Globalisation, Food and Health: A Sustainable Future?

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1. Introduction

Considered from the public health perspective, the global changes we have seen over the past years appear to be both a blessing and a curse. Increased economic growth and rapid technological advances have improved the general health and life expectancy of many groups of the population. However, multiple aspects of globalisation also endanger public health. Examples include the erosion of social cohesion and the environment, the global distribution of work, the expanding divide between rich and poor (both within countries and across borders) and accelerated growth of consumption. 'Incidents' such as the outbreak and spread of the new infectious disease SARS serve to show us what may happen to our health in the future under specific circumstances.

The relationship between globalisation and health comprises both local and global processes. It is at play both in the long and the short term and embraces ecological, social and economic systems. Health may be seen as an important integrative index that reflects the status – and in the long term, the sustainability – of our environment and our socio-economic climate (1). From a more anthropocentric approach we may also assert that if we want sustainable development to have some sort of real significance, people should be sufficiently healthy to benefit from it. In other words: sustainable development without health is of little value (2).

Before I address the issue of what out health could look like in a globalising world, let me first explain a number of key topics in greater detail.

2. Tropical Diseases in a Warmer World (3)

Melting ice caps, rising sea levels, flooding due to heavy rainfall, prolonged droughts and failed harvests... Most people would associate these phenomena with global warming. And although the majority of us would rank health as the greatest good of all, we hardly ever hear about the impact of climate change on public health.

Nevertheless, it has long been a well-known fact that a number of infamous pathogens thrive in tropical climates. The timing of epidemic outbreaks and the spreading of infectious diseases are influenced by temperature, rain, sunshine and ocean currents. A warmer and often wetter climate (as predicted for the greater part of the world by climatologists) improves the overall outlook for a number of the most deadly parasites and for rats, flies, mosquitoes, snails and other so-called vectors that spread these diseases.

Indirectly, reduced agricultural and fishery yields as a result of climate change will cause the number of people suffering from malnourishment to increase. Malnourishment is one of the main causes of child mortality. In addition, a wide range of health effects may be expected due to a change in water supplies; a lower availability of drinking water will lead to a higher incidence of diarrhoea for example. Disruption of communities due to floods, caused by rising sea levels or extreme rainfall for instance, will also impact health in numerous manners.

The health effects of climate change will not be the same throughout the world. Most health victims will be found in those areas where there are insufficient economic and technological options

to combat the effects (for example by air conditioning or insecticides) are limited – such as Africa. But the Dutch population will also feel the effects of climate change in the form of a higher risk of infectious diseases.

The climate is a key factor in the occurrence of a myriad of infectious diseases – from the bubonic plague (Black Death) in 14th century Europe to the potential new outbreak of a number of tropical diseases in moderate regions in the coming decades. Contagious infectious diseases are immediately transmitted from one person to the next through skin contact, by air, food or water. So-called vector-bound infectious diseases however need an 'in-between' host – the vector (often a mosquito or fly – to transmit the disease from one human to the next. The timing of the epidemic outbreak and the transmission of infectious diseases are influenced by temperature, rain, sunshine and ocean currents.

The relationship between climate and infectious disease is not just vital to understanding recent epidemics of emerging infectious diseases, such as Ebola in Africa, the altered spreading of cholera in South America and Lyme-arthritis in the United States, but also in order to make an accurate assessment of the effect of future climate change on these diseases. Most climate models show that the greatest temperature increase is expected in higher latitude areas, during the winter and in the evenings. The change in precipitation will also differ around the world. The interaction between these factors will be crucial in determining the shift in infectious diseases. If current moderate regions veer toward more tropical climates, tropical diseases may follow. Therefore, understanding the links to climate factors is essential to the fight against these diseases.

3. Animal Diseases + Human Diseases = Hyperdiseases? (4)

The above clearly establishes that the relationship between climate and infectious disease is decisive in understanding recent 'human' epidemics of emerging infectious diseases. But those diseases that affect our livestock and wildlife are also sensitive to climate change. Naturally, the spreading of these diseases are, as is the case with human infectious diseases, is determined by a great many factors (such as demographic and technological developments and social factors; see table 1). A greater potential risk is posed by so-called zoonoses, diseases that can be transmitted from animal to human. Given below is a brief, incomplete summary of a number of developments we have seen over recent years (quoted from (5) and the RIVM website, http://www.rivm.nl/Onderwerpen/Q/Q_koorts):

"In 1996 the United Kingdom sounded the alarm over the occurrence of a new variety of Creutzfeldt-Jakob disease, a neurodegenerative illness that is invariably fatal. British experts stated that exposure to the infectious agens responsible for the prion illness BSE among cattle (BSE: Bovine Spongiform Encephalopathy) should be considered the most likely explanation. A year later, Hong Kong saw an outbreak of avian influenza ('bird flu'). Duting this epidemic among poultry it was first proven that a virus of this type could be transmitted from animal to human. The total number of patients was limited to eighteen (with six fatalities), and there were no reports of the disease being transmitted from human to human. The possibility of the latter happening was cause for grave concern. Due to the fact that the outbreak occurred only a few weeks before the annual influenza season, there was a real risk of people becoming infected with two different influenza viruses simultaneously. This could lead to a new virus strain that would be transmittable from human to human and subsequently lead to an influenza pandemic.

In the spring of 2003, the world suffered the outbreak of multiple epidemics of a disease with an unknown pathogen and influenza-like symptoms: SARS (Severe Acute Respiratory Syndrome). A number of Chinese cities, Hong Kong and Toronto were dealt the heaviest blows. Research revealed that a new corona virus was to blame. According to the figures of the *World Health Organisation* (WHO) there were a total of 8422 SARS patients, of whom 916 succumbed to the disease. Around that same time, the Netherlands was faced with a major outbreak of the bird flu, which ultimately led to the slaughter of some thirty million chickens. Eighty-six people involved in fighting the epidemic and three of their family members were infected. The most commonly reported health complaint was conjunctivitis (also known as pink eye), sometimes in combination with flu-like symptoms. There was one death to be mourned (a veterinarian). That same year eight Asian countries were scourged by the bird flu, which led to 34 reported infections and 23 fatalities. Crisis situations such as these have served to deepen the fear of an influenza pandemic, particularly when the bird flu resurfaced in Southeast Asia in July of 2004. Such a pandemic could lead to a significant number of deaths, as has been proven in the previous century."

Q Fever is also an infectious disease that can be transmitted from animals to humans (zoonosis). In the Netherlands the source for humans are predominantly dairy goats and dairy sheep. The disease is caused by the Gram-negative *Coxiella burnetii* intracellular bacteria. The bacteria is capable of surviving outside of the host for prolonged periods of time, and can infect animals and people after many years. The illness occurs around the world. In the Netherlands, there were approximately 15 diagnosed cases among humans every year, but as of 2007, that number surged. In the summer of 2011, the outbreak in the Netherlands seems to have passed because hardly any new cases were reported. An estimated 100,000 people had been infected and at least 25 died from the disease.

The 'Middle East Respiratory Syndrome-corona virus' (MERS-CoV) is a relatively new type of corona virus that was discovered in September of 2012. The symptoms caused by the virus can be serious, particularly in people with other health issues. The name of the virus is derived from the region where it was first diagnosed and where the majority of cases are found, the Middle East. There is evidence to suggest that dromedaries in the Middle East can transmit the virus to people. However, the exact origin of the virus is not yet known. New viruses may be the result from mutations in an existing virus. Subsequently, the behaviour of the new virus is different and may cause more serious health issues. Some viruses cause mild infections in animals but far more severe infections in humans, and vice versa'. (quoted from the website http://www.rivm.nl/Onderwerpen/M/MERS_coronavirus)

In a globalising world, we see with an increasing demand for meat and animal products an unprecedented transport of these products within and between countries. Unfortunately, the transport of animal meat and fodder entails also the transport of animal- and human diseases. Major epidemic livestock diseases, including e.g. bovine plague, bovine spongiform encepha-lopathy, foot-and-mouth disease, contagious caprine pleuropneumonia, and rift valley fever, often migrate or spread across borders with the transport of 'animal proteins', cause major losses and emergencies, and can pose threats to human health. In the past, such damage has on occasions been catastrophic, leading to famines and sometimes triggering trade restrictions. These transboundary diseases are among the most contagious and place a serious burden on the economies of the countries in which they occur.

The reasons for this increasing risk are complex, but the main contributing factors have been identified as follows :

1) alteration of the environment affecting the size and distribution of certain animal species, vectors, and transmitters of infectious agents of humans;

2) increasing human populations favouring an increased level of contact between humans and infected/affected animals;
3) industrialization of foods of animal origin; changes in food processing and consumer nutritional habits; and,
4) increasing movements of people as well as trade of animals and animal products and decreasing activities for the surveillance and control of major zoonoses.

As the trade of animal products and the movements of people become more intense, the risks of introduction/reintroduction of certain diseases in a country increase. It is very likely, in view of the foreseeable global changes over the next few decades (e.g., population growth, urbanization, and climatic changes), that this trend will continue and even increase. Human disease patterns will be affected by high densities and movements of human populations within and between countries and changes in lifestyles; animal disease patterns will be affected by changing land-use patterns, new farming practices, displacement of animals, and environmental contamination.

Until now, as described above, the number of fatalities has remained relatively low. However, the question seems to be shifting from 'Will there be a pandemic' to 'When will it occur?'. An even more pertinent question is what a future pandemic will entail. Will the number of victims be limited or will it be an extremely contagious, lethal disease, so grave that it may be deemed a 'hyperdisease'?

***Box:** Hyperdisease*

The 'hyperdisease hypothesis' was developed by Ross MacPhee and Preston Marx. They assert that extremely contagious and fatal infectious diseases were decisive elements to the extinction of various animal species in regions such as North America. These hyperdiseases are not completely new diseases, but diseases that have 'jumped' from one species to another. Examples from the past underline that (viral) infectious diseases regularly jump from animals to humans. Increasing contact between people and (domesticated) animals, and increasing contacts between people among themselves (due to factors such as growing populations and increased mobility) command us to take these kinds of extreme scenarios seriously.

4. The 'Food Pandemic'

Malnourishment

Approximately one-tenth of the world population is malnourished, and a few million people die every year from starvation. Hunger and malnourishment particularly increase mortality in children and undermine general health. Although global food production is sufficient to support the entire world population, more than 800 million people are chronically undernourished because they do not have enough money to buy food. Therefore, the malnourishment is currently a matter of poverty and a poor distribution of food, and not one of insufficient total food production.

If we refocus on the link to the climate, we also see that the climate has a huge impact on agricultural yield: heat waves, droughts, flooding and cyclones will reduce the yield per hectare. In 1988 a heat wave and a period of drought in North America caused a 30% decline in the wheat yield. The result was a substantial rise in global wheat prices; this in turn is a risk for poor countries, who will be able to buy less wheat with their scarce funds at times

of need. If North America and South Europe become more arid in the future, this will have an effect on future production.

In many developing countries, insufficient rainfall is already a negative factor. Vulnerable areas are found in a zone that runs from Brazil to China. A reduction of the scarce amount of precipitation will cause a drastic reduction in agricultural yields in those countries. On the other hand, agricultural yields in countries with more moderate or cold climates could increase as a result of rising temperatures. In addition to being a greenhouse gas, carbon dioxide is also necessary for plant photosynthesis. The fertilisation effect – higher concentrations of carbon dioxide in the air will cause more plants to grow more rapidly – can also increase crop production.

Climate change also affects food production in other manners. Warm, moist circumstances promote the development of fungi and parasites, which can subsequently harm harvests. Certain cattle diseases will also be affected by the climate. The amount of available agricultural land may diminish as a result of rising sea levels. Climate change will also adversely affect the availability of irrigation water. And finally, aquatic ecosystems will also be impacted, which may cause yields from the oceans and lakes to decrease.

Obesity

Whereas 800 million people worldwide suffer from undernourishment, an estimated 1 billion people are obese. Ironically, the most poverty-stricken population groups are susceptible to both problems (6). Approximately one-third of African women and a quarter of African men are obese, and the World Health Organisation (WHO) predicts that those figures will increase to 41 and 30 percent respectively in the next decade.

In the Netherlands, 40% of the population is overweight, and 10% are gravely overweight, or obese. On a global scale, the Netherlands has a relatively limited problem in terms of obesity percentages. The US has the greatest obesity problem, where no

less than 30.6 percent of the population is obese. Particularly worrying is the high and growing number of children who are overweight or obese. The current number of overweight children worldwide – 14 million of who 3 million are obese – is increasing by more than 400,000 every year. Consequently, this means that nearly one in four children in the EU are overweight (7).

Although the figures are lower than in affluent countries, many experts fear that the health care system in African nations, which is already overstretched due to HIV, malaria and other diseases, will not be able to support the added pressure of health issues related to obesity, such as cardiovascular disease, strokes, cancer and diabetes.

5. A Healthy Future?

After considering only a part of the potential changes to our (infectious) disease patterns, we can and must ask ourselves in which direction we are moving in our globalising world? It is clear that – due to the uncertainties – it is impossible to make any definitive statements about this issue. As the discussion above illustrates, there are many factors that determine our health. Socio-economic circumstances play an important role. Poverty and insufficient medical care will cause a population's general health to deteriorate. Access to medical care is therefore an important precondition to control the outbreak of infectious diseases. The presence, or the lack of proper sewage systems, the scope undernourishment or obesity within a specific group of people and a high population density will all have a major impact on the prevention of diseases. The resistance of some transmitters of illnesses (such as the malaria mosquito) against insecticides, and of some pathogens against medications, is another key factor in the spreading of many infectious diseases (see Table 1).

Table 1: *Some factors of importance to new and emerging infectious diseases*

Social factors	Population growth; migration; poverty; war
Health care	Use of antibiotics and corresponding resistance; organ transplants; use of insecticide and corresponding resistance;
Food production	Globalisation of food production; global transportation of meat and meat products
Human behaviour	Sexual behaviour; drug use; travelling behaviour; diet; recreation
Environmental changes	Deforestation; flooding; drought; climate change; loss of biodiversity
Microbiological changes	Virulence changes; developments in resistance to medication

Migration, international trade, increased global mobility and tourism are other factors that influence the geographic distribution of diseases. Displacement of huge groups of people – caused by such circumstances as failed harvests due to drought, or by flooding as a result of rising sea levels – may introduce a certain infection into a previously uninfected area. But individual travellers are also capable of transporting a pathogen to a new area with a favourable climate. Therefore, quantifying the future of our health is difficult, particularly because humans, society and ecosystems are linked in a non-linear fashion. We can, however sketch future scenarios, depending on how the other (decisive) factors develop. Consequently, I use three potential future health situations (8):

1. *sustainable health,* in which economic factors and improvements in socio-cultural and ecological conditions have a positive effect on health;
2. *medical technology,* in which health risks increase, for instance as a result of lifestyle changes and environmental changes. However, these will be neutralized by economic growth and technological advances;

3. *emerging infectious diseases,* in which the rise of new and old infectious diseases has a significant negative impact on overall health, affected by travel and trade, microbiological resistance, problems in the health care sector and increasing environmental issues. An extreme variant of this future is the emergence of a so-called 'hyperdisease'.

Table 2: *Examples of emerging infections*

Bacteria	*Borrelia burgdorferi, Campylobacter jejuni, Chlamydia pneumoniae, Escherichia coli , Helicobacter pylori, Neisseria meningitidis, Salmonella*
Virus	Filo virus (Marburg, Ebola); hanta virus; HIV; human papilloma virus; leukaemia virus; Lassa virus; Rift Valley fever virus, SARS corona virus; Influenza virus
Parasite	*Cryptosporidium, Cyclospora cayetanensis, Giardia lamblia, Microsporida, Plasmodium, Pneumocystis carinii*

When we link these 'health futures' to scenarios regarding globalisation (see box), the following emerges [9] [10]:

Box: *Future Scenarios*

Future A: a globalising and market–focused world

- **Population growth:** high, particularly in developing countries
- **Inequality:** increasing
- **Education:** improvements, developing countries lag behind
- **Conflicts:** tension and conflicts due to social and ecological issues, particularly in developing countries
- **Social conditions:** no improvements to the social infrastructure; no reduc–tion of social problems; particularly problems in developing countries
- **Homogenisation of cultures:** yes, values and norms of current industrialised nations
- **Food shortage:** increasing in developing countries
- **Water shortage:** major in developing countries; some developed countries also encounter problems

- **Environment:** increasing environmental problems in both developing and developed countries; ecosystem degradation, pollution, loss of biodiversity
- **Climate change:** ultimately noticeable
- **Economy:** highest priority; growth is high, but unequal
- **Technology:** advances and diffusion, but developing countries lack the means for widespread use of new technologies
- **Policy:** low active involvement; confidence in competitive market process and market based solutions; varying effectiveness in developed countries; low effectiveness in developing countries

Future B: a fragmented and market–focused world

- **Population growth:** high, particularly in developing countries
- **Inequality:** rapidly growing
- **Education:** falling education levels, particularly in developing countries
- **Conflicts:** growing tension; frequent conflicts
- **Social conditions:** low priority; unwanted social changes; increasing social stress and deteriorating social infrastructure
- **Homogenisation of cultures:** no
- **Food shortage:** significant increase in food shortages in developing countries; some developed countries also encounter problems
- **Water shortage:** increase on a global scale; major problems in developing countries
- **Environment:** increasing ecological stress; deteriorating environmental quality; global
- **Climate change:** yes, with negative effects
- **Economy:** instability and fragmentation due to social and ecological problems; slow growth in developed countries; rest of the world lags behind
- **Technology:** very slow progress in wealthier regions; no distribution of technological innovations
- **Policy:** largely ineffective; no international collaboration; active involvement of governments varies

Future C: a globalising and sustainable world

- **Population growth:** low or even negative; potential population reduction in developed countries

- **Inequality:** decreases
- **Education:** improvements, particularly in developing countries
- **Conflicts:** rare
- **Social circumstances:** transformation toward a sustainable society; improved social infrastructure; reduction of social problems
- **Homogenisation of cultures:** yes, the mentality of the current consumption society changes and sustainable values and norms become important.
- **Food shortage:** decreases
- **Water shortage:** decreases
- **Environment:** transformation to ecological sustainability; improved ecological conditions and recovering ecosystems
- **Climate change:** yes, but ultimately stabilisation due to major emission reductions
- **Economy:** growth within the limits of sustainable development; increase in non–material economic activity; economic 'catch–up' of lesser developed areas
- **Technology:** progress (green technology, information technology) and diffusion
- **Policy:** effective; international collaboration and global policy; bottom–up processes; no confidence in free market process; participative

Health in a globalising and market-focused world

In this future, economic growth, technological advances and globalisation are the central focus. This will lead to a continuation of current trends with respect to social and ecological problems. Population growth (particularly in developing countries), migration, regional conflicts (again: particularly in developing countries), increasing pressure on food and water, loss of biodiversity, pollution and climate change will have a negative impact on health. Although the Third World participates in the global market, the economic inequality will remain, and even increase. This will certainly lead to negative health effects in developing countries as a result of the stated problems. Although new technology will become available, developing countries will most likely be unable to afford these. Increasing economic, socio-cultural and ecological problems these countries will face a gradually increasing incidence of *new and old infectious diseases*. Thanks to their economic growth and *(medical) technological innovations* industrialised nations will probably be able to counter these health problems. However, due to the rapid spread of infectious diseases, the threat of outbreaks of new and old diseases cannot be underestimated.

Box: *Disease and Technology in 2050*

Bacteriophages replace antibiotics

Perhaps the future will see a more successful treatment of persistent bacterial infections with bacteriophages instead of traditional antibiotics. The fact that bac–teriophages kill bacteria has been known since 1920. Every type of bacteria may be infected by multiple varieties of these viruses. And so, theoretically, bacteriophages can cure all kinds of bacterial infections in humans and animals. The old disadvan–tage that bacteriophages have a very specific attack spectrum, which would require a particular suitable bacteriophage for every infection, seems to have been resolved. By using the latest computer models, ready–to–use phage medications for future infections can be made, and bypass any potential resistance development. There–fore, the era of antibiotics as the preferred treatment for bacterial infections is over.

Malaria vaccine finally successful after 60 years

A new vaccine seems to be very effective in preventing malaria according to Dutch researchers in medical journal EcoHealth. Every day in Africa in 2050, tens of thou–sands of children succumb to malaria. Work on a vaccine has been in progress for 60 years, until now without results. The new vaccine differs from other vaccines because it incorporates a combination of malaria DNA and the recently developed Na–DNA 4c (produced by a 7th generation nano–machine). The combination of the two prepares the immune system even better for the intrusion of the malaria parasite. The method developed by the researchers is also promising for the battle against HIV and the panic virus.

Vaccine against cancer

Worldwide, approximately 20% of all cancers is caused by infections with viruses and bacteria. Principal instigators among viruses are Epstein Barr virus (naso–

pharyngeal cancer in Southeast Asia), Hepatitis B virus and Hepatitis C virus (liver cancer) in addition to Human Papilloma Virus (HPV, cervical cancer). Perhaps the time of a real breakthrough in the fight against cancer has finally arrived. Four years ago researchers of the Ghana cancer institute stated that they were on the trail of a medicine to prevent cervical cancer. We now know that the vaccine does not only protect against most common types of cervical cancer, bit that it can also play a part in treating other types of cancer. Manufacturer Janssen & Janssen hopes to start producing the medicine next year.

Health in a fragmented world

This future is characterised by a stagnation of the globalisation process and an increase in regionalism, combined with a market-focused attitude in society. Economic growth will only take place in already developed regions. And only wealthy nations will benefit from technological innovations: this fragmented world sees only little diffusion of knowledge. In this 'future of inequality' poorer nations will unavoidably be the first victims of the negative health effects of food and water shortages, environmental problems, weakened social infrastructure, conflicts, migration, population growth, insufficient educational options, inadequate healthcare and ineffective policies. The economy stagnates and society finds itself in a downward spiral. Social, economic and ecological problems will quickly lead to a future of *emerging infectious diseases* in developing countries. In the short term wealthier countries will be largely able to prevent the negative health effects. Therefore, more developed regions will initially be able to maintain or even improve their current life expectancy rates due to *(medical) technological developments*. However, this situation in the wealthier nations is far from stable.

Box: *Panic Virus (based on [11])*

Europe, around the year 2050…

Over the past year Europe has seen an increasing number of mosquitoes infected with a currently unknown virus. After an initially panicked reaction, the transmis–sion of the deadly virus seemed to be in check. However, new infections have – now that the mosquitoes have grown resistant to insecticides – once again grown rampant.

The panic virus reproduces in birds, dogs, cows and horses and is transmitted through a large number of species of mosquitoes. This animal reservoir has led to a huge number of human infections over the past years, many of which ended fatally. Many thousands of people, particularly the elderly, have already died this year as a result of this disease, and tens of thousands are currently in hospital. Despite appeasing government bulletins that the disease is under control, the public is not so sure. Consequently, everyday life is severely disrupted in large parts of Europe.

Scientists are still not entirely sure how this disease found its way to Europe. In all probability the disease was transported to these regions from Africa. This may have been by means of birds, imported cattle, cats and dogs, or via infected mosquitoes that crossed large distances as stowaways in today's heavily travelled airways. Tourism is also a likely candidate, as the jungles and urban areas of Africa have become increasingly popular among travellers.

A key factor in the current increase in the number of cases of the panic virus is the extremely warm and humid summer. During the months of June, July and August conditions in cities such as Lisbon, Budapest, Paris and London were highly con–ducive to the development of the virus (that particularly thrives at temperatures higher than 25°C) and the mosquitoes that spread it. Flooding of a number of rivers also created additional breeding places for mosquitoes.

Health in a globalising and sustainable world

This future is characterised by both economic growth and globalisation and increased social and ecological awareness. Sustainability is a top priority and economic growth stays within the limits of social and ecological objectives – including a mental-

ity shift in the current consumption society and effective policy measures. The result is a reduction of health risks by stabilised population numbers, improvements in education, reduction of conflicts and tensions, increased environmental quality, lower food and water problems and technological innovations and diffusion. Key is the reduction of the economic and social difference between current developing countries and the industrialised world. This future describes a transition to a more sustainable society, which allows the health circumstances to improve. Both developed and developing countries can achieve *sustainable health*.

***Box:** 2050- The Advent of the Silver Age!*

Slowly but surely, the average age in Europe is rising. Due to this 'gray wave', being old is becoming the norm. Compared to other continents, Europe has the largest ageing population. In the Netherlands, the province of Limburg takes the lead (12). There are two causes. First, after the war, the number of children per woman in Europe fell sharply. This is called "bottom–up" ageing of the population. Finland and the Scandinavian countries has already seen this decrease prior to 1950. This type of ageing continued in the first decades of the 21st century. A second cause for an ageing population is the increased life expectancy, which means that the volume of the number of people aged 65 and up increases relative to the historic figures. This is called a "top–down" ageing population. The share of 100+ seniors has also tripled over the past 5 years.

However, the silver generation has not resigned itself to knitting, but is sufficiently energetic and idealistic to serve the world. They have the time and stamina to put their talents to good use at non–profit organisations. Their authority and status allow them to continue building the sustainable bridge between nature and corpo–rate life. They also help to narrow the gap between rich and poor by sharing their expertise and insights with entrepreneurs in poor countries. Or they may contribute to the challenge posed by integrating various cultures, a challenge faced by an increasing number of Western nations. The dullness of 'ageing populations' has been transformed into a polished 'silver population'. Welcome to the Silver Age. (Source: Novos)

6. Our Assignment

Therefore, our health is increasingly determined by factors that cross national borders. At the same time, national healthcare systems are increasingly impacted by global events. In a world where countries and economies have become more and more interdependent, poor health in any population affects all populations – wealthy or poor.

Directing the health transition toward an era of sustainable health calls for a policy that envelops social, economic and environmental sectors. Managing this transition also requires a micro-approach that takes into account social, cultural and behavioural factors that determine health. However, such a micro-approach can only be sustainable in combination with a macro-approach.

At the macro level we find the strong and growing evidence of the relationship between the fight against poverty, for education, lower birth rates and better health. Lower mortality rates cannot simply be achieved by rapid macro-economic development, but also by policy that is designed to meet the fundamental needs of the majority of the population.

And so, quick advances in the health transition require urgent, large-scale investments – in education, but also in a restructuring of the healthcare systems, so that these are also accessible to the less affluent. At the same time, measures must be taken at an international level to ensure that the health effects of changes in the global environment are minimised. An example is the reduction of greenhouse has emissions in order to reduce the health effects of the climate change anticipated in the decades to come.

Worldwide observation systems must be developed in order to identify changes in health patterns or underlying factors at an early stage. For example, identifying changes in the incidence of malaria is essential in vulnerable areas in order to ensure timely, adequate measures.

The scientific knowledge of nearly every topic addressed in this essay is much too rough to be able to make any definitive statements. This is a challenging task for the scientific community. In addition to empirical research, developing theoretical and conceptual methods is equally important in order to enable better assessments of the health effects of global environmental problems. Developing inter-disciplinarian research programmes and research methods will be an essential component in this regard.

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