmas. Many consider addiction a social or criminal issue, not something to be dealt with in a healthcare setting. However, this attitude has been slowly changing over the past decades, with many countries adopting policies to establish health-based addiction procedures to help those suffering from substance abuse disorders.¹³ As the world drug trade continues to grow, establishing addiction care services that focus on the health of the patient will be crucial.¹⁴ However, these services are limited in coverage and exist in a few countries. Common themes of underappreciation and lack of support have made the delivery of adequate health services far more difficult for these areas of healthcare. The development of these support networks and educational institutions to support their expansion remains a key issue delegates are encouraged to approach. Overall, delegates in the WHA must act urgently to increase access to

these services worldwide.

History and Description of the Issue

Family Doctor Accessibility

Family doctors remain at the forefront of most patient care and often stay with patients for most of their lives. This relationship allows for an intimate understanding of the patient’s health and the ability to detect early warning signs of disease. Yet, access to a family doctor is limited or nonexistent for much of the global population. Family medicine is underdeveloped in many regions of the world.¹⁵ In Sub-Saharan Africa, for example, family physician-to-patient ratios have reached 50,000:1.¹⁶ In 2013, Dr. Margaret Chan, former Director-General of the World Health Organization (WHO), stated that “a health system where primary care is the backbone and family doctors are the bedrock delivers the best health outcomes, at the lowest cost, and with the greatest user satisfaction.... In some countries where chronic diseases are the principal health burden, family doctors manage 95 percent of the health problems while absorbing only 5 percent of the health budget.”¹⁷ This statement highlights the importance and lack of emphasis on family medicine. Although they are historically the foundation for the healthcare system, family doctors often lack the proper support. This includes personnel shortages, poor funding, and a lack of program development. Until these issues are resolved, family doctors and patients will continue suffering.

Family medicine has been an essential part of the medical system. In the 19th century, a large segment of the medical community functioned as general practitioners (GP) working in a capacity similar to the modern family doctor.¹⁸ During this

11 International Myopia Institute, “Myopia” (International Myopia Institute, 2024), <https://myopiainstitute.org/myopia/>.

12 Kate Whiting, “Could These Old and New Ideas Be the Future of Social Care for the Elderly?,” *World Economic Forum*, August 3, 2023, <https://www.weforum.org/agenda/2023/08/elderly-social-care-dementia-villages/>.

13 Alana Henninger and Hung-En Sung, “History of Substance Abuse Treatment,” 2014, 2257–69, https://doi.org/10.1007/978-1-4614-5690-2_278.

14 United Nations Office on Drugs and Crime, “Key Findings and Conclusions of the 2024 World Drug Report” (United Nations Office on Drugs and Crime, June 2024), https://www.unodc.org/documents/data-and-analysis/WDR_2024/WDR24_Key_findings_and_conclusions.pdf.

15 Arya et al., “Snapshot of Family Medicine around the World.” <https://doi.org/10.46747/cfp.6905330>

16 Nasir Faruk et al., “On green virtual clinics: A framework for extending health care services to rural communities in Sub-Saharan Africa,” *IEEE*, December 1, 2017, <https://doi.org/10.1109/ireehi.2017.8350380>.

17 Margaret Chan, “The Rising Importance of Family Medicine,” <https://www.who.int/director-general/speeches/detail/the-rising-importance-of-family-medicine>.

18 Freeman, “The Origins of Family Medicine: Chapter 1.”

period, there was far less specialization than there currently is within the medical community, with GPs and various forms of surgeons forming the bulk of the medical workforce. In the 20th century, however, this began to change with the rise of greater medical specialization. Doctors began to narrow their focus to specific organ systems, and more doctors moved away from the role of the GP. Without a clearly defined role in this new system, GPs began to decline significantly while patient care was divided among all the new specialists.¹⁹ The decline of doctor-patient relationships correlates with the lack of a permanent doctor assigned to a patient. In the 1960s and 1970s, medical boards attempted to combat this decline by formally establishing family medicine as a unique specialty.²⁰ The family doctor’s role was to be the primary link between the patient and the healthcare system. They were to work with patients over long periods to help with chronic illnesses, detect warning signs of disease, and provide a face to the health system. Today, the development of the family doctor is still ongoing.

Education for family doctors in many parts of the world remains lacking. In the early 1960s, family medicine was established as a separate medical specialty, first in Canada and the United Kingdom. Many other Western countries did the same soon after.²¹ Much of Eastern and Central Europe lagged until the fall of the Soviet Union, prompting rapid changes within the previously authoritarian medical structures. In the early 2010s, China and India, the world’s two largest countries by population, established family medicine programs of their own.²² Many countries, however, have fallen behind in converting medical students into family doctors. India is a notable example. With the rise of “super specialty” hospitals, finding care for small concerns or long-term care for the entire person is often difficult due to a lack of family doctors. Hyperspecialization and barriers to entering family medicine

have further fragmented the Indian healthcare system, making one of the world’s largest countries woefully underdeveloped in this sector.²³ Other regions are lacking further, with major African countries such as Algeria, Morocco, and Northwestern Africa having no family medicine programs at their universities.²⁴ Lack of education will continue to burden the healthcare system within these countries until adequate family medicine programs have been established.

The former Soviet Union is a great case study that demonstrates the importance of family doctors. In the former Soviet Union, almost all countries adopted the Soviet Semashko model, which emphasized a centralized structure that was built around hospitals and specialists.²⁵ Unfortunately, this system was ill-equipped to treat patients effectively, and many patients bounced around the medical system, desperate to find a physician who could treat them properly. This system did not develop a robust family medicine program during the late 20th century, in stark contrast to its Western European neighbors, who almost all followed the United Kingdom’s lead in developing the specialty. In the 1990s, as the Soviet Union collapsed, so did the healthcare systems of this region of Europe.²⁶ Almost overnight, the cracks within these systems were ripped wide open for the world to see, one of the most notable being a severe shortage of primary care physicians. Healthcare outcomes had remained poor under the former model due to a belief that only specialists could provide adequate care and that family doctors had no place in this new system. Specialists, however, had difficulty detecting easily diagnosable problems due to the narrow focus of their studies.²⁷ This problem became one of the top priorities of successive governments who attempted to establish family medicine programs quickly and give the specialty the necessary support. Despite this, family medicine is still lagging in the region. In 2004, Russia saw a conversion rate of only 30 percent between

19 Freeman.

20 Cal Gutkin, “The Specialty of Family Medicine in Canada,” *Canadian Family Physician* 52, no. 3 (March 10, 2006): 404–403.

21 Neil Arya et al., “Family Medicine around the World: Overview by Region,” *Canadian Family Physician* 63, no. 6 (June 2017): 436–41.

22 Arya et al.

23 Kumar, “Frequently Asked Questions about Family Medicine in India.” <https://doi.org/10.4103/2249-4863.184615>

24 Maaïke Flinkenflögel et al., “A Scoping Review on Family Medicine in Sub-Saharan Africa: Practice, Positioning and Impact in African Health Care Systems,” *Human Resources for Health* 18, no. 1 (April 3, 2020): 27, <https://doi.org/10.1186/s12960-020-0455-4>.

25 Anna Krztoń-Królewiecka et al., “The Development of Academic Family Medicine in Central and Eastern Europe since 1990,” *BMC Family Practice* 14 (March 19, 2013): 37, <https://doi.org/10.1186/1471-2296-14-37>.

26 D A Barr and M G Field, “The Current State of Health Care in the Former Soviet Union: Implications for Health Care Policy and Reform,” *American Journal of Public Health* 86, no. 3 (March 1996): 307–12.

27 Barr and Field.



Iraqi Doctor performs oral exam on young child
Credit: U.S. Navy by Mass Communication Specialist
2nd Class Kelvin Surgener

family medicine students and practicing physicians.²⁸ This is nearly a decade after federal law established the specialty. Despite this, progress has been made, with much of the former Soviet Union now having well-established family medicine programs and the beginnings of academic study in the field. Ultimately, the former Soviet Union serves as a reminder of the importance of family medicine and the shortcomings of healthcare systems that do not adequately develop the practice.

The perception of family medicine and its historical lack of respect continues to plague the profession. This partially results from a need for more information regarding the specialty in many regions of the world. In India, one-third of medical students felt unable to define family medicine or give an accurate description of the practice.²⁹ This creates a barrier to entering the field. However, even with greater awareness and understanding of the field, family doctors continue to be undervalued by their peers. While opinions vary among family doctors on how their peers perceive them, they agree on their feelings of governmental support. Many family doctors feel that their government does not properly

value them and the role they provide.³⁰ This lack of support makes it difficult to convince family doctors to do increasingly more with shrinking resources. This results in the already small family doctor workforce suffering from turnover in a way many other specialties do not. Finally, patient perception is often prejudiced against the family doctor, with stereotypes regarding their lesser status or perceived lower quality of care. Often, due to the family doctor’s role as the frontline physician and the inability to completely cure many ailments, patients will become dissatisfied with the quality of care received. In Indonesia, for example, there remains a perception that family doctors are unqualified doctors, and patients actively work around seeing their family doctor.³¹ Despite government regulations requiring a visit to a primary care physician before hospital specialists, patients continue to jump through hoops to access what they believe to be a higher quality of care. Better supporting family doctors requires a change in the attitudes of both citizens and governments alike.

Worsening the situation further is a lack of funding for family doctors. Financial compensation for many family doctors is

28 Igor Svab et al., “General Practice East of Eden: An Overview of General Practice in Eastern Europe,” *Croatian Medical Journal* 45, no. 5 (October 2004): 537–42.

29 Hemavathi Dasappa et al., “Perception of Family Medicine as the Career Option among Young Indian Graduates,” *Journal of Family Medicine and Primary Care* 12, no. 10 (October 2023): 2463–68, https://doi.org/10.4103/jfmpc.jfmpc_362_23.

30 Deena M. Hamza, Shelley Ross, and Ivy F. Oandasan, “Perceptions of Family Medicine in Canada through the Eyes of Learners,” *Canadian Family Physician* 67, no. 9 (September 2021): e249–56, <https://doi.org/10.46747/cfp.6709e249>.

31 Katherine Rouleau et al., “Strengthening Primary Care Through Family Medicine Around the World Collaborating Toward Promising Practices,” *Family Medicine* 50, no. 6 (2018): 426–36, <https://doi.org/10.22454/FamMed.2018.210965>.

at an all-time low. Many national health organizations froze wages during the COVID-19 pandemic. Despite lower wages, the cost of practicing family medicine has increased.³² This lack of support has driven many doctors out of family practice, as many can simply not afford to continue. For example, in the Canadian province of Ontario, the average visit with a patient yields just CAD 38. In comparison, Canadian insurance pays CAD 73 for 30 minutes of massage therapy.³³ This lack of funding also discourages students from entering family medicine. Family medicine residencies still need to be fulfilled in many parts of the world, with medical students opting into more prestigious and often better-paid specialties. The importance of family medicine cannot be understated. Family doctors have a profound effect on both patient outcomes and the overall healthcare system. Patients with long-term family doctors have fewer emergency visits, see a 25 percent decrease in mortality rate, and significantly lower costs for the healthcare system as a whole.³⁴ Patients report far greater satisfaction with their quality of care and see improved health outcomes. Family medicine is an important area to develop if the world wishes to improve patient outcomes in the 21st century drastically.

Underestimating the Toll of Oral Disease

Oral health and dentistry have long been relegated to “bonus” healthcare and are considered an unimportant part of the larger healthcare system. However, this opinion has begun to shift, especially with the WHO’s recent efforts to help combat oral disease across the globe. In 2022, WHO released its first comprehensive strategy on oral health and disease.³⁵ The WHO recognizes a global shortcoming in treating oral disease in this report. Since the 1970s, the rate of oral disease cases has remained almost static in comparison to decreases across

every other major disease group.³⁶ The acknowledgment of the failings regarding this important sector of health is essential. However, it is imperative to understand how the situation has gotten so dire.

Oral disease is often treated as less severe than other diseases. However, oral disease remains one of the largest and least changed healthcare sectors over the last 50 years. Today, over 3.5 billion people worldwide suffer from some form of oral disease.³⁷ This has been largely due to the lack of attention given to this aspect of healthcare. Some of the world’s largest countries, including the United States, China, and India, have all seen increased incidence rates of oral disease over the past 30 years.³⁸ While oral disease rates have decreased in some regions of the world, the vast majority have seen a significant increase in the rates of oral disease.

Many health experts have begun demanding that oral health receives the support it needs urgently. Throughout the average person’s life, there exist two key periods where risk is elevated: childhood and old age. Children often suffer from cavities and overall poor oral health.³⁹ While dental cavities have been controlled in many high-income parts of the world, they have risen in many low-income regions. This is often the result of poor health access and increased sugar in children’s diets. This is especially true for children in low-income households, as sugary foods have low costs. For the elderly, poor oral health is often the result of long-term lifestyle choices or untreated diseases. One of the risk factors for oral disease among the elderly is tobacco use. This can dramatically increase the risk of oral cancer, gum disease, and more.⁴⁰ Untreated oral disease leads to a dramatic reduction in quality of life, productivity, and overall mental health.⁴¹ To combat poor oral health, many researchers suggest that dental care be incorporated into

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33 Mike Crawley, “Want More Family Doctors in Ontario? Pay Them Better, Say Physicians,” *CBC News*, March 11, 2024, <https://www.cbc.ca/news/canada/toronto/ontario-family-doctors-pay-compensation-ohip-billing-fees-1.7137716>.

34 Michael R. Kolber et al., “The Value of Family Medicine: An Impossible Job, Done Impossibly Well,” *Canadian Family Physician* 69, no. 4 (April 1, 2023): 269–70, <https://doi.org/10.46747/cfp.6904269>.

35 WHO, “Recognizing the Importance of Family Doctors in Health Care.”

36 WHO, “Recognizing the Importance of Family Doctors in Health Care.”

37 WHO, “Oral Health,” March 14, 2023, <https://www.who.int/news-room/fact-sheets/detail/oral-health>.

38 Chengwei Tu et al., “Burden of Oral Disorders, 1990–2019: Estimates from the Global Burden of Disease Study 2019,” *Archives of Medical Science : AMS* 19, no. 4 (July 13, 2023): 930–40, <https://doi.org/10.5114/aoms/165962>.

39 Poul Erik Petersen et al., “The Global Burden of Oral Diseases and Risks to Oral Health,” *Bulletin of the World Health Organization* 83, no. 9 (September 2005): 661–69.

40 Petersen et al.

41 WHO, “Oral Health.”

universal health coverage systems globally.⁴² This would ease the financial burden associated with oral disease. However, traditional dentistry is still quite expensive, and funding remains scarce for this healthcare sector. Ultimately, one of the main challenges for oral health is the need for more government funding. Oral health is often not covered even in countries with universal health coverage. This means that patients must turn to private insurance, which is more expensive, for coverage. This increases the burden upon patients who may avoid visiting doctors due to the associated costs. This, in turn, causes easily preventable problems to spiral into far worse ailments.⁴³ This increases the burden on the patient and the economic burden upon the healthcare system due to more costly treatments.

Additionally, oral disease treatment methods are often more costly than necessary. In 2022, the WHO reported that many treatments for oral health issues rely on the use of expensive technologies.⁴⁴ This approach further worsens costs and recovery times for patients. Furthermore, most oral diseases are easily preventable and require little treatment if caught early. Therefore, shifting the oral health industry away from its current approach to a more holistic and prevention-oriented one could improve patient outcomes and reduce costs for both practitioner and patient. There have been some improvements in oral health, however. The largest change within dentistry practice in recent years has been the rise of Minimal Intervention Dentistry (MID). This form of dentistry seeks to avoid the costly interventions of traditional dentistry and instead focus on more stable, preventative measures.⁴⁵ MID is becoming more prevalent in dental colleges and associations, challenging them to reconsider the long-held dentistry

standard. However, viewpoints differ significantly from region to region. Some adopt MID readily and are working to quickly establish clear occupational guidelines surrounding this new standard of care. This can be seen in South America, with Brazil leading the way. The Brazilian government and its national health associations recommend MID as a standard of care for dental clinics nationwide. The use of MID is also being discussed now as a potential mandatory part of dental school education, with evidence from randomized trials across the country showing considerable success.⁴⁶

Many European and East Asian countries, notably Japan and the United Kingdom, have had a rather different approach to MID. Within Europe, there have been increasing restrictions around the use of MID due to concerns about the novelty of the practice and the lack of available data on its effectiveness.⁴⁷ This reflects the relative conservatism within modern dentistry, with many practitioners hesitant to adopt what they perceive as a large break from the previously held assumptions surrounding dentistry. Within Japan, 40 percent of dentists view MID very unfavorably and would not recommend its implementation.⁴⁸ While a large part of the practice remains under debate, there is no doubt about MID’s potential future success.

Some dentists have begun to use MID to treat dental cavities.⁴⁹ They do this by focusing on risk factors and actively seeking to prevent cavities. MID is one of the most effective ways to combat common and easily preventable diseases.⁵⁰ Recently, an Australian dental agency concluded a study on a series of MID initiatives to prevent plaque buildup and cavities within a group of children. They found that early preventive

42 E. Bernabe et al., “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, no. 4 (April 1, 2020): 362–73, <https://doi.org/10.1177/0022034520908533>.

43 Allin et al., “Do Health Systems Cover the Mouth?”

44 WHO, “The Global Status Report on Oral Health 2022.”

45 Banerjee, “‘Minimum Intervention’ – MI Inspiring Future Oral Healthcare?”; Jingrwar MM., Bajwa NK., and Pathak A, “Minimal Intervention Dentistry – A New Frontier in Clinical Dentistry,” *Journal of Clinical and Diagnostic Research : JCDR* 8, no. 7 (July 2014): ZE04–8, <https://doi.org/10.7860/JCDR/2014/9128.4583>.

46 Beatriz Ribeiro Perrone, Victor Cavallaro Bottesini, and Danilo Antonio Duarte, “Minimal Intervention Dentistry: What Is Its Clinical Application and Effectiveness in Different Continents? – A Scoping Review,” *Journal of Conservative Dentistry and Endodontics* 27, no. 2 (February 2024): 134–39, https://doi.org/10.4103/JCDE.JCDE_274_23.

47 Perrone, Bottesini, and Duarte.

48 Perrone, Bottesini, and Duarte.

49 WHO, “Oral Health.”

50 Jo E. Frencken et al., “Minimal Intervention Dentistry for Managing Dental Caries – a Review,” *International Dental Journal* 62, no. 5 (November 6, 2020): 223–43, <https://doi.org/10.1111/idj.12007>.



Routine dental visit
 Credit: Leeds City Council

measures for cavities reduced their incidence and improved patient outcomes for a large portion of the children.⁵¹ This was a significant finding because, in Australia, the second most common preventable reason for hospitalization of children is oral health issues. This trend is similar in other high-income countries as well.⁵²

MID is a promising way to help lower oral healthcare costs and improve patient outcomes. Oral disease places an incredible economic burden on many middle- and low-income countries. Lack of proper preventative healthcare means that many go untreated until intensive and costly intervention is the only solution. The World Economic Forum (WEF) reported on the economic case for increased oral healthcare investment. This report cites an enormous economic burden of USD 710 billion as a result of the currently lacking oral health infrastructure.⁵³ This USD 710 billion results from lost productivity due to oral disease and its overall impact on quality of life. However, actual monetary costs are also relatively high. In 2015, for example, the monetary cost of oral healthcare reached

USD 550 billion.⁵⁴ High-income countries, however, also experience significant oral healthcare costs. On a per capita basis, the largest spending and losses in productivity were found in high-income countries in North America, East Asia, Europe, and Australasia. Despite their higher income levels, these countries suffered significant losses due to the burden of oral disease. Costs for oral disease globally are expected to continue to rise.⁵⁵

The importance of oral disease and its consequences cannot be understated. In Japan’s 8020 campaign, an 80-year-old citizen once had only five teeth on average.⁵⁶ High malnutrition rates among the country’s elderly population lead to the 8020 campaign to raise the average number of teeth for 80-year-olds to 20. The campaign was a success, with over half of the 80-year-old population now having 20 or more teeth. Oral health plays a large role in shaping quality of life in ways not often considered. Oral diseases are particularly difficult to manage without proper care because they worsen over time. Oral disease has also been cited as a risk factor for

51 Tan Minh Nguyen, Utsana Tonmukayakul, and Hanny Calache, “Evaluation of an Intervention to Promote Minimally Invasive Dentistry (MID) in an Australian Community Dental Agency—A Pilot Study,” *International Journal of Dental Hygiene* 20, no. 4 (November 2022): 627–34, <https://doi.org/10.1111/idh.12523>.

52 Bernabe et al., “Global, Regional, and National Levels and Trends in Burden of Oral Conditions from 1990 to 2017.”

53 World Economic Forum, “The Economic Rationale for a Global Commitment to Invest in Oral Health.”

54 A. J. Righolt et al., “Global-, Regional-, and Country-Level Economic Impacts of Dental Diseases in 2015,” *Journal of Dental Research* 97, no. 5 (May 2018): 501–7, <https://doi.org/10.1177/0022034517750572>.

55 Righolt et al., “Global-, Regional-, and Country-Level Economic Impacts of Dental Diseases.”

56 WHO, “The Global Status Report on Oral Health 2022.”

other diseases. One of the most notable of these is the link between gum disease and diabetes.⁵⁷ This results in patients not only suffering from the effects of oral disease but also experiencing a greater risk for other chronic conditions. This further diminishes their quality of life. One of the most profound impacts of oral disease is the Disability Adjusted Life Years (DALYs), a metric used to measure how many years of an average life are lost to a particular disease.⁵⁸ From 1990 to 2010, oral disease that accounted for 15 million DALYs had increased by 20 percent.⁵⁹ Oral disease is unfortunate but easily preventable, and it will require careful consideration by the WHA.

Visual Health and Its Impact on Quality of Life

The impact of visual health or eye care on quality of life is often readily seen. Today, the vast majority of visual impairments are correctable, whether via glasses or cataract removal.⁶⁰ Yet, only one-third of the world’s population who require glasses will receive them, and less than a fifth of those who need cataract surgery will receive them.⁶¹ This represents the gap between the ability to manage these conditions and access to these treatments. Despite the lack of access to vision care, the WHO states that it is one of the most cost-effective health treatments.⁶² This shortcoming will only become more noticeable as the number of people with visual impairments is expected to increase in the coming decades.⁶³ Today substantially, there are at least one billion people in the world who suffer from a visual impairment that could have been or could be corrected.⁶⁴ However, visual impairments are not the only conditions that

affect our visual health. Chronic conditions such as Dry Eye Disease (DED) affect many people. These conditions require continual treatment throughout one’s life.⁶⁵ Although there are treatments readily available for conditions such as DED, many do not have access to them. In short, the world’s visual health sector will require substantial restructuring and expansion to meet the demands of the coming years effectively.

The impact on childhood development and quality of life from Visual Impairment (VI) is often overlooked due to the lower prevalence of childhood VI compared to adulthood VI.⁶⁶ However, its impacts are quite severe. Childhood VI significantly disturbs the normal course of childhood development. Childhood VI impacts sensory development and physical and social well-being. These all play a significant role in early childhood development.⁶⁷ Recent studies in the Netherlands found that children with VI perform significantly worse on physical well-being and social support scores compared to their peers.⁶⁸ This was especially prevalent in children aged seven to 11.⁶⁹ Other researchers have come to similar conclusions. For example, focus groups from the University of Alabama conducted interviews with children with VIs and their parents. These researchers found that children viewed themselves as having greater difficulty socializing with their peers and quickly pointed to their VIs as to what they believed to be the cause of their social shortcomings.⁷⁰ Psychosocial comments were the chief concern of these children.⁷¹ Furthermore, researchers in the Philippines found that the quality of life for children with VIs was significantly reduced

57 WHO.

58 WHO, “Indicator Metadata Registry Details: Disability-Adjusted Life Years (DALYs),” World Health Organization, 2012, <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/158>.

59 Derek Richards, “Oral Diseases Affect Some 3.9 Billion People,” *Evidence-Based Dentistry* 14, no. 2 (June 2013): 35–35, <https://doi.org/10.1038/sj.ebd.6400925>.

60 Peter Ackland, Serge Resnikoff, and Rupert Bourne, “World Blindness and Visual Impairment: Despite Many Successes, the Problem Is Growing,” *Community Eye Health* 30, no. 100 (2017): 71–73.

61 WHO, “Vision Impairment and Blindness.”

62 WHO.

63 Thomson, “Why Short-Sightedness Is on the Rise and What Can Be Done.”

64 WHO, *World Report on Vision*.

65 Noor, “Dry Eye Disease.”

66 Ellen B. M. Elsmann et al., “Quality of Life and Participation of Children With Visual Impairment: Comparison With Population Reference Scores,” *Investigative Ophthalmology & Visual Science* 62, no. 7 (June 11, 2021): 14, <https://doi.org/10.1167/iops.62.7.14>.

67 Elsmann et al.

68 Elsmann et al.

69 Elsmann et al.

70 Dawn K. DeCarlo et al., “Impact of Pediatric Vision Impairment on Daily Life: Results of Focus Groups,” *Optometry and Vision Science: Official Publication of the American Academy of Optometry* 89, no. 9 (September 2012): 1409–16, <https://doi.org/10.1097/OPX.0b013e318264f1dc>.

71 DeCarlo et al.

when compared to their peers.⁷² They found that children aged three to seven showed significantly reduced social scores, physical well-being, and competence scores. These difficulties in socializing and developing as a young child seriously affect the quality of life into adulthood. For instance, the WHO has estimated that childhood blindness globally results in a lost income capacity of USD six to 27 trillion each year.⁷³ Furthermore, 50 percent of cases of childhood blindness are either curable or preventable, revealing a tragic reality about this condition.⁷⁴

VI also has a significant impact on quality of life during adulthood, with a significant range of additional symptoms appearing. Aging is often associated with the development of VIs, with the elderly consisting of the majority of patients with VIs.⁷⁵ Regardless, the impact of VIs on quality of life can be severe. One of the largest impacts is reduced participation in social events.⁷⁶ This can be seen especially in young adults, where those with moderate to severe VIs often feel greater distress about the opportunities they are missing out on and show reduced participation. Considering many VIs are chronic and progressive, VI during young adulthood has long-term consequences for the rest of a person’s life. Older adults suffering from a VI often report higher rates of mental illness, such as depression and anxiety disorders.⁷⁷ Greater severity of VI is correlated with an increased risk of depression. Adults with VIs are two to five times more likely to report depression than their peers. Those suffering from moderate to severe VIs

report greater anxiety and lower life satisfaction than many of their peers with different chronic conditions.⁷⁸ All of these factors contribute to lower quality of life and life satisfaction for adults with VIs. Unfortunately, this leads to a lower life expectancy for those with VIs as they develop additional medical conditions.⁷⁹ While the exact cause of this increased mortality rate is not precisely known, theories related to greater fall risk, lowered ability for self-care, and lifestyle consequences due to the VI could all contribute to this increased mortality. Ultimately, adults with VIs suffer from a lower quality of life, especially as they age. With a rapidly aging global population, this will become an even more severe issue.

One of the most significant concerns with visual health is the prevalence of Myopia across the globe today. Myopia, or near-sightedness, is a condition that arises due to a refractive error within a patient’s eyes. This error causes the light rays to bend in a way that causes objects at a greater distance to appear blurry.⁸⁰ Myopia often occurs during childhood, stabilizing around the age of 20.⁸¹ By 2050, estimates have claimed that 50 percent of the world will be myopic.⁸² This condition will soon encompass an enormous portion of eye care resources and will worsen with current trends. With this in mind, it is important to understand the full extent of this epidemic. Myopia is especially prevalent in East Asia, where 80 to 90 percent of high school graduates each year suffer from the disease. This places a unique pressure on this region’s visual health infrastructure.⁸³ This sudden increase in Myopia cases is

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73 J RAHI et al., “Measuring the Burden of Childhood Blindness,” *The British Journal of Ophthalmology* 83, no. 4 (April 1999): 387–88.

74 Rohit Saxena et al., “Preventing Childhood Blindness: Synergy Between Ophthalmology and Community Medicine,” *Indian Journal of Community Medicine : Official Publication of Indian Association of Preventive & Social Medicine* 40, no. 3 (2015): 149–51, <https://doi.org/10.4103/0970-0218.158841>.

75 WHO, *World Report on Vision*.

76 Ellen Bernadette Maria Elsmann, Gerardus Hermanus Maria Bartholomeus van Rens, and Ruth Marie Antoinette van Nispen, “Quality of Life and Participation of Young Adults with a Visual Impairment Aged 18–25 Years: Comparison with Population Norms,” *Acta Ophthalmologica* 97, no. 2 (March 2019): 165–72, <https://doi.org/10.1111/aos.13903>.

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78 Gertrudis I. J. M. Kempen et al., “The Impact of Low Vision on Activities of Daily Living, Symptoms of Depression, Feelings of Anxiety and Social Support in Community-Living Older Adults Seeking Vision Rehabilitation Services,” *Quality of Life Research* 21, no. 8 (2012): 1405–11, <https://doi.org/10.1007/s11136-011-0061-y>.

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81 Gunjan Saluja and Kirandeep Kaur, “Childhood Myopia and Ocular Development,” in *StatPearls* (Treasure Island (FL): StatPearls Publishing, 2024), <http://www.ncbi.nlm.nih.gov/books/NBK587350/>.

82 International Myopia Institute, “Myopia.”

83 Thomson, “Why Short-Sightedness Is on the Rise and What Can Be Done.”



Optometrist adjusts trial lenses on Guyanese girl in Georgetown, Guyana

Credit: Airman 1st Class Perry Aston, U.S. Air Force

linked to various environmental influences. There is also some evidence that suggests that a person can inherit the condition if both parents have Myopia. While Myopia is often easily corrected with glasses, the potential consequences of this disease expansion could be immense. The first concern is the rapid expansion of adult-onset blindness as a result of the condition, as Myopia is projected soon to become the world’s leading cause of blindness.⁸⁴ Coupled with other health concerns such as retinal detachment, Myopia’s sudden expansion will mean a similar expansion in the costs of visual care each year. With only 27 percent of the world’s population suffering from the condition, estimates place the global economic burden at USD 244 billion each year. This number will increase with the rise in the number of myopic citizens worldwide.⁸⁵ Myopia represents a unique challenge for the global visual healthcare system and will require more resources. This could reduce care for other visual conditions if not addressed properly.

Visual healthcare is often not included in universal health coverage policies like oral healthcare. Eye care is often left to private insurance.⁸⁶ The WHO, in its recent World Vision report and in efforts to expand eye coverage has stated its wishes to see eye care be a part of the global pledge towards universal health coverage.⁸⁷ They aim to expand accessibility to the service to help reduce the burden on patients and the rapid expansion of these visual ailments. It will do this by allowing doctors to detect these conditions more quickly. However, while many countries have pledged to follow the UN and WHO’s goals for sustainable development and to help foster a robust universal health coverage system, many gaps remain.⁸⁸ This includes the uneven dispersion of the visual health burden. Already, there has been a clear concentration of the sudden expansion of eye care conditions in East Asia, and this is projected to continue.⁸⁹ To slow the projections of increased visual impairments, it will be critical to ensure universal visual

84 Thomson, “Why Short-Sightedness Is on the Rise and What Can Be Done.”

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87 WHO, *World Report on Vision*.

88 Matthew J. Burton et al., “The Lancet Global Health Commission on Global Eye Health: Vision beyond 2020,” *The Lancet Global Health* 9, no. 4 (April 1, 2021): e489–551, [https://doi.org/10.1016/S2214-109X\(20\)30488-5](https://doi.org/10.1016/S2214-109X(20)30488-5).

89 Koichi Ono, Yoshimune Hiratsuka, and Akira Murakami, “Global Inequality in Eye Health: Country-Level Analysis From the Global Burden of Disease Study,” *American Journal of Public Health* 100, no. 9 (September 2010): 1784–88, <https://doi.org/10.2105/AJPH.2009.187930>.

healthcare coverage.⁹⁰

Addiction Care and Stigma

In recent years, drug usage and addiction have increased significantly. The UN Office on Drugs and Crime (UNODC) estimates that there are 35 million people globally who suffer from drug-related disorders and require some form of treatment.⁹¹ This has placed enormous pressure on treatment services already struggling to deal with an increasingly large patient population. This has been fuelled in part by the raging opioid crisis, which has hit many parts of the world. As far back as 2017, the World Drug Report found that the death toll increased to 585,000 deaths that year.⁹² Throughout the COVID-19 pandemic, drug use increased dramatically. This trend has continued, with large increases in drug use reported by UNODC in 2024.⁹³ Despite record numbers of patients and users, little to no additional resources are being allocated to addiction services. In the United States and Canada, little is taught to medical or nursing students about how to identify or treat substance abuse disorders.⁹⁴ This lack of preparation remains costly for healthcare systems and patients, requiring serious reform in the years to come.

How to treat addiction and the stigma surrounding addiction are still some of the most greatly contested issues of healthcare. There remain various philosophies on how to rehabilitate addicts and help them recover from their addictions properly. One of the very first large-scale organizations aimed at helping addicts recover from substance abuse was Alcoholics Anonymous (AA), which aimed to help alcoholics move past addiction.⁹⁵ AA has helped many of those suffering

from addiction find a way out of their substance abuse. The organization helped to inspire a similar program for narcotics called Narcotics Anonymous. In the 1950s, the Minnesota Model was developed to help treat those suffering from alcohol abuse in a program similar to AA. However, the Minnesota Model also provided a support network of hospital staff.⁹⁶ In the Minnesota Model, treatments were 28 days long. During these 28 days, doctors and nurses helped gradually ease patients off of the addictive substance. By the 1950s, coupled with effective one-on-one counseling and group counseling with psychiatrists and social workers, the Minnesota Model had shown itself to be a highly effective tool for rehabilitation.⁹⁷ Both the Minnesota Model and AA also provided sponsors to those seeking treatment. These sponsors were people who had undergone addiction recovery themselves and helped those in the program.⁹⁸ This ensures that they remain active in their recovery and that patients in the program have someone who understands what they are going through.⁹⁹

Unfortunately, as drug addiction continued to grow in the 1950s and 1960s, civil authorities began to use asylums and other institutions to imprison addicts. The idea was that addiction was a social disease and may spread to others. By forcing them to seek help, these authorities thought that they could course-correct those struggling with addiction.¹⁰⁰ Ultimately, this proved quite unsuccessful, as the relapse rate was high among those released. There was also a sudden overcrowding of these institutions due to a push by local authorities to simply take the drug problem off the streets by any means necessary.¹⁰¹ Researchers then devised new methods focused on the usage of pharmacotherapy to help treat patients, especially in outpatient environments. This

90 International Agency for the Prevention of Blindness, “Eye Health and Universal Health Coverage.”

91 United Nations Office on Drugs and Crime, “Executive Summary of the World Drug Report” (United Nations Office on Drugs and Crime, June 2019), https://wdr.unodc.org/wdr2019/prelaunch/WDR19_Booklet_1_EXECUTIVE_SUMMARY.pdf.

92 United Nations Office on Drugs and Crime.

93 United Nations Office on Drugs and Crime, “Key Findings and Conclusions of the 2024 World Drug Report.”

94 Administration (US) and General (US), “HEALTH CARE SYSTEMS AND SUBSTANCE USE DISORDERS.”

95 Michael Gross, “Alcoholics Anonymous: Still Sober After 75 Years,” *American Journal of Public Health* 100, no. 12 (December 2010): 2361–63, <https://doi.org/10.2105/AJPH.2010.199349>.

96 Henninger and Sung, “History of Substance Abuse Treatment.”

97 Henninger and Sung, “History of Substance Abuse Treatment.”

98 Christopher C. H. Cook, “The Minnesota Model in the Management of Drug and Alcohol Dependency: Miracle, Method or Myth? Part I. The Philosophy and the Programme,” *British Journal of Addiction* 83, no. 6 (1988): 625–34, <https://doi.org/10.1111/j.1360-0443.1988.tb02591.x>.

99 D. J. Anderson, J. P. McGovern, and R. L. DuPont, “The Origins of the Minnesota Model of Addiction Treatment—a First Person Account,” *Journal of Addictive Diseases* 18, no. 1 (1999): 107–14, https://doi.org/10.1300/J069v18n01_10.

100 Kamron A. Fariba and Vikas Gupta, “Involuntary Commitment,” in *StatPearls* (Treasure Island (FL): StatPearls Publishing, 2024), <http://www.ncbi.nlm.nih.gov/books/NBK557377/>.

101 Megan Testa and Sara G. West, “Civil Commitment in the United States,” *Psychiatry (Edgmont)* 7, no. 10 (October 2010): 30–40.

involved using methadone, a drug used to treat severe pain, as a tool to help prevent the early stages of drug withdrawal and help ease patients through the detoxification process.¹⁰² While it was met with initial resistance by some governments and agencies, with a notable example being the Food and Drug Administration (FDA) in the United States, its effectiveness won out. It became part of a standard regimen for substance abuse treatment.¹⁰³

Drug abuse and criminalization are often connected. An important case study from Portugal in 2001 demonstrates a drastic change in drug policy. In 2001, Portugal decriminalized drug possession.¹⁰⁴ In the early 1990s, Portugal was suffering from a drug epidemic centered around heroin abuse, with estimates of up to one in every 100 adults addicted to heroin. Drug overdoses and other related diseases became commonplace. For this reason, the government decided to embark on what many at the time considered a radical policy.¹⁰⁵ This decriminalization meant that possession of drugs was no longer a crime and was now an administrative violation; however, drug trafficking remained a crime. This rare combination allowed the Portuguese state to open user centers where Portugal’s drug-using population could use their drugs in a safe environment.¹⁰⁶ This led to a dramatic reduction in the number of HIV and AIDS cases related to injection and drug usage. In 2001, Portugal accounted for 50 percent of the EU’s HIV cases related to drug injections. In 2020, however, it accounted for only 1.7 percent.¹⁰⁷ By 2006, drug-related deaths had also decreased dramatically—by about 66 percent since 2000.¹⁰⁸ It is important to note, however, that in 2008,

the Portuguese system did change due to concerns regarding drug trafficking. The legal limit for individual possession was ten days of individual consumption, and the Supreme Court of Portugal criminalized possession above this limit.¹⁰⁹ Still, Portugal ranks as one of the lowest countries for overall drug usage across the EU.¹¹⁰ For instance, Scotland, a country with half the population of Portugal, had 1,300 drug-related deaths compared to Portugal’s 74.¹¹¹ Many within the country largely view the policy as a success despite its radical stance. The case remains strong for Portugal’s position. Emphasizing treating patients and harm reduction has worked well for the country, but its philosophy remains to be seen and practiced outside of the country.

Stigma remains within healthcare relating to drug use and substance abuse. This stigma, unfortunately, makes it far more difficult to get those suffering from the effects of substance abuse to seek appropriate care. In New York City, recent studies found that over 80 percent of those suffering from substance abuse disorders felt they received some form of enacted stigma within healthcare.¹¹² As a result, those who initially seek treatment for their substance abuse disorder often are scared to return to health facilities. This exacerbates the problem for both patient and physician, resulting in those patients only returning once their addiction has become extremely severe. At that point, a once-treatable issue has often become unmanageable. Words and attitudes matter. Regions that report lower stigma often see improved patient outcomes, lower substance abuse, and higher rates of rehabilitation.¹¹³ The enacted stigma mentioned by patients often comes in the form of discrimination and

102 J. T. Payte, “A Brief History of Methadone in the Treatment of Opioid Dependence: A Personal Perspective,” *Journal of Psychoactive Drugs* 23, no. 2 (1991): 103–7, <https://doi.org/10.1080/02791072.1991.10472226>.

103 Engineering National Academies of Sciences et al., “The History of Methadone and Barriers to Access for Different Populations,” in *Methadone Treatment for Opioid Use Disorder: Improving Access Through Regulatory and Legal Change: Proceedings of a Workshop* (National Academies Press (US), 2022), <https://www.ncbi.nlm.nih.gov/books/NBK585210/>.

104 Oliver Balch, “It Beats Getting Stoned on the Street: How Portugal Decriminalised Drugs – as Seen from the ‘Shoot-up Centre,’” *The Guardian*, January 25, 2024, sec. World news, <https://www.theguardian.com/world/2024/jan/25/it-beats-getting-stoned-on-the-street-how-portugal-decriminalised-drugs-as-seen-from-the-shoot-up-centre>.

105 Balch.

106 Transform Drug Policy Foundation, “Drug Decriminalisation in Portugal: Setting the Record Straight,” Transform, 2021, <https://transformdrugs.org/blog/drug-decriminalisation-in-portugal-setting-the-record-straight>.

107 Transform Drug Policy Foundation.

108 Glenn Greenwald, “Drug Decriminalization In Portugal: Lessons for Creating Fair and Successful Drug Policy” (Cato Institute, 2009), https://www.cato.org/sites/cato.org/files/pubs/pdf/greenwald_whitepaper.pdf.

109 Ximene REGO et al., “20 Years of Portuguese Drug Policy - Developments, Challenges and the Quest for Human Rights,” *Substance Abuse Treatment, Prevention, and Policy* 16, no. 1 (July 17, 2021): 59, <https://doi.org/10.1186/s13011-021-00394-7.2>

110 Transform Drug Policy Foundation, “Drug Decriminalisation in Portugal.”

111 Balch, “It Beats Getting Stoned on the Street.”

112 Brandon Muncan et al., “They Look at Us like Junkies’: Influences of Drug Use Stigma on the Healthcare Engagement of People Who Inject Drugs in New York City,” *Harm Reduction Journal* 17, no. 1 (July 31, 2020): 53, <https://doi.org/10.1186/s12954-020-00399-8>.

113 Committee on the Science of Changing Behavioral Health Social Norms et al., “Understanding Stigma of Mental and Substance Use



Pill bottle with pill fallen out
 Credit: Yinan Chen

prejudice, resulting in different quality of treatment, leaving those vulnerable patients worse off.¹¹⁴ One patient, Carla, a woman in her forties, described overhearing a conversation between doctors in an ER department after seeking care for a persistent rough cough. “I overheard them when I was in the ER, right before I was admitted last time for pneumonia. One of the doctors who was deciding on what medication to give me said, ‘Well, I don’t think we have to worry about giving her too many benzos; look at everything she’s on.’ I’m overhearing this, and I’m like, ‘Okay, you know that I can hear what you’re saying.’”¹¹⁵ Many patients fear an interaction such as this one upon seeking treatment. Ultimately, there remains a lack of research into addiction services, with few focusing on the stigma or services related to one specific form of substance abuse.¹¹⁶ Until there is substantial reform, patients will continue to suffer discrimination.

Elder Care

As the world continues to grow older and older, there is an ever-pressing need to find a long-term solution for caring for the elderly. Nursing homes and long-term care facilities began to spring up in Western Europe in the early 1600s, with the almshouses in the United Kingdom and Hotel Dieux in France.¹¹⁷ These facilities aimed to provide housing and the barest levels of support to the elderly. Their philosophy was that they should support people who had worked their whole lives and still could not afford care in old age.¹¹⁸ This style of thinking and philosophy continues to hold today, with many societies viewing care for the elderly as one of the principal responsibilities of their governments. By the mid-1800s in the United States, the establishment of care homes was beginning. These early charitable homes were founded by Catholic and Jewish organizations aimed at providing support for elderly women, who were often widows and could not earn a living alone.¹¹⁹ However, these charitable homes were often in poor

Disorders,” in *Ending Discrimination Against People with Mental and Substance Use Disorders: The Evidence for Stigma Change* (National Academies Press (US), 2016), <https://www.ncbi.nlm.nih.gov/books/NBK384923/>.

114 Janet Zwick, Hannah Appleseth, and Stephan Arndt, “Stigma: How It Affects the Substance Use Disorder Patient,” *Substance Abuse Treatment, Prevention, and Policy* 15, no. 1 (July 27, 2020): 50, <https://doi.org/10.1186/s13011-020-00288-0>.

115 Muncan et al., “They Look at Us like Junkies.”

116 Stephen P. Hinshaw, “Stigma Related to Substance Use and Addiction: The Long Journey Ahead—Commentary on Krendl and Perry (2023),” *Psychological Science in the Public Interest*, December 14, 2023, <https://doi.org/10.1177/15291006231202775.S>

117 John E. Morley, “A Brief History of Geriatrics,” *The Journals of Gerontology: Series A* 59, no. 11 (November 1, 2004): 1132–52, <https://doi.org/10.1093/gerona/59.11.1132>.

118 Morley, “A Brief History of Geriatrics.”

119 Kevin C. Fleming, Jonathan M. Evans, and Darryl S. Chutkan, “A Cultural and Economic History of Old Age in America,” *Mayo Clinic Proceedings* 78, no. 7 (July 2003): 914–21, <https://doi.org/10.4065/78.7.914>.

conditions and struggled to operate due to lack of funding. This began to change, as many governments adopted policies for old-age pensions and assistance providing money directly to senior citizens.¹²⁰ This allowed the elderly to use these funds to find assistance.

The business of taking care of the elderly began in the 1930s. Various private home agencies began to spring up, and caring for the elderly became a business. These institutions faced some licensing and regulation; however, very little regulation of this industry existed well into the 1950s.¹²¹ This changed in the early to late 1970s when stricter regulations for nursing homes came into effect. This improved conditions in these homes. There was also a shift towards a greater medical focus at nursing homes. This then led to the creation of various quality-of-life assessment tools, such as the Resident Assessment Instrument (RAI).¹²² The RAI was a complex tool that government officials and compliance officers could use to assess the quality of care at nursing homes thoroughly. In response to the RAI, a French version called Geronte was launched as a simpler version of the RAI.¹²³ These assessments led to the creation of modern nursing homes, with the United States sending up to 70 percent of their elders to such facilities.¹²⁴

Elder care is now an important area of focus for policymakers due to the aging population and increased life expectancy. By 2050, the WHO estimates that the proportion of the world’s elderly population will nearly double, moving from 12 percent in 2015 to 22 percent.¹²⁵ Trends point to an ever-

growing elderly population that will continue to pressure already stressed long-term care facilities. Furthermore, higher numbers of nursing home residents are under the age of 65. Many of them reside in nursing homes due to mobility issues or because they have nowhere else to go.¹²⁶ Some researchers have seen the average age of nursing home residents fall by more than two years (81.1 to 78.8).¹²⁷ Unfortunately, most long-term care facilities are not set up for younger residents. There is also little to no support for those suffering from mental health issues or disability.¹²⁸ These factors have created a surge in demand for nursing homes. However, governments have been slow to act across the globe. From 2020 to 2023, the number of countries with a framework for long-term care decreased despite UN support for increasing elder care during their declared decade of “Healthy Ageing.”¹²⁹ Of the six regions evaluated by the WHO, four saw decreases in the number of countries with long-term care strategies.¹³⁰

Outside of the nursing home, much of the healthcare sector fails to provide adequate care for the elderly. This is often due to many reasons, including lack of education on the part of the patient and physician, limited resources, mental illness, and discrimination. One of the largest challenges of elder care is the number of medical concerns that come with aging. Concerns about reduced mobility, difficulty breathing, and other chronic conditions due to lifestyle often occur during older age and require continuous care. Management of chronic conditions is often difficult, and disagreements between patients and physicians are common. Furthermore,

120 Fleming, Evans, and Chutka.

121 Engineering National Academies of Sciences et al., “Evolution and Landscape of Nursing Home Care in the United States,” in *The National Imperative to Improve Nursing Home Quality: Honoring Our Commitment to Residents, Families, and Staff* (National Academies Press (US), 2022), <https://www.ncbi.nlm.nih.gov/books/NBK584647/>.

122 John N. Morris et al., “Designing the National Resident Assessment Instrument for Nursing Homes1,” *The Gerontologist* 30, no. 3 (June 1, 1990): 293–307, <https://doi.org/10.1093/geront/30.3.293>.

123 J. M. Vetel, “Geronte: A Low-Cost Tool to Increase the Quality of Care of Elderly Persons,” *Danish Medical Bulletin Suppl* 5 (October 1987): 93–95.

124 National Academies of Sciences et al., “Evolution and Landscape of Nursing Home Care in the United States.”

125 WHO, “Ageing and Health,” October 1, 2022, <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>.

126 Peter Goffin, “Thousands of Under-65 Adults with Physical Disabilities Are Being Forced into Ontario Nursing Homes: Ministry Data,” *Toronto Star*, July 9, 2017, https://www.thestar.com/news/gta/thousands-of-under-65-adults-with-physical-disabilities-are-being-forced-into-ontario-nursing-homes/article_0e898544-a18a-55ac-a1bc-668e1edeea3d.html.

127 M. Barton Laws et al., “Prevalence of Serious Mental Illness and Under 65 Population in Nursing Homes Continues to Grow,” *Journal of the American Medical Directors Association* 23, no. 7 (July 2022): 1262–63, <https://doi.org/10.1016/j.jamda.2021.10.020>.

128 Ari Ne’eman, Michael Stein, and David Grabowski, “Nursing Home Residents Younger Than Age Sixty-Five Are Unique And Would Benefit From Targeted Policy Making: Study Examines Policies That Could Benefit Nursing Home Residents Younger than Sixty-Five,” *Health Affairs* 41 (October 1, 2022): 1449–59, <https://doi.org/10.1377/hlthaff.2022.00548>.

129 WHO, “Ageing and Health.”

130 WHO, “Number of Countries That Have a Long-Term Care Policy / Plan / Strategy / Framework (Stand-Alone or Integrated within an Ageing and Health Plan),” WHO Data, 2023, [https://platform.who.int/data/maternal-newborn-child-adolescent-ageing/indicator-explorer-new/mca/number-of-countries-that-have-a-long-term-care-policy-plan-strategy-framework-\(stand-alone-or-integrated-within-an-ageing-and-health-plan\)](https://platform.who.int/data/maternal-newborn-child-adolescent-ageing/indicator-explorer-new/mca/number-of-countries-that-have-a-long-term-care-policy-plan-strategy-framework-(stand-alone-or-integrated-within-an-ageing-and-health-plan)).

many elderly people do not want to move into rehabilitative or long-term care facilities. However, physicians often recommend this.¹³¹ Balancing patient comfort and the desire to remain at home with the best medical practice is difficult. There is little training on how to have these conversations. In addition, at-home care for patients often needs to be improved. When patients are labeled with “failure to cope,” it means that they are unable to care for themselves at home. However, this is exacerbated by the failure to support these patients.¹³² Those providing home visits and at-home care are often separate from primary physicians who give a diagnosis to patients. This causes a mismatch between care routines and recommendations from physicians.

Mental illness, especially dementia, delirium, and depression, are more common in elderly patients. Caregivers and family sometimes avoid treating other health issues because they fear that they will worsen the patient’s mental health conditions.¹³³ Especially in emergency rooms, patients suffering from a mental illness might be combative and distressed. This impacts the patient’s and the emergency department’s ability to function. However, when other health issues are overlooked, they can become more severe and turn life-threatening. They can also impact the patient’s quality of life. Suppose the elderly population is going to receive the care it deserves. In that case, there will need to be a joint effort by healthcare administrators to improve conditions and support systems for them. Today, less than half of the elderly population feels satisfied with their care and their living facility.¹³⁴ Serious action is required to bring elder care to the standard it deserves. Stories exist in multitudes of the children of elderly parents trudging through the complexity of the medical system. Without family

intervention on their behalf, the care of these patients is often lacking.¹³⁵ Greater education in both clinical and medical school environments is important, especially as the number of elderly patients continues to grow.¹³⁶

Current Status

Current Access to Nonessential Healthcare around the Globe

When discussing “nonessential” healthcare around the globe, it is important to consider the varying levels of access to each healthcare sector in different regions. In various countries, there are very different systems in place for each healthcare sector. Understanding these established systems helps identify where improvements need to be made. One of the most important developments in the family medicine space has been the acceptance of their role as long-term care providers for patients across the globe. When family doctors can act as the frontline for the majority of healthcare interactions, patient satisfaction improves, and healthcare costs go down.¹³⁷ Costs are brought down most readily because family doctors act as gatekeepers in many healthcare systems. This means that patients must see a family doctor before seeing a specialist. This is most notable in countries such as Turkey or the United Kingdom, where registration with a family doctor is mandatory. Patients cannot access other services without their referrals.¹³⁸ However, this is coupled with a longer training period and greater emphasis on family medicine in both countries’ healthcare networks. In comparison, other countries use the Bismarck Model created in Germany. The Bismarck Model involves a large public insurance that allows for more flexibility in the system.¹³⁹ This

131 Marianne Kumlin et al., “Elderly Patients with Complex Health Problems in the Care Trajectory: A Qualitative Case Study,” *BMC Health Services Research* 20 (June 29, 2020): 595, <https://doi.org/10.1186/s12913-020-05437-6>.

132 Ryan A. Luther, Lisa Richardson, and Allan S. Detsky, “Failure to Cope,” *CMAJ* 190, no. 17 (April 30, 2018): E523–24, <https://doi.org/10.1503/cmaj.180263>.

133 Alex Glover et al., “Diagnoses, Problems and Healthcare Interventions amongst Older People with an Unscheduled Hospital Admission Who Have Concurrent Mental Health Problems: A Prevalence Study,” *BMC Geriatrics* 14, no. 1 (April 2, 2014): 43, <https://doi.org/10.1186/1471-2318-14-43>.

134 Ding et al., “The Satisfaction of Elderly People with Elderly Caring Social Organizations and Its Relationship with Social Support and Anxiety during the COVID-19 Pandemic.”

135 Howard Gleckman, “Why Old People Get Such Bad Medical Care,” *Forbes*, May 6, 2015, sec. Personal Finance, <https://www.forbes.com/sites/howardgleckman/2015/05/06/why-old-people-get-such-bad-medical-care/>.

136 Diachun, Charise, and Lingard, “Old News.”

137 Mona Jeffreys et al., “Financial Barriers to Primary Health Care in Aotearoa New Zealand,” *Family Practice*, September 11, 2023, cmad096, <https://doi.org/10.1093/fampra/cmad096>.

138 Roghayeh Bakhsh et al., “Family Physician Model in the Health System of Selected Countries: A Comparative Study Summary,” *Journal of Education and Health Promotion* 9 (June 30, 2020): 160, https://doi.org/10.4103/jehp.jehp_709_19.

139 Theodore H. Tulchinsky, “Bismarck and the Long Road to Universal Health Coverage,” *Case Studies in Public Health*, 2018, 131–79,

has allowed patients to access specialists or hospital physicians directly, bypassing their family doctor system. This can strain the system, where patients who a family doctor could have treated take up the time of a specialist. Balancing the desires of patients to directly access specialists and the need to take a more moderate approach to avoid cost runups is important. In many countries, the gatekeeping role of family doctors can create tension between them and their specialist colleagues, especially if pay is based on the number of patients seen.¹⁴⁰ Giving family doctors the right to dictate patient access could hold large pay implications for specialists. Ultimately, debate continues around the exact nature of the family doctor’s role and whether they should hold this power despite its proclaimed benefits.

Oral healthcare around the world varies significantly from region to region as well. One of the most important indicators for access is oral health’s inclusion in national and other governmental health packages. According to the WHO, of the 111 countries whose data is available, only 19 of them lack oral healthcare as a part of their national health packages.¹⁴¹ This displays the increased attention given to oral healthcare. This is partially due to the WHO’s oral health initiatives that began in 2022.¹⁴² However, these efforts are impacted by the lack of dentists in many parts of the world, most notably in Sub-Saharan Africa and Southern Asia. In these regions, the number of dentists per 10,000 people ranges from 0.04 to 2.57.¹⁴³ This is far below the WHO’s recommendation. Despite this, spending on oral healthcare remains quite high. The average country spends USD 100 million each year on oral healthcare. However, this varies greatly among different

countries.¹⁴⁴ Oral healthcare continues to present a significant financial burden for many countries around the world, making treatment for many diseases difficult despite the presence of well-developed cures and preventive measures. This can be seen in the prevalence of untreated cavities in people aged five-plus years. In many countries, around 32 percent of the population suffers from untreated cavities.¹⁴⁵ If oral health is to improve worldwide, it cannot be focused on any singular region. It must be a truly global initiative.

Visual healthcare lags even further behind oral healthcare. This is despite the WHO’s 2019 pledge to increase access to vision healthcare and address the visual health crisis.¹⁴⁶ This can be most notably seen in coverage for eye cataract surgeries. Cataracts are one of the leading causes of blindness and visual impairment worldwide, with close to 100 million suffering from them globally.¹⁴⁷ Cataracts result from the clouding of the eye lens, causing visual impairment. One of the most common courses of treatment for the ailment is surgery.¹⁴⁸ Despite the success of these surgeries, with over 90 percent of patients seeing dramatic improvement of vision post-surgery, cataract surgery continues to be unavailable for a large number of the global population.¹⁴⁹ Today, less than 20 percent of the global population has access to safe and effective cataract surgery. This is far behind the WHO’s goal at the 74th World Health Assembly in 2021.¹⁵⁰ This also heightens deep gender disparities, especially in low-income countries. 90 percent of those living with a visual impairment today live in a middle- or low-income country, with seven percent more women suffering from cataracts without intervention than men.¹⁵¹ Many estimate that current global initiatives will not

<https://doi.org/10.1016/B978-0-12-804571-8.00031-7>.

140 Bakhsh et al., “Family Physician Model in the Health System of Selected Countries.”

141 WHO, “Routine and Preventive Oral Health Care,” 2021, <https://www.who.int/data/gho/data/indicators/indicator-details/GHO/routine-and-preventive-oral-health-care>.

142 WHO, “Landmark Global Strategy on Oral Health Adopted at World Health Assembly 75.”

143 WHO, “Dentists (per 10 000 Population),” 2022, [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/dentists-\(per-10-000-population\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/dentists-(per-10-000-population)).

144 WHO, “Total Expenditure on Dental Healthcare in Million (US\$),” April 20, 2023, [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/total-expenditure-on-dental-healthcare-in-million-\(us-dollar\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/total-expenditure-on-dental-healthcare-in-million-(us-dollar)).

145 WHO, “Prevalence of Untreated Caries of Permanent Teeth in People 5+ Years,” April 17, 2023, <https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-untreated-caries-of-permanent-teeth-in-people-5--years>.

146 WHO, *World Report on Vision*.

147 WHO, “Vision Impairment and Blindness.”

148 National Eye Institute, “Cataracts | National Eye Institute,” November 15, 2023, <https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/ataracts>.

149 WHO, “Report of the 2030 Targets on Effective Coverage of Eye Care” (World Health Organization, 2022), <https://iris.who.int/bitstream/handle/10665/363158/9789240058002-eng.pdf?sequence=1>.

150 Jude Stern et al., “2030 In Sight: The Future of Global Eye Health,” *Eye* 38, no. 11 (August 2024): 1979–80, <https://doi.org/10.1038/s41433-023-02815-2>.

151 International Agency for the Prevention of Blindness, “Vision Atlas,” The International Agency for the Prevention of Blindness, 2020,

keep pace with the demands of the coming decade.¹⁵² Visual healthcare suffers not from a lack of treatment methods but from an unequal distribution of resources and access.

Overall, “nonessential” healthcare has a long way to go, and the WHO and its partner agencies must continue to work to improve healthcare access globally. This includes adhering to its own goals and timelines for improvement and ensuring progress is made despite difficulties. For instance, the WHO’s recent “Oral Health Global Strategy: 2023 - 2030” aims to see a ten percent total reduction in lifetime oral diseases and to see the percent of citizens covered by some form of dental coverage rise to 80 percent.¹⁵³ These goals are commendable but will require diligent action by all of those involved across the globe. In combination, vision health goals for the next decade have been released, recommitting the WHO to combating one of the world’s most overlooked health crises. The current goal is to increase the percentage of the global population with access to cataract surgery by 30 percent by 2030, one which currently is nowhere near being fulfilled.¹⁵⁴ The WHO has set ambitious goals for the establishment of “nonessential” healthcare around the globe, and achieving them will require continual work and cooperation from the international community.

Case Study: Canada’s Family Doctor Crisis

Canada presents a unique case study on the development of the family doctor and the consequences of a system without them. Canada was one of the first countries globally to establish a well-defined family doctor program and their role as the frontline physician.¹⁵⁵ Many provinces require a visit to family doctors before seeing specialists. This means, however,

that limited family doctor access can delay referrals and other necessary appointments.¹⁵⁶ This gate-keeping role has served the Canadian health sector incredibly well over the last decades, reducing hospital visits and rapidly treating diseases identified by family doctors. However, this is no longer the case. The family doctor sector in Canada is undergoing what many call a crisis. Understanding Canada’s fall from a robust primary care model to a system of family doctors on the brink of collapse will be a useful guide. It can guide family medicine’s development globally and its importance to modern healthcare.

Family medicine developed in Canada in the early 1960s to provide a reliable front to the healthcare sector and provide continued care to many Canadians.¹⁵⁷ The passage of the “Medical Care Act” established a single-payer healthcare system, unlike many others.¹⁵⁸ This system kept hospitals and doctors as separate private entities from the government. However, the various provincial governments act as a “single payer” for the various costs of operating these entities. Canadian Medicare has blossomed into a symbol of pride for Canadians, with over 90 percent saying they take pride in the system.¹⁵⁹ Therefore, the maintenance of it has become an issue of national importance. Unfortunately, this system of healthcare has not been fully expanded to all realms of healthcare.¹⁶⁰ Regardless, one of the cornerstones of the Canadian health sector remains the family doctor. Despite the current difficulties within the sector, it remains one of the most important areas of Canadian healthcare today.

One of the pressing concerns with Canadian family medicine today is its aging workforce. In Canada’s largest province, Ontario, 2,100 family doctors are aged 65 and over and are nearing retirement. This presents an enormous challenge for

<https://www.iapb.org/learn/vision-atlas/>.

152 Sam L. Forrest et al., “Does the Current Global Health Agenda Lack Vision?,” *Global Health: Science and Practice* 11, no. 1 (February 28, 2023): e2200091, <https://doi.org/10.9745/GHSP-D-22-00091>.

153 WHO, “Global Strategy and Action Plan on Oral Health 2023–2030” (World Health Organization, May 26, 2024), <https://iris.who.int/bitstream/handle/10665/376623/9789240090538-eng.pdf?sequence=1>.

154 WHO, “Report of the 2030 Targets on Effective Coverage of Eye Care.”

155 Arya et al., “Snapshot of Family Medicine around the World.”

156 Vincent K. Cubaka et al., “A Global Picture of Family Medicine: The View from a WONCA Storybooth,” *BMC Family Practice* 20, no. 1 (September 12, 2019): 129, <https://doi.org/10.1186/s12875-019-1017-5>.

157 Gutkin, “The Specialty of Family Medicine in Canada.”

158 Carolyn Hughes Tuohy, “What’s Canadian about Medicare? A Comparative Perspective on Health Policy,” *Healthcare Policy* 13, no. 4 (May 2018): 11–22, <https://doi.org/10.12927/hcpol.2018.25497>.

159 Danielle Martin et al., “Canada’s Universal Health-Care System: Achieving Its Potential,” *Lancet (London, England)* 391, no. 10131 (2018): 1718–35, [https://doi.org/10.1016/S0140-6736\(18\)30181-8](https://doi.org/10.1016/S0140-6736(18)30181-8).

160 Marina von Stackelberg, “Canada’s Dental Care Plan Begins Today. Here’s What You Need to Know,” *CBC News*, May 1, 2024, <https://www.cbc.ca/news/politics/canadian-dental-care-plan-cdcp-seniors-coverage-begins-may-1-1.7189717>.



Hospital in Etobicoke, Canada

Credit: The Bold and Brash

the country, as young family doctors are not being produced in the same numbers they once were. The number of students choosing family medicine as their specialty has declined for years, citing low pay, long hours, and personal burdens as the top reasons they avoid the profession. Notably, the number of those entering the specialty each year has dropped from close to 40 percent of all students in 2015 to less than 33 percent in 2022.¹⁶¹ This trend of fewer and fewer medical students adopting the profession further exacerbates the aging workforce, with nobody to replace the retiring family doctors. This will impact up to nearly 2.5 million people, or 17 percent of the province's population.¹⁶²

One of the reasons commonly cited among students is the clear burn-out and dissatisfaction with work seen in their older peers. As family doctors near retirement, many slow down their practices and begin to assist with teaching roles for university students. Unfortunately, the picture they tend to paint of the practice is rarely positive.¹⁶³ Medical students cite

the complaints they hear from older practitioners about the excessive workload and burnout as particularly discouraging. Many worry about entering solo practice once they graduate.¹⁶⁴ However, this workload often does not come in the form of new patients or medical concerns; it is via administrative tasks dumped onto their family doctor as a solo practitioner. The average family doctor in solo practice spends, on average, an additional ten hours outside their normal workday on administrative tasks, a burden that many claim has only grown worse.¹⁶⁵ To make matters worse, research out of Nova Scotia, one of Canada's Atlantic provinces, has found that up to 38 percent of all administrative tasks were unnecessary, with that time wasted equivalent to 1.73 million patient visits in the province.¹⁶⁶ These researchers also found that 24 percent of these tasks could be completed by a non-physician, and up to 14 percent could be reasonably eliminated without any loss to quality of care.¹⁶⁷ This enormous burden placed on doctors for tasks that are now being described as unnecessary worsens the

161 Sarah Kester, "Fewer Medical Students Are Pursuing Family Practices, and These Doctors Are Worried," *CBC News*, July 11, 2022, <https://www.cbc.ca/news/canada/ottawa/fewer-medical-students-are-pursuing-family-practices-and-these-doctors-are-worried-1.6516261>.

162 Canadian Medical Association, "Insight: Why Is It so Difficult to Find a Family Doctor?," Canadian Medical Association, March 20, 2024, <https://www.cma.ca/latest-stories/insight-why-it-so-difficult-find-family-doctor>.

163 Sarah Simkin, Simone Dahrouge, and Ivy Lynn Bourgeault, "End-of-Career Practice Patterns of Primary Care Physicians in Ontario," *Canadian Family Physician* 65, no. 5 (May 2019): e221–30.

164 Kester, "Fewer Medical Students Are Pursuing Family Practices, and These Doctors Are Worried."

165 Canadian Medical Association, "Insight."

166 Canadian Federation of Independent Business, "Patients before Paperwork: Nova Scotia's Approach to Improving Patient Care by Reducing Physician Red Tape" (Canadian Federation of Independent Business, January 2023), https://20336445.fs1.hubspotusercontent-na1.net/hubfs/20336445/red_tape/pdfs/Patients_Before_Paperwork_Report_2023.pdf.

167 Colleen M. Flood, Bryan Thomas, and Ella McGibbon, "Canada's Primary Care Crisis: Federal Government Response," *Healthcare*

perception of family medicine as a specialty of burnout and excessive workload. The specialty itself is already considered one of, if not the most complex medical specialties according to a new study from the US due to the number of factors and duration of patient visits and consultations.¹⁶⁸ This and the administrative burden prove too much for many family doctors. This lack of attractiveness is further worsened by two final factors: perception among peers and the lack of financial stability.

The common perception among many medical students is that family medicine is for those who are not capable of joining one of the higher-level specialties and that many of those who enter the practice do so as a fallback.¹⁶⁹ In Canada’s medical schools’ highly intense and competitive environments, being seen as a weaker student can be quite disheartening for many students who will instead seek out different specialties. Further worsening this perception is the lack of support many feel coming from both their federal and provincial governments. At a time of record low students entering the field, those who have opted in feel completely abandoned, with two-thirds of students in family medicine believing that the “government does not perceive family medicine as essential to the health-care system.”¹⁷⁰ This shows the effects of this perception in the record-breaking numbers of residency vacancies for family doctors. In Canada, residency after medical school is required to help train doctors in their specialties within a clinical environment. In the final round of residence matches in Canada, over 100 family medicine residents remained unfilled with other specialties, and no more than two unfilled specialties were seen across the country.¹⁷¹ If family medicine is to grow and adapt within the country, its perception will certainly need reshaping. Otherwise, residence vacancies,

particularly in vulnerable regions such as rural or poorer areas, will likely continue.¹⁷²

The final aspect of Canada’s family doctor woes is the lack of suitable pay for the work that family doctors perform. Family doctors in Canada receive, on average, some of the lowest payments from the various provincial health systems when compared to other specialties.¹⁷³ Family doctors received the third lowest clinical payments of any specialty, slightly higher than psychiatry and physical therapy. This pay gap worsens further when considering that most family doctors have significant overhead expenses from operating their solo practices. The majority of family doctors spend close to the same on overhead expenses as their specialist colleagues while, on average, making 100,000 CAD less than them.¹⁷⁴ The College of Family Physicians in Canada also finds that the overhead expense estimates for family doctors severely underestimate the impact of inflation and price rises during the COVID-19 pandemic. These rises in costs make operating as a family doctor prohibitively expensive, with doctors in the province of Alberta seeing up to 60 percent of their take-home pay taken by unavoidable expenses.¹⁷⁵ Many family doctors feel the financial squeeze of their practice, making it difficult for those who enjoy the work to continue practicing. Many fee structures do not value the work done outside patient appointments, paying for the number of appointments without recognizing the time it takes to treat each one and the various side work that must be completed. On average, family doctors in Canada can expect to make only USD 38 for the most common type of patient visit.¹⁷⁶ In Ontario, Canada’s largest province, pay disparities dissuade family doctors from opening new practices. Some of the former heads and directors of the Ontario Medical Association published an op-

Management Forum 36, no. 5 (September 1, 2023): 327–32, <https://doi.org/10.1177/08404704231183863>.

168 David Katerndahl, Robert Wood, and Carlos Roberto Jaén, “Complexity of Ambulatory Care across Disciplines,” *Healthcare* 3, no. 2 (June 1, 2015): 89–96, <https://doi.org/10.1016/j.hjdsi.2015.02.002>.

169 Hamza, Ross, and Oandasan, “Perceptions of Family Medicine in Canada through the Eyes of Learners.”

170 Mira Mitri, Melissa Nutik, and Milena Forte, “Undervalued and Underappreciated: Perceptions from Future Family Physicians,” *Healthy Debate*, June 18, 2024, <https://healthydebate.ca/2024/06/topic/undervalued-underappreciated-family-physicians/>.

171 Mitri, Nutik, and Forte.

172 Karen Pauls, “Medical Students’ Interest in Being Family Doctors on Decline Even as Provinces Boost Training Spots,” *CBC News*, April 5, 2023, <https://www.cbc.ca/news/health/medical-students-family-doctors-declining-interest-1.6801372>.

173 Lauren Vogel, “Pay Gap Growing between Family Doctors, Other Specialists,” *CMAJ* 189, no. 41 (October 16, 2017): E1300–E1300, <https://doi.org/10.1503/cmaj.109-5508>.

174 The College of Family Physicians of Canada, “Equitable and Fair Remuneration for Family Physicians” (The College of Family Physicians of Canada, November 2023), <https://www.cfpc.ca/CFPC/media/Resources/Health-Policy/HPGR-Equitable-and-Fair-Remuneration-Nov23-EN.pdf>.

175 The College of Family Physicians of Canada, “Equitable and Fair Remuneration for Family Physicians.”

176 Crawley, “Want More Family Doctors in Ontario?”

ed warning family doctors that the province is nowhere near suitable for practice and that if they wish to continue in family medicine, they should move away from Ontario.¹⁷⁷ This paints a dire picture for the future of family medicine within the province, which will only worsen with time to come.

Canada displays many of the current problems currently facing family medicine. While these struggles are not unique to Canada, they are readily exemplified within the country, especially one that historically has had a well-functioning family medicine sector. Administrative burden, low pay, lack of respect among peers, and an aging workforce are some of the most common problems facing the development of family medicine worldwide. In India, the perception surrounding family medicine as a lesser practice and its lack of support has turned many students away from the field in a similar way to the feelings of many Canadian medical students.¹⁷⁸ Despite this perception, the role of family medicine remains ever-important, improving patient outcomes and reducing costs. Family doctors reduce ER visits significantly and provide an essential check against unnecessary medical waste. In Canada today, over half of ER visits could have been handled by a single family doctor.¹⁷⁹ Despite this, less than half of Canadians have access to a family doctor on the same day or by the end of the next day, making visits to hospitals and walk-in clinics a necessity if they seek treatment. This will only continue to worsen as in just the last six months, 160,000 Ontarians lost their family doctor, with similar declines being seen across the country.¹⁸⁰ If the situation is going to improve, it will require the full efforts of both provincial and federal governments. Hopefully, Canada serves as an example of the challenges family medicine faces and what can happen when they all begin to compound one another.

Sustainable Development Goals

The United Nations created the Sustainable Development Goals (SDGs) to foster global development in a meaningful and sustained way.¹⁸¹ These were adopted in 2015 as a universal call to action to end poverty, protect the environment, and allow people to enjoy peace and prosperity to complete their general development and live in healthy conditions. “Nonessential” healthcare has a profound role in these goals due to its impact on many aspects of life. Specifically, improving these healthcare sectors will significantly impact reaching SDGs 2, 3, and 4.

SDG 2: Zero Hunger aims to “end hunger, achieve food security and improved nutrition, and promote sustainable agriculture.”¹⁸² Addressing oral health can help achieve Target 2.2, which aims to end all forms of malnutrition.¹⁸³ Oral disease and tooth decay are some of the leading causes of malnutrition, especially in elderly persons. Older people are more likely to have significant tooth loss, increasing malnutrition risk. This can be seen through Japan, where efforts to address malnutrition and tooth loss were successful when addressed together.¹⁸⁴

SDG 3: Good Health and Well-being have clear connections to “nonessential” healthcare. SDG 3 aims to promote well-being for all and ensure healthy lives for citizens.¹⁸⁵ Specifically, Target 3.4 aims to reduce premature mortality from non-communicable diseases.¹⁸⁶ The world’s largest noncommunicable diseases relate to both visual and oral healthcare.¹⁸⁷ This is largely the result of improper funding and support from many countries. To eliminate this large cause of premature mortality, considerable efforts to reduce the oral disease burden are needed.

177 Nadia Alam, Sohail Gandhi, and Silvy Mathew, “As Family Doctors Our Prescription for Residents Is to Not Set up a Practice in Ontario,” *Toronto Star*, February 20, 2024, https://www.thestar.com/opinion/contributors/as-family-doctors-our-prescription-for-residents-is-to-not-set-up-a-practice-in/article_92430004-d015-11ee-9408-d711cf0d1b55.html.

178 Dasappa et al., “Perception of Family Medicine as the Career Option among Young Indian Graduates.”

179 Nicole Ireland, “Number of Ontarians without Family Doctor Reaches 2.5 Million, College Says,” *CBC News*, July 12, 2024, <https://www.cbc.ca/news/canada/toronto/ontario-family-doctor-shortage-record-high-1.7261558>.

180 Ireland, “Number of Ontarians without Family Doctor.”

181 “The 17 Goals,” United Nations Department of Economic and Social Affairs, accessed August 23, 2024, <https://sdgs.un.org/goals>.

182 United Nations Department of Economic and Social Affairs, “Goal 2 | Department of Economic and Social Affairs,” United Nations Department of Economic and Social Affairs: Sustainable Development, 2024, 2, https://sdgs.un.org/goals/goal2#targets_and_indicators.

183 United Nations Department of Economic and Social Affairs, “Goal 2 | Department of Economic and Social Affairs.”

184 WHO, “The Global Status Report on Oral Health 2022.”

185 United Nations Department of Economic and Social Affairs, “Goal 3 | Department of Economic and Social Affairs,” United Nations Department of Economic and Social Affairs: Sustainable Development, 2024, 3, https://sdgs.un.org/goals/goal3#targets_and_indicators.

186 United Nations Department of Economic and Social Affairs, “Goal 3 | Department of Economic and Social Affairs.”

187 WHO, “The Global Status Report on Oral Health 2022.”

SDG 4: Quality Education seeks to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.”¹⁸⁸ Targets 4.2 and 4.5 aim to expand access to childhood education for vulnerable populations.¹⁸⁹ Visual impairment and blindness continue to be major barriers to children’s receiving quality education. While many of these diseases and disabilities are treatable and preventable, children are often unable to receive the necessary procedures and preventative care.¹⁹⁰ This not only stunts early childhood development but will impact their well-being forever. COVID-19 caused major setbacks in addressing these targets, with participation levels in schools only just returning to pre-pandemic levels.¹⁹¹

Bloc Analysis

Points of Division

The principal divisions between countries when tackling nonessential healthcare are the breadth of coverage and the strength of that coverage. The breadth of coverage refers to the number of sectors of “nonessential” healthcare countries. With many countries only having an established system within one sector, their goals may be focused on establishing another sector and not as focused on improving the existing system. Therefore, the goals of this country would be to make establishing these new systems easier, either through international support or by using new tools established elsewhere for ease or efficiency’s sake. This differs from countries whose aims may be to improve the strength of their already existing coverage. For example, suppose a country believes that sector X is unimportant but has a weak family doctor system. In that case, it may focus on establishing programs to reform and improve the family doctor system. In addition, some countries may have sufficient breadth, covering all the various sectors of “nonessential” healthcare but many lag behind significantly in one and try to

steer the committee towards the sector that is most important to their country’s situation.

While all of the subtopics and sectors of “nonessential” healthcare are critical for healthy and sustainable living, countries vary in their emphasis on each one and the importance of each sector. A country may have a failing dental system but might focus on expanding and improving vision care due to an explosion in the cases of Myopia seen in the population. Delegates must work to improve existing systems and how the WHO can work with countries and their current healthcare networks. They can also focus on initiatives that equip countries with little development in these areas of healthcare and how they can and should establish these new national healthcare systems. Focusing on one sector may also be possible, as well as deciding to improve existing systems globally and expand the sector into regions that currently lack well-established ones. However, it will be important to note that not all discussed subtopics can be expanded and reinforced simultaneously.

Countries with Extensive Coverage and Strong Systems

Countries in this bloc are defined by having extensive coverage and strong systems for the various sectors of nonessential healthcare. For example, they may have robust dental coverage and a well-established addiction care system. Variance in national policy may lend itself to focusing on improving one sector of care or expanding one that has previously been neglected. An example of this may be the Organization for Economic Cooperation and Development (OECD), which generally ranks high in healthcare outcomes but lacks extensive dental coverage.¹⁹² With many member states within the organization providing less than half to none of the dental coverage for their citizens, initiatives to reduce costs for patient care may be an attractive solution without requiring a greater national effort. Many of these countries will be focused

188 United Nations Department of Economic and Social Affairs, “Goal 4 | Department of Economic and Social Affairs,” United Nations Department of Economic and Social Affairs: Sustainable Development, 2024, 4, https://sdgs.un.org/goals/goal4#targets_and_indicators.

189 United Nations Department of Economic and Social Affairs, “Goal 4 | Department of Economic and Social Affairs,” United Nations Department of Economic and Social Affairs: Sustainable Development, 2024, 4, https://sdgs.un.org/goals/goal4#targets_and_indicators.

190 WHO, *World Report on Vision*.

191 United Nations Department of Economic and Social Affairs, “Goal 4 | Department of Economic and Social Affairs,” United Nations Department of Economic and Social Affairs: Sustainable Development, 2024, 4, https://sdgs.un.org/goals/goal4#targets_and_indicators.

192 Tim T Wang, Manu Raj Mathur, and Harald Schmidt, “Universal Health Coverage, Oral Health, Equity and Personal Responsibility,” *Bulletin of the World Health Organization* 98, no. 10 (October 1, 2020): 719–21, <https://doi.org/10.2471/BLT.19.247288>.

on ways that international standards of care may change and improve their systems without a large financial investment. For many of these countries, the direct initiatives of the WHO may have a lessened impact on the systems that have already been developed. Still, efforts elsewhere could be adopted and used to strengthen pre-existing systems. Focusing on cost-saving efforts is one of the most attractive policy initiatives for these member states as healthcare expenditures remain one of the largest expenses for any government.¹⁹³ The WHO will have to work with these countries to help identify any existing problem areas within their systems or persuade them of the importance of the establishment of the sectors that have been previously neglected. The most common of these neglected sectors is addiction care due to its position as a social ailment within many countries, but attitudes towards its improvement vary significantly. Identifying the country's largest priority or global obligation will be crucial for defining what direction or bloc your country belongs to. Examples of countries in this bloc include Germany, Australia, Japan, Canada, France, and the United Kingdom.

Countries with Limited Coverage and Strong Systems

Countries in this bloc are defined by having limited coverage yet strong systems for the various sectors of nonessential healthcare that have been established. For example, a well-organized family doctor network needs dental care. Developing strong systems within one sector, which creates a lack of resources elsewhere, is common. Many countries have chosen to focus on the “nonessential” healthcare sector, which has most affected them, while neglecting the development of other sectors due to their perceived unimportance of cultural values surrounding them. Take, for example, China, in response to its growing vision care crisis, began to make large sweeping reforms to its vision care sector.¹⁹⁴ Expanding cataract surgery availability tremendously and working to combat the explosion in cases of Myopia within the country became a matter of national importance. Simultaneously,

sectors such as addiction care and elder care have been neglected partially due to social values related to them and a lack of federal urgency by the Chinese government. This is a typical example of what one might expect from a country with limited coverage but an overarching robust system. Some forms of crisis or renewed national interest in one healthcare sector prompt large-scale efforts to improve it while others are neglected. This can also be seen in the case of Portugal; their rapid expansion of addiction services was the result of a national outcry over a heroin epidemic.¹⁹⁵ These efforts resulted in the rapid development of their systems within the addiction care network, while many other sectors of Portuguese healthcare have seen little improvement in the last decade. These countries will need to decide what other sector of healthcare is most important to them and how they will begin to establish these systems or improve their otherwise deficient additional sectors of healthcare. The focus of these countries will typically be broader in scope, not necessarily focusing on the improvement of only one sector but instead seeking a more holistic approach to help round out the current limited coverage. Tools such as improved doctor capacity or reprioritization of what healthcare sectors are most important will be crucial for these states. Examples of countries within this bloc include China, Portugal, Russia, Brazil, and Argentina.

Countries with Extensive Coverage and Weak Systems

Countries in this bloc are defined as having extensive coverage yet lacking strength for the various sectors of nonessential healthcare that have been established. For example, a legal requirement for family doctors or their provision but an incredibly low network supply. Countries often fall into this category due to the realization that these sectors are important but cannot currently execute their development. This is often the result of a rapid expansion in healthcare demand without being equipped to handle the rapid increase in patient numbers. It can also be caused by the development of systems with improper support or lack of priority from the

193 Katharina Bucholz, “Charted: The Countries with the Most Expensive Healthcare,” World Economic Forum, February 9, 2023, <https://www.weforum.org/agenda/2023/02/charted-countries-most-expensive-healthcare-spending/>.

194 The Lancet Global Health Commission on Global Eye Health, “The Development of Eye Health Services in China, 1949 - 2020,” Global Eye Health, February 11, 2021, <https://globaleyehealthcommission.org/case-study/the-development-of-eye-health-services-in-china-1949-2020/>.

195 Balch, “It Beats Getting Stoned on the Street.”

government, creating the system on paper without the hard work of ensuring it is fully operational. A great example of this is the country of India, which has a large-scale healthcare network but lacks well-developed systems in many sectors of “nonessential” healthcare. One notable example is its failure to develop a strong family doctor network due to perceptions among students about the practice and systemic barriers to entering the field from medical school.¹⁹⁶ Emphasis on specialists has left the family medicine sector weak, but on paper, it is designed to serve and cover a large portion of the Indian population. These are the common characteristics of countries with these kinds of systems: coverage on paper but often lacking support in reality or providing minimal care with more costly or specialized care not being offered. These countries will focus on finding cost-effective ways to improve their systems or help reform their development networks to make these systems operate more efficiently. In addition, the development of these more specialized forms of care or the expansion of the number of personnel in these fields remains a high priority to help fill in the gaps of what coverage is supposed to be. These countries will typically focus on improving their weak systems through improved equipment or funding to shore up the deficiencies within their system. Countries within this bloc include Colombia, Saudi Arabia, and Cuba.¹⁹⁷

Countries with Limited Coverage and Weak Systems

Unfortunately, many countries around the globe need to improve on both small-scale coverage at best and nonexistent coverage at worst. In addition, the existing systems are often poorly maintained, worsening health outcomes further. Countries in these positions may focus on the initial development of the sector they see as a priority, with WHO efforts focusing on expanding educational resources and hospital capacity related to these fields. A notable example of this is Sub-Saharan Africa,

where family doctor networks are nonexistent, and where they do exist, patient-doctor ratios are astronomical.¹⁹⁸ Here, the development of greater educational opportunities is necessary to allow for the training of more family doctors to fill the large shortages across the region. With many countries lacking any formal educational program for family medicine, WHO resources that focus on helping to facilitate the development of these institutions will be critical.¹⁹⁹ Countries within this bloc will focus on developing educational support and resources to help pave the way to stronger systems and more coverage. In addition, resources dedicated to helping expand healthcare coverage within these countries will be crucial in helping them improve their performance within the various sectors of “nonessential” healthcare. National priorities will be more dissimilar to other countries as they will be far more singularly focused, attempting to reform and improve upon one sector due to limited resources, typically the sector with the greatest national importance or concern. Countries in this bloc include Liberia, Afghanistan, and Malawi.²⁰⁰

Committee Mission

The World Health Assembly (WHA) is the highest decision-making branch of the WHO. Delegations from all WHO member states attend the Assembly and set the agenda for the WHO.²⁰¹ The purpose of the WHO is to connect states, partners, and people to promote health, keep the world safe, and serve vulnerable populations so that everyone can attain the highest level of health. The organization meets annually in Geneva, Switzerland, to review and approve the proposed budget, with the Executive Board following through on executing these plans.

Resolutions and directives from the WHA are not binding to its member states. Thus, the organization requires the cooperation of the various member states to function.²⁰² As

¹⁹⁶ Kumar, “Frequently Asked Questions about Family Medicine in India.”

¹⁹⁷ World Health Organization, “World Health Organization Assesses the World’s Health Systems,” news release, February 7, 2000, <https://www.who.int/news/item/07-02-2000-world-health-organization-assesses-the-world’s-health-systems>.

¹⁹⁸ Flinkenflögel et al., “A Scoping Review on Family Medicine in Sub-Saharan Africa.”

¹⁹⁹ Arya et al., “Snapshot of Family Medicine around the World.”

²⁰⁰ “25 Countries With Limited Access To Health Care,” World Atlas, accessed September 6, 2024, <https://www.worldatlas.com/articles/the-countries-with-the-fewest-doctors-in-the-world.html>.

²⁰¹ WHO, “World Health Assembly,” World Health Organization, 2024, <https://www.who.int/about/governance/world-health-assembly>.

²⁰² Vanessa Seijas, Carlotte Kiekens, and Francesca Gimigliano, “Advancing the World Health Assembly’s landmark Resolution on Strengthening Rehabilitation in Health Systems: unlocking the Future of Rehabilitation,” *European Journal of Physical and Rehabilitation*

a result, any resolution should provide ways to encourage the various member states to participate and follow through on this. Additionally, it is important to note that any decision or action by the WHA must be grounded in science and evidence. The WHA can dispatch WHO groups to chosen countries to assist with the development or improvement within the various health sectors that are most deserving. In addition, the Assembly can guide its partner agencies in researching topics to provide a more thorough analysis. However, the WHA is limited in its scope to health topics. While delegates must be conscious of other sectors and international events, they must act within the mandate of the Assembly to address the lack of access to “nonessential” healthcare worldwide.

The WHA must take immediate and comprehensive action, as increasing wait times and the minimal availability of these key health services underscore an urgent need for a solution. Furthermore, the problem has a disproportionate impact on developing countries, which lack access to both essential and “nonessential” healthcare. Thus, delegates must develop practical solutions that can be implemented in individual countries to promote access to quality “nonessential” healthcare. Without comprehensive solutions, healthcare shortages and chronic diseases will persist, endangering billions worldwide.

Research and Preparation Questions

Your dais has prepared the following research and preparation questions as a means of providing guidance for your research process. These questions should be carefully considered, as they embody some of the main critical thought and learning objectives surrounding your topic.

Topic A

1. Has your country implemented any regulations or policies specifically targeting the control of carcinogen exposure, or is there a lack of formal regulation in this area?
2. How does your country regulate carcinogens? Are there specific substances or industries where carcinogen exposure is most prominent?
3. Has your country participated in any international action related to carcinogen exposure or its regulation? How effective were these measures, and what improvements could be made?
4. What programs and policies have your country implemented in the past? Could these measures be applied globally, or would there be challenges due to economic barriers between countries?
5. Which actors play a significant role in your country's production/ distribution or consumption of carcinogenic substances? What unique difficulties do these groups present when addressing carcinogen regulation and enforcement?
6. How do economic, political, and social issues delay addressing carcinogen exposure? How have these issues affected collaboration with other nations?

Topic B

1. What are the different types of healthcare coverage that citizens have? How much does your nation's healthcare insurance cover regarding the five sub-sectors of non-essential healthcare? Do they cover all, none, or some?
2. Which sector is the weakest in your country? Family doctor accessibility, oral healthcare, eye healthcare, elder care, or addiction healthcare?
3. Is your country part of the OECD or other organizations that aid their healthcare outcomes? If so, how is this aid received, and what part of healthcare does it go toward?
4. Does your country have a large stigma around one or more of these non-essential health care, whether it stemmed from cultural beliefs, racial divides, or long-rooted stereotypes? Are there resources currently available to help those struggling with addiction?
5. Are there any recent initiatives to help develop one of these healthcare sectors in response to certain concerns by the public? Are any specific situations triggering change or improvement among healthcare sectors? Are they effective solutions that can be implemented on an international level?
6. Is your country's healthcare industry growing in size and job growth? How has this impacted the accessibility of non-essential healthcare? What can the WHA do to make healthcare more accessible and allow more students to specialize in these non-essential areas?

Important Documents

Topic A

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The National High School Model United Nations Conference (NHSMUN) is a project of IMUNA, a non-profit organization formally associated with the United Nations Department of Global Communications (UNDGC). IMUNA is dedicated to promoting global issues education through simulation.

Written by Karyn Fu and Ed Hagerman

Edited by Jordan Baker, Ximena Faz, Kellie Fernandez, Ana Margarita Gil, Christian Hernandez, Therese Salomone, and Terry Wang.

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