

# World Medical Journal

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## Editorial

The coronavirus disease 2019 (COVID-19) pandemic and monkeypox virus outbreaks, which are recognized as public health emergencies of international concern, have propelled global dialogue and actions to strengthen pandemic preparedness and response efforts, better understand the human-animal-environment nexus, and critically examine the effects of climate change on population health and health systems. Global leaders are attentive and observe ongoing transmission, with an estimated 630 million COVID-19 cases and 6.5 million deaths worldwide, reported by the World Health Organization (WHO), and an estimated 78,964 monkeypox cases in 110 countries, reported by US Centers for Disease Control and Prevention (CDC) (as of 9 November 2022). Health professionals, who are already experiencing workplace burnout amidst a global health workforce shortage, will need to reflect on existing and emerging global health challenges, leverage expertise across disciplines, and discuss next steps to ensure global health security and health system preparedness.

Pivotal global meetings will occur in November 2022 – including the Group on Earth Observations (GEO) Week in Ghana and the 27th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27) in Egypt – and the topic of climate action will be forefront. The recent launch of the One Health operational definition and the joint plan of action (2022–2026), supported by the WHO, Food and Agriculture Organization (FAO), United Nations Environment Programme (UNEP), and World Organisation for Animal Health (OIE), offers technical guidance to expand One Health activities and capacities across six areas.

The 221st World Medical Association (WMA) General Assembly was held in Berlin, Germany, from 5–8 October 2022. This event highlighted the 75th anniversary of the German Medical Association (GMA), incorporating scholarly addresses by key leaders in the GMA as well as within the local political arena. The official ceremony was held to recognize Dr. Heidi Stensmyren (WMA President, 2021–2022) for her leadership efforts as well as welcome Dr. Osahon Enabulele (WMA President, 2022–2023) to his new position with support for his future action plan. Also, WMA members discussed policy statements, recommended relevant revisions to WMA resolutions, and connected with colleagues. Of notable achievements, the revisions to the WMA International Code of Medical Ethics were adopted, commenting on four elements: 1) duties to the patient; 2) duties to other physicians, health professionals, students, and other personnel; 3) duties

to society; and 4) duties as a member of the medical profession.

In this issue, Dr. Cecil Wilson described the ethical issue of dual loyalty in military medicine. The Latvian Medical Association shared information about the Latvian Congress of Physicians, which was held in September 2022. Dr. Michael Willie and Dr. Siphon Kabane offered an update on the impact of COVID-19 on human immunodeficiency virus (HIV) care in Africa. Mr. Andris Veikenieks presented a historical context of HIV adherence to antiretroviral therapy in Latvia. Dr. Ramona Coelho, Dr. Sonu Gaiind, Dr. Trudo Lemmens, and Dr. John Maher reviewed the Canadian experiences and specific challenges related to the Medical Assistance in Dying legislation. Dr. Skander Essafi, Dr. Lekha Rathod, Dr. Mercy Wanjala, Dr. Andrey Cruz, Dr. Dabota Yvonne Buowari, Dr. Wunna Tun, Dr. Yassen Tcholakov, and Dr. Flora Wendel provided an overview of primary health care systems across eight selected countries and reflections about Clean Air Day for Blue Skies.

We are honored to present this third issue of the *World Medical Journal*, which includes high-quality articles to complement the scientific literature. The collective article commemorates Clean Air Day for Blue Skies, which provides a closer look at activities and reflections across 13 countries and raises awareness and advocates for actions to reduce air pollution. We hope that WMA members will be inspired by these insightful articles and motivated to share their articles in future issues. Together, we represent a medical community of diverse specialties, and with these differences lie our greatest strengths: global leadership to advance scientific knowledge and promote health and well-being.

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## Dual Loyalty/Military Medicine



*Cecil B. Wilson*

Military medicine is described as the ethical issue of dual loyalty, and how it relates to those health care personnel who are both officers in the military and are medical officers such as doctors and nurses. And, it has great expectations and challenges.

Some years ago, I graduated from medical school and took the Hippocratic oath. This oath states that: "I will apply, for the benefit for the sick, all measures which are required, avoiding those twin traps of over treatment and therapeutic nihilism." This phrase embodies *Primum non-nocere* – first, do no harm. My primary loyalty is to the patient, whether in the office, the hospital, in combat or in prison.

The next day, I became a member of the United States Navy as an officer. And I swore to my country that:

"I, \_\_\_\_\_, having been appointed an officer in the Navy of the United States, as indicated above in the grade of \_\_\_\_\_ do solemnly swear (or affirm) that I will support and defend the Constitution of the United States against all enemies, foreign and domestic; that I will bear true faith and allegiance to the same; that I take this obligation freely, without any mental reservation or purpose of evasion; and that I will well and

faithfully discharge the duties of the office upon which I am about to enter; So help me God."

My primary loyalty is to my country.

Medical ethics in times of armed conflicts is identical to medical ethics in times of peace. According to the American Medical Association (AMA)'s Declarations of Professional Responsibility, "It involves respect for human life and the dignity of every individual. Refrain from supporting or committing crimes against humanity and condemn any such acts. Treat the sick and injured with competence and compassion and without prejudice" [1].

Notably, I wear two hats – one to my country as an officer and one to my patients as their doctor. This clinical role may bring conflict between professional duties to a patient and obligations – expressed or implied, real or perceived, to the interest of a third party such as an employer, an insurer or the state – that can violate patient's rights. Dual loyalty, in this case, is simultaneous for obligations expressed or implied to a patient and a third party such as the military.

During my 10 years as a Navy physician, there was never a time when conflict arose. When I asked others in the military service, their impression was that usually when there was a conflict, the problem was eventually resolved. However, in cases that involved an unresolved conflict, it could mean that health care professionals in the military experienced catastrophic consequences for his or her life's work. The following three examples depict public (but anonymous) scenarios of such unfortunate consequences.

*Primary Care Physician (Early Career):* A young female primary care physician deployed in Afghanistan was directed to perform physicals on male detainees prior to their interrogations. Female physicians performing exams on males of Islamic faith can be considered highly embarrassing. As the physician, she refused considering it a problem of her relationship as a doctor to the patient, and she was threatened with court martial. The following day, she subsequently conducted the physicals, although fearing the risk of a court martial and serving a two-year jail term. This doctor had a young daughter and did not want to be sentenced to jail and miss time with her daughter.

*Team Physician (Mid Career):* This physician on duty for critical care transport (flying intensive care unit) stationed outside the United States, was directed to transport four critically ill civilians to another hospital. This transfer referred to leaving a front-line battlefield location to a civilian hospital. The physician onboarding the plane determined that the facilities of the previous hospital were able to provide better patient care, and he directs the pilot to return the plane. The pilot refused as he had different orders, and there was potentially a court martial.

*Navy Nurse (Senior Level):* This nurse refused to force-feed Guantánamo prisoners and was threatened with court martial because he refused to manage tube feedings of prison hunger strikers. He was removed from his duties treating captive patients. He was described as an 18-year active duty sailor, with only three years before retiring, and a one-time submariner who became a nurse and commissioned officer at

the U.S. Navy's urging. At one point, he was threatened with court-martial for insubordination, but the personnel board would not agree to have a court martial, and he was returned to regular duties. The nurse was going to be able to go back to work, and have every reason to believe that he completed his honorable service in the U.S. Navy.

These examples describe three service personnel who volunteered to serve in their military, who were dedicated to patient care, and who expected the service to be rewarding and honorable with a future. However, they have experienced abrupt changes in their careers. First, the primary care physician will face the realization the she did not care for her patients. She will have to decide whether to continue with a career in the military or not. Second, the mid-career physician will be faced with the positive or negative finding that he did meet the order of his commandeering officer. This may lead to a lack of promotion or exclusion from the service. Third, the exonerated nurse will face the realization that there will be some individuals in the military that feel he made the wrong decision. Even in retirement, there will be a message of what he did – rightly or wrongly – rather than capping off a long honorable career.

During the years following the New York attacks on 11 September 2001, and the housing of prisoners at the Naval Base at Guantanamo, there have been conflicts about how the prisoners were treated, including water boarding and tube feeding for prisoners who protested by fasting. Having health personnel (physicians) being directed to participate in these practices is contrary to medical ethics. From 2001 to the present, there have been multiple communications from the AMA to the U.S. President

and the Secretary of Defense of the AMA's position that health personnel should not be ordered to participate.

On 29 January 2013, the Acting Under Secretary of the Department of Defense (DOD) requested that the Defense Health Board (DHB) review the unique challenges faced by military medical professionals in their dual-hatted positions as a military officer and a medical provider (dual loyalty). Two questions were asked for evaluation.

- How can military professionals most appropriately balance their obligations to their patients against their obligations as military officers help commanders maintain military readiness?
- How much latitude should military medical professionals be given to refuse participation in medical procedures or request excusal from military operations with which they have ethical reservations or disagreement?

The DHB is an appointed civilian group, a Federal Advisory Committee to the Secretary of the DOD, providing independent recommendations on matters pertaining to military health and ethics. The DHB subcommittee reviewed current civilian and military health care medical professional practice policies and guidelines as well as medical ethics, education, and training in DOD and civilian institutions.

Panel discussions were held with subject matter experts, and DOD personnel, including active duty, National Guard, Reserves, retired military health care medical professionals and line officers, and healthcare professionals in civilian institutions. Among the civilian organizations, the World Medical Association (WMA), AMA,

American Nurses Association, American Psychiatric Association, and the American Psychological Association were included. As I represented the WMA, my remarks focused on the WMA's history, goals, mission, and purpose, where I moderated extensive discussions and positions of the WMA policies related to medical ethics, including:

- WMA International Code of Medical Ethics [2]
- Statement on the Protection and Integrity of Medical Personnel in Armed Conflicts and Other Situations of Violence [3]
- WMA Statement on Regulations in Times of Armed Conflict Declaration of Tokyo [4]
- Guidelines for Physicians Concerning Torture and other Cruel, Inhuman or Degrading Treatment or Punishment in Relation to Detention and Imprisonment [5]

## Medical Ethics Landscape

- The current medical ethics landscape, recognized by the DOD, includes the following reflection – What is the nature of potential problems that can be seen today? – and the following eight elements:
- Societal and media perceptions of military medical practice
- Varying influences on ethical thought and practices dependent on age, cultural and economic background, and religious beliefs of providers, both military and civilian
- Advances in medical technology

- Determining the roles of patients' providers in decision-making
- Potential conflicts between autonomy and beneficence
- Ethical practices in deployed environment
- Appropriate parameters of patient and healthcare professionals
- Confidentiality and disclosure of Personnel Health Information
- Military mission and chain of command influence and potential conflict of interest

Based on the two-year evaluation of medical ethics, the DHB report entitled, "Ethical Guidelines and Practices for U.S. Military Medical Professionals", highlighted 16 recommendations and was published on 11 February 2015. This report led to the formation of a Defense Medical Ethics Center (DMEC), established at the Uniformed Services University (USU). The DMEC vision is to facilitate a common cultural ethos throughout the Medical Health System (MHS), to serve as a knowledge repository and consultancy resource for all military health professionals, and to provide that:

- Health care personnel will adhere to principles of medical ethics
- Baseline and periodic updates will be disseminated in medical ethics education and training
- Systematic and integrated DOD Medical Ethics Program will be formed
- Consultations will be provided by fully trained experts in medical ethics

- Medical ethics leadership, composed of senior medical ethics in military ethics, will promote ethics conduct and culture across the MHS and DOD

- Health care personnel must protect their patient's privacy

MHS leaders must:

a. Unless it could have an adverse impact on military readiness, unit cohesion, and good order and discipline, the Armed Forces will accommodate individual expressions of belief of a member of the armed forces, reflecting the sincerely held conscience or moral principles of the member.

b. In so far as practicable, the Armed Forces may not use such expression of belief as the basis of any adverse personnel action, discrimination, or denial of promotion, schooling, training or assignment.

c. This paragraph is applicable to individual expressions of belief of a health care professional, reflecting the sincerely held conscience or moral principles of the individual that are grounded in an applicable professional ethics code.

d. No element precludes disciplinary or administrative action for conduct that is proscribed by the Uniform Code of Military Justice, including actions and speech that threatens good order and discipline.

The principles of medical ethics, promoted by the DHB, have now been established, and the MHS embraces the principles of professional ethics of America's health care professions whose members are represented in the military. The ethical code developed by health care professional organizations recognize the responsibility to patients first

and foremost and to society. The MHS views the responsibilities of health care personnel and military professionals as mutually reinforcing, and will

- Provide competent health care with compassion and respect for human dignity and rights. All individuals are treated with respect and tolerance. Discrimination on the basis of age, sexual orientation, gender, race, ethnicity, language, disease, disability, religion, or rank is forbidden because it is inconsistent with the ideals and principles of the MHS.

- Uphold the standards of professionalism. Members must be honest in all professional interactions, support open and honest communication among members of the health care team, and promote the utmost professionalism of all health care colleagues.

- Advocate for the best possible health interests of patients while respecting the law and lawful military authority.

- Respect the rights of patients, colleagues, and other health care personnel, and safeguard patient confidences and privacy within the constraints of the law.

- Complete appropriate education and training, as necessary, and provide competent and ethical health care.

- Support patient-centered decision-making, engaging patients, surrogate decision-makers, and members of the health care team in decisions, as appropriate.

- Use the expertise of the health professions to minimize the incidence and severity of injuries and illnesses.
- Consider the context of local culture, custom, capabilities, and sustainment in overseas humanitarian and disaster relief activities and use available resources to achieve the greatest good for the greatest number.
- Uphold responsibilities under the law in caring for enemy combatants. Responsibilities include, but are not limited to: not participating in or acquiescing to torture or cruel, inhumane or degrading treatment or punishment in the battlefield or detention settings. It is important to report to appropriate authorities all suspected violations of these obligations.
- Regard responsibility to the patient as a primary responsibility, but recognize that there may be extraordinary circumstances associated with the mission or military necessity that may require additional considerations and ethical consideration.

This multi-year process started with the 9/11 attacks, involved the housing of prisoners at the Naval Base in Guantanamo, presented the evolution of the issue of dual loyalty for the uniformed US forces, and

finally lead to the present times. Multiple dedicated individuals and organizations were involved, including DHB, AMA, and WMA leadership.

Dual loyalty brings great opportunities and challenges to which medical ethics is the common denominator.

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## Resolution of the 9th Latvian Congress of Physicians



*Ilze Aizsilniece*

The Latvian Congress of Physicians, which is recognized as the largest medical forum in Latvia, offers physicians from Latvia and other countries to connect every four years and discuss emerging health priorities across Latvia and the world.

Reflecting on history, the first three Latvian Congresses of Physicians were held during the first half of the 20th century, between World War I and II. In efforts to support these global events, three orthopaedic surgeons – Dr. Bertram Zarins (Boston University), Dr. Kristaps Keggi (Yale University), and Dr. Viktors Kalnberzs (Riga Institute of Medicine) organized the First World Congress of Latvian Physicians in Riga in 1989, which became one of the most significant events in Latvia's history. This event paved the way for health care reform and democratic movements within the country.

Supported by the Latvian Medical Association, the subsequent coordination of Latvian Congresses of Physicians provided an overview of medicine in Latvia and globally as well as highlighted key events and milestones within the country's health system. At the 9th Latvian Congress of Physicians, participants contributed to the four-day agenda, where they strengthened cooperation

among colleagues to achieve common goals and launched joint projects in various fields of medicine. Notably, they participated in scientific debates and discussions, which led to the approval of resolutions during the plenary sessions.



Due to the coronavirus disease 2019 (COVID-19) pandemic, the 9th Latvian Congress of Physicians was postponed in 2021 and rescheduled from 21-24 September 2022 in Riga, Latvia. With more than 2,300 participants participating in-person and remotely, this event commemorated the 200th anniversary of the Riga Physicians Society, which was established on 15 September 1822.

This meeting focused on the importance of modern health care in the development of the country's national economy and the public welfare (Photo 1-3). Since well-organized, timely, and effective health care increases the capacity of the health workforce, it is an important guarantor of national security and sustainability.

### Resolution of the 9th Latvian Congress of Physicians

*Qualitative and Accessible Health Care – The Guarantor of the Existence of the Latvian State and Society*

Modern, value-based and patient-centered health care cannot be provided without sufficient funding.

Health care organization and sector reforms must be planned and evaluated comprehensively before they are approved and implemented in practice. The introduction of a new remuneration model for medical personnel is one solution to the health workforce shortage and will enable the successful future implementation of patient-centered health care that focuses on maternal and child health.



*Photo 1. Ceremony performed prior to the opening session of the 9th Latvian Congress of Physicians. Credit: Latvian Medical Association*

Since novel discoveries and advancements in medical science can strengthen clinical management, increase the quality of health care services, and improve clinical competences, increased state support will be essential to expand research in the biomedical and public health disciplines. Continued support for the involvement of Latvian specialists in international collaborations can broaden their clinical competences as well as help recognize the contribution of Latvian medical leaders on the global platform.



The medical treatment process incorporates close interactions between patients and diverse clinical specialties, including physicians, physician assistants, nurses, midwives, physiotherapists, pharmacists, and other allied health care professionals. This process is based on fostering collaboration and mutual understanding, displaying respectful and empathetic attitudes towards each other, and strictly observing ethical principles in practice. Since such interactions cannot be implemented without knowledgeable and responsible patients, restoring health education in school programs and improving health literacy in Latvian society will help increase patient satisfaction and participation in the treatment process.

Since rehabilitation is an integral part of result-oriented, patient-centered health care, it is important to ensure the availability of rehabilitation services at all stages of medical treatment. Rehabilitation may be included as a mandatory component in health care, as it is currently prioritized in psychiatry and oncology services.

Effective primary and secondary disease prevention is essential for ensuring public health. In Latvia,



Photo 2. Dr. Maris Plavins, Vicepresident of the Latvian Medical Association, presented an overview of the past 200 years in medicine in Latvia. Credit: Latvian Medical Association

a sports medicine strategy must be developed to ensure that sufficient human resources and high-quality health care services are available for all citizens, including athletes. In order to emphasize the importance of the prevention of cardiovascular, oncologic, and other diseases, sports medicine physicians should be included on the specialist list for family medicine referrals.

The high professionalism and evaluation of Latvian doctors has been a collegial and independent process since the restoration of Latvia's independence in 1991. The existing system of certification and re-certification is a democratic process, ensured by professional medical

associations and with the support of the Latvian Medical Association. We concur that professional medical associations are recognized with the authorization to validate continuing education, certification, and re-certification measures, which should not be replaced by an official procedure.

Associate degrees and postgraduate education of physicians must be planned, according to the needs of the health system. University graduates and young physicians should have the opportunity to pursue postgraduate training in Latvia, which can reduce their emigration from Latvia to other countries for advanced training and employment opportunities.

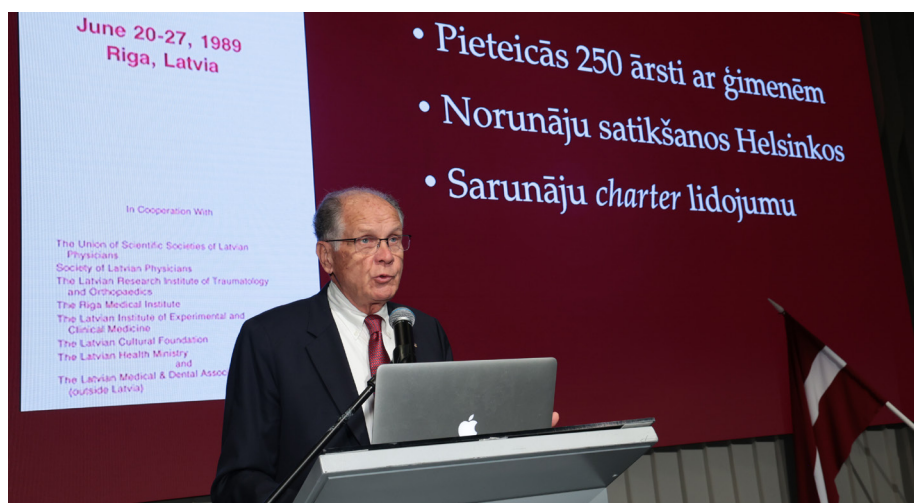


Photo 3. Dr. Bertram Zarins, from Boston University, described key highlights about the first Latvian Congress of Physicians, which was held in 1989. Credit: Latvian Medical Association

It is a timely moment to implement qualitative and functional digital solutions in health care service delivery. Health data analyses offer a foundation for decision-making and evidence for the creation and implementation of new strategies that support health system reform.

Prepared and adopted by delegates of the 9th Latvian Congress of Physicians on 24 September 2022, in Riga, Latvia.

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## Impact of COVID-19 on HIV Care in Africa



*Michael Mncedisi Willie*



*Siphso Kabane*

The human immunodeficiency virus (HIV), the virus that can cause the acquired immunodeficiency syndrome (AIDS), continues to be one of the world's most serious diseases [1]. In 1981, AIDS was first identified in the United States [1,2]. By the end of 2021, 38.4 million people were living with HIV on a global scale [3,4]. The World Health Organization (WHO)'s African Region continues to be the most severely affected, with nearly one HIV infection in every 25 adults (3.4%), or more than two-thirds of the world's HIV-positive population [3].

The Joint United Nations Programme on HIV/AIDS (UNAIDS) initiated the 90–90–90 objectives in 2014, which seeks for 90% of HIV-infected people to be diagnosed by 2020, 90%

to be on antiretroviral medication (ART), and 90% to achieve sustained virologic suppression [5,6]. However, most nations trailed behind these global targets, marking this 2020 deadline as unrealistic [5-7]. The UNAIDS targets for 2025, which were amended in December 2020, called for 95% of individuals living with HIV to know their status, 95% of those who know their status to be on ART, and 95% of those on ART to have viral suppression [8,9]. The HIV targets (cascade) has increasingly been used to direct and assess programs to improve ART coverage within the population, a vital element of treatment prevention strategy [10].

HIV care was adversely impacted as the coronavirus disease 2019 (COVID-19) threatened progress toward achieving the HIV care cascade [11]. These goals are related to reducing new HIV infections among people who are already infected. For this reason, it is necessary to investigate the direct and indirect effects of the pandemic on health care resources, access to HIV services, and the availability of support structures to evaluate the impact of COVID-19 on HIV care [11,12].

### **Impact of COVID-19 on HIV Prevention Measures**

During the pandemic, health care practitioners were compelled to focus primarily on COVID-19 patients, overlooking in many instances equally significant acute and chronic disorders [13]. One of the most noteworthy challenges, especially for low-resource communities and health systems, was a disruption in access to routine HIV-centered healthcare [13-15]. Consequently, HIV screening and diagnosis efforts may have been considerably compromised,

and there were missed opportunities to treat opportunistic infections and slow HIV progression to AIDS [16]. These changes in the provision of health services led to downstream effects on health prevention and promotion measures for global HIV care. According to the US Centers for Disease Control and Prevention, the number of HIV diagnoses fell by 17% in 2020, when compared to reports in the United States from 2019 [17]. Also, the number of HIV tests performed by commercial laboratories dropped by more than 50 percent by the end of April 2020 in Jiangsu, China [18].

Similar phenomena on prevention measures were also observed in some African countries during the COVID-19 pandemic. In South Africa, there was a drastic reduction in voluntary medical male circumcisions (MMC), from 600,000 in 2019-2020 to 130,000 in 2020-2021 [19]. Also, one national study across 65 primary health care clinics found that HIV testing and ART services were severely impacted [20]. Another study that included 2,471 public sector facilities reported that ART services decreased sharply in all provinces in 2020, when compared to 2019, with a slight recovery between COVID-19 waves in October 2020 [21]. Similar observations were noted in countries such as Ghana, where there was also a decline in service uptake, including HIV testing, missed appointments, and defaulting [22].

### **Teenage Pregnancy, Male Condoms, and COVID-19 in South Africa**

It is estimated that young women between ages 15 and 24 become infected with HIV around five to seven years earlier than their male

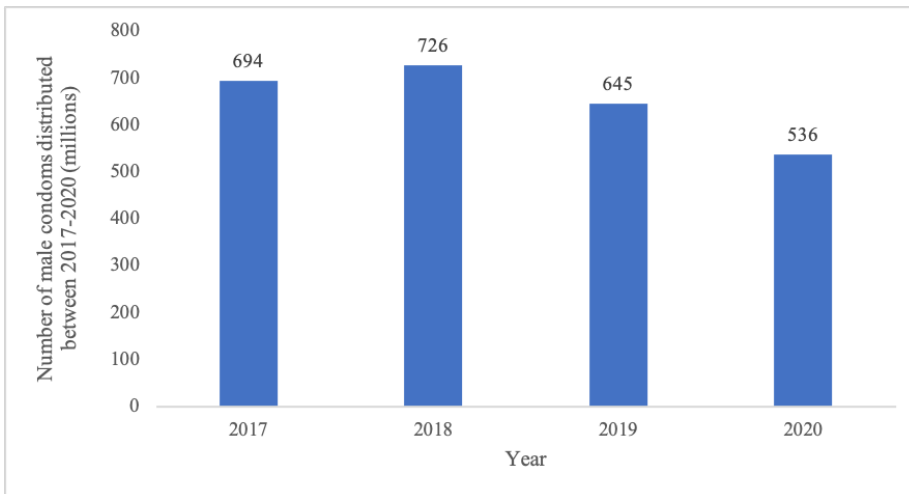


Figure 1. Number of male condoms distributed in South Africa from 2017-2020 (millions), adopted from SANAC [19].

counterparts, and approximately one in every four new infections occurs in young women of this age range [23]. During the COVID-19 pandemic, South Africa, like many African nations, observed a surge in teenage birth rates [24,25]. Just over one-third (33.8%) of all births registered in 2020 were linked to adolescent girls under age 18, making this demographic the single largest contribution to the country’s overall birth rate and increasing their risk of HIV infection. The South African Medical Research Council (SAMRC) reported that 31% of South African girls aged 15-19 did not have access to contraception, and 21% of respondents reported having trouble accessing condoms, as a direct result of the COVID-19 lockdown [25]. Reflecting this challenge, the UNAID report highlighted a significant decline in male condom access for many South Africans between 2019 and 2020 [26,27]. Figure 1 depicts a significant 17% decline in the number of male condoms distributed between 2019 and 2020 [19].

### Effect of COVID-19 on UNAIDS Targets

A few studies illustrate the effect of COVID-19 on the UNAIDS

90-90-90 targets. For example, researchers compared the 90-90-90 targets in 2020, during the COVID-19 pandemic, with the targets spanning the period 2017-2019 in people with HIV and found a considerable loss in 2020, when compared with 2017-2019, due to the COVID-19 pandemic [28]. South Africa is transitioning to the 95-95-95 targets set by the National Strategic Plan (NSP) for HIV, tuberculosis (TB), and sexually transmitted infections (STIs) [29]. Looking ahead to 2023-2028, South Africa is well below the targets,

when compared to neighbouring countries such as Lesotho and Botswana [29,30]. According to the WHO, just nine countries – Botswana, Cabo Verde, Kenya, Lesotho, Malawi, Nigeria, Rwanda, Uganda, and Zimbabwe – are on pace to meet the 95-95-95 targets by 2025 [30]. Figure 2 illustrates that the Kingdom of Eswatini met and exceeded the 95-95-95 targets by September 2022 [31].

### COVID-19 and HIV Vaccines

In nearly four decades of research, scientists have not been able to develop an effective vaccine against HIV. Table 1 illustrates vaccine innovations for 11 diseases [33]. Since the late 1980s, several potential vaccines against HIV have been produced, but none of them have demonstrated effective prevention [34,35]. Particularly, one Thai study reported a 31% lower HIV infection rate in vaccinated individuals than the placebo group, representing the only HIV vaccine experiment that has shown promising findings [35]. Since vaccine licensure requires an efficacy of at least 50%, exploring virus complexity will remain a challenge [34].

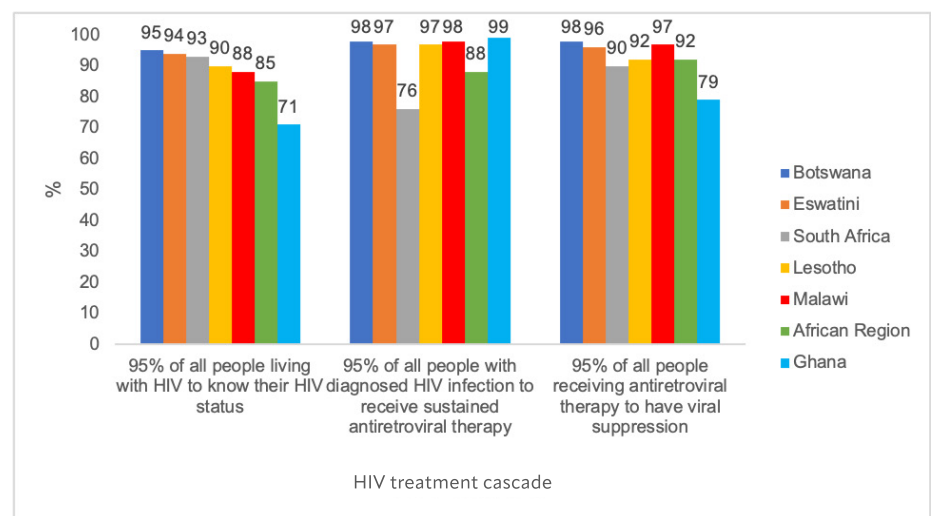


Figure 2. The current status of selected African countries to achieve the HIV 95-95-95 cascade levels by 2025 [31,32].

Disease	Year of disease discovery	Year of vaccine approval (USA)
Malaria	1880	N/A
Tuberculosis	1882	N/A
Meningitis	1889	1981
Polio	1906	1955
Chickenpox	1953	1995
Measles	1953	1963
Hepatitis	1965	1981
Ebola	1976	2019
AIDS	1983	N/A
Coronavirus disease 2019	2020	2020

Table 1. Vaccine innovations on selected diseases from 1880–2022. Source: Vanderslott, Dadonaite, Spooner, and Roser (2013) [33].

“In comparison to SARS-COV-2, the HIV virus is complex, and there’s proof to be a formidable foe,” commented Dr. Linda-Gail Bekker, CEO of the Desmond Tutu Foundation and former president of the International AIDS Society [34].

## Conclusion

The COVID-19 pandemic prompted health leaders to comprehensively examine the evidence-based literature about disinfection virology and immunology as well as the development of targeted medicine and vaccinations. However, although some African countries prospered during the pandemic, HIV care generally deteriorated across the globe. Disruptions in health care services rendered specific prophylactic measures ineffective, such as voluntary MMC. Most countries have a long way to go before reaching the HIV cascade targets of 95-95-95 by 2025. Botswana and Eswatini are two African countries that are notably leading the way in achieving these objectives. By examining Botswana’s and Eswatini’s experiences, other countries can acquire invaluable insight.

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## HIV Adherence to Antiretroviral Therapy in Latvia: Still a Long Way to Go



*Andris Veikenieks*

Antiretroviral therapy (ART), which was discovered in 1996, effectively reduces the mortality of human immunodeficiency virus (HIV) positive patients by stabilizing the HIV viral load to an undetectable level (e.g. not a source of further HIV transmission). Adherence, which is fundamental for clinical management, depends on patients' understanding of and conscious participation in their disease management. As a chronic disease, effective ART requires regular supervision by health professionals as well as community support to reduce HIV/acquired immunodeficiency syndrome (AIDS) stigma and discrimination.

As a global society, we must reflect on some key questions: How do people living with HIV access ART services? How responsible are their actions towards their own health and society? What barriers prevent them from achieving undetectable levels of HIV viral load, especially with gratuitous health care services and treatment?

### HIV in Latvia

HIV/AIDS cases have been reported in Latvia since 1987, initially in men having sex with men [1]. As a result, mandatory nationwide HIV/AIDS screenings were conducted with high-risk population groups, including

health professionals, blood donors, and prisoners [1]. The first reported case of heterosexual transmission was discovered in one female patient in 1990. Although mandatory screenings were eliminated in 1993, epidemiological surveillance programs were strengthened in collaboration with the World Health Organization and European Center for the Epidemiological Monitoring of AIDS [1]. Until 1997, HIV transmission rates were low and occurred predominantly through sexual contact. However, in 1997, HIV infections were reported among injection drug users (IDUs) and spread very rapidly through shared syringes [1].

In 2001, Latvia reported the highest peak of HIV transmission in one year – 807 new HIV cases. Since then, HIV incidence has decreased each year. On 1 January 2022, health leaders reported that 5,983 Latvians were living with HIV, and 2,450 deaths [2]. In 2020, the three highest HIV transmission rates (per 100,000 people) in the European Union and European Economic Area were reported in Malta (15.9), Latvia (13.5), and Cyprus (11.8) [3].

Since 2010, the Latvian health system has provided free consultations with infectious disease specialists and has reimbursed ART fees to patients throughout their HIV diagnosis and treatment. Over the past decade, the national health system increased ART coverage to Latvian citizens living with HIV albeit financial barriers. During the Latvian financial crisis from 2008–2010, Latvia modified the treatment algorithm for HIV-positive patients, where ART care was initiated with less than 200 CD4+ T cells per mm<sup>3</sup> of blood [4]. Then, in 2015, ART care was revised to start at

350 CD4+ T cells per mm<sup>3</sup> of blood, and subsequently at 500 CD4+ T cells per mm<sup>3</sup> of blood. More recently, in 2018, these specific criteria of CD4+ T cells were eliminated, and all HIV-positive patients were eligible for ART care [5].

Three elements – diagnosis, treatment, and adherence – are important to limit HIV infection across communities. Although significant strides have been accomplished in Latvia, the large number of HIV cases who are not receiving ART care remains a concern. Hence, adherence to ART therapy was crucial for positive health outcomes. By fostering an open and trusting partnership with health professionals, HIV patients could seek comprehensive examinations, receive general lifestyle and nutritional recommendations, and be empowered to take ART medications.

### Next Steps

Moving forward, increased attention to ART adherence will be crucial to meet national goals of the Latvian Ministry of Health as well as the targets and indicators of the 2030 Agenda for Sustainable Development. Although several obstacles to treatment exist, one primary concern is existing HIV/AIDS-related stigma, discrimination, and myths within communities [6]. This stigma can drive denial about HIV infection, which ultimately hinders early diagnosis, creates disbelief about ART benefits, and affects the complex management of HIV/AIDS. One primary question remains: what actions are needed to encourage HIV-positive persons to adhere to ART care in Latvia?

First, it is essential to develop health courses in primary and secondary school programs across Latvia to improve health literacy on HIV/AIDS awareness. These efforts, coupled with community health education campaigns, can strengthen the dissemination of public health advisories. Second, in order to fill the acute shortage of infectious disease physicians and other health professionals across national health institutions, health leaders can develop initiatives that encourage health professional students to pursue advanced training in internal medicine and infectious disease in Latvia.

Third, since some patients live more than 100 kilometers away from health centers, the Latvian health system can expand primary care clinics to reach these marginalized communities. Finally, future collaborations with social services, state, and non-governmental organizations can increase awareness and provide support for the implementation of ART adherence among the HIV-positive community. Non-government organizations play a valuable role in society, where they can help identify knowledge gaps and community needs and connect HIV/AIDS patients and families with outreach resources [4]. Specifically, HIV/AIDS treatment programs that incorporate support groups can have a positive impact on adherence, quality of life, and health outcomes [7].

World AIDS Day, which was founded in 1988, is commemorated annually on 1 December. This 1 December 2022, the Joint United Nations Programme on HIV/AIDS (UNAIDS) promotes

a call to action – “Equalize” theme – to identify and minimize inequalities that hinder access and availability of essential HIV/AIDS services [8].

To support World AIDS Day initiatives, UNAIDS Executive Director Ms. Winnie Byanyima said, “We can end AIDS – if we end the inequalities which perpetuate it. This World AIDS Day we need everyone to get involved in sharing the message that we will all benefit when we tackle inequalities. To keep everyone safe, to protect everyone’s health, we need to Equalize” [6].

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## WMA Members Share Reflections about International Day of Clean Air for Blue Skies 2022



Credit: TR STOK / shutterstock.com

The International Day of Clean Air for Blue Skies (<https://www.cleanairblueskies.org/>) is recognized each year on September 7, and nations increase awareness of the annual theme through community events, media releases, and social media campaigns. The 2022 theme, “The Air We Share”, provides an opportune moment for global citizens to learn about the current state of our atmosphere, understand the anthropogenic influences (e.g. emissions from fossil fuel combustion) on the Earth’s systems, and recognize the intricate links between air pollution, health, and climate [1,2].

Exposure to air pollution, which can increase risk of respiratory and cardiovascular disease, is associated with 6.5 million premature deaths each year [3].

An estimated 99% of the global population is exposed to air that

exceeds the limits reported by the World Health Organization (WHO)’s Global Air Quality Guidelines [3]. These guidelines offer evidence-based recommendations about the limits of harmful exposure to pollutants, including carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ground-level ozone (O<sub>3</sub>), particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), and sulfur dioxide (SO<sub>2</sub>) [3]. Air pollution can significantly alter the delicate balance of the natural ecosystem of plants and animals, by harming soil and vegetation, affecting the reproductive health of animals, and influencing eutrophication in water bodies [4].

Nations should identify best approaches to achieve the targets of two Sustainable Development Goals (SDGs) – SDG 3 as good health and wellbeing (Target 3.9: Reduce the number of deaths and illnesses from hazardous chemicals and air, water

and soil pollution and contamination) and SDG 11 as sustainable cities and communities (Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management). Indirect links, however, can be made between air pollution and SDG 13 (climate action), SDG 14 (life below water), and 15 (life on land). Global leaders can use the One Health concept to guide the development of strategies, policies, and educational programs for air pollution and climate action [5]. In this article, physicians from 13 countries – Austria, Dominican Republic, Hong Kong, Myanmar, Nigeria, Philippines, South Africa, Spain, Sweden, Thailand, Trinidad and Tobago, Turkey, and the United States – shared valuable insight, reflections, and testimonies about the International Day of Clean Air for Blue Skies.

## Austria

Along with climate change, air pollution is one of the greatest environmental threats to human health and livelihoods worldwide. Austria is a country of 8 million residents that is recognized for its low levels of air pollution. Unique factors to Austria include the high proportion (48%) of forests, partial presence of heavy industry, and only one city with over one million residents. Air quality is also positively impacted by the mountainous terrain, where dust mites as well as mold spores or bacteria do not exist at 1,200 and 1,500 meters above sea level, respectively. With reduced levels of asthma and allergy symptoms, citizens and tourists can visit resorts, including special climatic health resorts that promote “healing landscapes” across the country. Notable examples are the resorts located in the Carinthian Nockberge Region of southern Austria.

To Austrian physicians, it is important that good air quality is maintained through the implementation of appropriate local and national measures. In Austria, many initiatives have been developed to reduce ambient and indoor air pollution. In 2021, the Environment Agency Austria launched a national initiative to reduce harmful air pollutants, based on the new WHO guidelines for air quality [6]. In 2022, the Austrian Emission Control Act widely introduced speed limits on highways in order to reduce traffic-related air pollution [7].

Physicians, who have significant clinical and public health expertise across specialties, can serve as important role models and influencers who disseminate key recommendations to citizens across health settings and via social media. As a medical community, our actions

can encourage health leaders and other decision-makers to develop national collaborations as part of an international alliance to combat air pollution.

## Dominican Republic

With air pollution as the leading environmental health threat across the globe, prompt action is needed to examine air quality across all urban and rural communities. The Dominican Republic (DR), a country of 11 million residents, has a highly dense urban population in Santo Domingo (2.9 million), Santiago de los Caballeros (1.0 million), and San Cristóbal (637, 429), according to the DR National Statistics Office. With these demographics, it is important to recognize three key sources of air pollution – power plants, automobiles, and landfill emissions – directly affect air quality and health across the Hispaniola island shared by the DR and Haiti.

First, nitrates, sulfur dioxide, carbon soot, and mercury were toxic substances released from the country’s 10 thermoelectric plants (including the recent construction of “Punta Catalina”). As industries use petroleum, their processes generate sulfuric acid to produce electricity. Second, carbon monoxide concentrations from increased vehicular emissions on roads and highways have greatly impacted the air quality in urban cities (Santo Domingo, Santo Domingo, Santiago de los Caballeros, La Vega, San Cristóbal, San Francisco de Macorís). For example, 310,081 new vehicles were registered during 2021 (compared to 2020), with a total of 5.1 million vehicles in the country [8]. Of this total, these vehicles include motorcycles (55.8%), automobiles (20.3%), sports utility vehicles (11.0%), and cargo vans and buses (12.9%) [8]. Third, as carbon

dioxide and methane emissions result from solid waste degradation in landfills (Duquesa Landfill of Santo Domingo, Rafey Landfill of Santiago de los Caballeros), the potential risk of fires can also increase risk of exposure to toxic fumes [9].

To address this national burden, DR leaders have adopted the environmental law (Law 64-2000), which has focused on the conservation, protection, improvement, and restoration of the surrounding environment and natural resources using alternative energy. Current adaptations have included using forms of clean energy, such as hydroelectric plants (34 active dams) and wind farms (9 wind farms), and long-term goals include the transition to electric and hybrid vehicles. Alternative plans will focus on improving air quality and highlighting the three Rs (reduce, reuse, recycle) for waste management. Since national governments and communities have leading roles in developing initiatives that aim to achieve the targets of the SDGs – especially SDG 11, 13, and 15 – our global community needs to act quickly to build robust collaborations and develop key interventions that prioritize population health.

## Hong Kong

Hong Kong, a metropolitan city with an estimated 7.4 million residents, can be described as an urban environment with dense road traffic, crowded buildings, coal-powered power plants, and factories located in Guangdong and Pearl River Delta. Emissions from vehicles, burning of fossil fuels, and container ships can increase risk of cardiovascular and respiratory diseases, as a result of harmful exposures to SO<sub>2</sub> and PM<sub>2.5</sub> such as black carbon, dust, and nitrates. According to the UN Environment Programme, over 90% of populations across the Asia Pacific

region are exposed to levels of poor air quality that can pose a significant risk to their health [10]. Furthermore, an estimated 70% of annual deaths associated with air pollution across the globe occur in the Asia Pacific region [11].

To address this regional burden, Hong Kong leaders have led initiatives over the past decade that support the development of public green spaces in urban communities. As a result, an estimated 75 % of Hong Kong's territories has been covered with grass, which offers residents an opportunity to visit these urban parks for fresh air. These green parks are protected from future development, in national efforts to reduce air pollution. In 2021, the Hong Kong government launched the Clean Air Plan for Hong Kong 2035, which supports the "Healthy Living Low-carbon Transformation World Class" vision and identifies goals, strategies, and challenges to improve air quality across Hong Kong by 2035 [12]. Notably, one ambitious goal is to attain zero vehicular emissions by 2035 [12].

As physicians, we should promote clean energy and smart utilization of our energy sources as well as educate our global populations about the health impacts of air pollution. As children can develop severe illnesses caused by air pollution, we need to educate our next generation about the associations between poor air quality and respiratory illness, heart disease, stroke, and lung cancer.

## Myanmar

The Republic of the Union of Myanmar, a country of 53 million residents, is widely recognized for its rich biodiversity and natural resources [13]. Over the past decades, the country has experienced significant economic challenges due to exploitation and mismanagement

of forest and marine ecosystems [13]. As one notable health burden, 45,000 annual deaths are attributed to air pollution (e.g. PM<sub>2.5</sub>), due to an increased risk of cardiovascular and respiratory diseases, including lung cancer, in adults and children in Myanmar [14]. As health professionals, we have a responsibility to safeguard human life, advocate for future generations' right to life, and protect the natural environment – including promoting the importance of clean air.

However, Myanmar's military and security forces, which consume fossil fuels and emit harmful gases, pose a threat to the natural ecosystem. In October 2022, military forces conducted an airstrike and bombed a convent and 100 civilian homes in Yangon, leaving 500,000 persons internally displaced [15]. These systematic, widespread events have disrupted the natural ecosystem, caused transboundary air pollution, and negatively impacted health and safety of Myanmar citizens.

The impact of the military sector on air pollution, including the carbon footprint, has been described, but not well documented in the literature, especially since they are not required to report such harmful emissions (e.g. greenhouse gas emissions) [16]. Moving forward, it will be important for international organizations – like the United Nations, WHO, and World Medical Association (WMA) – to examine all sources of air pollution (including military carbon emissions) across the globe and develop prompt interventions to mitigate risk. These global actions can help countries, like Myanmar, to develop policies that support a more sustainable future that protects original biodiversity and natural resources.

## Nigeria

Clean air is necessary for optimal respiratory health. In Port Harcourt, which forms part of the Niger Delta region in southern Nigeria, the emergence of black soot has impacted air quality within this geographic region. These emissions have resulted from the activities of illegal refineries (locally known as kpo-fire), which processes involve the transformation and use of local technology of locally refining crude oil into petroleum products (artisanal refining). No safety measures are used after the distillation of the petroleum products, and by-products (black soot) are released into the air [17].

Black soot can negatively impact health, highway safety, housing, and surrounding environments [17]. First, inhalation of black soot can increase risk of asthma and respiratory infections, especially for vulnerable populations like children and elderly persons. Second, black soot can affect drivers' visibility on highways. Third, deposits on physical infrastructures like roofs can cause rapid deterioration of such materials. Finally, environmental deposits can impact crop yields on farms and water quality for aquaculture, which can also be harmful for ingestion without cooking.

Since community residents in Port Harcourt and the Niger Delta spend more money on purchasing cleaning agents to remove black soot deposits on furniture and clothing, they conducted a peaceful protest called, "Stop the Soot Protest", on 19 April 2018. Since this event, the Nigerian government has continued to take proactive steps to reduce air pollution in Port Harcourt, especially due to artisanal refining. These efforts have included the destruction of illegal refineries in the bushes and creeks

as well as widespread messaging on mass media and social media. Non-government organizations, medical professional associations, and good Samaritans have been actively involved in these campaigns to stop black soot emissions in Port Harcourt of Rivers State.



## Philippines

The Philippines, a country with an estimated 110 million residents, has been recognized for taking tremendous strides to reduce air pollution. First, in 1999, the implementation of the Republic Act 8749, also known as the Philippine Clean Air Act of 1999, outlined the efforts of the Department of Environment and Natural Resources – Environmental Management Bureau (DENR-EMB) to reduce air pollution by supporting environmental protection activities. It adopted the “polluters pay principle”, in order to promote behaviours for self-regulation among the population. Emission standards were set for all types of motor vehicles and issuance of pollutant limitations among industries [18].

Second, in 2019, the Philippines joined the rest of the world in commemorating the first International Day of Clean Air for Blue Skies, which was spearheaded by the DENR-EMB through the Resolution No. 212, which was adapted from the 74th session of the UN General Assembly, on 19 December 2019. This day, which aimed to showcase the importance of clean air, and its effect on health, the economy, and the environment, demonstrated the link between air quality and other environmental challenges, such as climate change. Director William Cuñado expressed that this day reminds us of our continuous drive to find solutions and address various environmental challenges [18,19].

Finally, in 2020, through the Memorandum Circular 2020-003, the DENR-EMB established an Air Quality Network Center using a Uniform Data Acquisition and Handling System (DAHS). All regional offices were mandated to install a Continuous Emission Monitoring System (CEMS) or Continuous Opacity Monitoring System (COMS), to collect all data and information related to industrial emissions. Subsequently, the Memorandum Circular 2020-17 offered established guidelines on the Issuance of Permit to Operate (PTO) for Air Pollution Source Installation or Equipment (APSI/APSE) [18].



## South Africa

As a country of 57 million residents, South Africa’s air quality has been a mounting problem and has contributed to the climate crisis. The health sector is not exempt as a contributor to greenhouse emissions; globally, healthcare’s climate footprint is equivalent to 4.4% of global net emissions. The health sector’s climate footprint emanates from its carbon-intensive supply chain, chiefly including fossil fuel-dependent vehicle fleets, energy and heating systems, waste disposal including incineration, and the production and supply of health goods such as pharmaceuticals and food [20]. Industrial and domestic sources of air pollutants compound the climate footprint, and harmful exposures to  $PM_{2.5}$  can increase risk of respiratory and cardiovascular disease [21].

The dangerous air covering South African cities and communities is on account of South Africa’s heavy reliance on coal-fired power generation for industrial operations, as well as vehicle emissions in heavily motorised cities (like Johannesburg) of  $CO$ ,  $NO_2$ , and  $PM_{2.5}$ . On the other hand, non-industrial events

or phenomena – such as windblown dust, waste burning, veld fires, and burning of wood or coal for domestic use – are common in South Africa and contribute significantly to poor air quality. With more than 13 air quality monitoring stations available in South Africa, data show that many areas, notably the Mpumalanga Highveld region, have ambient air pollution concentrations exceeding acceptable thresholds established by the WHO Global Air Quality Guidelines [3].

South Africa’s decarbonisation efforts have included the introduction of several air quality legislations, including the National Ambient Air Quality Standards (2009), the National Environmental Management Act (Act 107 of 1998) (“NEMA”), and the Air Quality Act (Act 39 of 2004). Guaranteeing clean air in South Africa, Africa, and globally is a fundamental right for all family members of the global village to live and work in a safe and healthy environment. By reducing acute and chronic exposures to health-damaging air-borne toxins, the burden of respiratory and cardiovascular diseases, cancers, and other air pollution-related health problems will be minimised. Clean air will bear health dividends, which will translate to reduced stress on the country’s health system while ensuring better quality of life, economic participation, and life expectancy for South Africans.

The South African Medical Association has and will continue to advocate for better air quality, clean energy use, and the early identification and treatment of health conditions related to air quality. We encourage all physicians and other health professionals to commit themselves to understanding and reducing the healthcare sector’s contribution to the overall carbon footprint.



## Spain

Air pollution and climate change pose the greatest threats to global health. Half of the world's population, or more than 4 billion people, lives in urban areas with levels of air pollution above the WHO Global Air Quality Guidelines [3]. To address this global burden, the Spanish General Medical Council continues to sensitize Spanish doctors and take a proactive stance in the decarbonization of the healthcare system, as part of the 2030 Agenda for Sustainable Development.

In 2021, the Council launched the Health and Climate Change Working Group (<https://www.cgcom.es/grupo-de-trabajos/salud-y-cambio-climatico>), through which the Medical Alliance against Climate Change was formed. This alliance includes administrative bodies in legislation and encourages the application of public health laws and programs. The Council's Foundation for Training promoted seminars and courses to raise awareness among citizens on the effects of climate change on health. Specifically, the second seminar, Health and Climate Change, allows leading experts in geology, architecture, and medicine to share findings on the impact of ambient and household air pollution on urban health.

Moving ahead, in late 2022, the Spanish medical profession will launch its new Code of Ethics and Medical Deontology, as a text that will highlight the ethical duty to preserve the environment and combat climate change. Also, in October 2022, the formation of the Federation on the Fight against Climate Change will be announced during the Assembly of the European Union of Medical Specialists – with more than 1.7 million European medical specialists – in Athens, Greece.



## Sweden

Over the past 20 years, European countries have undergone significant changes in the emissions of atmospheric pollutants and their effects on health. In Sweden, a country of 10 million residents, epidemiological studies have shown that air pollution affects our health in more ways than previously known. Improved exposure estimates and emission inventories have revealed associations between long-term exposure to air pollution and mortality, respiratory and cardiovascular diseases, detrimental birth outcomes, dementia, and childhood allergies. With thousands of annual excess deaths in Sweden, scientists have reported that local emissions are important contributions to these harmful exposures [22].

To improve air quality, global measures are required to encourage citizens to seek sustainable lifestyles within their environments. Smart urban planning, by widening pedestrian and bicycle paths, can promote active lifestyles for citizens and discourage sedentary behaviors and automobile use. The use of green space in urban settings can reduce ambient temperatures, improve air quality, and promote physical activity during the summer months. If community leaders can advocate for such significant changes in the built and natural environments, then we can support active lifestyles and ultimately protect population health.



## Thailand

Clean air is undoubtedly a primary need for all human beings. Clean air should be free of pollutants, particulate matter, and chemicals, and hence have no smell, color or taste. Although air pollution can result from wildfires, most air pollution is caused by human activities, such as

cooking, traffic, industries, and power stations. Tobacco smoke, which contains more than 1,000 chemicals, heavy metals, and particulate matter, is cancerogenic and can increase the risk of chronic diseases. In Thailand, a country of 69 million residents, the particulate matter (PM<sub>2.5</sub>) concentration was measured at four times higher than the WHO Global Air Quality Guideline [23].

The Medical Association of Thailand has collaborated with the Ministry of Public Health and the Thai Health Promotion Bureau to actively support the Smoking Cessation Program of the "Clean Air Project" [24]. With the support of the Royal Thai Government, the Tobacco Product Control Act (B.E. 2560) was implemented in 2017 [25]. This new enactment, which combined the tobacco control law and non-smoker rights protections, prohibits smoking in closed public spaces, transportation, schools, universities, and marketplaces.

In 2019, Thailand became a country partner of the Climate and Clean Air Coalition (CCAC), and leaders conducted collaborative projects with the Thailand Pollution Control Department, Asian Institute of Technology, and UN Environment Programme, to examine PM<sub>2.5</sub> emissions from water transport in Bangkok and offer timely recommendations to mitigate health risks [4]. In 2021, Thailand and CCAC launched a novel collaboration with the Institute for Global Environmental Strategies and the Stockholm Environment Institute, to quantify air pollutant emissions and develop solutions that can reduce short-lived climate pollutants (e.g. black carbon, hydrofluorocarbons, methane) [26]. These efforts aim to improve air quality and human health as well as help achieve climate goals in Thailand.

Thai physicians recognize the urgent need to reduce air pollution and are leading national efforts to promote public health through this “Clean Air Project”. As a result of this initiative, which promotes the importance of clean air and healthy lives, fewer smokers and cigarette butts are observed in public spaces.

## Trinidad and Tobago

The most pervasive air quality problem in Trinidad and Tobago (T&T), a country with 1.4 million residents, is the increasing frequency and intensity of Saharan dust, which peaks between May and July each year. It is linked to climate change, drought, and desertification in West Africa, and millions of tons of topsoil are transported across the Atlantic Ocean to the Caribbean basin and the eastern coast of the United States. The T&T Meteorological Service issues warnings of impending Saharan dust, advising vulnerable persons with respiratory allergies and asthma to take precautions. However, air quality challenges that are more amenable to local action include emissions from industry, traffic of over one million vehicles, and forest or bush fires.

Over the past 30 years, living in the watershed north of the capital, Port of Spain, I have noted that bush fires have become more frequent, last longer, and spread further distances. These events have simultaneously occurred with increased development of housing and informal settlements and hotter and drier conditions resulting from the effects of climate change. Bush fires have many adverse health and environmental impacts, including fire hazards to lives and property, destruction of habitats, reduced air quality leading to increased asthma cases, and tragic fatalities resulting from burns. A large bush fire in 2020 prompted the evacuation of five wards of the St. Ann’s psychiatric hospital,

when the flames threatened the facility. However, 36 hours later, the same fire reached our community, and our neighbours and the fire services all sprang to help keep houses from burning.

The T&T Forestry Division of the Ministry of Agriculture reports hundreds of annual bush fires, caused by people who use fire to clear land or burn rubbish. In fact, they have estimated that more than 300,000 acres of forest have been destroyed over the past 30 years. Furthermore, bush fires can lead to the loss of watershed forest cover, where rainfall that rushes off the land can cause destructive flooding of properties and businesses. It can hinder soil health and forest growth as valuable topsoil washes away. The Forestry Division and local non-government organizations, such as the Fondes Amandes Community Reforestation Project (<https://facrp1.webs.com/>), make valiant efforts to reforest burned areas. However, there is an urgent need for coherent policy, education, monitoring, and other measures to reduce the incidence of forest fires and its adverse health and environment consequences.

Physicians in T&T should be aware of the increasing risk to human health and the quality of our air and environment resulting from bush fires. First, we can advocate for robust implementations of national policy and programs for forest fire prevention and re-forestation. Second, we can support educational programs for patients and communities, especially those persons with respiratory conditions like asthma. Third, we can recommend that people who live in agricultural and forested areas should not start fires during the dry season. Finally, we can participate in data collection (including citizen science applications) for the monitoring and surveillance of the adverse impacts of poor air quality, by serving as sentinel

physicians for asthma and respiratory allergies.

## Turkey

Climate change and air pollution are closely connected, resulting from natural and anthropogenic sources such as the use of fossil fuels in industrial production, transportation, and energy generation. Tackling these dual environmental threats requires the active participation of our medical community to protect population health. To address these challenges, the Turkish Medical Association (TMA) has contributed to two key efforts over the past decade.

In 2015, the Right to Clean Air Platform (<https://www.temizhavahakki.com/en/home/>) was founded by a collaboration of 16 professional and non-governmental organizations including the TMA, Turkish Neurological Society, Turkish Society of Public Health Specialists, Greenpeace Mediterranean, Health and Environment Alliance (HEAL), 350.org, Climate Action Network (CAN)-Europe, and World Wildlife Fund (WWF)-Turkey. The platform aims to advocate for clean air and reduce emissions from coal-fired power plants, support air quality monitoring and data collection, strengthen cooperation among medical associations and environmental organizations to develop relevant policies and programs, and enhance scientific communication (including community awareness) on the health impacts of air pollution. Then, in 2020, they collaborated with scientific experts and prepared the WMA Resolution on Protecting the Future Generation’s Right to Live in a Healthy Environment [27].

Unfortunately, citizens’ right to clean air in Turkey is jeopardized by the country’s policies that are persistently dependent on fossil fuels for energy

in heating, transportation, industry, and electricity generation. Other risks include systematic deforestation by mining, transportation, unplanned urbanization projects, and poor or unlawful waste management practices. While national environmental legislation is comprehensive, the legislative power is exercised excessively in favor of the energy companies – rather than focusing on the impacts on population and ecosystem health – and deliberately overlooked by the implementing agencies.

As health professionals, we have a duty to respect and care for all life forms on our planet. Together, we can advocate for five prompt actions by our governments, non-governmental organisations, and academic communities, to tackle air pollution and climate crisis. First, academic leaders can lead efforts to strengthen medical curricula by incorporating problem-based learning techniques on complex environmental challenges. Second, health leaders can advocate for the necessary academic and legal collaborations that can offer insight to professional medical associations on the invisible cost of air pollution to health outcomes. Third, by reviewing national and international environmental and health legislation, national leaders can identify existing gaps and propose more robust inspections (including sanctions or banning products). Fourth, national leaders can promote the use of renewable energy resources through energy and employment policy development. Finally, they can invest in appropriate policies that build social protection for a fair workforce transition to a low-carbon economy and future investment in renewable energy. It is important to recognize the urgency, complexity, and interconnectedness of the essence of the climate crisis action and take immediate action to protect the rights

of future generations for the sake of climate justice – before we reach an irrevocable point.



## United States

With climate change negatively impacting the health in the United States and around the globe, the American Medical Association (AMA) adopted policy during the Annual Meeting of its House of Delegates in June 2022, declaring climate change a public health crisis that threatens the health and well-being of all people [28]. Building on existing efforts to address the climate crisis, the new policy specifically mobilizes the AMA to advocate for policies that limit global warming to no more than 1.5 degrees Celsius, reduce U.S. greenhouse gas emissions aimed at carbon neutrality by 2050, and support rapid implementation and incentivization of clean energy solutions and significant investments in climate resilience through a climate justice lens. The recent passage of the U.S. Inflation Reduction Act of 2022 marks the largest investment in history to reduce emissions and combat climate change has created hope that it is now possible to reach these goals.

The AMA has long advocated for upholding the U.S. Clean Power Plan by filing friend-of-the-court briefs in *West Virginia v. Environmental Protection Agency*, and most recently filing an amicus brief with the American Thoracic Society and dozens of leading medical organizations and public health leaders to support clean air initiatives. Also, as part of AMA's broader ongoing commitment to address climate change, the AMA is a member of the National Academy of Medicine Action Collaborative on Decarbonizing the U.S. Health Sector [29] – a public-private partnership among the health sector

aimed at mitigating climate change and protecting human health, well-being, and equity by addressing the sector's environmental impact.

## Conclusion

As our global community commemorates the International Day of Clean Air for Blue Skies, we learn about the ambitious national initiatives across 13 countries, which aim to protect population health from environmental exposures to air pollution. Using “The Air We Share” theme, prompt global collective action is indispensable to identify best practices in energy conservation and solid waste management as well as explore renewable energy sources. As WMA members with extensive training in clinical and surgical specialties, we have a moral obligation to share our expertise with key decision-makers, moderate scientific debates and fora on timely issues, present our critical analyses and research findings in scholarly publications, and lead community health and advocacy activities.

Our contributions to local and national health activities can raise community awareness and encourage scientific discourse on emerging health topics, such as reducing air pollution and combating climate change. By fostering the development of our professional medical networks, we can promote One Health collaborations across disciplines and sectors that can guide forward steps to achieve the targets and indicators of the 2030 Agenda for Sustainable Development.

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## Normalizing Death as “Treatment” in Canada: Whose Suicides do we Prevent, and Whose do we Abet?



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In 2016, the Canadian parliament legalized “Medical Assistance in Dying” (MAiD) [1], a new term referring to both assisted suicide and euthanasia. MAiD was introduced in response to a 2015 Supreme Court ruling that overturned an absolute prohibition of these practices in Canada’s Criminal Code [2]. To accommodate this court ruling, the Canadian parliament enacted Bill C-14 in 2016, which created a legislative exemption for assisted suicide and euthanasia. MAiD became legal for capable adults who have an irremediable disease that causes enduring and intolerable suffering that cannot be alleviated under conditions the person finds acceptable, with an “irreversible decline of capability”, and when their natural death is “reasonably foreseeable” [1,3].

Within five years of its introduction, the Canadian parliament removed several key safeguards embedded in the law in its updated MAiD legislation, Bill C-7 [4]. It did so after the federal government failed to appeal [5] a provincial (Quebec) lower court decision which ruled that the restriction of MAiD to natural death being ‘reasonably foreseeable’ was unconstitutional [6]. The government then expanded de facto eligibility to include those not dying but living with disabilities; and as of March 2023, this will also include those suffering solely from mental disorders [4]. This commentary reviews the Canadian experience to date and raises issues to consider as assisted dying policies or expansion are considered in the rest of the world.

### Background

MAiD deaths have increased dramatically year after year in the short time since Canada’s legalization in 2016. MAiD cases in Canada involve almost exclusively euthanasia, with death being administered by the health care provider via lethal injection [7]. Within three years of its introduction in 2016, the death rate by MAiD had risen to 2% of all deaths. By 2020, the rate had increased to 2.5% of all deaths, and by 2021, it was 3.3% of all Canadian deaths, with some provinces approaching 5% [8]. These figures largely represent the escalating death rates even before the government expanded MAiD to those living with disabilities in 2021, which reflect situations where natural deaths were reasonably foreseeable (termed track 1 for MAiD in Canada). In 2021, only 2.2% of MAiD reported deaths were documented in those living with disabilities who were not approaching their natural death (track 2 for MAiD in Canada) because the expanded legislation was only enacted in March 2021 [8]. Bill C-7, which expanded MAiD and lifted several safeguards, was passed in the middle of the coronavirus disease 2019 (COVID-19) pandemic and received limited media attention. Many Canadians were likely unaware of the changes to the MAiD regime. In coming years, death rates are thus likely to increase even more substantially as euthanasia and assisted suicide for those not dying but living with disabilities will be more widely provided, as well as once further expansion occurs in March 2023, to those living with sole mental health disorders.

By 2021, there were 10,064 MAiD deaths in Canada, bringing the total number since legalization in 2016,

to 31,664 deaths. Within six years of the introduction of MAiD, Canada has surpassed all other countries for its number of euthanasia and assisted suicide deaths reported in 2021. The Netherlands and Belgium, which have allowed both euthanasia and assisted suicide since 2002, have experienced much more gradual increases over many more years [9]. Particularly, the proportion of MAiD deaths in the provinces of Quebec and British Columbia [8] are now already at a similar or higher level, when compared to Belgium and the Netherlands [10].

## Misleading Nomenclature and Concepts: The Artificial Distinction between “Suicide” and Canada’s Assisted Death Expansion

When the Canadian government coined the acronym “MAiD” in 2016, Canada’s new assisted dying laws included as key safeguard that “MAiD” would only be provided to those whose natural deaths were “reasonably foreseeable,” which arguably restricted it to the ‘end of life’ context [1,3]. “Assistance-in-dying” may have seemed an apt description for that practice, even though the ‘reasonably foreseeable death’ criterion was already quickly interpreted to include persons without terminal illness and no clear expectation of approaching death [11]. With the government’s expansion of assisted suicide and euthanasia to those not dying, the term “medical assistance in dying” became a misnomer. Given Canada’s assisted dying laws now allow for the provision of facilitated death to the non-dying, we revert to the terminology of medically administered death (MAD). To be consistent with the actual practice in Canada following the 2021 expansion of euthanasia and assisted suicide to the non-dying, the remainder of this article will use the acronym “MAD” instead of “MAiD” [12].

## Overinclusion vs Underinclusion

In addition to the removal of the restriction to “reasonably foreseeable death”, Canada’s 2021 legislation stripped away several other safeguards which were in place to prevent avoidable or wrongful deaths for those who met the initial criteria. These changes included, among others, eliminating the previously mandated 10-day reflection period prior to euthanizing those who wished to die. In principle, this allows the same day administration of death. As well, there was an introduction of a limited form of MAiD based on an advance request, that is, allowing a waiver of final consent. Two comprehensive articles on the Canadian MAiD regime were previously published in the *World Medical Journal* and deserve a full reading for greater perspective on the problems within the entire MAiD framework [13,14]. The remainder of this article focuses on the new MAD expansion outside the end-of-life context, that is, providing euthanasia and assisted suicide to those living with disabilities who potentially have decades to live.

In the decision that spurred the introduction of MAD, the Supreme Court only ruled that an absolute prohibition restricted people’s constitutional rights. Notably, it did not impose any specific obligations with respect to how to organize MAD and how to ensure access. But the decision has been popularly framed, even by medical professionals and medical organizations, as somehow creating a broad positive right of access to MAD. As a result, the need to ensure access has arguably been more the focus of attention than the need to protect against premature death. This is reflected, for example, in an obligation introduced by the medical profession’s regulatory college in Ontario to provide an effective referral when people

request MAiD, and physicians have a conscientious objection [15]. The preamble to the 2016 legislation that partially legalized MAD further emphasized the federal government’s commitment to make it universally available across the country, including through obligations of provincial health authorities to fully fund it [1].

As a result, there is a remarkable situation in Canada that MAD is fully funded and broadly accessible, and available for disabled Canadians who are otherwise not dying. At the same time, access to adequate health care and social support is not guaranteed and, in many instances, not given the same priority. In fact, although basic health care services are publicly funded, there is no positive right to health care in Canada, as the Supreme Court [16] and most recently again the British Columbia Court of Appeal [17] have emphasized. Canada’s funding for health care and social support services sits below the Organization for Economic Cooperation and Development (OECD) average [18]. Palliative care, most speciality chronic care, disability and community support services are inadequately funded, and in chronically short supply [19,20].

For any health care system, which naturally has interdependencies including balancing of fiscal pressures, this should raise ethical concerns. Providing state sanctioned death to avoid life suffering is clearly more cost effective than providing state-supported health care and community support to facilitate living well. Canada’s federal parliament and government have aggressively promoted access to MAD and imposed this as a practice that provinces have to implement and fund, but they have failed to do the same for timely and adequate access to many other components of health care and social support.

To place this further in context, MAD can be administered by any of the 100,000 physicians or nurse practitioners in our country of 37 million, and the federal government ensures Canadians that “eligible Canadians will be able to request MAiD” [21], yet no right to health care. The primary manner of causing death via MAD is euthanasia, by injection of toxic substances.

## How MAD Works in Canada

In contrast with recent legislation in New Zealand [22] and Victoria (Australia) [23], there is no legal prohibition on health professionals suggesting MAD as an option to patients. There are now several media reports of patients being profoundly and negatively impacted by suggestions from their physicians that they consider death [24]. In fact, the Canadian Association of MAiD Providers and Assessors, which has received significant funding from the federal government to provide training to health care providers, even recommends that all those who “might qualify should be offered MAiD” as part of the informed consent process [25]. This would thus imply that a person with a disability and “irreversible decline of capability” (including a person with mental illness, as of March 2023) who visits a physician to have a medical issue addressed that appears to create serious suffering, would have to be offered MAiD as one of the options. No other country in the world has normalized assisted suicide or euthanasia in this way as a potential first-line therapeutic option to address suffering. (As below, Canada does not have any actual safeguard or requirement that other treatments need to have been accessed or tried first).

Those whose deaths are considered “reasonably foreseeable” (track 1),

which has been taken to mean having potentially several years of life left to live [11], can receive MAD in principle the same or next day, if two assessors agree that they fit the criteria. For those who are not dying (track 2), Canada requires that the two MAD assessors (medical doctor or nurse practitioner) conduct a more detailed assessment of patient eligibility. The timing to die by lethal injection is set at a minimum of 90 days after the first MAD assessment is completed. This period can be reduced if the assessors agree that loss of capacity is imminent, and if they can do their assessment faster. In order to qualify for MAD, a patient must be in a situation of irreversible decline of capability, and experience intolerable psychological or physical suffering. These terms are not further defined by the legislation, and suffering is treated as purely subjective [3]. If the patient says their suffering is intolerable, there is no requirement or provision for further validation by clinicians, as there is in Belgium and the Netherlands, where physicians at least have to agree with the patient [10].

Patients need to be informed about alternative options to MAD, and physicians have to ensure that patients ‘considered’ all these. However, there is no legal requirement that the other means of alleviating suffering be accessible to the patient, nor is there any requirement that standard best-practice treatments have been appropriately attempted prior to providing death by MAD [26]. In Belgium and the Netherlands, two other jurisdictions that allow state-sanctioned euthanasia or assisted suicide outside the end-of-life context, physicians need to agree that there are no further medical or social support options that can relieve patients’ suffering. Canada thus has now arguably the most wide-open state-facilitated suicide process in the world, which can be subjectively driven

by patients declaring intolerable suffering during periods of despair. To reiterate this point: MAD can be provided despite lack of access to care and resources that could remediate symptoms, or if the patient refuses to try standard treatments in the depth of their despair, despite scientific literature demonstrating that this treatment would overwhelmingly lead to adjustment and recovery.

With the dangers of such broad and imprecise legislation, access to medical and social care in Canada is often not timely, which directly fosters and compounds patient suffering and desperation. For example, the average wait time to be treated by a psychiatrist can exceed six times the 90-day waiting period to access a lethal injection [27]. That is to say, a person seeking treatment from a psychiatrist and also asking for death, could be given access to death long before they get appropriate treatment. Some MAD proponents have even suggested that being on such a waiting list for a long time should qualify someone for MAD [28]. The wait times for many other specialized health care and social support services, including specialized pain clinics, specialized long-term care homes, community-based housing, and disability benefits, far exceed the 90-day assessment period [29].

Three United Nations representatives [30], over a hundred Canadian disability and social justice organizations [31], Indigenous advocacy groups [32], and hundreds of medical and legal experts [12, 33], have argued that due to its lack of safeguards, Canada’s euthanasia and assisted suicide laws put the lives of marginalized and vulnerable Canadians at risk. Indeed, the law uniquely fails to provide equal protection against premature death for persons with disabilities, by offering only to them MAD as a

“reasonable” tool to relieve their experience of suffering.

## **MAD’s Impact on Canadians with Disabilities and Chronic Illness**

As will be seen in the examples provided below, some Canadians with disabilities and chronic illness, who should have the right to better living conditions and care, are now choosing death as their best “treatment” option.

Raymond Bounbonnais chose to die rather than continue living in a long-term care facility. Raymond reported that his room would reach temperatures as high as 30 degrees Celsius in the summer. He always had to leave his door open to benefit from the air conditioning in the hallway. The noise from the hallway, coupled with the constant fear and anxiety of another resident entering and touching him or taking his belongings, led him to ask for MAD instead [34].

A national CTV news story recounted how “Sophia” was unable to secure affordable housing compatible with her chemical sensitivities. She chose MAD because she could not find a healthy and affordable place to live with her disability support income. [35].

Donna Duncan suffered from a concussion, and it took over a year for her to receive the correct specialized care, during which time she continued to deteriorate. She received MAD within four days after her initial request. There is currently a police investigation into the circumstances surrounding her MAD death [36].

As we see in these examples, other options should and could have been offered to these people. Considering the living conditions and lack of care that they were forced to endure, their tragic choices may be understandable.

However, we should ask ourselves whether their choices for death in these inhumane circumstances are not the result of structural coercion.

In Canada, MAD expansionists have seemingly shown little consideration for how governments create and sustain the predicaments that can make death an attractive choice for those who would have instead benefitted from greater resources and care. The obvious and better solution would be to demand that governments provide funding to cut wait times and ensure access to health care and community supports. However, the reality is that MAD costs less than state-supported health and community care for the disabled, which deliberately or not can create a perverse incentive to guarantee access to MAD, despite no guarantee of access to care or community support.

## **MAD’s Impact on Canadians Adjusting to New Disabilities or Injuries**

Evidence related to new illness or injury shows that suicidality is often present at the outset, for a period following loss of function, but it is not enduring in the long run. In one recent study, which followed patients with spinal cord injury, half of the participants reported suicidal ideation within the first two years of experiencing a spinal cord injury. In retrospect over the longer term, no participants thought that they would have been able to make an informed decision about MAiD in the early years after their injury and none wanted MAiD after they had time to adjust to living in the community [37]. One of the authors, Dr. Karen Ethans, spoke at a press conference about Bill C-7. She highlighted that many people with a new spinal cord injury are suicidal, but within a few years, these individuals rate their quality of life as high; many individuals in fact

rate their quality of life higher than that of the non-disabled population after rehabilitation and integration back into the community. She shared that in her experience, acute care health care professionals do not always have an informed idea about disabilities and may inaccurately present future outcomes as negative to patients [38].

## **Mental Illness, Suicidality, and MAD**

The Canadian government has committed that MAD will be provided to Canadians with sole mental disorders by March 2023. Evidence and scientific research highlight the dangers of this expansion, including the known risk of providing psychiatric MAD to suicidal individuals who would otherwise benefit from suicide prevention strategies [39]. Data from the few European jurisdictions currently providing MAD for mental illness show that women and marginalized individuals suffering from unresolved loneliness and poverty disproportionately seek and receive psychiatric euthanasia [40]. Despite this, MAD expansion proponents ignored these known risks to vulnerable populations in calling for expanded access to MAD. In all its written and verbal testimony leading to Bill C-7’s MAD expansion and the provision to allow psychiatric euthanasia by 2023, the Canadian Psychiatric Association never once raised concerns about suicidality risks associated with mental illness, nor mentioned the importance of suicide prevention – indeed, never once mentioned any variation of the word ‘suicide’ during Bill C-7 public consultations on mental illness and death [41-45].

Contrary to this ideologically driven policy push, the majority of psychiatrists in Canada and related organizations have challenged the government’s decision to implement

MAD for those with a sole diagnosis of mental illness, as there is no adequate scientific evidence that mental illness in any individual can be predicted to be irremediable. From the world-renowned Centre for Addiction and Mental Health (CAMH) [46] to the Canadian Association for Suicide Prevention (CASP) [47], experts have warned that it is impossible to predict, as per the language of the law, the “irremediability” of mental illness for any individual. Cautions have been raised to not conflate life suffering and other resolvable social woes with mental illness “irremediability” [48].

The Canadian Mental Health Association (CMHA) [49] and the Ontario Association for ACT & FACT (experts providing front-line care to those with the most severe mental illnesses, OAAF) [50] both stand in strong opposition to this expansion of MAD for mental illness. In a recent survey, the overwhelming majority of Ontario psychiatrists who responded said that they oppose MAD solely on the grounds of mental illness [51]. Evidence-based reviews by the Expert Advisory Group in 2020 and 2022 likewise concluded that determinations of “irremediability” in individual cases of mental illness cannot be made [52]. This evidence raises concerns that those seeking MAD for mental illness will be wrongly informed, during periods of despair, that their conditions are “irremediable” and will not improve, despite this being impossible to predict. Combined with the known high prevalence of psychosocial suffering in those with mental illness, this escalates concerns that those receiving MAD for mental illness could have gotten better, but will instead be provided state-sanctioned death while suffering from symptoms of despair fueled by life suffering.

These concerns are validated by the fact that in the few European countries that provide euthanasia for mental illness, those requesting it for this reason are disproportionately seeking relief, not from their mental illnesses per se but because of marginalization, including unresolved social and economic suffering and loneliness – problems that are remediable [53].

We know that lack of access to care for mental health needs is a problem in Canada [54]. The Mental Health Commission of Canada tells us that fewer than one in three adults get the mental health care they need. Canadians may have to wait years for specialized tertiary psychiatric care. Knowing the failures in the delivery of mental health care, one must question why the federal government is prioritizing MAD instead of heavily focusing resources on the timely and needed delivery of patient care.

## Conclusion

The federal government, when introducing a bill to expand MAiD (now MAD), asked the Canadian parliamentary budget officer to estimate the potential financial impact of doing so [55]. As would be expected, this review found cost savings will be greater. This will be even more when we end the lives of people prematurely by many years who had higher care needs, especially when we factor in social services, disability benefits, equipment, and other costs on top of the direct savings to health care budgets.

However, these financial savings will come at the high cost of prematurely ending the lives of those who could have thrived or recovered and enjoyed long meaningful lives with family and loved ones. Patients in Canada deserve a health care and social

system and a government that is responsive to their needs, that at the very least aims to provide them with an adequate quality of life and care, no matter the complexities of their illnesses, their disabilities or their economic situations.

The legalizing of MAiD, or MAD, has been claimed to offer ‘choice’ to Canadians, despite the known gaps in our health care system that fail to provide medical care or community support to the chronically ill, the disabled, and the mentally ill. Particularly, the expansion of MAD provides the illusion of choice, while in reality it pushes the most vulnerable and marginalized Canadians towards choosing an enticed death instead of allowing them a meaningful and fulfilled life [56].

With the recent expansion of MAD, Canadians with disabilities are deprived of an equal protection against premature death and suicide, which others continue to receive. Canadians are increasingly opting to receive medical state-funded death, not because they no longer want to live, but because our society has failed them.

Note: The primary author, Dr. Ramona Coelho, was an expert witness before the House and Senate committees examining Bill C-7 and the Special Joint Committee on MAiD ([https://www.youtube.com/watch?v=XI5SSMz\\_rU8](https://www.youtube.com/watch?v=XI5SSMz_rU8)) in May 2022. She is a founding member of Physicians Together with Vulnerable Canadians (<https://maid2mad.ca/>).

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## Primary Health Care Systems across the Globe: Does One Size Fit All?



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Historically, ensuring access to basic healthcare has been considered an essential component to achieving the Sustainable Development Goals (SDGs) [1,2]. These goals have been addressed only to a certain extent; people's health needs remain unmet because of increasingly complex challenges [3,4]. At the centre of

these goals is SDG 3 – “ensure healthy lives and well-being for all at all ages” [5]. Therefore, the strengthening of primary health care (PHC) systems has been identified as a major vehicle towards the achievement of universal health coverage (UHC) and the achievement of SDG 3. This has also been stated in the Astana 2018,

which envisions that “governments and societies prioritize, promote and protect people's health and well-being, at both population and individual levels, through strong health systems” [6].

PHC addresses the broader determinants of health and focuses on the comprehensive and interrelated aspects of physical, mental, and social health and well-being [7]. It provides holistic person-centred care for health needs throughout the lifespan, not just a set of specific diseases. Approaches taken to achieve these objectives differ from one country to another, based on their distinct socio-cultural and political context and implementation strategies [7]. A PHC approach includes three components: meeting people's health needs throughout their lives; addressing the broader determinants of health through multisectoral policy and action; and empowering individuals, families, and communities to take charge of their own health [7].

Loffreda et al. (2021) suggest that “achieving UHC is an inherently political process” [8]. Consequently, PHC is affected by the political context in each region. The global coronavirus disease 2019 (COVID-19) pandemic has impacted health systems worldwide and led to disruptions of

essential health services. However, as a learning opportunity, it highlighted that resilient health systems require a robust frontline at the core of their infrastructure [9].

At the World Health Assembly 2022, strengthening PHC was a major topic discussed among the Member States and Non-State Actors [10]. It was underlined as a cornerstone to achieving UHC and to enhancing health systems' resilience, cost-effectiveness, and equity. Countries across the globe with their respective PHC systems need to continuously adapt, improve, and implement their strategies as per the local context and determinants [3,4,11]. Several initiatives have been suggested to support this improvement with a no-one-size-fits-all approach [12,13].

As part of the PHC working group in the World Medical Association (WMA) Junior Doctors Network (JDN), several members gathered on multiple occasions, in-person and online, to share experiences within their PHC systems. This narrative review incorporates synthesized data informed by published and unpublished articles in the literature, as well as from national and international resources and registries. Furthermore, data were collected from first-hand experiences of the junior doctors working in primary health care in Brazil, Canada, Cuba, Germany, India, Myanmar, Nigeria, and Tunisia. In the discussion, we conducted a Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis of the described PHC systems, using the Primary Health Care Performance Initiative (PHCPI) as a reference framework, which "describes the critical components of a strong primary health care system and serves as the foundation of the initiative's activities" [13].

This review was conducted to provide an overview of PHC systems across the world, including the strengths and gaps of various systems, and to provide a brief overview of learning opportunities for other systems. From the point of view of junior doctors, this paper offers a general overview of the diversity of PHC systems and describes the workforce and financing across different countries and regions. The working group has decided to focus on the following domains for the narrative review: service delivery, PHC workforce, and PHC financing.

## Findings

PHC systems are designed to provide preventive, promotive, curative, rehabilitative, and palliative health care services, which are readily accessible and available to the community, and develop community participation and engagement [7,14]. Each PHC system is defined by a set of indicators that are shared publicly and frequently monitored [13]. The PHCPI has supported the process of showcasing these indicators via a conceptual framework and vital signs profiles in the following domains: System, Inputs, Service delivery, Outputs, and Outcomes [13].

## Service Delivery

Some aspects of PHC service delivery across our represented countries (Brazil, Canada, Germany, India, Myanmar, Nigeria, Cuba, and Tunisia) from the authors' first-hand experiences are summarized below:

### *Spectrum of Services*

In all the observed countries, PHC provides services like the treatment and management of acute and chronic diseases, immunizations, minor surgical procedures (e.g. suturing

wounds or other procedures in local anaesthesia), and health screenings. Health promotion belongs to the spectrum of services in all countries. The availability of cancer screening services and specific treatment options for communicable and non-communicable diseases vary among the observed settings. In Brazil, PHC provides social protection activities to the communities; in India, health education, family welfare services, and water, sanitation, and hygiene (WASH) actions are provided directly within communities. In Tunisia and Germany, nutrition or tobacco counselling services are only optionally provided in some PHC centres. Family planning and antenatal care forms part of PHC in Tunisia, Brazil, India, and Canada, whereas obstetric services are also offered at PHCs in India, Canada, and Myanmar. In Germany, antenatal care and obstetric services are usually provided by gynaecologists. In all the highlighted countries, basic mental health counselling is an offered service at the PHC facility.

### *Infrastructure*

Equipment for vital signs monitoring, such as blood pressure, temperature, and oxygen saturation, is available in all presented countries. Most PHC facilities have an electrocardiogram. Ultrasounds are very common in German PHC facilities, often in Canadian PHC facilities, and rare in Nigerian PHC facilities. In Tunisia, some PHC facilities offer x-ray services, and in Brazil PHC facilities are equipped for dental care and public pharmacy. Most PHC facilities in the observed countries collaborate with laboratories, while in some settings (Nigeria, Tunisia, Germany) there are point-of-care laboratories within the PHC facility.

## *Referral Mechanisms*

A gatekeeping system is in place in India, Canada, and Brazil, where the patient is referred to secondary or tertiary care after visiting a PHC centre. In Tunisia, referral to other levels of care is only necessary in the public sector. In the private sector, as well as in Germany, self-referral or a direct consultation at the secondary or tertiary care level is possible. In the private medical sector in India, referrals are made within the hospital or with established referral connections of private medical providers

## **PHC Workforce and Financing**

Elements on PHC workforce and system financing are summarized for the respective countries (Table 1). Data on the number of physicians per 10,000 population density, PHC out-of-pocket (OOP) expenditure, and external expenditure (USD) (23 July 2022) was extracted from the WHO databases [15,16].

### **Brazil**

#### *Workforce*

The workforce consists of two types of teams: 1) the Family Health Strategy included the family doctor (medical residency or general practitioner, GP), nurse, nursing technician, dental surgeon, and community health workforce; and 2) the “traditional” team had GPs, nurses, and specialists in preventive medicine, internal medicine, paediatrics, gynaecology and obstetrics.

The physician density is 23.1 per 10,000 population (2019) [15]. There is a two-year residency program in Family and Community Medicine, with the possibility of a one-year additional training in specific

topics (i.e. health management and preceptorship, preventive medicine, palliative care) or access to other specialty training (e.g. allergy and immunology). Clinical guidelines for the PHC setting are published by the Ministry of Health and the State and Municipal Health Departments through the Unified Health System.

#### *Financing*

There is a salary-based payment for PHC providers paid by public health funds. The Brazilian Unified Health System is a national health system that is 100% financed with public resources and has universal and comprehensive access to all levels of treatment, including the PHC.

### **Canada**

#### *Workforce*

The PHC team consists of doctors, nurses, physiotherapists, occupational therapists, psychologists, social workers, and other allied health professionals. Physician density is 24.4 (2019) per 10,000 population [15]. There is a two-year Family Medicine specialty training (but ongoing discussions towards extending the duration of training to a three-year program), with the option of doing an additional fellowship of 3-12 months in other fields. While the health systems are organized at the provincial and federal levels, the Canada Health Act dictates several principles that underpin a universal PHC system across the country. Those principles include public administration, accessibility, universality, comprehensiveness, and portability.

#### *Financing*

Health professionals are paid mostly by the single-payer systems, except

for providers offering non-ensured services. Although Canadian health care systems are different in each province, most care is covered by a single-payer tax-funded system. Some types of care, however, have incomplete coverage, such as dental care, eye care, psychological services, and outpatient medications.

### **Cuba**

#### *Workforce*

The PHC workforce (basic health team) is comprised of a family doctor and a nurse at the consultorio. There are bigger teams made up of 8-10 basic work teams, plus other primary care specialists – obstetrician, gynaecologist, psychiatrist, statistician, epidemiologist, internal medicine, dentists, and ophthalmologist. Additionally, there are supportive teams of other specialists and technical staff who run a clinic once a month at the community polyclinics. The physician density is 84.2 per 10,000 population (2018) [15]. There is a general three-year competency-based Comprehensive Medicine residency program based at the consultorios for Cuban medical residents (or two years for international medical residents). Regarding clinical guidelines, there is a general national program on implementation of primary health care, family doctor and nurse program, and other disease and age-specific community health programs.

#### *Financing*

The PHC workforce receives a salary paid by the state. There is universal health coverage for Cuban citizens, meaning that every health and health-related service is paid for by the state through a tax-based system. There is a co-pay system for medication with government subsidies. For international residents,

it is an insurance-based fee-for-service system and OOP.

## Germany

### *Workforce*

The basic team consists of doctors, nurses, and non-physician assistants. Collaborations exist with other internal medicine specialties, physiotherapists, nutrition specialists, and other health professionals. The physician density is 43.7 per 10,000 population (2019) [15]. There is a five-year residency program in GP and Family Medicine, which requires least two years of GP practice and at least one year of internal medicine. Clinical guidelines specific to the PHC setting are provided by German College of General Practice and Family Medicine (DEGAM).

### *Financing*

Payment mechanisms are mainly fee-for-service mixed with capitation fee, alongside Disease Related Groups. GPs are self-employed or employees in GP practices or medical centres. Public health insurance funds exist through shared contributions of employer and employee (percentage of gross income), and about 11% of the population has private health insurance.

## India

### *Workforce*

The workforce comprises one PHC medical doctor, other specialists visiting weekly, and alternative health providers who may work in some settings, as well as nurses, auxiliary nursing midwives, and Accredited Social Health Activist (ASHA) personnel. PHC is the first point of contact between the village community and the doctor having at least 15 people including a medical

officer (MO) and a medical health assistant. Physician density is 7.4 per 10,000 population (2020) [15]. There is a three-year MD (Master) and DNB (Diploma) in Family Medicine. Residency programs exist which started because of advocacy due to a need in the country, modelled on the United Kingdom's National Health Service (NHS) and the US Family Medicine programs.

There is a three-year MD (Master) and DNB (Diploma) in Internal Medicine who practice as GPs or family physicians. Although clinical guidelines are provided by the government for public and private hospitals, private hospitals have their own rules in compliance.

### *Financing*

PHC personnel are paid a fixed amount by the respective government department. Private GP practices are self-owned. Private hospitals pay a fixed salary to their employees, although sometimes, allopathic generalists may be paid the same as alternative medicine graduates. PHC services are funded by the government, with minimal entry fees in public hospitals and generally high OOP (mixed payment structure). Private health insurance is accepted in both government and private set-ups. National programs and social actors help economically weaker sections of the society.

## Myanmar

### *Workforce*

The PHC team is composed of a doctor, nurses, female health visitor, public health staff, community health educators, midwives, and volunteer health personnel in the public sector.

In private general practice clinic, the team is composed of doctor

and nurses. Physician density is 7.4 per 10,000 population (2019) [15]. There is a one-year diploma program in Family Medicine, and a three-year MSc in Family Medicine is being planned (temporarily halted due to COVID-19 and military coup). Clinical guidelines for health care professions are provided by the Myanmar Medical Association General Practitioner Society.

### *Financing*

In the public sector, there is a fixed salary-based payment for most employed health professionals. In the private sector GP are self-employed. A health insurance is under development, but it has been halted due to the coup and the COVID-19 pandemic.

## Nigeria

### *Workforce*

The PHC workforce is comprised of doctors, community health practitioners, health assistants, nurses and administrative support staff. Physician density is 3.8 per 10,000 population (2018) [15]. There is a diploma in Family Medicine for a duration of 18 months and a residency training in Family Medicine for 4-6 years. Clinical guidelines are provided by the National Primary Health Care Development Agency (NPHCDA). There are also standing orders drafted for the community health practitioners as there are primary health centres without a physician. In Nigeria, most of the PHCs are in rural settings.

### *Financing*

At the public PHCs, clinical and non-clinical staff are paid by the government. Although some patients are enrolled in Nigerian Health Insurance Scheme (NHIS),

most patients pay out of pocket. Furthermore, there are some community-based health insurance schemes.

## Tunisia

### Workforce

A PHC team consists of family doctors (up to three), nurses, midwives, dentists, and pharmacists, visiting the PHC centre daily, and fewer consultations of nutrition, psychology, gynaecology, paediatrics, and other medical specialties. Physician density is 13.0 per 10,000 population (2017) [15]. There is a three-year specialty training program, rewarding with a specialty diploma in Family Medicine. Clinical guidelines for chronic diseases management and public health measures are provided by the Ministry of Health and the National Institute of Health Accreditation and Evaluation.

### Financing

There is a salary-based system in the whole public health care system and fee-for-service in the private sector for GPs. A public insurance exists for basic health services in the public sector as well as co-payments and partial reimbursement for contributors in the private sector.

## Discussion

This review aimed to consolidate PHC systems across the world and highlight similarities and differences across systems regarding delivery of care, services, financing, and workforce. The information from Brazil, Canada, Cuba, Germany, India, Myanmar, and Tunisia stands for even more diversity across the globe as well as regional, social, cultural and political differences within countries. Generally, countries represented have several elements in common:

- *PHC workforce:* A physician-centred model and a team working within the PHC centre, and training programs of Family Medicine ranging from 2 to 5 years. This structure is in line with the worldwide recommended capacity building for the health workforce in the PHC setting [17].

- *PHC financing:* Expenditures for the PHC settings are multi-factorial and can range from 40 to 50% of the current health expenditures in most countries represented, except Nigeria (67%) and Myanmar (68%).

In addition, some aspects differ across countries and highlight challenges at the global level:

- *PHC workforce:* There is a great diversity in physician density per 10,000 population (range from 3 to 84) from the countries represented. There is also a difference in the PHC teams, showing other possible models (e.g. community health workers) or additional competencies (e.g. tobacco cessation counsellors, mental health specialists, nutritionists).

- *PHC financing:* Payment mechanisms for health care professionals and PHC services vary a lot and have been developed in adaptation to the societal and political contexts. Clinicians and patients should not face financial hardships, and clinicians' financial rights for provided services must be ensured. Moreover, indicators related to financing the PHC system are met [13,18].

Overall, the importance of a strong PHC system has been outlined and prioritized in advocacy efforts. Operational guidance for PHC strengthening has been developed to support governments and health authorities undergoing health system transformation and redirection [7,9,13]. Notably, this article includes authors working in the respective systems from five continents and countries of different income groups. However, with limited availability and comparability of national data

	Brazil	Canada	Germany	India	Myanmar	Nigeria <sup>a</sup>	Cuba <sup>b</sup>	Tunisia
Primary health care (PHC) expenditure	40	48	48	45	67	68	42.6	48
Out of pocket (OOP) expenditure	25	15	13	55	76	71	11	38
External expenditure	-	-	-	2	10	15	-	1

Table 1. Health expenditure (in USD, millions) across eight selected countries. Note: <sup>a</sup>PHC expenditure data (Nigeria) from 2011, and OOP expenditure data from 2019. <sup>b</sup>PHC expenditure data (Cuba) from 2015. Source: World Health Organization's Global Health Expenditure Database (n.d.) [16].



related to PHC indicators, the authors relied on existing data from the WHO database. Since only one health system per country was presented, the diversity of PHC systems may have been overlooked. To monitor indicators and ensure the validity of future analyses, the authors recommend that countries measure and make PHC data available annually for the general populace.

### Call to Action

Sharing best practices and exchanging national experiences between countries can help with the adaptation and implementation of general recommendations to strengthen PHC. By recognizing that countries have diverse health systems, collaborating and learning from each other can lead to cost-effective and feasible local solutions. Quantitative and qualitative implementation research studies are needed to understand different contexts and allow the adaptation of successful interventions. Furthermore, global health care systems should provide easily accessible, high quality, and equitable care at the PHC level. However, the implementation of

PHC improvement strategies and its translation to clinical practice are not always guaranteed and should be supported by the identification of barriers that can be monitored and addressed [19]. Overall, this global representation comes with assets showcased in the SWOT Analysis (Figure 1).

### Conclusion

As PHC is constantly evolving while facing challenges all over the world, the JDN PHC working group seeks to facilitate a platform for junior doctors working in PHC to share their visions, experiences, ideas on improvement, and lessons learned to strengthen PHC systems. The perspectives of health care providers must be included at all stages of policy making. Furthermore, strong political commitment towards strengthening and investing in PHC is needed, placing PHC at the core of every health care system. As this article offers a general overview on how PHC is addressed worldwide from a junior doctor perspective, we hope that it encourages readers to continue their analyses.

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<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>Operational framework for PHC performance</li> <li>Guidelines supporting clinical practice and policy</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>Inconsistent PHC workforce density</li> <li>OOP expenditure is greater than 35% in half of the represented countries</li> <li>Lack of funding for PHC</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>Collaborations between sectors and at the global level</li> <li>Learning from best practices</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>Implementation challenges</li> <li>Monitoring</li> <li>Transparency</li> </ul>

Figure 1. Global representation of primary health care (PHC) systems using the Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis.

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