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Health and global change in an interconnected world

Concerns and responsibilities for Switzerland

Current anthropogenic pressures on the biosphere are historically unprecedented. These complex and far-reaching changes are disrupting many of the Earth's systems, cycles and feedback mechanisms, leading to adverse impacts and threatening the foundations of human health and well-being. This factsheet highlights the principal drivers of global change, placing particular emphasis on associated health impacts. Relevant issues for Switzerland include local health impacts due to climate change, vulnerability to (re-)emerging infectious diseases, in-migrant health and overseas health impacts. Interdisciplinary research and cross-sector action are needed to mitigate adverse health impacts and adapt to global change. The role of Swiss-based multinational companies engaged in commodity trading as well as the extractive, pharmaceutical and food industries warrant particular attention towards promoting sustainable and equitable practices.

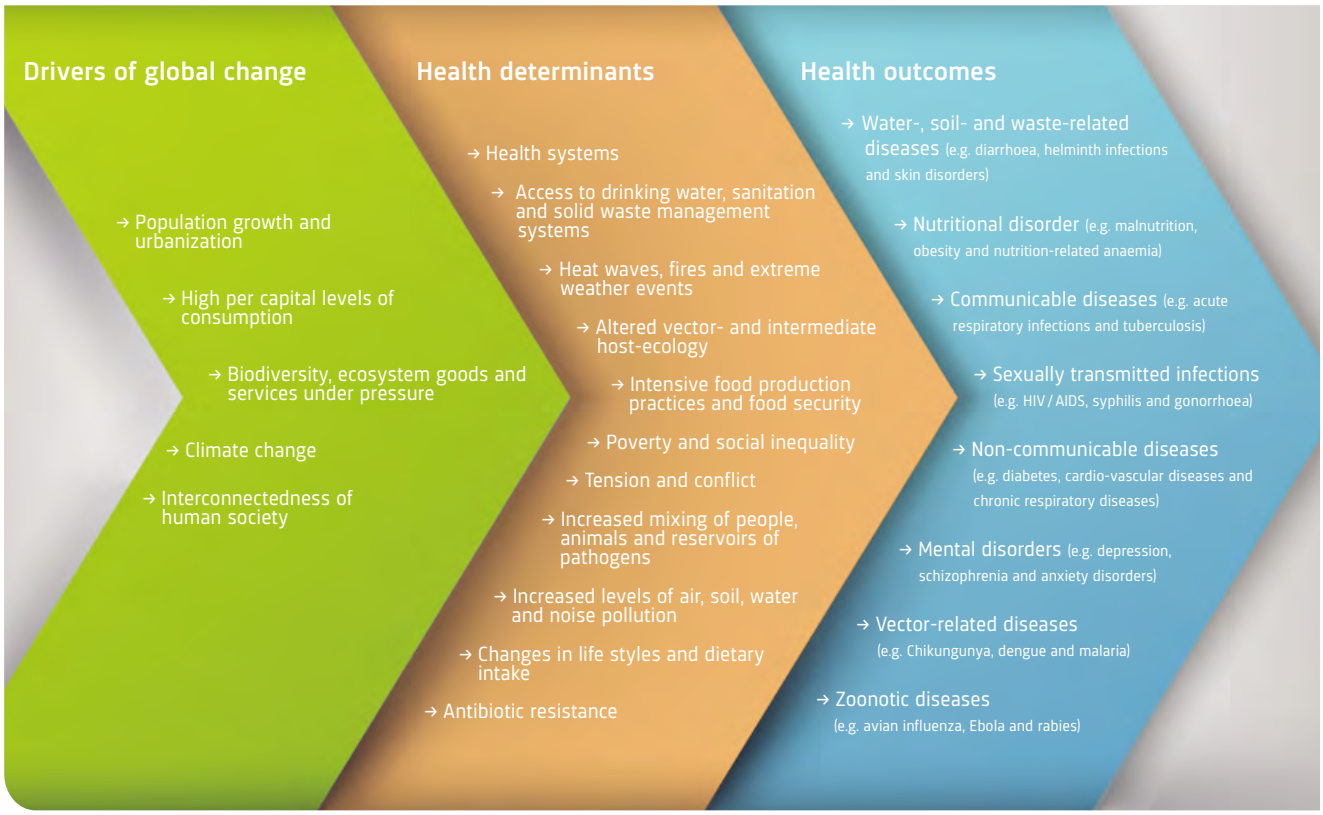
Drivers of global change and associated health effects

Today, the principal drivers of global change include a rapidly growing human population, increasing urbanization, pressures on biodiversity, ecosystem goods and services, high per capita levels of consumption, climate change and the interconnectedness of human society. These historically unprecedented pressures are generating a range of complex and far-reaching changes that are fundamentally altering many of the Earth's systems, cycles and feedback mechanisms. The resulting adverse impacts are threatening the foundations of human health and well-being. Though, on average, people now live longer than 20 years ago, but the global burden of disease has shifted from infectious to non-communicable diseases (NCDs) such as diabetes and cardio-vascular diseases. Across all regions of the world, the rising burden from mental and behavioural disorders, musculoskeletal disorders and NCDs is generating new challenges for health systems. In many low- and middle-income countries this is leading to a double burden of disease, with high infectious disease rates still observed mainly in rural settings while the rate of NCDs increases particularly in urban areas. Population growth and climate change, coupled with the ongoing epidemiological transition in low- and middle-income countries[1] and rapid spread of antibiotic resistance, may further exacerbate poverty.

Population growth and urbanization

The world's population is estimated to reach 9.6 billion in 2050, placing further strain on mineral and energy resources, as well as the global food supply. Most of that growth will occur in developing regions, particularly in Africa. Population growth in urban areas is outpacing growth in other settings, with more than half of the population already living in urban areas, and expected to grow to two-thirds in 2050. Nearly 90 % of this increase is predicted for

1 Chronic and degenerative diseases are increasingly important causes of death as infant mortality rates fall, life expectancy increases and fertility rates decline.



Africa and Asia. While cities offer opportunities to expand access to essential commodities and services such as health care and education, exponential urban growth directly and indirectly impacts human health and wellbeing due to the degradation of ecosystems and ecosystem services. Urbanization can change vector ecology, increasing the potential for vector-related diseases to spread (e.g. dengue). Residents of densely populated urban areas are more prone to cardio-respiratory and metabolic diseases due to pollution, at greater risk from transmission of infectious diseases like avian influenza, have higher levels of mental disorders due to insecurity and lack of social support, and may assume sedentary lifestyles with little physical activity, which increases the burden of NCDs. In urban areas, in addition to a greater threat of violence and conflict, socio-economic disparities and associated health inequalities may also increase due to unequal distribution of goods and lack of access to high-quality healthcare services. These negative impacts will be more severe for irregular migrants, displaced persons and refugees who may lack access to essential services such as health care, adequate sanitation, safe drinking water and waste management.

Biodiversity, ecosystem goods and services under pressure

Local and regional environmental quality and stability has eroded due to a growing world population in conjunction with industrialization and current patterns of consumption. These dynamics have accelerated so dramatically since the mid-20th century that some planetary boundaries[2] have been reached or already exceeded. Since biodiversity and ecosystem goods (e.g. food and clean air) and services (e.g. freshwater purification, protection from natural hazards, climate regulation and sequestration of pollutants) are indispensable to human well-being, changes to the Earth's ecosystems affect human health in a variety of ways. The types and magnitude of health effects correspond with the dependency of local populations on ecological systems that are experiencing degradation or overexploitation. As a result, factors like socio-economic status affect vulnerability to ecosystem change, reflecting for instance the capacity to access food and water or shelter from natural hazards.

Climate change

The world's climate is being influenced by the increase in atmospheric greenhouse gas (GHG) emissions due to the combustion of fossil fuels, ozone depletion, large-scale livestock breeding and deforestation. The complex nature of climate change and its environmental and societal manifestations results in diverse threats to human health, which can be classified into three broad categories:

- **primary risks** entail direct consequences to human health from heat waves, fires, extreme weather events and temperature-enhanced levels of urban air pollutants;
- **secondary risks** are health effects related to changes in biophysically and ecologically based processes and systems such as food yields, water flows, disease vectors and intermediate host ecology; and
- **tertiary risks** include health outcomes related to tension and conflict owing to climate change-related declines in basic resources, as well as more diffuse health effects (e.g. mental health problems in displaced groups).

The World Health Organization (WHO) recently applied a risk assessment approach to quantify climate change induced mortality. Under an optimistic scenario of continued future socio-economic development and adaptation to climate change, the study estimated

2 Also defined as "tipping points" beyond which irreversible and abrupt environmental change is expected.

250,000 additional deaths per year due to coastal flooding, heat, diarrhoeal diseases, malaria, dengue and undernutrition (stunting) in the years 2030 – 2050. This estimate does not consider potential health effects from economic loss, major heat wave events, inland flooding, water scarcity, migration or armed conflict. In terms of geographical distribution, adverse health impacts of climate change are projected to be greatest in South Asia and sub-Saharan Africa. There is a major equity issue, as the populations most vulnerable to climate change are only responsible for a minor part of current GHG emissions.

Interconnectedness of human societies

Globalization typically refers to the international movement of financial capital, trade goods and people. Processes such as ecological change, poverty and social inequality, movement of people, intensive food production practices and antibiotic resistance are all associated with globalization, and can all increase the threat of emerging and re-emerging infectious diseases (EIDs).[3] Examples include pandemic influenza, human immunodeficiency virus (HIV), severe acute respiratory syndrome (SARS) and the 2014 Ebola outbreak in West Africa. These examples demonstrate the ease with which EIDs move around the world, highlighting an increasing global interdependence due to the capacity for EIDs to affect not only the health of people and animals, but also the economic stability of entire societies.

Consequences and responsibilities for Switzerland

Local health consequences of climate change

Changes in climate conditions are expected to generate proximal and distal effects on the health of the Swiss population. In the short term, an increase in the frequency and intensity of heat waves will be the most important climate-related change in Switzerland. The vulnerability of the elderly population was evident during the heat wave in the summer of 2003, which resulted in excess deaths of approximately 1,000 people. The growing frequency and severity of extreme weather events increases health risks associated with natural hazards. Floods, storms and mudslides often cause death and injuries, as well as severe psychological effects. The increase in temperatures with warmer summer seasons may lead to periods of increased ozone concentrations and related negative health effects. Climate shifts may also result in longer pollen seasons, which may affect those with allergies (e.g. hay fever). Moreover, rising average temperatures may increase the risk of vector-borne disease due to increased habitat suitability for potential disease vectors such as the invasive tiger mosquito or endemic ticks. However, the risk for outbreaks of exotic vector-borne disease such as malaria or dengue may be less dependent on climate change rather than other factors such as access to treatment (in the case of malaria) or passive spread of vectors through global trade (in the case of invasive mosquitoes).

Vulnerability to (re-)emerging infectious diseases

Four main factors render Switzerland vulnerable to EIDs: (i) it is a hub for international business travel and tourism; (ii) it ranks among the countries with the highest per capita rates of international travel; (iii) a large number of people come to Switzerland to seek asylum (approximately 20,000 per year in the last decade); and (iv) we import goods from all over the world. Hence, any newly emerging or re-emerging infection with pandemic potential is a real threat for Switzerland, and EID preparedness strategies should be prioritized.

In-migrant health

The individual or combined impacts of population growth, degradation of ecosystems and their services, climate change and globalization are already causing and will trigger further major population movements both within states and between neighbouring countries. Population movements that are triggered by climatic factors occur mainly within states and, to a lesser degree, between neighbouring states. Most global migrants are economic migrants, refugees or people fleeing conflict. Switzerland, as all European countries are marked by major population dynamics through high levels of mobility. As a result, the public health services are increasingly confronted with the needs of marginalized populations such as migrants, asylum seekers and displaced people. For example, communication challenges and socio-cultural barriers often hinder healthy behaviour and access to health care services. Hence, in-migrant health is a topic of direct relevance for health policy and planning in Switzerland.

3 EIDs are communicable diseases that appear in a population for the first time or that have been known for some time, but are rapidly increasing in incidence or expanding their geographic range. Most EIDs are zoonotic in nature (diseases that can be passed between animals and humans).

Health-related consequences for Switzerland

VULNERABILITY TO EMERGING INFECTIOUS DISEASES

(primarily due to high levels of international travels and trade)
→ Any newly emerging or newly recognized infection with pandemic potential is a threat for Switzerland

LOCAL HEALTH CONSEQUENCES OF GLOBAL CLIMATE CHANGE

→ Injury and fatality due to extreme weather events and natural hazards
→ Increased incidence of respiratory diseases
→ Altered ecology of potential disease vectors

IN-MIGRATION

(primarily economic refugees or people fleeing conflict)
→ In-migrant health as an important topic for Swiss health policy

Responsibilities overseas

OVERSEAS HEALTH IMPACTS CAUSED BY SWITZERLAND

→ Swiss citizens have a considerable share in global morbidity and mortality attributable to climate change
→ Multinational corporations headquartered in Switzerland may cause negative effects on health, the environment, social structures and human rights in the countries they operate
→ Consumption and production in Switzerland has a growing environmental impact abroad
→ Swiss consumer behaviour and market policies indirectly promote or oppose labour conditions in producing countries

Overseas health impacts

In addition to the consequences of global change on the health of people living in Switzerland, it also needs to be considered that Swiss people and companies impact the health of people living abroad in a variety of ways. First, Switzerland contributes to GHG emissions and thus climate change. In 2010, it was ranked as one of the 10 countries with the highest per capita carbon footprints,[4] a measurement that takes into account GHG emissions emitted locally and abroad in the production of goods (e.g. housing, food, clothing and manufactured products) and services (e.g. mobility, trade, etc.), as well as from consumption activities. Hence, Swiss citizens contribute to the global morbidity and mortality attributable to climate change. Second, many multinational companies engaged in commodities trading as well as the extractive, pharmaceutical and food industries are headquartered in Switzerland. As a host country, Switzerland therefore has a responsibility to advocate healthy and sustainable industry and agricultural practices. If the same health and environmental regulations used in Switzerland were also applied by these multinational companies for their overseas operations, this would minimize negative effects on health, the environment, social structures and human rights in other countries as well. Third, consumption and production in Switzerland has a growing environmental impact abroad. According to a recent study,[5] the total environmental impact caused within Switzerland from 1996 to 2011 had significantly decreased, but was largely offset by Switzerland's growing environmental impact abroad. Swiss livestock, for instance, are fed with imported fodder grown across some 250,000 hectares of land abroad – equivalent to 60 % of the arable land in Switzerland. In many cases, these large-scale monocultures are created through massive land conversion and deforestation. Such displacement of environmental burdens indirectly triggers a broad range of adverse health impacts. The authors concluded that in order to reach an environmentally sustainable level, Switzerland's overall environmental impact should be reduced by at least half. Fourth, unhealthy labour conditions are common in low- and middle-income countries. According to the Swiss Customs Administration, the country imported goods with a net value of approximately CHF 180 billion in 2013.[6] Swiss consumer behaviour and market policies exert an influence on the provenance of goods consumed in Switzerland and therefore indirectly promote or deter positive labour conditions in producing countries.

4 http://carbonfootprintofnations.com
5 «Development of Switzerland's worldwide environmental impact.» (Federal Office for the Environment, FOEN 2014)
6 Most importantly, chemicals: CHF 42 billion; machinery and electronic devices: CHF 30 billion; instruments, watches and jewellery: CHF 19 billion; and vehicles: 16 billion

Possible courses of action

Local adaptation to climate change

In recent years, many measures have been taken to mitigate potential adverse effects of climate variability and change. These include early warning systems for climate sensitive diseases (e.g. malaria) or extreme weather events (e.g. heat waves), flood protection measures along rivers, risk assessments and the targeting of care to the most vulnerable groups. There is a need to further strengthen compliance with climate change and clean air policies to cut emissions of primary pollutants in order to prevent high ozone levels during prolonged warm periods, to sustainably improve air quality and to mitigate climate change. In order to minimize the risk of transmission of exotic diseases in Switzerland, surveillance systems are needed for vector-borne and zoonotic diseases. Furthermore, in line with commitments under the United Nations Framework Convention on Climate Change (UNFCCC), Swiss policies and programmes to reduce GHG emissions should consider and promote better health as win-win-strategies for both the climate and public health. This includes urban planning that promotes green spaces and other measures for micro-climate regulation and recreation possibilities, walking and biking, public transport, low emission mobility and "green building" codes based on clean renewable energies.

Development cooperation

Many of the Swiss Agency for Development and Cooperation's (SDC) priority countries are particularly affected by population growth and urbanization, climate change and depletion of natural resources. In order to minimize potential adverse health impacts and contribute to the sustainable development goals, the authors recommend to prioritize the following issues in Swiss development policy: (i) food security and sovereignty; (ii) protection of biodiversity and ecosystem goods and services; (iii) availability and quality of drinking water and air quality; (iv) insufficient sewerage and solid waste management system capacity; (v) epidemiological transition due to lifestyle changes and ageing populations; (vi) socio-economic and health inequalities; and (vii) health systems that lack the human and technical capacity to effectively respond to growing health risks posed by climate change. In addition to directly addressing health and climate change issues, relevant SDC programmes could promote implementation of UNFCCC Article 4.1.f by ensuring that relevant tools such as health impact assessment (HIA) are employed to determine the health implications of mitigation and adaptation policies, programmes and projects by identifying opportunities to safeguard and promote health.

Promotion of sustainable and equitable industry practices

Multinational corporations often operate in fragile states, leaving citizens vulnerable to a range of external factors. For example, many countries rich in mineral and fossil resources have weak policy frameworks for promoting, or even regulating, health and sustainability practices within industries. As a consequence, adverse health and other impacts of large infrastructure developments are often only recognised once they have materialised. Prospective approaches such as HIA, which should be implemented as part of the feasibility studies of any large infrastructure project or marketing scheme, are still largely underutilised. Ongoing efforts in low- and middle-income countries to enforce good industry practices need to be complemented by policies at international level. To advocate sustainable and equitable industry practices, Swiss-based companies and consumers should act with a consciousness of equity, ethics, occupational health and sustainability as integral parts of corporate social responsibility programmes. This also applies to public and private entities that import large quantities of goods from low- and middle-income countries.

Controlling EIDs through surveillance and rapid response

Surveillance and response mechanisms – key elements for controlling EIDs – depend on rapid detection of pathogens in vectors and infected humans, management of patients and containment of the disease. Recent examples of EIDs like the Ebola outbreak in West Africa have underscored the need to reassess and adjust existing surveillance and response mechanisms in line with international standards to make them more efficient and enable comparison across countries and regions. It will also be crucial to expand surveillance systems beyond pure case detection to also include environmental changes and population dynamics. EIDs cannot be adequately addressed solely through disease surveillance and response, which traditionally fall within the domain of public health. There is a critical need for research efforts to develop advanced countermeasures such as monitoring tools, point-of-care diagnostic tests, vaccines, therapeutics and geographic information systems that capture environmental and social change. By considering such dynamics, monitoring will become proactive instead of reactive, helping to prevent EIDs. Importantly, research institutions in low- and middle-income countries need to be partners in this endeavour by promoting local capacity building and mutual learning.

Promoting migrant health

The National Programme on Migration and Public Health of the Federal Office of Public Health was launched in 2002 and aims to strengthen the migrant population's health literacy and develop the public health care system according to their needs. The programme already addresses a wide range of in-migration health issues through various initiatives and projects, and focuses in particular on migrants with a low socio-economic status. By assisting socially and economically vulnerable people in their countries of origin, humanitarian aid and development cooperation have the potential to decrease emigration, and thus make an indirect contribution to migrant health challenges.

Options for action

- Sustain and improve early warning systems for extreme weather events and natural hazards
- Surveillance of vector-borne pathogens and vectors alongside disease case reporting and public awareness campaigns on the prevention of vector-borne diseases
- Strengthen implementation of clean air policies in Switzerland and by Swiss companies operating abroad
- Promote policies with co-benefits for climate, the environment and health such as cycling and the use of public transport systems
- At national and international level, promote biodiversity and ecosystem health as they are crucial for human health and well-being
- The protection and promotion of access to clean water, safe liquid and solid waste management systems, food security and sovereignty, ecosystem health and the support of climate-resilient health systems need to remain a priority of Swiss international cooperation
- Switzerland should serve as a role model for healthy, sustainable and equitable industry, agriculture and trading practices. Particular focus should be placed on multinational companies operating in fragile states
- In order to promote environmentally sustainable consumption in Switzerland, consumers need to be informed about the environmental footprint of production processes, including those of the ingredients used. This should be complemented by policies and market interventions at national level
- Tools and projects need to be developed to globalize health and environmental protection policy frameworks and standards to end the outsourcing of environmental pollution to low-income countries
- Pursue a research agenda aimed at promoting further transdisciplinary and interdisciplinary research and intersectoral action to:
  - support the development of effective and integrated (e.g. linking human and animal health) surveillance and response strategies to emerging and re-emerging infectious diseases
  - understand the implications of the transition from infectious diseases to a dual burden of infectious diseases and non-communicable diseases on public health, health systems and the economy
  - assess the impacts of urbanization on disease, health and social systems and the environment
  - evaluate the consequences of loss of biodiversity and ecosystem health for human health and well-being
- Partnerships need to be formed with research institutions in low- and middle-income countries to strengthen cooperation

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