One hundred years of health in Poland

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ABSTRACT
Life expectancy is the best synthetic indicator for measuring the improvement or deterioration of a country’s health across time. This article charts the life expectancy trends, and their underlying factors, in Poland in the last one hundred years. The process of health gain in Poland has seen much fluctuation. Periods of health convergency with Western Europe have been intertwined with periods of divergency and crisis. The social and economic watershed of 1989 has been followed by a rapid improvement in health indicators. However, the last fifteen years have seen a stalling of the health growth in Poland.

KEY WORDS: life expectancy, epidemiological transition, Poland, public health, tobacco control, alcohol diseases, diet.

INTRODUCTION
The last century has seen a rapid improvement of health indicators around the world. Life expectancy has been historically the best and most useful measure for charting health developments across time and space. This paper analyses the health trends in Poland in the last century through the lens of life expectancy.

After World War II we have seen a global convergence of life expectancy trends (see slide 6 in Webappendix 2). In most high-income, politically and economically stable countries a steady increase in life expectancy has been observed. In Poland, and the neighbouring countries of Central and Eastern Europe, the trends in life expectancy have seen much fluctuation. Periods of quick health growth have been intertwined with periods of stalling health improvement, or even its freezing (see slide 6 in Webappendix 2).

HUMAN DEVELOPMENT INDEX
Since the early 1990s the United Nations have been using a synthetic measure called the Human Development Index (HDI) to classify the degree of socio-economic development and quality of life in different countries. The HDI allows to make comparisons across countries, and track development through time. The index is composed of three elements – per capita Gross Domestic Income, a measure of education combining average adult years of schooling with expected years of schooling for children, and life expectancy (see slide 6 in Webappendix 2).

In the hundred years since Poland regained its independence in 1918 the country has experienced significant improvement in economic and educational attainment [1]. The Polish economists Paweł Bukowski and Wojciech Paczos estimated that in this period Polish GDP rose from EUR 4,000 to EUR 24,000 [2]. They argue that despite wars and crises we are today six times wealthier than our great-grandparents were in 1918 [1]. Most striking are the last three decades, in which Poland developed not only without interruption, but also significantly faster than the West [1, 2].

Similar trends were observed in measures of educational development [3, 4]. In the last century Poland underwent an educational revolution. In 1919 illiteracy
was common in Poland, especially in rural areas. The development of public education after World War I, and especially its expansion after World War II allowed all citizens access to at least basic secondary education. Since 1990 the educational development of the Polish population has been proceeding apace. Only 10% of the population – around 2.5 million Poles, have primary education, with the rest of the population having completed secondary school or higher. Between 1995 and 2009 the share of people aged 25-64 with higher education increased from 9.7% to 21.2%. Today, the number of university-educated Poles stands at over 5 million. Nonetheless, Poland is still far from Canada and the United States, where 48% and 40% of citizens, respectively, have higher education [3].

Life expectancy is the final component of the HDI. It is also the best synthetic indicator for measuring the improvement or deterioration of a country’s health across time. Life expectancy forms the basis of the analysis of health in Poland conducted in this article. In Poland, annual collected data on life expectancy are only available since 1950 (the data from earlier periods is fragmentary) [5-7].

In the years 1990-2000 the Polish HDI was growing by about 1% every year, which was one of the quickest increases of this indicator in the world, and Poland moved up by 5 positions. In the next periods analysed, 2000-2010 and 2010-2017, the pace of HDI increase declined by half. In 2017 Poland was on the 33rd position of the global ranking of HDI [8].

HEALTH BEFORE THE WORLD WAR II

The scale and rate of health improvement in the 20th century is without precedent in human history. In the period of one hundred years in many countries life expectancy doubled, from under 35 to over 70 years globally. However, while in most countries of Western Europe this growth has occurred in a harmonious, sustainable manner, in much of Central and Eastern Europe, including Poland, it was characterised by leaps, plunges, and fluctuations[9, 10].

Highly developed countries of Western Europe have seen their life expectancy levels increase steadily from the end of the 19th century. Between 1870 and 1880 average life expectancy levels stood at 37 years in Germany, 43 years in England and Wales, and 47 years in Sweden. By the break of the 1920s and 1930s it already stood at 61 years in Germany, England and Wales, and at over 64 years in Sweden [10-12].

This was in contrast with the state of health in the Polish population during and after the World War I. Between August and October 1918 Poland experienced its largest epidemic of infectious diseases as the Spanish flu pandemic took a heavy toll on the country [13, 14]. By 1927 the average life expectancy in Poland was still at a dramatically low level and was estimated to be 46 years. As much as 40% of newborns did not live past the age of 5.

The World War II exacerbated the situation [5]. The country’s infrastructure was in ruins, and the sanitary and hygienic state of the Polish population, already low before the war, deteriorated further. New epidemics of infectious diseases were breaking out. It is estimated that in the catastrophic period between 1939 and 1945 life expectancy in Poland dropped by 20-25 years. The health situation in 1946 was described by the reporter Junta Połczyński, who after a few weeks spent in Poland wrote about ‘an epidemic of infectious diseases reminiscent of the Middle Ages’ [15].

The first reliable epidemiological estimates after World War II, carried out in 1950, summarised the health situation in Poland. Infant mortality was estimated at 110-120 deaths per 1000 live births, and 33% of children did not live to the age of 5. In contrast, in Sweden and England infant mortality stood at 20/1000 live births, and 5% of children did not live to the age of 5. Maternal mortality was also very high in Poland and stood at 100 deaths/1000 births [5, 11, 12].

EPIDEMIOLOGICAL TRANSITION

The epidemiological transition in Poland began in earnest only in the 1950s, so almost one hundred years later than in Sweden or Great Britain. The starting point was very low and not dissimilar to the health situation in some Western European countries in the 19th century. However, the improvement of the health state in Poland in the decades following World War II proceeded rapidly [5, 11].

The dominance of the Soviet Union over Central and Eastern European after World War II also influenced the shape of the health doctrine in the region. The ‘universal health system’, or so-called ‘Semashko model’ (named after a Minister of Health in Lenin’s government) was also introduced in Poland, leading to fundamental change in health policy. The Semashko model ensured every citizen had access to free medical care. It was characterised by the phenomenon of ‘medicalisation of health’. The term ‘medicalisation’ in Poland is often perceived positively and understood as describing easy access to medicine, doctors, hospital beds. The debates about the negative societal impact of overmedicalisation, ongoing in the Western world since the 1960s, are still sparse in Poland even today [11, 16-18].

Developing a system of combatting infectious diseases was a central strategic priority of the Semashko model. In order to contain the infectious disease epidemic in Poland in 1954 the State Sanitary Inspectorate was created. At the same time sanitary-epidemiological stations were established, conducting vaccination campaigns, but also educating the population about the importance of vaccination and hygiene. Another important element of the Semashko model was the creation of an effective system of maternal and childcare. The improvement in health was also shaped by the increasing levels of female education and of their health competencies. Within a short period, over 90% of Polish children were included in vaccination prophylaxis [11].

A spectacular symbol of the involvement of Polish communist authorities with the fight against infectious diseases was Poland’s pioneering role in tackling polio [19]. In the 1950s every year thousands of children in Poland encountered the disease. In the late 1950s Hilary Koprowski, a Polish virologist working in the United States, and the inventor of the first polio vaccine, obtained 9 million doses of the vaccine for Poland. In autumn 1959 Poland became one of the first countries in the world to embark on mass polio vaccination, and the number of cases of the disease declined to just a few dozen in the early 1960s [11].

A result of these changes was quickly declining infant and child mortality (see slide 6 in Webappendix 2). Within 10 years infant mortality rates in Poland decreased by half (from 109/1000 live births in 1950 to 55/1000 live births in 1960). By 1970 infant mortality in Poland stood at 30/1000 live births. At the same time in West Germany it was 23/1000, in Austria 26/1000, in Italy 29/1000, and in Portugal 53/1000. Mortality before the age of 5 in Poland declined from 33% in 1950 to 7%. Twenty-five years after the end of World War II infant and child mortality in Poland reached a good, European level. The same applied to maternal mortality, which declined from 100/100 000 in 1950 to 55/100 000 in 1970. Mortality due to infectious diseases also rapidly decreased, for example among men it fell from 99/100 000 in 1963 to 20/100 000 in 1985 [11, 12, 16-18].

All of these positive developments led to a leap in life expectancy in Poland in both sexes. In the 1950s life expectancy in Poland grew by 9 years, while in West Germany the growth was only 2.5 years. In the late 1960s life expectancy in Poland, at 70 years, was only 1-2 years lower than in highly developed Western European countries (in England and Wales it was 72 years, in Western Germany 71 years). The health gap between Western Europe and Poland was almost closed [16-18, 20-22].

ERA OF NON-INFECTIONOUS CHRONIC DISEASES

After World War II, just as the epidemiological transition was taking place in Poland, the main public health problem in developed countries were increasingly chronic diseases. Lung cancer by the late 1940s became the number one killer in countries such as the UK. Northern European countries, such as Finland or the UK, saw rapidly increasing cardiovascular disease morbidity and mortality. In France and Italy liver cirrhosis and laryngeal cancer reached epidemic levels. All of these were leading to the changing paradigm of health policy and medicine in many high-income countries [16, 22-25].

As a result, in Western Europe in the 1960s and 1970 a new philosophy of public health was increasingly adopted, the main tenet of which was that health policy must be realised by the entire government and all its ministries – especially the Ministry of Finance – and not just the Ministry of Health. This so-called ‘Health in All Policies’ approach was successfully carried out by countries such as Finland, which from a nation with poor health in the 1960s became one of the European public health leaders. Another example is the United Kingdom, which was traditionally a tobacco trade, sales, and consumption powerhouse (in the late 1940s around 80% of adult British men smoked cigarettes). The UK government took a comprehensive approach to tackling smoking, especially using economic and educational tools. Cigarettes were heavily taxed, and the UK became one of the countries with highest cigarette prices in Europe. As a result of these measures lung cancer rates were reversed and decreased threefold. British scientists estimate that half of the decline in cardiovascular disease morbidity was also due to the rapid decline of smoking prevalence [7, 23, 26-29].

This shift in thinking about health (broadening it from just focusing on curative medicine), campaigns to build health competencies of the population, popularising healthy lifestyles, and the close participation of state and society in public health programmes led to rapid health gains in Western European, democratic countries. In contrast, in Poland and neighbouring communist countries, the period between 1960 and 1990 saw numerous developments deleterious to health. Alcohol consumption doubled. Tobacco consumption per capita grew from 1065 to 2648 cigarettes annually, in the late 1980s reaching the highest level in the world. Consumption of butter and full-fat milk was also beating world records. Consumption of read, highly processed meat, especially pork, as well as sugar, was growing. A steady increase in calories (in the 1970s and 1980s higher than in countries of western Europe), coincided with a decrease in physical activity. Levels of overweight, obesity and diabetes rose. This applied to inhabitants of cities, but was even more prevalent among inhabitants of villages, also children [17, 18, 29-34].

All of these processes resulted in dramatic health consequences. Between the early 1960s and early 1990s a very unusual phenomenon in peace time was observed in Poland – every year the mortality of young- and middle-aged adults, especially men, was increasing. Life expectancy at the age of 20 was decreasing, while stroke mortality...
was increasing. Among Polish men lung cancer morbidity skyrocketed, reaching the highest levels in the world, especially among young- and middle-aged adults. Liver cirrhosis morbidity also increased. Almost one in five men died prematurely due to injuries. All of these negative trends were happening at the same time as the number of doctors and hospital beds in Poland was steadily growing – in 1990 it was higher than the OECD average [16, 35-40].

By the late 1980s the health of Poles was in a catastrophic state. Premature mortality in middle age, mortality due to lung cancer and other tobacco-related cancers, liver cirrhosis, CVD, and sudden deaths due to external causes (accidents, injuries, poisonings) reached in Poland some of the highest levels in the world. This epidemic of man-made diseases became one of the greatest challenges facing the country as the communist system was nearing to collapse. According to WHO estimates in 1990 a 15-year old boy in Poland had a lower probability of living to the age of 60 than his peers in China, Latin America, or India [11, 36, 41].

THE HEALTH MIRACLE: DEMOCRACY IS HEALTHIER

When at the end of the 1980s democratic transformation and market economy begun in Poland, health of adult Poles was in catastrophic shape and health prognoses were poor [41]. After a short period of health perturbations (1988-1991) resulting from political transition processes, completely unexpectedly a health improvement begun in Poland. Almost all health indicators started to improve. In years 1991-2001 infant mortality rates declined from 15.0/1000 to 7.7/1000 live births. For the first time in 30 years the negative trends of adult premature mortality have been reversed. All-cause mortality rates decreased in all age groups, especially in young and middle-aged adults. Mortality in men in age group 20-64 years declined from 38% to 30% between 1991 and 2001, and at the same time CVD mortality declined dramatically in both sexes. Among young adults aged 20-44 CVD mortality declined by 50%, in middle age (45-64) by 40%, and in age groups 65+ by 30% [12, 16-18, 42-44] (see as well Sir R. Doll and R. Peto box).

For the first time since World War II the improvement of health indicators concerned both sexes, although it was faster in men. The decline in adult male premature mortality between 1991 and 2002 resulted from decreases in three groups of causes of death: cardiovascular diseases (decrease of around 40%), cancer – especially lung cancer and other tobacco-related neoplasms (12%), and injuries (around 30%). At the same time life expectancy increased.
by 4 years in men and 3 years in women. Health improvement in the 1990s concerned everybody, regardless of sex, age, education and place of living. After the introduction of democratic system and market economy in Poland health became the most important value. Both government and citizens considered health as one of the most important elements of wellbeing [16, 22, 45, 46].

After the political breakthrough of the late 1980s, few fundamental favourable circumstances occurred in public health. First, an anti-tobacco law was drafted and introduced in 1995. It was a baseline for the preparation of a national tobacco control programme, which was evaluated by the government and accepted by the Parliament each year. Health education campaigns began on a large scale. Cyclical intervention efforts were conducted, e.g. the national campaign “Quit smoking together”/“Great Polish smoke-out”. This campaign was recognised as the largest and most effective public health action in Europe at the time.

In the subsequent years, Parliament introduced national governmental programmes controlling cancer and cardiovascular diseases in Poland with substantial financial sources from national budget dedicated to their realisation [47, 48]. Substantial funds were also allocated to primary and secondary prevention efforts. Another important element of health building was the rapid change in diet structure resulting from the introduction of market economy and new availability of a variety of food products. This led to a change in patterns of fat consumption (levelling out of deficiency of n-3 fatty acids, levelling out of consumption of vegetable oils, decreasing consumption of animal fats), but also the increase in availability of fruits and vegetables, as these products became relatively cheap and available all year. Finally, the market economy enabled access to modern medicines and medical technologies. Especially the cardiac community exploited these new opportunities and introduced a range of effective cardiosurgical treatment programmes in Poland [16-18, 40, 49-51] (see Prof. G. Opolski box).

By the end of the 20th century it seemed that Poland had followed other Western, high-income countries on a path of stable health improvement. In fact, the health gain in Poland in 1990s was one of the most rapid in Europe and adult premature mortality (before 65 years of age) decreased substantially [16, 18, 22, 52-55]. The health gap between Poland and the West seemed to be closing.

HEALTH DEVELOPMENT IN POLAND IN THE 21ST CENTURY

In the beginning of the 21st century Poland was recognised as one of the public health leaders in the world [18, 22, 25, 44, 54]. The Polish anti-tobacco law was called by the WHO an example to the rest of the world. Polish health warnings on cigarette packages were the largest in the world and the Polish standards were later adopted by the European Union. Poland also introduced a ban on tobacco advertisement [25]. The Polish Prime Minister and Minister of Health were awarded by the Director-General of the WHO, Gro Harlem Brundtland, for their achievements in tobacco control in Poland. The Director of WHO Regional Office for Europe in Copenhagen, Marc Danzon, organised in 2001 in Warsaw the WHO European Health Ministers Meeting devoted to coordination of anti-tobacco activities in Europe (see Photo 1). Poland was one of the initiators and took part in preparing the first health convention of United Nations – the World Health Organization (WHO).
Framework Convention on Tobacco Control (FCTC) [56]. A series of papers analysing the pace of decline in smoking prevalence in the world between 1970 and 2015 was published recently [57-59]. In these publications Poland is included into the group of countries with the most rapid pace of decline in smoking prevalence, from the highest level in the world in 1980 (see slides 18, 19, 20 in Webappendix 2) [25, 53, 54, 57, 58, 60].

In August 2002 the Polish government decided to decrease the excise tax for spirit products (vodka) in Poland by 30% [61]. This led to an immediate, rapid increase in alcohol consumption [32, 55, 61, 62]. Registered annual vodka consumption per capita calculated per 100% of spirit in years 2003-2008 doubled from 1.7 to 3.4 litre (see slide 25 in Webappendix 2). In the years 2003-2017 consumption of alcohol (especially vodka and beer) increased in Poland from 7 to almost 10 litres of pure alcohol per capita [63]. By the year 2019 Poland reached the highest level of alcohol consumption in history. This increase in alcohol consumption resulted in a growing disease burden [64, 65]. Analysis by Moskalewicz and Wieczorek documented the increase in diagnosed alcohol psychoses by 1/3 in years 2003-2008 [32, 66]. Epidemiological analyses of mortality showed annual increase in alcohol-attributed mortality since 2003 (see slide 25 in Webappendix 2). At the same time, Poland experienced a freezing in the decline in adult premature mortality (20-64 years) [55]. The increase in life expectancy in both men and women started to slow down (see slide 29, 30 in Webappendix 2). Since 2013, Poland has experienced a freezing of increase in life expectancy in both sexes (2013 – 77 years, 2014 – 77.5 years, 2015 – 77.5 years, 2016 – 77.81 years) [10].

The epidemiological situation that we have been observing in the recent years in Poland should be the cause of immediate public health concern and action. Interdisciplinary research is needed, involving epidemiologists, economists, sociologists and other scientists, to assess the social and economic causes of abovementioned phenomena and spurring immediate political and regulatory action.

**Conclusions**

Poland remains a country of relatively poor health, which stands in contrast with the rapid improvement in wealth and education which we have observed in the last decades. The health gain in Poland has not been stable and has been characterised by significant fluctuations [11, 12, 16-18, 67, 68]. It seems that one of the underlying factors for this is the still low level of health competencies among the Polish population. Health education, changing health behaviours, progressive health policy conducted by the authorities, a health-in-all-policies approach of the government – only with these approaches Poland can return to a sustainable trend of health improvement [69, 70].
Poland in the last decades has been a good example of both effective, evidence-and-science based health policy conducted by the government, as well as of catastrophic public health blunders committed by decision makers [61, 63, 71, 72].

After World War II an example of the positive actions was the ability to rapidly tackle the high levels of infectious diseases and infant and child mortality. Similarly, in the 1990s primary and secondary prevention, as well as improvements in treatment, paved the way for a cardiovascular revolution in Poland, reducing the CVD morbidity and mortality at a very quick pace [17, 18, 22]. Modern preventive and clinical cardiology were created. However, the greatest success in the last three decades was the ability to reverse the tobacco epidemic and the resulting toll of disease and mortality. Recent epidemiological analyses show that the decrease in smoking prevalence and cigarette consumption in Poland between 1990 and 2015 was among the fastest in the world [57-59]. Poland became a leader in tobacco-related disease control. The risk of tobacco-related diseases halved. The ability to achieve this success was to a large extent possible thanks to Polish oncology. The halving of lung cancer morbidity in certain age groups, for instance among young and middle-aged man, was one of the greatest successes of Polish medicine.

On the other hand, in the last decades the Polish policymakers exposed the population to a gigantic natural experiment. In 2002 the excise tax on vodka products was decreased by 30% and the laws regulating beer marketing have been liberalised [71]. This led to a rapid increase in alcohol consumption from circa 7 to circa 10 litres of pure alcohol per capita. The effects of this are the stalling (since 2003), and then the freezing (since 2013) of the increase in life expectancy in Poland. An immediate return of good practice public health activity, which has existed in Poland in the 1990s, is necessary. Without this further economic and social development of the country will be impossible.

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DISCLOSURE

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