A Global Perspective

Chronic Diseases
Diet, Physical Activity & Lifestyle

Michael Sagner, MD

International Conference on Role of Diet, Physical Activity & Lifestyle in Promoting Health

Lifestyle-related Chronic Diseases
An economic Burden for all Nations

World Health Organization (WHO):
‘...Insufficient Progress (in the fight against chronic diseases) has been made.’
Obesity levels across the globe have not decreased.

World Health Organization (WHO):
The worldwide increase of noncommunicable diseases is a slow-motion disaster, as most of these diseases develop over time. But unhealthy lifestyles that fuel these diseases are spreading with a stunning speed and sweep.

United Nations (UN):
Urgency is needed to scale up action to prevent and control NCDs, taking into account that 300 million lives have been lost to NCDs in recent years.

World Economic Forum (WEF):
Non-communicable diseases have been established as a clear threat not only to human health, but also to development and economic growth.
World Population Levels

Human population increases
Life Expectancy
At birth for both genders, by country
Lifestyle-related Chronic Diseases
Burden of Disease 2001

Group 1 ≠ Communicable, maternal, and perinatal conditions and nutritional disorders

Group 2 ≠ Non-communicable diseases

Group 3 ≠ Injuries

AVERAGE LOW- AND MIDDLE-INCOME COUNTRIES

Group 1 36%
Group 2 54%
Group 3 10%

HIGH-INCOME COUNTRIES

Group 1 7%
Group 2 87%
Group 3 6%
Lifestyle-related Chronic Diseases

Longer lives but more disease burden

© EUROPEAN SOCIETY OF LIFESTYLE MEDICINE

For people who survive to age 50, for every added year they get, only seven months are healthy.

Potential decline in life expectancy for future generations?
Obesity
A global Epidemic

© EUROPEAN SOCIETY OF LIFESTYLE MEDICINE
Type-2-Diabetes
Increasing Dramatically

© EUROPEAN SOCIETY OF LIFESTYLE MEDICINE
King et al, Diabetes Care, 1998
Type-2-Diabetes 2010
A global Lifestyle-related Disease

Prevalence* (%) estimates of diabetes (20-79 years), 2010

* comparative prevalence
Type-2-Diabetes 2030
A global Lifestyle-related Disease

MAP 2.2 Prevalence\(^*\) (%) estimates of diabetes (20-79 years), 2030

* comparative prevalence
Uncomfortable Facts
Chronic Lifestyle-related Diseases

Chronic Diseases are now the leading cause of death and disability on the planet.

- Chronic diseases responsible for 60% of all deaths in 2005.
- Chronic Diseases are killing more people in their prime adult years.
- Surprising fact:
  - TB, HIV, and malaria only account for 10% of the global deaths.

Chronic Diseases kill more people than all infectious diseases combined!
Lifestyle-related Chronic Diseases
An economic Burden for all Nations

- Cancer: $895.2 bn
- Heart diseases: $753.2 bn
- Cerebrovascular disease: $298.2 bn
- HIV/AIDS: $193.3 bn
- Lower respiratory infections (including pneumonia): $125.8 bn
- Malaria: $24.8 bn
- Cirrhosis of the liver: $92.8 bn
- Road accidents: $204.4 bn

© EUROPEAN SOCIETY OF LIFESTYLE MEDICINE
WWW.ESLM.EU
Infectious Diseases
Germ Theory - Monocausal Focus in Health Care

FIGURE 1. Crude death rate* for infectious diseases — United States, 1900–1996†

Source: Center for Disease Control & Prevention
The Risk Transition

Major shift from traditional risks to modern risks

- Tobacco
- Physical inactivity
- Overweight
- Urban air quality
- Road traffic safety
- Occupational risks
- Undernutrition
- Indoor air pollution
- Water, sanitation and hygiene

Risk size vs. Time

Traditional risks vs. Modern risks
Lifestyle-related Diseases
A unexpected Challenge for Health Care Systems

![Bar chart showing the number of deaths per 100,000 population for various diseases from 1900 to 2010:
- Diphtheria, 40.3
- Senility, 50.2
- Cancer, 64.0
- Accidents, 72.3
- Nephropathies, 88.6
- Cerebrovascular disease, 106.9
- Heart disease, 137.4
- Gastrointestinal infections, 142.7
- Tuberculosis, 194.4
- Pneumonia or influenza, 202.2
- Suicide, 12.2
- Pneumonia or influenza, 16.2
- Nephropathies, 16.3
- Diabetes, 22.3
- Alzheimer’s disease, 27.0
- Accidents, 38.2
- Cerebrovascular disease, 41.8
- Noninfectious airways diseases, 44.6]

© EUROPEAN SOCIETY OF LIFESTYLE MEDICINE
Epidemiological Transition
From Infections to Lifestyle-related Diseases

<table>
<thead>
<tr>
<th>Age</th>
<th>Pestilence and famine</th>
<th>Receding pandemics</th>
<th>Degenerative “man-made” diseases</th>
<th>Delayed degenerative diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predominant CVD</td>
<td>Rheumatic heart disease</td>
<td>Hypertension-related diseases</td>
<td>CHD, stroke, diabetes at young ages</td>
<td>CHD, stroke at older ages</td>
</tr>
<tr>
<td>% of deaths due to CVD</td>
<td>5-10</td>
<td>10-35</td>
<td>35-65</td>
<td>&lt;50</td>
</tr>
</tbody>
</table>

Current examples
- Sub-Saharan Africa
- Rural China
- Rural India
- Urban India
- North America, Australasia

### Table 2. Actual Causes of Death in the United States in 1990 and 2000

<table>
<thead>
<tr>
<th>Actual Cause</th>
<th>No. (%) in 1990*</th>
<th>No. (%) in 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco</td>
<td>400,000 (19)</td>
<td>435,000 (18.1)</td>
</tr>
<tr>
<td>Poor diet and physical inactivity</td>
<td>300,000 (14)</td>
<td>400,000 (16.6)</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>100,000 (5)</td>
<td>85,000 (3.5)</td>
</tr>
<tr>
<td>Microbial agents</td>
<td>90,000 (4)</td>
<td>75,000 (3.1)</td>
</tr>
<tr>
<td>Toxic agents</td>
<td>60,000 (3)</td>
<td>55,000 (2.3)</td>
</tr>
<tr>
<td>Motor vehicle</td>
<td>25,000 (1)</td>
<td>43,000 (1.8)</td>
</tr>
<tr>
<td>Firearms</td>
<td>35,000 (2)</td>
<td>29,000 (1.2)</td>
</tr>
<tr>
<td>Sexual behavior</td>
<td>30,000 (1)</td>
<td>20,000 (0.8)</td>
</tr>
<tr>
<td>Illicit drug use</td>
<td>20,000 (&lt;1)</td>
<td>17,000 (0.7)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,060,000 (50)</strong></td>
<td><strong>1,159,000 (48.2)</strong></td>
</tr>
</tbody>
</table>

*Data are from McGinnis and Foege.¹ The percentages are for all deaths.
Deaths attributed to risk factors
By country income level, 2004

- High blood pressure
- Tobacco use
- High blood glucose
- Physical inactivity
- Overweight and obesity
- High cholesterol
- Unsafe sex
- Alcohol use
- Childhood underweight
- Indoor smoke from solid fuels
- Unsafe water, sanitation, hygiene
- Low fruit and vegetable intake
- Suboptimal breastfeeding
- Urban outdoor air pollution
- Occupational risks
- Vitamin A deficiency
- Zinc deficiency
- Unsafe health-care injections
- Iron deficiency

Mortality in thousands (total: 58.8 million)
Virtually ALL of the top 10 leading causes of death in US adults are moderately to STRONGLY influenced by lifestyle patterns and behavioral factors.
Lifestyle factors are the main contributor to chronic diseases
Lifestyle Risk Factors
Spreading across the Globe
Lifestyle Transition
Nutrition and Physical Inactivity

The modern world: Increased caloric consumption in a milieu of reduced energy expenditure

- Sedentary lifestyle
- Motorized transport, Labor-saving devices
- Reduced leisure time physical activity
- Changed nutrition patterns
- Role of chronic stress (?)
Lifestyle Transition
Nutrition and Physical Inactivity
Daily Caloric Intake
Per Capita in European Countries and the US

© EUROPEAN SOCIETY OF LIFESTYLE MEDICINE
Diet and Nutrition
Dietary Energy Availability 1961 (kcal/person/day)
Diet and Nutrition

Dietary Energy Availability 2001-2003 (kcal/person/day)
Daily Occupational Energy Expenditure

Dropping

- **Men**
  - 140 daily kcals
  - Annual Reduction: -35,000 kcals

- **Women**
  - 120 daily kcals
  - Annual Reduction: -30,000 kcals

<table>
<thead>
<tr>
<th>Year</th>
<th>Occupation Related Daily Energy Expenditure (calories)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>1,550</td>
</tr>
<tr>
<td>1970</td>
<td>1,450</td>
</tr>
<tr>
<td>1980</td>
<td>1,350</td>
</tr>
<tr>
<td>1990</td>
<td>1,250</td>
</tr>
<tr>
<td>2000</td>
<td>1,150</td>
</tr>
<tr>
<td>2010</td>
<td>1,050</td>
</tr>
</tbody>
</table>
-250 kcals/day of accumulated energy expended on housework.
Energy Balance System

Energy In vs. Energy Out

Energy Intake → Active Regulation/Metabolism → Energy Expenditure

Diet Quality → Energy Stores (Visceral Fat) → Obesity
Red Meat Intake and All-Cause Mortality

Dose-response relationship

Health Professionals Follow-up Study

Nurses’ Health Study

Pan et al 2012, JAMA
Hazard Ratios: Replacement of Red Meat

Replacement of other food groups for red meat

Nuts for unprocessed red meat
Legumes for unprocessed red meat
Low-fat dairy for unprocessed red meat
Whole grains for unprocessed red meat
Poultry for unprocessed red meat
Fish for unprocessed red meat

Nuts for processed red meat
Legumes for processed red meat
Low-fat dairy for processed red meat
Whole grains for processed red meat
Poultry for processed red meat
Fish for processed red meat

Nuts for total red meat
Legumes for total red meat
Low-fat dairy for total red meat
Whole grains for total red meat
Poultry for total red meat
Fish for total red meat

© EUROPEAN SOCIETY OF LIFESTYLE MEDICINE

Pan et al 2012, JAMA
Relative Risk of Type-2-Diabetes
By different levels of fiber intake and glycemic index

© EUROPEAN SOCIETY OF LIFESTYLE MEDICINE
The emerging field of Lifestyle Medicine takes the complex interaction of lifestyle factors and different systems (e.g. cellular, social) into account.
Lifestyle-related Diseases

Myths and Misconceptions hindering Progress

- Personal Behaviours vs. Public health problem
- One factor vs. complexity of lifestyle
- Treatment vs. Prevention
- Ageing (natural) population vs. young population
- Modernization (rich) vs. local problem (poor)
- Future vs. present problem
Lifestyle-related Diseases
A complex Challenge

• Few clear policies and strategies
• Disconnect between public health and clinical medicine
• Low commitment to prevention
• Under-estimation of intervention effectiveness
• Commercial pressure
• Severe lack of investment in research
Opportunities
Looking Ahead

• We have to deal forcefully with the underlying issues of chronic diseases.

Work from ‘CELL to COMMUNITY’
- Understanding how lifestyle factors influence human health and biology
- Clinical medicine to treat underlying mechanisms
- Public Health to create healthy environments and prevent chronic disease

We need an interdisciplinary, systems-based and holistic approach. We need to address the underlying mechanisms and factors of chronic diseases.

• Private – Public collaborations
• Link state and industry research
Michael Sagner, MD

https://twitter.com/MichaelSagnerMD

https://www.facebook.com/MichaelSagnerMD

www.eslm.eu