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HEALTH IS WEALTH! IS WEALTH HEALTH?

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A b s t r a c t: Current demographic analyses of the world population show a considerable increase in life expectancy of the general population in nearly all regions of the world. Consequently, "Health Economy", defined as "Provision and marketing of goods and services in order to support the maintenance and restoration of health", has become the megatrend of the millenium. This holds true not only for national economies and GDPs, but also – in qualitative terms – for the elderly generation. Guestimates on the purchasing power of the elderly generation show a threefold higher figure compared to the actual working population, at least in the Western hemisphere.

A globally organized wellness industry will profit from this situation. However, the increased morbidity of the elderly generation requires enormous financial endeavours to provide resources not only for healthcare programmes, such as disease prevention, healthcare education and improvement in quality-of-life pattern, but also for the development of sophisticated medical devices and therapies which are closely adapted to the needs of the elderly. The notion "Wealth is health" is valid indeed and so is "Health is wealth". Wellness, not just sickness, will determine the lifestyle of coming elderly generations.

Key words: health, wealth, economy, world population.

Introduction

Life expectancy has been improving for many decades and there is evidence that health among the elderly will also be improving in the future. Real achievements in the realms of hygiene, nutrition and quality of life have increased life expectancy from about 30 years during the time of Imperial Rome to today's 70–80 years. These figures are even surpassed by the currently observed worldwide highest life expectancy at birth of 88 years for a Japanese

woman. What are the reasons for these developments? Does the increasing life expectancy depend on the improved wealth of many nations? Or does this wealth guarantee better health for the citizens of developed countries? These questions may be related to the term "Health Economy", which has become a decisive factor in modern societies. It contributes to both social life and economy and reflects the needs for our ageing populations.

During the 1st German National Congress on Health Economics, held in Rostock-Warnemünde in 2005, Horst Klinkmann defined "Health Economy" as: "Provision and marketing of goods and services in order to support the maintenance and restoration of health" [1]. In this paper, comments on this definition and related questions will be given in more detail.

"How much can the human life span be extended?" This question was asked in an editorial in Science Magazine in 2005 [2]. The author referred to Jeanne Calment, who died at the age of 122, at that time the longest-living human being ever documented. Insights may come from studies on human centenarians by revealing that human physiology may allow for an achievable life expectancy of up to 130 years, given that possible strategies to counteract the major effects of immunosenescence and inflammaging are successful. The systematic reduction of the lifelong antigenic load, an elimination of chronic infections, thymic rejuvenation and preventative treatments with anti-inflammatory drugs in people with a pro-inflammatory phenotype: some of these measures seem promising [3].

Chronic infections are – among other things – mainly due to contaminated potable water. This raises concern about the current situation of its free access mainly in the Third World. Worldwide about 1.1 billion people have no access to clean drinking water and 2.6 billion have no access to sanitary installations. As a consequence, activities and newly defined targets for worldwide governmental actions have been advanced. For instance, at a summit in New York, the United Nations agreed already in 2000 to define so-called Millennium Development Goals (MDG). According to these goals, the number of people without access to clean potable water should be reduced by 50% by 2015 and it should be guaranteed for everybody by 2025. Given that these endeavours will really come true, life expectancies will further rise and will require new concepts of life style and healthcare, and new therapies.

1. Demographic changes

Demographic changes are a well-perceived reality for the steady increase in the world's population. The 6.5 billion inhabitants of the world currently include a "bulge" generation, which, although presently of working age, will in 3 to 4 decades become old. By 2050, the world population is expected to be 8.9 billion [4]. By then, individuals aged 60 and older are expected to

represent at least 25% of the world population, and 3 out of 4 persons in the group aged 80 years or older will be living in the developing world [5].

Among these coming generations chronic diseases will determine their daily life. It is estimated that by 2050, there will be more than 4.5 million hip fractures annually and more than 36 million patients will suffer from dementia [6]. Other chronic diseases, such as diabetes Type II, chronic kidney disease or Parkinson´s disease will add to this scenario. Consequently, an increase in the number of elderly persons who are in need of care will be observed. Recent statistical analyses for Germany from 2008 predict an increase of 58% in the number of patients in need of care by the year 2030, compared to today [7], (Figure 1). In terms of figures, this relates to an increase from 2.1 million to 3.4 million people in need of care in Germany. In addition, 53% of patients in need of care today are older than 85 years. In 2030, this percentage will have increased to 65%. Simultaneously, hospital stays will increase from 17 million to 19 million [7].

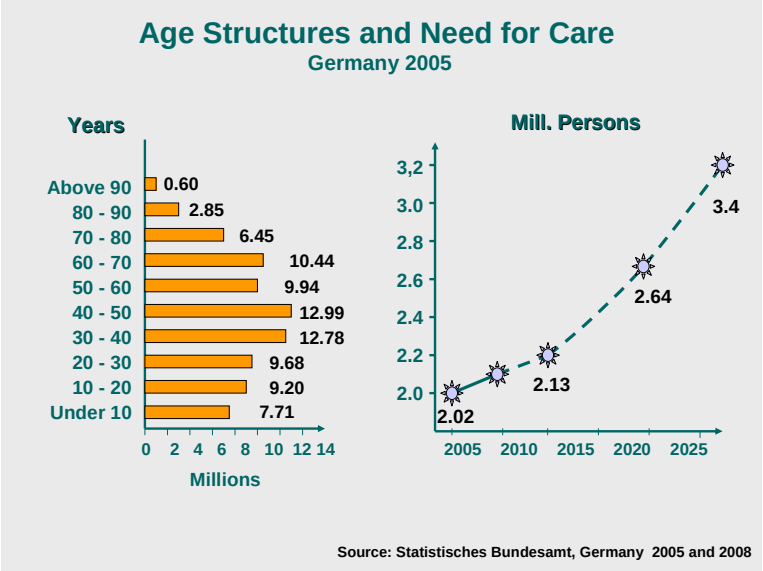

Figure 1 – The "bulge" generation of 2005 will create a bulge in the age-distribution curves in the upcoming decades. Consequently, the number of people in need of care will rise accordingly

Слика 1 – „Пик“ генерацијата од 2005 год. ќе формира пик во кривата на дистрибуција на возраста во следните декади. Како резултат на тоа ќе расте бројот на луѓе со потребата од здравствена нега

These figures show that a considerable need will arise for people delivering care and the number of nurses, carers and physicians involved will increase. Given that under these circumstances a ratio of 1 to 1.5 for patients in

relation to care-givers has to be assumed, about 8 million German persons will be involved in either care-receiving or care-giving in 2030. These figures amount to 10% of the actual German population. Similar calculations will certainly also hold true for other countries.

The ageing population, however, is not homogeneous. Some individuals are more robust than others, and some show substantially less evidence of age-associated functional decline. Increasing evidence suggests that postponing the onset of conditions contributing to frailty will reduce age-related disability and increase active life expectancy. The capacity of individuals to improve their health status is already closely linked to nutrition, physical activities and good life-style habits at early stages of age. Eubie Blake, when attaining the age of 100 years, noted "If I´d known I was gonna live this long, I´d have taken better care of myself!" [5]. The importance of normal weight and blood pressure, low cholesterol levels and no-smoking attitudes has to be stressed in order to attract an increasing attention among the younger generation. However, when comparing standards in the sixteenth century with today's conditions life-style habits, nutrition and workload have changed considerably. Premature ageing is being postponed to later stages in life, as shown in Figure 2.

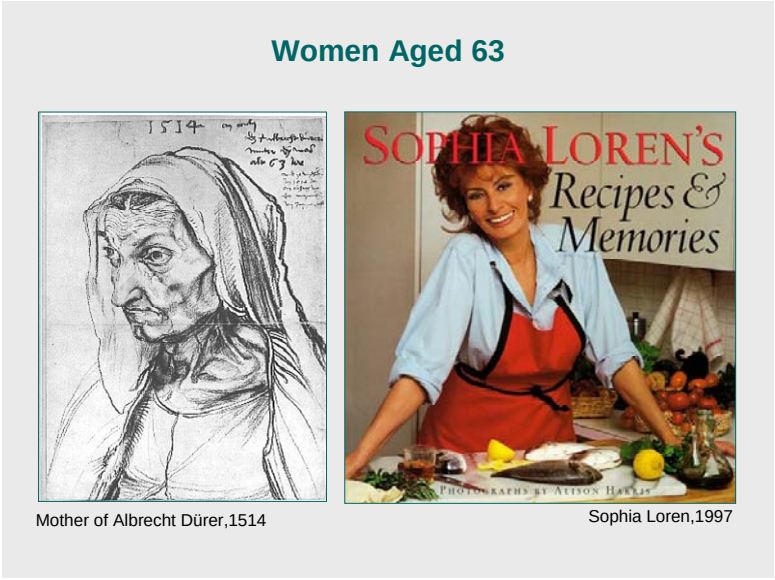

Figure 2 – Albrecht Dürer drew the face of his mother in 1514 when she was 63 years old. The comparison with a modern actress shows the difference in life style and performance.

Слика 2 – Albrecht Dürer ја насликал својата 63-годишна мајка во 1514 год. Нејзината споредба со сликата на модерната глумица со иста возраст ги покажува разликите во начинот на живот.

2. Health Care, the Megatrend of the Millenium

Nikolai Kondratjew (1892–1938) published what are known as his Kondratjew – cycles or – waves in 1926 [8], (Figure 3.) Kondratjew waves, also called grand supercycles, are described as regular, sinusoidal cycles in the modern capitalist world economy. Fifty to sixty years in length, the cycles consist of alternating periods between high sectoral growth and periods of slower growth. Although economists dispute Kondratjew´s views controversially and doubt the repeated ups and downs of its sectors, these cycles neatly describe the focus of the world's economic priorities in the last decades.

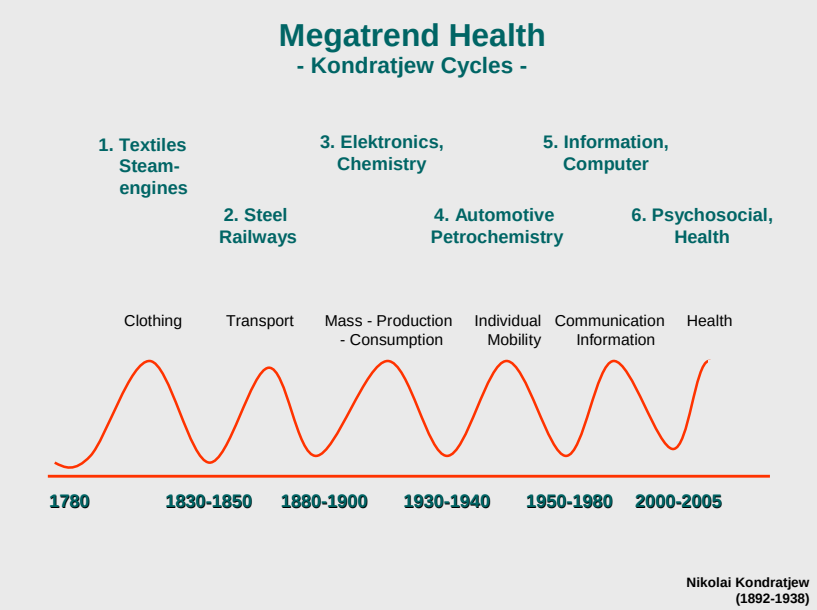

Figure 3 – Nikolai Kondratjew (1892–1938) elaborated on what are known as his Kondratjew-cycles or waves [8]. Kondratjew waves, also called grand supercycles, are described as regular, sinusoidal cycles in the modern capitalist world economy. Fifty to sixty years in length, the cycles consist of alternating periods between high sectoral growth and periods of slower growth. The recently defined 6th Kondratjew cycle refers to health and wellness

Слика 3 – Nikolai Kondratjew (1892–1938) ги објаснил циклусите или брановите на Kondratjew. Kondratjew циклусите или големите суперциклуси претставуваат синусоидални циклуси на капиталистичката економија во светот. Циклусите содржат периоди помеѓу секторите со висок и низок раст со траење од 50 до 60 год. Актуелно е дефиниран 6-от Kondratjew циклус кој одговара на здравје и благосостојба

Kondratjew´s concepts have recently been actualized. Health and health care is considered to represent its sixth cycle and called a "megatrend" with a change in focus. Wellness, not just sickness, is one of the targets of modern healthcare! In parallel to this paradigm change, a new type of entrepreneurial business has appeared, i.e., the wellness industry. This industry offers both services and therapies, accompanied by leisure activities. Profits come from the relatively high wealth of the elderly generation. Guestimates on the purchasing power of the elderly generation show a threefold higher figure compared to the actual working population.

It is, therefore, not a surprise that increasing turnovers of the wellness industry can be observed (Figure 4). In 2003, money for wellness was spent preferentially on fitness and spas (€17.74 billion), on health cures and vacations (€11.07 billion), massages and physiotherapy (€6.6 billion), specific healthy food (€4.06 bil) and on pharmaceuticals, cosmetics and literature (€4.6 bil).

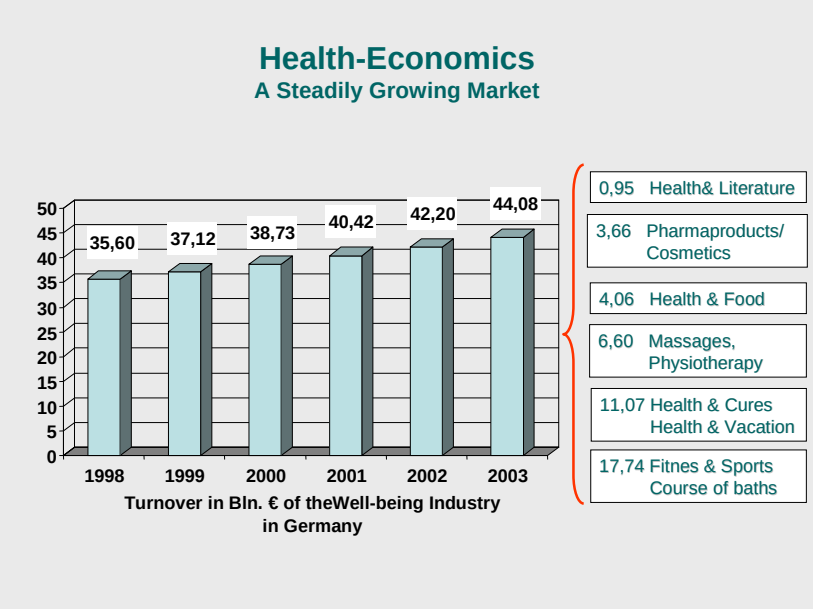

Figure 4 – In 2003, money for wellness is spent preferentially on fitness and spas (€17.74 bil), on health cures and vacations (€11.07 bil), massages and physiotherapy (€6.6 bil), specific healthy food (€4.06 bil) and on pharmaceuticals, cosmetics and literature (€4.6 bil)

Слика 4 – Во 2003 год., биле потрошени пари за фитнес и лековити бањи (17.74 билиони евра), лекови и одмор (11.07 билиони евра), масажа и физиотерапија (6.6 билиони евра), здрава храна (4.06 билиони евра) и за лекови, козметика и литература (4.6 билиони евра)

Interesting observations have been made in the United States. The 2003 analysis of Lubitz *et al*. on health and life expectancy in the elderly population shed light on the specific situation in the US [9]. Between 1992 and 1998, people above the age of 70 and not showing functional limitations (28% of study population) were spending about $4,600 on health care individually. This adds up to total expenditures for medical care for a period from age 70 to death of about $140,700. These average expenditures per year, however, increased with worsening health status, from about $4,600 to $45.400 annually for institutionalized persons [9]. These observations are certainly also valid for other countries.

Like most industries, the health care market is also going global. Apart from global health and wellness tourism, the need for health-educational and health-structural activities arises in many countries. Saudi Arabia, for instance, promotes the education of its health professionals locally with the help of European health specialists [10]. Further, hospital construction and hospital management is performed in close cooperation between local authorities and European and American healthcare companies, as is shown by the worldwide activities of Fresenius AG. This trend offers interesting business opportunites for health care professionals in the future.

A basis for such activities could be a public private partnership between universities and public companies in the sense of a commonly accepted health economy. The European Union, for instance, has invested one billion € since 1990 in the improvement of the health infrastructure in its member states in order to overcome barriers, such as data protection limits, different technological standards or varying approval procedures [10].

Apart from health education and activities in the developed world, important steps have to be taken for the improvement of health in third world countries. The question "Health is wealth, is wealth health?" in the title of this article implies that health – apart from genetic predispositions – may be associated with both life style and economy.

The journal *PLoS Medicine* asked in October 2007: "Which single intervention would do the most to improve the health of those living on less than $1 per day?" [11]. Among several answers provided by the interviewees, some should be mentioned here: the greatest improvements in health will come from a general education in hygiene. Others opinions refer to hiring health workers, organizing vaccination programmes, guaranteeing general access to clean potable water and sanitation, and providing adequate nutrition.

These rather heterogeneous requirements will only be possible by means of the joint efforts of all countries, both poor and rich. The MDGs of the United Nations might be a first step towards this goal.

3. Outlook and consequences for the medical device industry

Patients with kidney failure are usually treated with blood purification devices in an extracorporeal blood circuit. This treatment, called haemodialysis, is considered to be one of the most expensive therapies in medicine. In 2007, about 1.4 million patients with chronic kidney disease (CKD) worldwide were treated with this therapy. The average annual cost per CKD-patient adds up to €60,000. Of course, these high costs have an impact on the general worldwide access to this therapy, mainly in the developing world, as shown in a recent analysis by A. Grassmann *et al*. [12]. Assuming the general prevalence of kidney failure to be between 900 and 1,000 patients per million inhabitants, many countries of the world with a GDP below $10,000 are not yet in line with these figures. However, no difference in the prevalence of ESRD patients is shown, once the gross national product (GDP) of an individual country has reached a level above US$ 10,000 [12].

Haemodialysis might serve as an example for other high-cost medical therapies. An increasing number of countries will be able to afford such therapy-technologies in the future. Meanwhile, local and national differences in the price and availability of services throughout the world may lead to an increased medical tourism even to low-developed countries, such as described by Shrivastava for India [13]. Hungary, welcoming an increasing number of medical tourists for e.g. plastic surgery and dental therapies, is another example of this perception. High-tech therapies will, thus, be applied to a larger cohort of patients.

Further, the increase in the number of elderly people and patients cannot be completely matched by a corresponding increase in the number of caregivers. A sophisticated medical device technology can offer help and support in the future. The advent of miniaturized or nano-scaled devices, non-invasive sensors for a series of physiological parameters as well as therapeutic feedback loops between sensors and devices will facilitate and support the performance of better care for the elderly in the future. Such feedback loops have already been incorporated into modern haemodialysis machines and may serve as examples for other therapeutic manoeuvres.

In summary, demographic changes require new perspectives not only for the working population but also for the retired elderly generation. Wellness, not just sickness, will determine the lifestyle of this increasing cohort. If public programmes for the prevention of infectious diseases and easy access to clean potable water, to mention only a couple, are successful, the number of elderly people in a good health status will increase further. Major contributions to support this notion may come from a globally organized wellness industry. The medical device industry will need to offer sophisticated therapy systems, e.g. micro- or nano-scaled devices or non-invasive sensors for the online determi-

nation of physiological parameters leading to therapeutic feedback guidance of medical devices. There is no doubt that "Health is wealth". The enormous financial and economic endeavours to be made for realizing health programmes support the notion that "wealth is health" as well.

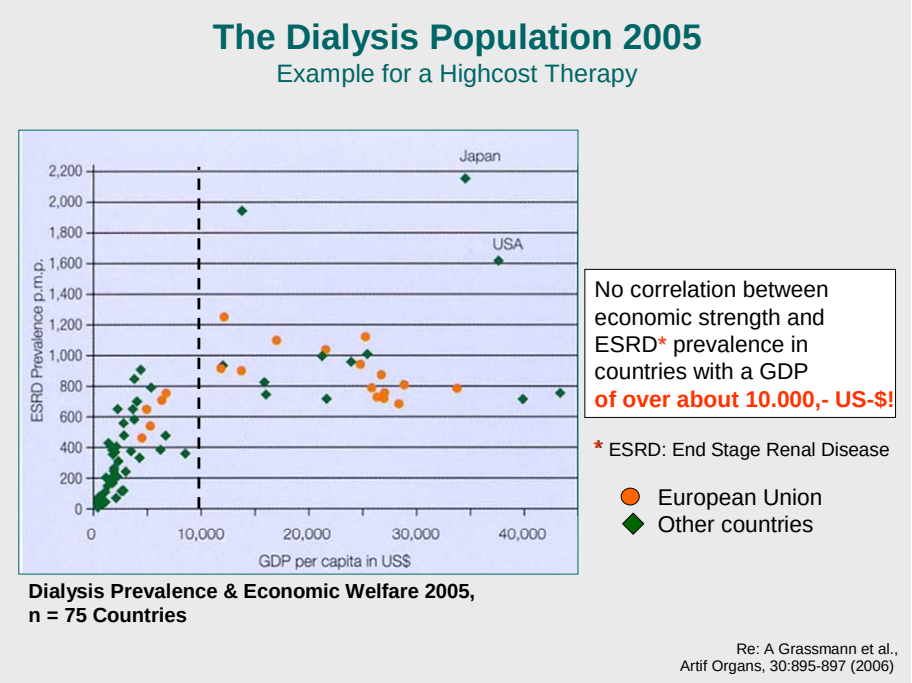

Figure 5 – Prevalence of end stage renal disease (ESRD) in 2005 versus economic wealth in the 75 countries with the highest ESRD population. The broken line indicates the boundary between high-income countries and the group of low- and middle-income countries as classified by the World Bank group. The analysis shows, further, that no difference in the prevalence of ESRD patients is observed, once the gross national product (GDP) of an individual country has reached a level above US$ 10.000 [12].

Слика 5 – Преваленцијата на терминалната бубрежна инсуфициенција во 2005 год. е споредена со економската благосостојба во 75 држави, држави со највисока превалеција на бубрежната инсуфициенција. Анализите покажуваат дека не постои разлика во преваленцијата на бубрежната инсуфициенција во државите каде што БДП постигнал ниво над 10.000 долари.

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Р е з и м е

ЗДРАВЈЕТО Е БОГАТСТВО! ДАЛИ БОГАТСТВОТО Е ЗДРАВЈЕ?

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Актуелните демографски анализи на светската популација покажуваат разумно зголемување на животниот век на општата популација скоро во сите региони на светот. Последователно „Економијата на здравјето“, која се дефинира како „Провизија и маркетинг на добрата и услугите со цел да се

овозможи одржување и обнова на здравјето“, претставува мегатренд на овој милениум. Дефиницијата ја содржи вистината не само за националните економии и БДП, туку и за постарата генерација. Постои предвидување дека потрошувачката моќ на постарата популација е трикратно повисока во споредба со таа на работно активната популација, барем во западната хемисфера.

Од оваа ситуација профитираат глобално организираните лековити бањи. Сепак, зголемениот морбидитет на постарата популација повлекува големи финансиски средства, потребни за организирање на програмите за заштита на здравјето, како што се превентивната здравствена заштита, едукацијата и подобрувањето на моделот за добар квалитет на животот, како и за развој на софистицирани медицински апарати и лекови, адаптирани за потребите на возрасните. Белешката дека „Богатството е здравје“ е валидна како и белешката дека „Здравјето е богатство“. Благосостојбата, не само болеста, ќе го одредат животниот стил на идните возрасни генерации.

Клучни зборови: здравје, богатство, економија, светска популација.

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