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Research Proposal

Incorporating Anticipatory Thinking within Science Diplomacy to Bridge Gaps in Cancer Research and Care: Lessons from Geneva

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Abstract

Confronting the global cancer burden requires more than scientific progress, it requires international foresight, equity-driven policymaking, and cross-disciplinary collaborations among scientists, policy makers, and the public. This research project explores how anticipatory thinking, a concept grounded in futures literacy, can be integrated into science diplomacy to address systematic inequities in cancer prevention and care. By looking beyond reactive policy cycles, the aim of my research is to uncover how future-oriented approaches can help governments and organizations to prepare for emerging health challenges before they escalate.

Leveraging Geneva's unique position as a hub for international organizations like WHO (World Health Organization) and Geneva Science & Diplomacy Anticipator (GESDA), this project aims to investigate how anticipatory thinking can enhance science diplomacy's capacity to investigate how to foresee and respond to emerging trends. Through a mixed-methods approach, including literature review, stakeholder interviews, and scenario analysis using foresight tools like Three Horizons and Casual Layered Analysis, I plan on identifying policy gaps and proposing a roadmap for anticipatory science diplomacy.

The ultimate goal is to contribute to global health equity by developing a framework and recommendations enabling institutions to move beyond reactive strategies and embrace future-informed policymaking.

Introduction

Cancer remains one of the leading causes of death globally, accounting for nearly 10 million deaths in 2020, or almost one in six deaths worldwide. (WHO, n.d.) Low-resource settings bear a disproportionate burden, with over 70% of cancer deaths occurring in low- and middle-income countries. Despite advancements in early detection and prevention, systemic disparities continue to hinder equitable access to these life-saving measures, exacerbating global health inequities.

This research is deeply personal to me, as it is inspired by a relative's journey with cancer in a low-income country like Pakistan heavily affected by systemic disparities. Participating in summer research programs focused on early cancer detection contributed to my eventual decision to study molecular biology at the University of Toronto. Witnessing the profound impact of this disease not only fueled my interest in understanding its biological underpinnings but also drove my desire to contribute to systematic solutions that can prevent such suffering. My passion for science diplomacy stems from a commitment to influencing societal change on a broader scale. Having spoken at the United Nations and advocated for systemic social good through my work, I believe in the power of collaborative efforts to address global challenges and create equitable health outcomes.

This challenge requires innovative, forward-thinking approaches that combine global health expertise with the tools of *science diplomacy*. Science diplomacy is the 'use of scientific collaborations among nations to address the common problems facing 21st-century humanity and to build constructive international partnerships' (Soler, 2020). In a global context, science diplomacy can play a pivotal role in tackling transboundary health issues such as cancer, where

collaborative research and policy efforts can lead to shared solutions. *Anticipatory thinking*, a concept rooted in *futures literacy*, involves the ability to envision and prepare for potential future scenarios by identifying emerging trends and challenges before they fully materialize (Geden et al, 2019). Futures literacy is a 'skill that allows people to better understand the role of the future in what they see and do' (UNESCO, n.d.).

By incorporating anticipatory thinking in science diplomacy, we can proactively identify and address emerging cancer trends, anticipate shifts in disease patterns, and design preemptive interventions that align with international health priorities. This approach is particularly significant in a global context where science and technology are advancing rapidly, reshaping societies and the environment. However, without science diplomacy these advancements risk deepening existing inequities.

Additionally, it offers an opportunity to leverage Geneva's unique position as a hub for international organizations like WHO (World Health Organization) and GESDA (Geneva Science & Diplomacy Anticipator) to foster impactful partnerships. Through this project, I hope to:

1. Develop a framework for anticipatory science diplomacy in cancer prevention.
2. Identify emerging global cancer trends requiring preemptive action.
3. Create actionable policy recommendations for equitable and proactive cancer prevention efforts.

Research Objectives & Questions

Primary Objective:
To investigate how anticipatory thinking can be applied to science diplomacy to enhance global cancer prevention and early detection initiatives.

Secondary Objectives:

1. To identify key stakeholders, trends, and innovations in cancer prevention using foresight tools.
2. To analyze the role of international organizations like WHO and GESDA in shaping cancer prevention policies.
3. To propose a framework grounded in anticipatory science diplomacy that addresses disparities in cancer prevention.

Research Questions:

- How can anticipatory thinking improve global cancer care and prevention strategies?
- How can science diplomacy ensure equitable access to cancer prevention resources?
- What strategies can international organizations implement to integrate science diplomacy and anticipatory thinking for equitable cancer prevention?

Background

Cancer presents a multi-faceted global health challenge that extends beyond biology and clinical management into realms of economics, governance, and forward thinkings. “Cancer economics, policy and politics” recognizes remarkable inequalities in cancer outcomes and spending within Europe, in the face of comparatively similar income levels. For instance, five-year breast cancer survival rates range between 57.9% in Slovakia and 82% in Sweden, whereas national expenditures per capita on treating cancer range between €52 in Bulgaria and €171 in Germany. These disparities are influenced by late diagnoses, inequitable access to treatment, and insufficient standardization of evidence-based policies application. While early diagnosis and prevention are increasingly becoming a priority in global cancer agendas, the translation of these interventions into relevant national policies remains uneven and typically late (Aggarwal et al, 2014).

The delay between new scientific evidence and its application in public health is partly due to the absence of anticipatory governance mechanisms in global health. Anticipatory thinking is defined as an active mental process that is separate from forecasting or prediction. It is described as a sensemaking process that enables actors to anticipate and prepare for possible futures through means such as trajectory tracing, pattern detection, and risk convergence analysis. Although historically used for military or emergency preparedness, anticipatory thinking has promise in global health, and that is acting on weak signals and new inequities of cancer burden (Klein et al. 2017).

Science diplomacy is increasingly being recognized as a means to deal with transnational challenges where scientific innovation, political coordination, and long-term governance must converge. The Geneva Science and Diplomacy Anticipator (GESDA) provides an institutional basis for mainstreaming foresight in global science governance. In its Science Breakthrough Radar, GESDA identifies upcoming scientific breakthroughs and organizes multilateral forums to assess their long-term social impacts. Although GESDA's frameworks have been applied to develop quantum computing and AI, their application to health foresight and cancer diplomacy is limited. As the GESDA anticipatory thinking guide has put into perspective, the challenge is not one of forecasting precise outcomes but rather facilitating institutions to work systematically with uncertainty, map likely futures, and align anticipatory action across scientific and diplomatic realms. (GESDA, 2023)

The potential of anticipatory science diplomacy in cancer governance is not yet fully realized, and it presents a unique window for institutional innovation, particularly in hubs like Geneva where institutions like WHO and GESDA are well-positioned to lead the way.

Methodology

The research will employ a mixed-methods approach, combining qualitative analysis, stakeholder engagement, and foresight tools. The summer research will take place in Geneva, Switzerland, with a one-day visit to Lyon, France, and will focus on three key institutions: the

Geneva Science and Diplomacy Anticipator (GESDA), the World Health Organization (WHO), and the International Agency for Research on Cancer (IARC). The methodology will focus on:

1. **Literature Review:**

Document analysis will be conducted to review institutional strategies, foresight publications, internal reports, and global policy frameworks related to cancer prevention and early detection. This material will be triangulated with interview findings to build a grounded understanding of how anticipatory governance is, or is not, operationalized within these institutions.

2. **Interviews and Site Visits:**

The primary data collection method will involve semi-structured, in-person interviews with experts working in science diplomacy, strategic foresight, and cancer research policy. These interviews aim to elicit insights into institutional priorities, anticipatory planning approaches, and the perceived challenges and opportunities in applying futures thinking to global cancer prevention.
Interviews will be supplemented by direct observation during site visits to GESDA and WHO in Geneva, and IARC in Lyon. Field notes will be taken to capture observations on organizational culture, the use of foresight platforms (such as GESDA's Science Breakthrough Radar), and the physical and public-facing dimensions of these institutions' engagement with anticipatory science.

3. **Foresight Methods:**

Foresight tools will be applied analytically to the research data. These include horizon scanning, scenario mapping, and the Futures Triangle framework. These tools will support the construction of future-oriented narratives and the development of an analytical framework that connects science foresight with global cancer governance.

The research will be conducted under the supervision of Professor Guy Allen at the University of Toronto, whose expertise in scientific narrative and communication will guide the integration and articulation of findings.

Training/ Certifications Needed

S4D4C European Science Diplomacy Online Course: https://www.s4d4c.eu/european-science-diplomacy-online-course/ - Requires 15 hours

Research Location

Outside of Canada – Geneva, Switzerland & Lyon, France

Timeline

Pre-Work (May 5th – June 1st)
Complete the S4D4C Course
Finalize list of interview questions and interviewees
Get site visit approval for GESDA, WHO, and IARC

Week 1 (June 16–22)
Conduct literature review on GESDA, WHO, and IARC strategies.
Confirm logistics, initiate field journal, and begin mapping anticipatory governance frameworks.

Week 2 (June 23–29)
Interview GESDA personnel and conduct site visit to observe foresight tools in practice.
Begin mapping GESDA's anticipatory science ecosystem and its potential health applications.

Week 3 (June 30–July 6)
Interview WHO experts; conduct foresight analysis using tools like the Futures Triangle.
Draft initial cancer governance scenarios informed by WHO's global health approach.

Week 4 (July 7–13)
Visit IARC in Lyon and interview stakeholders on cancer trend forecasting and research diplomacy.
Synthesize insights across institutions and identify shared anticipatory themes.

Week 5 (July 14–20)
Develop scenario narratives on the future of global cancer governance and diplomacy.
Draft outline of GESDA-focused case study and anticipatory science diplomacy framework.

Week 6 (July 21–27)
Revisit institutions if needed, complete field reflections, and finalize on-site synthesis.
Prepare research summary and outline deliverables for post-summer writing and analysis.

Resources & Support Needed

Access to GESDA, WHO, IARC on-site.

Potential Impact

The research will contribute to the foresight field by highlighting the potential of anticipatory thinking in addressing global health inequities. It will also inform future science diplomacy initiatives, fostering collaboration among researchers and policymakers to tackle other emerging health challenges. By learning from the only organization in the world doing anticipatory thinking for science diplomacy, GESDA, I plan on ensuring that policy recommendations and foresight frameworks are taken into consideration.

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