

What is public health all about?

- health promotion
- disease prevention
- population based
- human rights
- public health messsures
- public health ethics
- country comparison
- influence of religion on health (social influence, determinants...)
- mental health

public health standards

- clear drinking water
- excercise, medication
- nutrition
- hygiene
- safe driving (airbag, good roads, seatbelt,...)
- smoking restrictions

Definition:

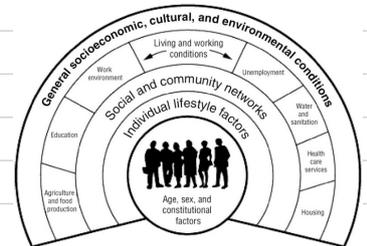
"Public Health is the science & the art of *what is public health?* **preventing disease, prolonging life & promoting physical health & efficiency through** *how can this be achieved?* **organized community efforts** for the sanitation of the environment, the control of community infections, the education of the individual in principles of personal hygiene, the organization of medical & nursing service for the early diagnosis & preventive treatment of disease & the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health." - Winslow

Public health refers to...

- ... all organized measures
- ... to prevent disease, promote health & prolong life
- ... among the **population as a whole**

its activities...

- ... aim to provide **conditions in which people can be healthy** (Dahlgren, Whithead, Lancet)
- ... focus on entire populations, not on individual patients or diseases



Basic Principles of Public Health

1) Population Perspective

public health model: focus on group of people, entire population (and their needs)
 disease prevention, health promotion, interventions on enviroment
 medical model: individual (an its needs)
 diagnosis, treatment

2) Ethics

have to work together

principle of **autonomy** (each person has right on own decisions)
 principle of **mutual dependence** (e.g. protect people from others behavior, e.g. passive smoking)

Proportionality (is it adequate, not „overdone“?)

Protection of most vulnerable group, overall goal of **health equity**

3) evidence based

decision making, development, implementation, evaluation of public health activities
... must be guided by evidence

History of Public Health

- organized community efforts to promote health go back to ancient times
- key issues change over time, new challenges arise (e.g. shift from personal hygiene to health-related lifestyle)
- practices have risen & fallen over centuries depending on changes in social-political-religious systems (e.g. flushing toilets with water on sewers was found antiquity)

Ancient Greece

Hippocrates

- father of western medicine
- rejected supernatural or religious theory of disease
- proclaimed causal relationship between health & environment
- > Disease, climate, water, lifestyle, nutrition
- 4 vital bodily fluids: blood, phlegm, yellow bile, black bile
- clinical medicine
- Hippocratic oath (Hippokratischer Eid)

Roman Empire (23 BC - 476 AD)

- Great engineers: aqueducts, complex system of sewers
- administration, sanitation, hygiene (e.g. water supply, public bath, market)

Middle Ages (476-1450 AD)

- Deterioration of Roman infrastructure (Aqueducts decayed, water supply often polluted)
- Decline of hygiene & sanitation (no rubbish collection, butchers slaughtered animals in the streets, no drains, sewers or toilets in poor areas)

The Plague in the 14th century

- epidemic of the „black death“ killed 25 – 50% of the total population
- beginnings of public health tools
- > measures against the plague: isolation of patients, cleaning of areas with chalk

Edward Jenner

- show the concept of vaccination on human —> „father of immunology“
- herd immunity
- smallpox

Great Sanitary Awakening (1800s-1900s)

- health-related consequences of industrial revolution (creation of slums, overcrowding, bad housing, lack of drainage & sewerage)
- Focus on sanitation & changing physical environment (water supply & sewage removal, monitoring of community health status, control contamination of physical environment)

Ignaz Semmelweis

- child bed fever: mortality of women shortly after childbirth (25%)
 - importance of good hygiene in clinical practice to reduce risk of infections and the mortality rate
- lets

John Snow

- epidemiology
- cholera
- water pumps with dirty water can cause diseases

Birth of Social Medicine: Poverty in Focus

- connection between poverty and health

Edwin Chadwick

- hygiene of the city (epidemics of Cholera & Typhus)
- poor law amendment act: focus on the poor, medical supply & hygiene for the poor
- water canalisation, garbage collection

Robert Koch

- microbiology
- tuberculosis bacteria, milzbrand, cholera Erreger
- new vaccines because more informations about pathogen

Contagion Control (1880-1940)

- „The science and art of preventing disease, prolonging life & promoting health through organized community effort to the...
 - > sanitation of the environment
 - > control of community infections
 - > education of individuals on personal hygiene
 - > organization of medical and nursing service...“

Filling Holes in the Medical Care System (1950-1980s)

- advances in epidemiological methods & movements towards evidence-based public health & medicine
- non-communicable disease first time prominent issue (smoking recognized as harmful)
- Randomized-controlled trials (RCT)
- Regulation of drugs, vaccines & other interventions

Health Promotion & Disease Prevention (mid 1980-2000)

- focus on individual responsibility for health
- intervention at individual level —> behavioral change to fight against disease risk

Expamples of Public Health Achievements (CDC 1999)

- motor vehicle safety (*seatbelt, helmet*)
- Safer workplaces (*helmets, protection against toxic material*)
- Control of infectious diseases (*vaccinations, hygiene standards*)
- Decline in death from coronary heart disease and stroke (*preventive activities*)
- safer & healthier food
- healthier mothers & babies
- family planning
- recognition of tobacco use as health hazard

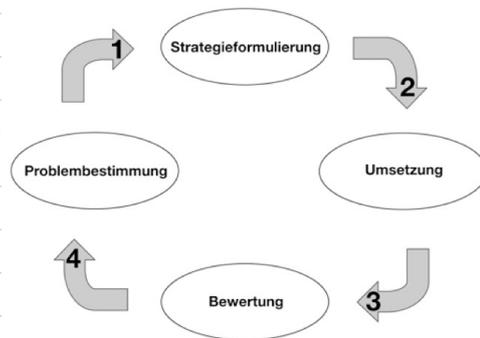
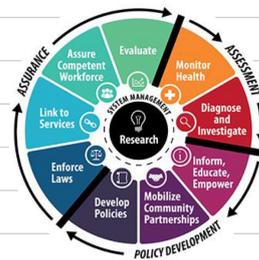
The Global Burden of Disease

Core funktions & Essential Services

Assessment: what is the problem?

Policy Development: What can we do?

Assurance: is it appropriate what we do?



10 essential services/activities related to 3 core functions

Services/Activities in Assessment:

What is the problem?

- monitor health status to identify & solve community health problems
- diagnose & investigate health problems & hazards in the community

Services/Activities in Policy Development:

What can we do?

- inform, educate & empower people about health issues (*e.g. through health promotion, prevention strategies*)
- mobilize community partnerships & actions to tackle health problems
- develop policies & plans that support health efforts

Services/Activities in Assurance:

Is it appropriate what we do?

- enforce laws & regulations that protect health & ensure safety
- link people to needed health services & assure the provision of health services (*especially identify population with limited access*)
- assure a competent health workforce
- evaluate effectiveness, accessibility & quality of personal & population-based health services

Research is linked to all services (important tool in all activities „*evidence-based public health*“)

- to assess the health problem & potential risk factors (epidemiology)
- to gather new insights & innovative solutions to health problems
- to test the cost effectiveness of interventions

Public Health is represented in many domains...

- ...system
- ...professions
- ...research methods
- ...government services

Information on mortality & health in populations in all regions of the world is fragmentary & sometimes inconsistent

—> **PROBLEM:**

- sound data important for planning of public health activities & decision-making
- priority setting
- monitoring whether improvement occurs over time

Global Burden of Disease (GBD) Project

- systematic, scientific effort to quantify the magnitude of health loss due to disease, injuries & risk factors
- comparative approach (data from 195 countries, epidemiological homogeneity)

1990: First GBD study

- quantification of health effects of 100+ disease & injuries in 8 world regions
- comprehensive estimates of mortality & morbidity by age, sex, region
- introduction of new metric to quantify burden of diseases & injuries: *Disability-Adjusted Life Years (DALYs)*

2000 – 2002:

- analyses of mortality & burden of disease attributable to 26 global risk factors (*Comparative Risk Factor Assessment CRA*)
- regular updates (2004, 2012, 2017...)

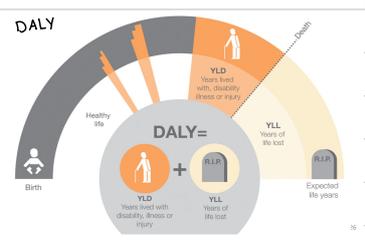
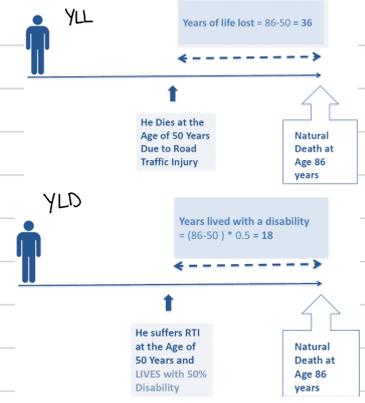
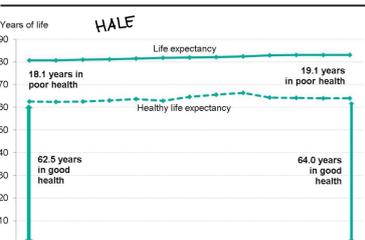
GBD Report 2017:

- Life expectancy
- Fertility rates
- Gender gap in life expectancy & morbidity
- Antibiotic resistance
- Childhood mortality
- HIV/AIDS
- Risk factors: high blood pressure & smoking

Sustainable Development Goals (SDGs)

- achievement of SDGs by 2030 is in doubt





Health Life Expectancy (HALE):

describes the average number of years that a person can expect to live in „full health“ by taking into account years lived in less than full health owing disease/injury

Years of Life Lost (YLL):

„normative standard life table“ used to compute YLL at each age by identifying lowest observed death rates for any age group in countries with over 5 Mio. population

Swiss woman dies aged 54 from a skiing accident (life expectancy Swiss female: 85.1) → YLL = 31.1

British man dies aged 67 from a heart attack (life expectancy UK male: 79) → YLL = 12

Years Lived with a Disability (YLD):

years lived with a disability from diagnosis to death or healing

man diagnosed with moderate Dementia at age 70 dies at 76 : YLD = (76-70) · 0,377 = 2,26

woman diagnosed with HIV at age 30 and receives treatment dies at 78 : YLD = (78-30) · 0,078 = 3,74

boy diagnosed with partially controlled asthma at age 6 dies at 86 : YLD = (86-6) · 0,036 = 2,88

Disability-Adjusted-Life Years (DALY):

* the higher the number the more severe the disability is

DALY = YLL + YLD

based on years of life lost from premature death & years if life lived in less than full health

man dies in a car accident aged 51, he was diagnosed with mild MS at 31 which progressed to severe MS at 49

DALY = YLL + YLD = (86-51) + (49-31) · 0,183 + (51-49) · 0,719 = 39,732

Social Inequalities in Health

place where you live (urban or rural → hospital...)

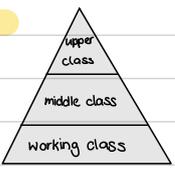
BIP of a country/wealth

gender

race



What is „Social Inequality“?



„Scarce & Valued material or immaterial Resources“

Social Capital: social network, relationships, all that results out of those networks

Economic Capital: Income, Wealth

Cultural Capital: education, titles, books, cultural objects

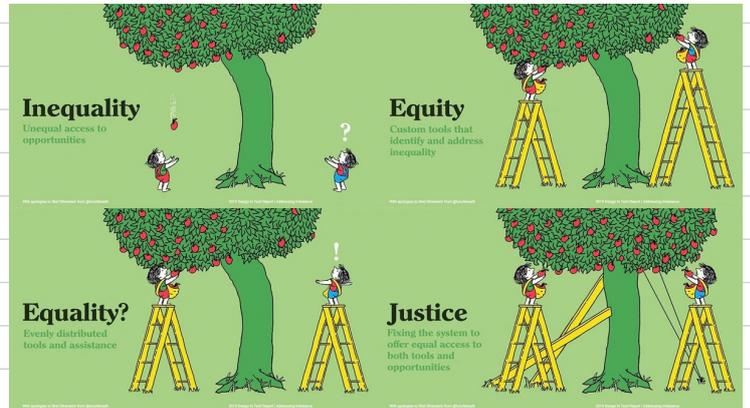
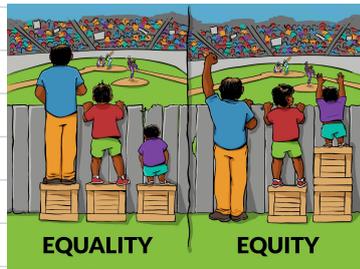
Symbolic Capital: mostly gained through social, economic and cultural capital (Honor, prestige, recognition...)

* table of disability weights for Global Burden of Disease (moodle)
life expectancy: 86 years

„The Position in Social Hierarchy“

- Societies are hierarchically structured
- Hierarchical structure is typical for all known societies

Equality vs. Equity



Equality: everyone gets the same, (same input, different outcome)

Equity: everyone has the same result/outcome (different input, same outcome)

„Why is the fence there?“ -> Systematic error? Structural barriers

How to measure Social Inequalities?

„Social inequality describes the fact that people regularly get more or less of material or immaterial resources based on their position in the social hierarchy“

- Identification of observable characteristics to measure social inequality
- Which indicators? (income, wealth, access to health service, job/occupation, education,
- How are these criteria related to health?

Socioeconomic Position (SEP)

- Education (years of education): access to different jobs, cultural capital, social networks...
- Income & wealth: impact on life situation, relevant for health (housing conditions, neighborhood, access to health care, behavior, leisure time...)
- occupation: defines income, access to social security system, risk factors for health, hierarchy between job types difficult to establish

Evidence on Social Inequalities in Health

social gradient: higher prevalence in lower SEP groups

- coronary heart disease - musculoskeletal diseases
- injuries & accidents - mental disorders
- tumors - chronic obstructive pulmonary diseases
- diabetes - liver diseases
- development disorders - oral health

Summary



- Incidence & prevalence of most diseases & mortality follow a social pattern:
 - People with lower education, income or occupational status are at increased disease & mortality risk
 - Phenomenon summarized under 'Social inequality in health'
- Gradual increase in disease risk ('social gradient in health'): not only highest & lowest SEP groups differ in disease risk but gradual increase of risk
- Pattern of social inequality is also evident when countries, regions, cities, neighborhoods, or social groups are compared (inequalities on macro-, meso- & micro-level)

Etiological Pathways from SEP to Health

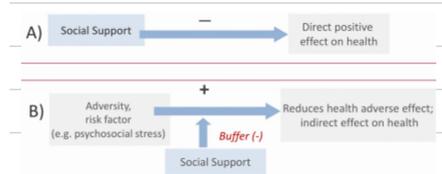
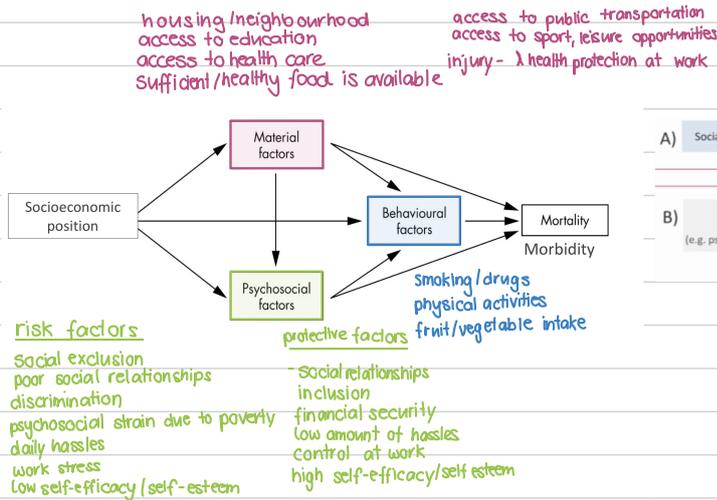
- understanding causal effects of SEP on health is challenging as it acts via a multitude of mechanisms or pathways
- Low SEP is not unhealthy per se... but leads to several unhealthy conditions

Selection-/Drift-Hypothesis: Diseases cause social downward mobility

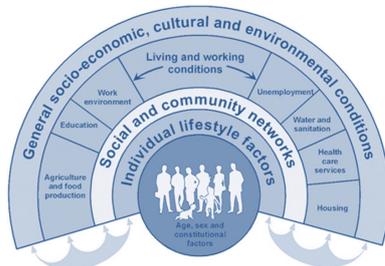
Social Causation Hypothesis: material factors, behavioral factors, psychosocial factors (risk & protective factors are unequally distributed):
Lower SEP groups are exposed to more risk factors & less protective factors)

Life course perspective: expands social causation hypothesis by the dimension of time

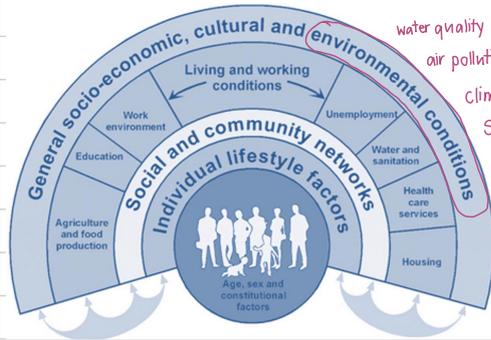
Printings



The Social Determinants of Health



Link: ZIP code – Health status: „Where we live - the air we breathe, the water we drink, the environments around us – has a huge impact on our health and even our DNA“



Environmental Health: is comprised of those aspects of the human health & disease that are determined by factors in the environment. It also refers to the theory & practice of assessing & controlling factors in the environment that potentially affect health of present & future generations (WHO, 1989)

Direct pathological effects: chemicals, biological & physical agents

indirect effects on health: physical, psychological, social, cultural environment, which includes housing, urban development, land use & transportation

Agents (pollutants/toxicants)

- chemicals (air pollutants, toxic waters, pesticides, volatile organic compounds)
- biological (disease organisms, insects, animals allergens)
- physical (plastic waste, noise, radiation, electromagnetic fields)

Vectors: water, air, soil, food

Routes of entry: into the human body to produce adverse health effects (inhalation, ingestion, absorption)

SEP correlation: lower income buy cheaper food, have jobs with exposition to toxic chemicals (asbestos), access to water and sanitation

Environmental disease burden: mortality – lower income countries are more affected

Examples of Environmental Pathways of Toxic Agents

Agent	Vectors	Route of entry	Disease
Biological: <i>Legionella pneumophila</i>	Soil, air (cooling towers, building ventilation systems)	Inhalation	Legionnaire's disease
Biological: Salmonella	Food (meat, eggs) water	Ingestion	Acute diarrhea
Chemical: Dioxin in herbicides, paper mills, incinerators	Air, water, food	Inhalation, ingestion	Chloracne, soft tissue tumors, damage to nervous & immune system
Chemical: Pesticides in agriculture	Soil, food, water	Inhalation, ingestion	Nervous system toxicology
Chemical: Asbestos	Air, water (insulation, auto brakes)	Inhalation, ingestion	Asbestosis, lung cancer
Physical: Micro-plastic in water	Water, food	Ingestion	Current research ongoing!

Reducing the Impact of Environmental Hazards: structural/policy interventions

- precautionary principle
- polluter pays principle
- addressing the root
- holistic approach
- cooperation principle

Environmental Causes of Non-Communicable Diseases

Noncommunicable diseases	Agents
Cancers	Household and ambient air pollution, second-hand tobacco smoke, ionizing radiation, UV radiation, chemicals, worker protection.
Mental, behavioural and neurological disorders	Occupational stress; disasters such as floods, earthquakes and fires (linked to housing, flood management, climate change); forced relocations in the context of development projects; occupations in the entertainment or alcohol industry; head trauma (for epilepsy); chemicals (for certain neurological diseases); noise (for insomnia); bright lights, poor air quality and odours (for headaches). Physical activity fostered by supportive environments can reduce certain disorders.
Cataracts	UV radiation, household air pollution.
Hearing loss	Occupational exposure to high noise levels.
Cardiovascular diseases	Household and ambient air pollution, second-hand tobacco smoke, exposure to lead, stressful working conditions, shift work.
Chronic obstructive pulmonary disease	Household air pollution, ambient air pollution, exposure to dusts in the workplace.
Asthma	Air pollution, second-hand tobacco smoke, indoor exposure to mould and dampness, occupational exposure to allergens.
Musculoskeletal diseases	Occupational stressors, prolonged sitting at work and poor work postures; need to carry large quantities of water over significant distances for domestic use.
Congenital anomalies	Mothers' exposure to second-hand tobacco smoke, chemicals.

Primary Prevention Opportunities by Sectors

Sectors	Selected risks/intervention areas
Agriculture	<ul style="list-style-type: none"> • Risk of infection by parasitic diseases: domestic and peri-domestic management of vectors. • Occupational exposure to chemicals: regulations, personal equipment. • Consumers' exposure to chemicals: regulations.
Industry/commercial	<ul style="list-style-type: none"> • Air pollution: industrial emission control; improved energy options; indoor tobacco smoke-free legislation • Occupational exposure to chemicals, air pollutants, UV exposure, noise: workers' personal protection; education on protective behaviour; engineering approaches to reduce exposure, such as ventilation, dust suppression techniques, enclosure of pollution sources etc.; removal from sources of pollutants or other relevant exposure regulations. • Exposure to industrial chemicals (workers, consumers): legislation, treaties. • Water pollution: industrial emission control. • Noise: noise control regulations.
Transport	<ul style="list-style-type: none"> • Air pollution: decreased physical activity; improved urban planning, improved and increased use of public transport; reduction of traffic congestion; replacement of older diesel vehicles, etc. • Risk of injury: traffic-calming measures and other traffic control solutions; separation of pedestrians from motorized traffic, etc.
Housing/community	<ul style="list-style-type: none"> • Household air pollution: use of clean fuels; strategies to reduce exposure to smoke from solid fuels – implementation of WHO <i>Indoor Air Quality Guidelines</i> (WHO, 2014ee). • Contact with infected excreta: safe disposal of excreta. • Contact with malaria and other vectors: environmental manipulation and modification of human habitats • Contact with Chagas vectors: wall plastering and improved household hygiene.

„Health conditions that are non-infectious & non-transmissible among people“

main types:

- cardiovascular disease
- cancer
- chronic respiratory disease
- Diabetes

Mostly chronic & complex (Long disease duration, risk factors: genetic, physiological, environmental, behavioural factors)

NCD lead to 71% of death cases worldwide)
80% of health care costs in CH)

Risk Factors of NCDs:

- **health behaviour:** use of tobacco, diet, physical inactivity, excessive alcohol consumption

Physiological factors: stress hormones, weight, blood pressure, blood lipids, cholesterol, genetic predisposition

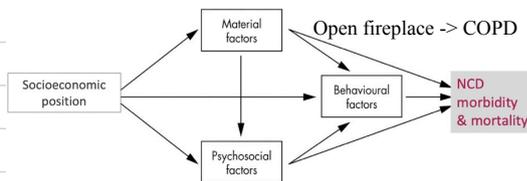
Social determinants: living & working conditions, psychosocial stress, environmental conditions

Examples for Risk Factor 'Environment' in the Etiology of NCDs

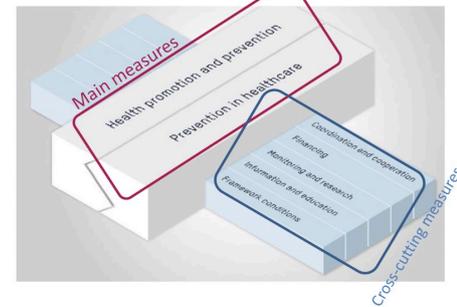


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Congenital anomalies	Mothers' exposure to second-hand tobacco smoke, chemicals.

know these factors and give some examples, hypothesize why this leads to another



The Action Fields of the Swiss NCD Strategy



Gesundheitsförderung Schweiz (Organisation) engagieren sich in der Schweiz im Bereich NCD Prävention

„Purzelbaum Schweiz“

RADIX

Sucht Schweiz

Health promoting environment: prevention in industry & workplaces

Industry has an important role in public health: as employer, producer of products, provider of services, engagement of industry is voluntary, requires commitment for implementation

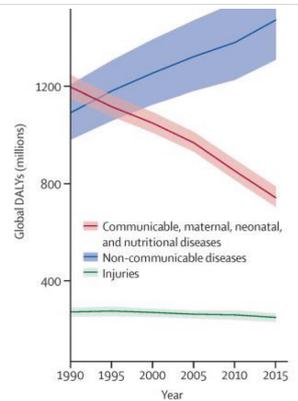
Communicable diseases

understandinh disease/injury = basis for any public health action

- Which information is important for the planning of public health actions?
- What is the **etiology (cause)** of the disease or injury?
- What are the **risk factors** for these disease or injury?
- Are there population groups with increased risk (**vulnerable groups**)?
- What has been proven **effective to tackle** the risk factors?

Core functions of public health:

- > **Assessment:** Whats the problem?
- > **Policy development:** what can I do?
- > **Assurance:** is it appropriate what we do?



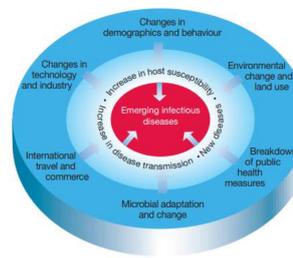
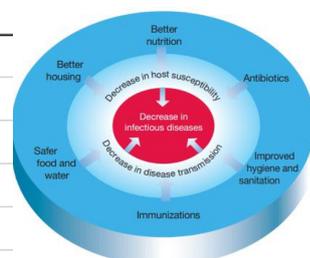
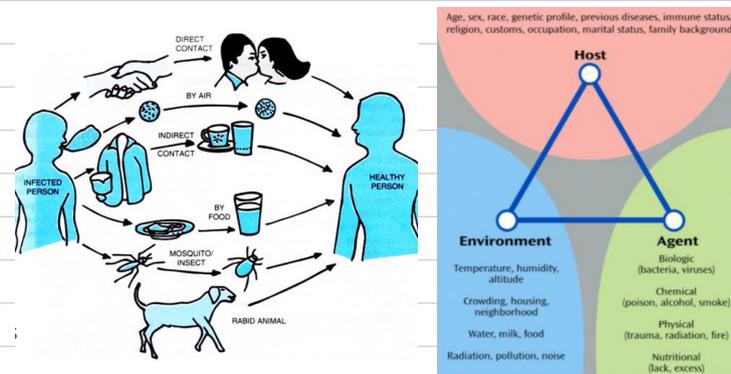
National strategies or action plans are often divided into the sectors NCD, CD, injury & mental disease

Defining CDs: are caused by infectious agents that can be transmitted to other from an infected person, animal or a source in the environment

infectious agents = bacterial, viral, fungi, parasitic organisms

cause of CD: Transmission of infectious agents by vectors (person, animal or other source)

Dependent on frequency, temporal & spatial characteristics: CDs classified as endemic, outbreaks, epidemics or pandemics



Agents (pollutants/toxicants):

- chemical (air pollutions, toxic wastes, pesticides, volatile organic compounds)
- biologic (disease organisms, insect or animal allergens)
- physical (plastic waste, noise, radiation, electromagnetic fields)

Vectors

- Water, air, soil, food

Routes of entry (into human body to produce adverse health effects)

- inhalation, ingestion, absorption

Endemic: CD is endemic in a population when CD is **constantly maintained at a baseline level in a geographic area** without external inputs

- persists in community at relatively constant level for longer time; approximately same number of affected individuals (e.g. tuberculosis is endemic in many African countries)

Outbreak: **sudden increase in incidence** of specific disease within **delimited community**, region or season. Single case can also constitute an outbreak of disease has never occurred before/not anymore for longer time

- outbreaks often spread via contaminated water or food (e.g. salmonella & noro viruses repeatedly lead to outbreaks in CH)
- source of outbreak to be identified (e.g. through interviewing affected people, molecular biological typing on the pathogens → Remediation or eradication of source to stop dissemination)

Epidemic: occurrence of **more cases of disease than expected**/high prevalence in a given year or among **specific group of people** over a particular period of time

- high frequency, delimited area & limited temporarily (e.g. seasonal influenza epidemic, Lyme borreliosis)

Pandemic: **epidemic** occurring **over a wide geographical area**, putting large proportion of population at risk

- high in wider area, temporarily limited or unlimited (e.g. flu pandemics, SARS-CoV-2, HIV)

Threshold for Epidemics?

- Declaration of epidemic requires understanding of baseline incidence rate

Epidemics for certain disease (influenza) = reaching defined increase in incidence above baseline

- Strongly depends on incidence of disease

Few cases of a rare disease (e.g. measles) may be classified as epidemic, while many cases of a common disease (common cold) would not

Challenges with CDs

- CD remain a major global public health threat worldwide, with higher burden in low service countries (e.g. malaria, HIV/AIDS)
- microbial resistance: new dimension of threats (e.g. drug-resistant tuberculosis, antibiotic resistance)
- mobility/intensive intercontinental travel of humans: allows infections to travel more quickly (e.g. SARS outbreak 2001, COVID-19)

Risk Factor 'Environment' in the Etiology of CDs



Respiratory infections	Household and ambient air pollution, second-hand tobacco smoke, housing impr
Diarrhoeal diseases	Water, sanitation and hygiene, agricultural practices, climate change.
Intestinal nematode infections	Water, sanitation and hygiene, management of wastewater for irrigation.
Malaria	Environmental modification and environmental manipulation to reduce vector breeding sites and reduce contact between humans and disease vector, contextually mosquito-proof drinking-water storage, livestock distribution.
Trachoma	Access to domestic water supplies, latrines, fly control, personal hygiene.
Schistosomiasis	Excreta management, safe water supply, safe agricultural practices, worker protection.
Chagas disease	Management of peri-domestic areas.
Lymphatic filariasis	Modification of drainage and wastewater ponds, freshwater collection and irrigation schemes.
Onchocerciasis	Water resource management projects (particularly dams).
Leishmaniasis	Housing, cleanliness of the peri-domestic environment, worker protection.
Dengue	Management of water bodies around the house, removing standing water.
Japanese encephalitis	Management of irrigation areas and distribution of farm animals, personal protection.
HIV/AIDS and sexually transmitted diseases	Occupational transmission in sex workers and migrant workers.
Hepatitis B and C	Occupational transmission in sex workers and migrant workers for hepatitis B; accidental needlestick injuries in health-care workers for hepatitis B and C.
Tuberculosis	Exposure of miners and other occupational groups to airborne particles such as silica or coal dust; possibly exposure to household fuel combustion smoke and second-hand tobacco smoke; exposure in settings such as prisons, hospitals and overcrowded housing conditions.

Populations Vulnerable to CDs

- People affected by povrty
- People with poor immunity
- People living in unhygienic conditions
- People affected by disasters; diplaced people: „60-95% of reported death among refugees and displaced populations are due to malnutrition, diarrheal diseases, measles, acute respiratory infections & malaria“

Mental health and injuries

1/4 will have a mental health disorder in his/her life
 reduction in life expectancy due to mental disorder (7-24 years)
 Stigmatisierung ging zurück in den letzten Jahren

Challenges:

- Reductionism (Mind vs. Body dichotomy)
- Treatment (Lag & Gap)
- Definition & Classification (Mental Health vs. Mental Disorders, ICD and DSM, Boundaries of disorders)

Defining mental disorders

What are conceputualizations of Mental Health that you will find in the litarature?
 Mental health is the absence of mental disorders or decrements in mental functions

Mental disorders:

(ICD: more with diagnosis)

- Depression
- Anxiety
- Schizophrenia
- Substance use
- Eating disorders

Mental functions:

(ICF: functions)

- Orientation
- Energy & drive
- Sleep
- Emotion
- Memory
- Concentration

WHO definition of mental health

mental health is a state of **well-being** in which every individual realizes his or her own **potential**, can **cope** with the normal stresses of life, can **work** productively and fruitfully, and is able to make a **contribution** to her or his community

Very open definition, people who are healthy in this definition can still suffer from a mental disorder

Well-being (2400 years of debate)

Heudaimonic

Perspective

Eudaimonic

WB is a subjective experience of positive affect

Definition

WB means growth & human fulfillment of one's daimon or true nature

WB is an outcome

Nature

WB is a process

Are you happy?

Question addressed

What contributes to selfrealization?

How happy are you?

What makes worth living?

Subjective

objective/Subjective

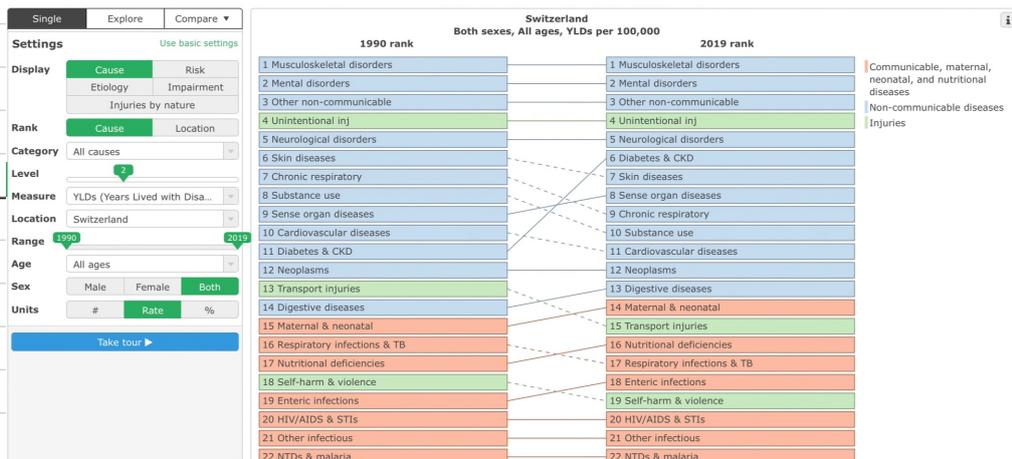
subjective & objective

prevalence of mental disorders

mental disorders are on swiss ranking #2 cause for YLD

most common mental health disorders worldwide

1. Anxiety disorders
2. Depression
3. Alcohol use disorders
4. Drug use disorders
5. Bipolar disorder



DALY: measure of overall disease burden expressed as the cumulative numbers of years lost due to ill health

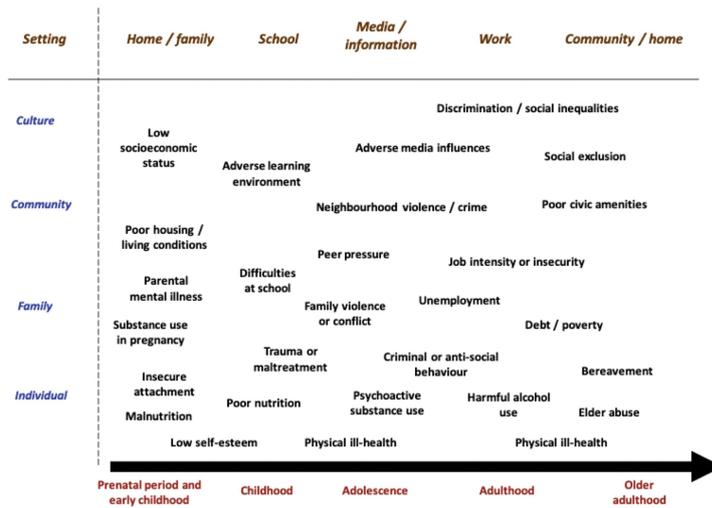
Risk factors for mental disorders:

Examples of adverse and protective factors

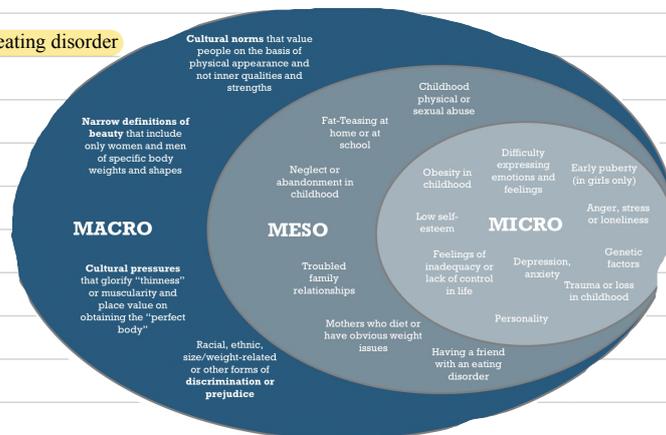
Level	Adverse factors	Protective factors
Individual attributes	Low self-esteem ↔	Self-esteem, confidence
	Cognitive/emotional immaturity ↔	Ability to solve problems and manage stress or adversity
	Difficulties in communicating ↔	Communication skills
	Medical illness, substance use ↔	Physical health, fitness
Social circumstances	Loneliness, bereavement ↔	Social support of family & friends
	Neglect, family conflict ↔	Good parenting / family interaction
	Exposure to violence/abuse ↔	Physical security and safety
	Low income and poverty ↔	Economic security
	Difficulties or failure at school ↔	Scholastic achievement
	Work stress, unemployment ↔	Satisfaction and success at work
Environmental factors	Poor access to basic services ↔	Equality of access to basic services
	Injustice and discrimination ↔	Social justice, tolerance, integration
	Social and gender inequalities ↔	Social and gender equality
	Exposure to war or disaster ↔	Physical security and safety



Figure 2 Schematic overview of risks to mental health over the life course (Adapted from: Foresight project, 2008; Kieling et al, 2011; Fisher et al, 2011)^{4 5 6}



prevent eating disorder



"NICE" national Institute for Health and Care Excellence
 → evidence-based guidelines for treatment

Evidence-based interventions

mhGAP: WHO mental health gap action programme
NICE: guideline in UK

Defining Injuries: Harm or hurt usually applied to damage inflicted on the body by an external force, also called trauma or wound
 unintentional injuries: unplanned, mostly occurring in short period of time (road traffic accidents, falls, fires, burns, drowning, poisonings)
 intentional injuries: resulting from purposeful human action, directed at oneself or others (suicide (attempt), interpersonal violence)

Problem Extent:

injury mortality: 5 mio. people worldwide annually
 death by injuries: 9% of global mortality
 strongly dependent on age, gender, setting
 extent of harm: difficult to estimate (hospitalizations, emergency department visits, doctors appointments)
 large proportion of people surviving injuries: temporary or permanent disabilities

Reducing Environmental Risk Factors

Disease or injury	Main intervention areas
Unintentional injuries	
Road traffic accidents	Design of roads, land-use planning; traffic intensification in development areas with big infrastructure projects.
Unintentional poisonings	Safe handling and storage of chemicals, adequate product information, adequate choice of chemicals, worker protection.
Falls	Safety of housing and work environment.
Fires, heat and hot substances	Safety of cooking, lighting and heating equipment, building fire codes, use of flammable materials in the home, safety of occupational environments and practices, climate change.
Drownings	Safety of water environments, public awareness, regulations, worker safety, climate change.
Other unintentional injuries	Protection from animal bites and contact with venomous plants, safety of mechanical equipment, ionizing radiation and currents.
Intentional injuries	
Self-harm	Access to toxic chemicals such as pesticides, access to firearms.
Interpersonal violence	Access to firearms, urban design (e.g. mobility, visibility), worker protection.

Injury Prevention:

- unintentional injuries:
- seat-belt & helmet use in road traffic
 - blood alcohol limits
 - child-resistant containers to prevent poisonings
 - home hazard modification to prevent falls among the elderly
 - pool fencing to reduce the risk of drowning
- intentional injuries:
- treatment of depression to prevent suicide
 - school-based educational programs to prevent intimate partner violence
 - home visitation programs to reduce child maltreatment

Health promotion and disease prevention

5.Vorlesung, 28.03.2022

Behavior-oriented- & structural interventions

Behavior-oriented interventions: Interventions to change individual behavior, to empower individuals in relation to their health

Structural interventions: Interventions to change the social determinants of health; to alter the context in which health is produced

(the structural interventions gained more importance)

Example for contextual change: Smoking

→prohibiting smoking in public places changes social norms

→further structural interventions: increase of prices, prohibition to minors, prohibition of advertisements

Target groups for interventions

= group of individuals with identical characteristics who are the objective of a health promotion or disease prevention intervention

- Defining target group = important to design efficient & efficacious interventions
- Population-based approach = improving-the-average-approach
- Public health interventions targeted to everyone address populationwide concerns
- Problem: interventions to change for example health-related behaviours have potential to increase social inequalities in health
- High-risk-approach = interventions targeted to vulnerable populations

Example: Good Practice in Interventions Targeted Towards Low SEP Groups

- Clearly define target group
- Pretest whether target group is reached
- High degree of involvement & participation *also in the development*
- Use multipliers *e.g. role models with potential for identification*
- Low-threshold services = *no barriers in accessibility*
- Empowerment *takes into account strength & resources of target group*
- Setting / living environment where people live is taken into account

Disease prevention (primary, secondary, tertiary)

Disease prevention

- Reducing/ eliminating **risk factors** identified as important in the aetiology of diseases
→ *Primary, secondary, tertiary*

Pathogenesis

Health promotion

- Strengthening **protective factors** identified as important to maintain & increase health
→ *Health promotion strategies (Ottawa Charter)*

Salutogenesis

Primary prevention

- Pro-active
- Preventing initial development of disease

Secondary prevention

- Re-active
- Early detection of existing disease to reduce severity & complications

Tertiary prevention

- Re-active
- Prevent recurrence, reducing impact of disease

	Primary	Secondary	Tertiary
Method	Proactive	Reactive	Reactive
Disease stage	None (yet)	Imminent	Established
Objective	Disease/injury avoidance	Early detection	Minimize damage
Strategy	Implement before individuals acquire risk factors; Prevent onset of illness or injury before disease process begins/injury happens	Implemented after risk factor acquired; Measures that lead to early diagnosis & prompt treatment of disease & risk reduction	Treatment/rehabilitation of diseased persons; Activities to prevent an established disease from becoming worse
Intervention tools	Health risk assessment, self-care book, behavioral coaching, exercise programming, health education...	Biometric screening, CVD screening, consumerism classes, compliance program, nurse help line....	On site medical care, interventions for optimal management of the disease...

Health promotion (along the Ottawa Charter)

Health promotion now: is the process of enabling people to increase control over the determinants of health and thereby improve their health

3 Basic Strategies for Health Promotion:

- **Enabling** all people to achieve their full health potential: Befähigen und Ermöglichen; Menschen können ihr Gesundheitspotenzial nur dann entfalten, wenn sie auf die Faktoren, die ihre Gesundheit beeinflussen, auch Einfluss nehmen können (→Chancengleichheit)
- **Mediating** between different interests in society in the pursuit of health: Vermitteln und Vernetzen; Gesundheitsförderung verlangt koordiniertes Zusammenwirken unter Beteiligung aller Gesundheitsbezogenen Akteuren
- **Advocacy** for health to create the essential conditions for health: Gesundheitsförderndes Handeln, womit verschiedenste Faktoren positive beeinflusst werden

5 key action areas in health promotion:

1. Develop personal skills (Persönliche Kompetenzen entwickeln)
 - Behavioral-oriented intervention with focus on individual responsibility for health
 - Providing information, education for health & enhancing life skills
 - Enabling people to learn to cope with health issues
 - Empower people to gain control over health by adequate knowledge & skills
2. Re-orient health services (Gesundheitsdienste neu orientieren)
 - Focus of health services on health promotion rather than cure
 - Shared responsibility for health promotion among individuals, community groups, health professionals, health services & governments
3. Strengthen community action (Gesundheitsbezogene Gemeinschaftsaktionen unterstützen)
 - Supporting collective efforts in communities to increase their access to & control over the social determinants of health
 - Strengthening capacity of people as active citizens through community groups, organizations & networks
4. Create supportive environments (Gesundheitsfördernde Lebenswelten schaffen)
 - Creating conditions that allow people to have living & working conditions that are safe, stimulation, satisfying & enjoyable
 - Strengthening physical environment: facilities for physical activity; land use & transportation; foodscape
5. Build healthy public policy (Entwicklung einer gesundheitsfördernden Gesamtpolitik)
 - "Health in all policies"
 - Policies directly related to health: health promotion, drug administration
 - Policies indirectly related to health: protection of water & environment; social insurance, equity & social justice

Zusammenfassung Lernziele:

Health Promotion & Disease Prevention

- Understanding the difference between behavior-oriented & structural interventions
- Understanding the importance of defining clear target groups
- Knowing the theoretical differences between prevention & promotion (perspectives behind, i.e. pathogenesis vs. salutogenesis)
- Knowing the three main preventive approaches (primary, secondary, tertiary)
- Understanding the concept of health promotion along the Ottawa Charter & being able to transfer the concept to practical examples
- Being able to establish a link between health promotion/disease prevention activities to the core functions & services of public health

Why pay attention to Health of Children & Adolescents?

- Reduce Burden of disease in later life
- Healthy & unhealthy practices adopted early in life may last a lifetime
- Today's adolescents are tomorrow's parents, teachers & community leaders
- Adolescence = period of curiosity, when young people are receptive to information about themselves and their bodies, and when they begin to take an active part in decision making

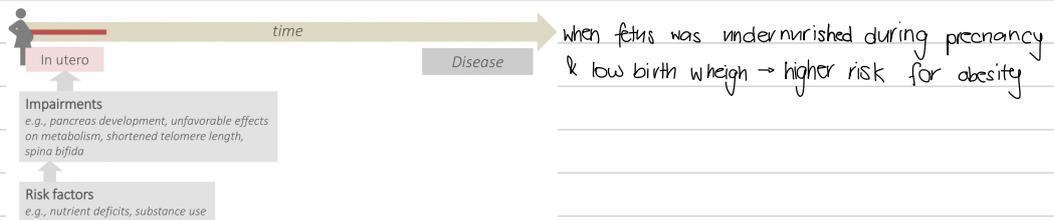
Life course perspective

- explores how social determinants operate or accumulate as advantages or disadvantages **over stages of the lifecycle**
- main interest: longitudinal association between exposures to **risk factors over life course & disease outcomes**
- helps identifying **entry points for interventions**
- when we think in a life course perspective, we see the **importance of exposures in childhood** for the rest of the life

Critical period model: Focus on early life exposures

critical period (in utero)

- vulnerable time window of rapid growth of organism
- exposure to risk factors in critical period likely to cause irreversible impairments on body structures & functions („biological programming“)

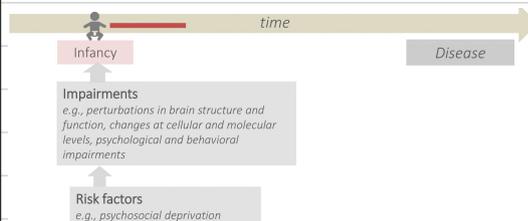


critical period (infancy)

- Health-damaging exposures or health-enhancing opportunities

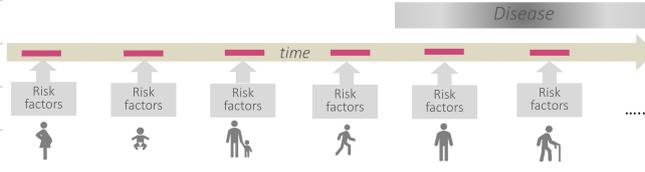
critical period (pregnacy & early infancy)

- critical timing of exposure to risk factors that are likely to cause irreversible effects on health outcomes („biological programming hypothesis“)



Accumulation of Risk Model

- Exposures to health risk factors accumulate over the life course
- with increasing number, duration & severity of risk exposures: cumulating damage to body structures & functions

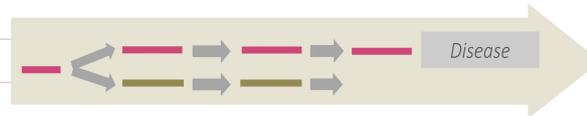


psycho-social factor
 Social inequality: parents are stressed → domestic violence
 → no loving parent-child relation

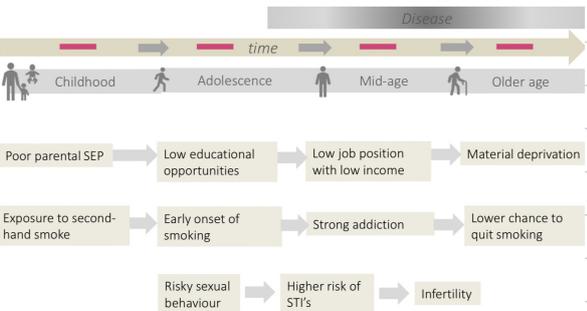
material factor
 quality of housing
 refugee
 growing up in war
 parents need a longer period to settle in their new home (refugees) than children
 children translate for parents

Chain of Risk Model

- Risk factors often occur as sequences of linked events: one exposure leads to another, „unhealthy trajectories“
- Turning points shape future trajectories/directions



Chain of Risk Models & Socioeconomic Disadvantages



The Life Stage „Childhood“ (age span from birth to adolescence)

- 0 - 12 Months: Infancy
- 12 - 36 Months: Toddlerhood (learning to walk)
- 3 - 6 years: early Childhood (play age)
- 7 - 9 years: middle Childhood (start school age)
- > 9 years: Adolescence (puberty through post-puberty)

Most common risk factors in newborns and infants in CH

- | in utero | after birth |
|------------------------------------|------------------------------------|
| - Chromosomal disorders | - instable social relationship |
| - congenital disability | - stress |
| - birth complications | - unstimulating environment |
| - premature birth | - sensory or emotional deprivation |
| - low birth weight | - environmental factors |
| - high birth weight | - low SES |
| - mineral and vitamin deficiencies | |
| - Low SES | |

Health promotion and prevention

- prevention of premature births (Mutterschutzbestimmungen)
- Newborn screening - heel prick test, hearing test
- Childhood screening - growth, development, vaccinations

Vaccination in Switzerland:

Measles: 96%, (France: 90%)

CH: big regional differences, rather rural areas have a very low vaccination coverage

measles have a good coverage compared to other vaccinations

The Life Stage „Adolescence“

- transition from Childhood to adulthood
- rapid, physical, psychological, cognitive, behavioral changes and developments
- become independent individuals
- forge new relationships
- develop social skills
- learn behavior that will last for the rest of their lives

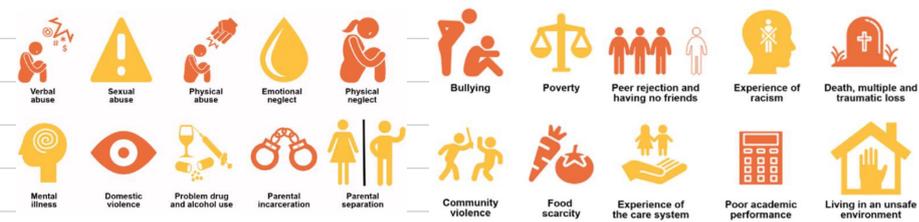
	Age	Key characteristics
Early	9-13	Spurt of growth, development of secondary sexual characteristics, demand for privacy, group activities mainly with same-sex peers, starting first experiments with risk behavior
Mid	14-15	Development of separate identity from parents, new relationships with peer groups & opposite/same sex, experimentation, irritability, emotional instability
Late	16-19	Fully developed physical characteristics, distinct identity, well-formed opinions and ideas, more selective in entering relationships, concerned about the future

Most common risk factors

- social conditions - nuclear family - social media
- body image - sedentary behavior
- diet and exercise - sexual behavior
- substance use - risk-taking behavior & injuries (traffic accidents is leading cause of death in male adolescents)

Risk Factors for Morbidity: adverse childhood experiences

- profound harm for children's developing brains
- effects show up decades later
- risk factors for chronic disease, mental illness, addictions, violence



Age & Ageing

What is ageing?

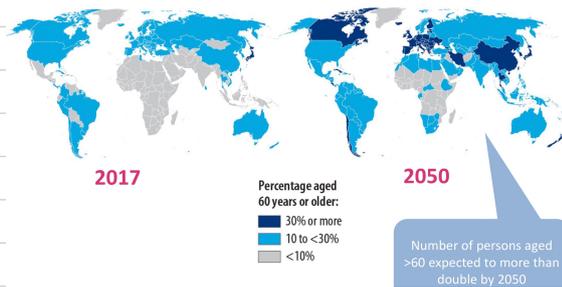
- *chronical*: Process of becoming older in terms of age in years

- *biological*: Progressive loss of function; can refer to single cells within organism (e.g. cellular senescence) or individuals (individual ageing)

When does ageing begin?

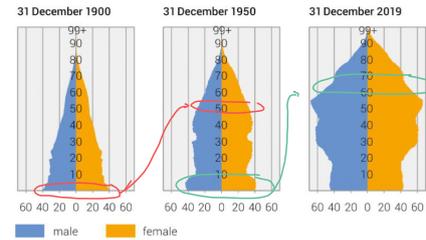
- little consistencia across studies, different cut-offs used

- consnsus: later life stages = heterogeneoud, fine-graded distinction needed (early old age, old age, oldest-old age)



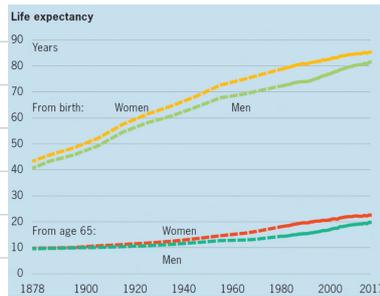
Population pyramid by age and sex

Number of people in 1 000



population is getting older
- Baby boomer
- better health

What could be dr



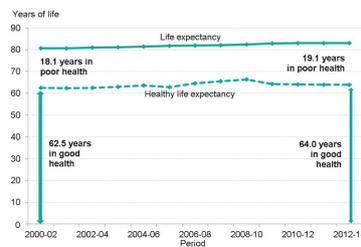
Why do women get older?

- work
- health behavior (prevention behavior, risk factor avoidance)

life expectancy raised all over the world
- improved survival in young age (assisted birth, vacc, sanit.)
- improved survival in older (healthier life, health care...)

Falling Fertility Rates:

Changing in gender norms, more likelihood to survival of newborns
access to contraception



Longer Life = More years spent in poor health?

- finding inconsistent
- data mostly available from period when population ageing has already emerged
- difficult to disentangle change in environment from change in individual health

Two perspectives on individual ageing

Biological/biomedical (Biogerontology): - accumulation of molecular, cellular, organ system damage over time leading to...
... gradual decreases in intrinsic capacity
... growing risk of disease

Psychosocial: - Emotional & Social aspects of lives of elderly (e.g. participation in society, mental health, well-being, satisfaction)

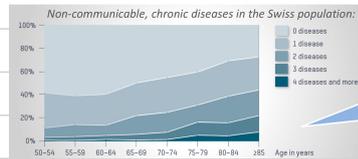
Biomedical Perspective: Compression of Morbidity

increased risk of „big 4 NCDs“ & other age-related diseases/disorders (hearing loss, cataracts, back/neck pain, osteoarthritis, dementia)

„geriatric syndromes“: complex health states occurring only in later life, often consequences of multiple underlying factors (frailty, urinary,

incontinence, falls, delirium, pressure ulcers)

Occurrence of disease is compressed at the end of life



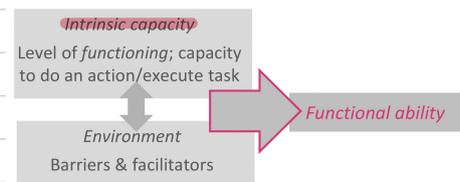
Higher burden of multi-morbidity with increasing age

„Healthy ageing“ as multidimensional construct

„Healthy ageing is the process of optimising opportunities for physical, social & mental health to enable older people to take an active part in society without discrimination & to enjoy an independent & good quality of life.“

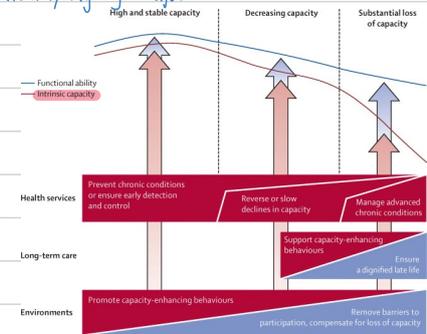
- process of developing & maintaining functional ability that enables well-being in older age

- functional ability is determined by the **intrinsic capacity of individual**, the **environments** they inhabit & the interaction between them

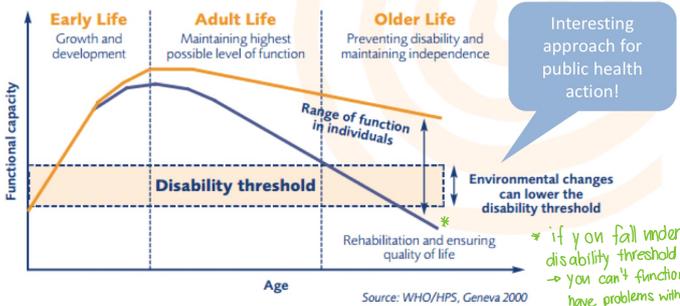


- e.g. > instructions given on different methods (for bad hearing, infos also written not only spoken)
- motion controlled light (fall prevention)
- wheel chair accessible buildings, flats
- hand rails in corridor, on both sides of a stair
- emergency button "watch", chain...

Healthy Ageing Trajectories



A life course perspective for maintenance of the highest possible level of functional capacity

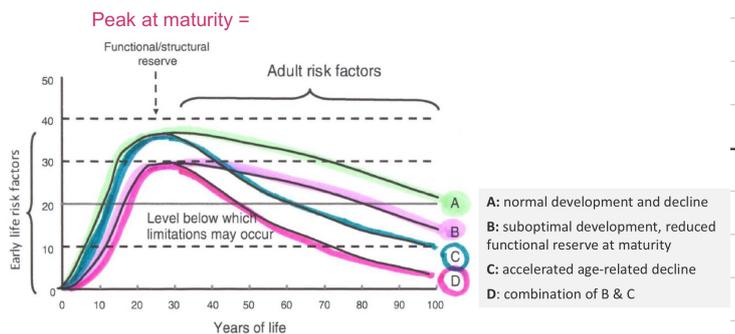
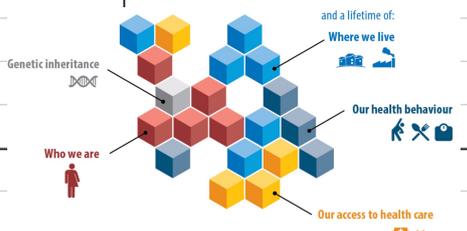


A life course approach to healthy ageing:

What makes us age differently?

health in older age is not randomly distributed:

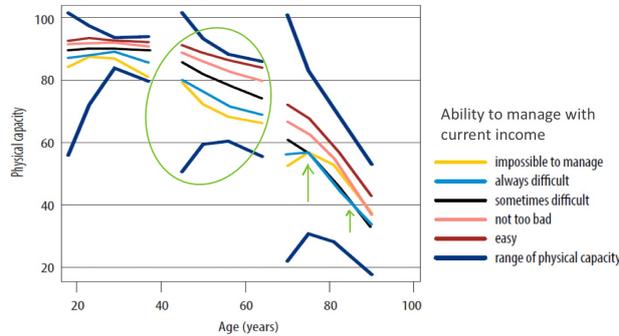
- **cumulative exposure** to risk factors, resources & vulnerabilities across life span shape health
- **Plasticity**: turning points through which trajectories of life course can change



- A: normal development and decline
- B: suboptimal development, reduced functional reserve at maturity
- C: accelerated age-related decline
- D: combination of B & C

Social Inequalities in Physical Capacity

Australian Longitudinal Cohort Study On Women's Health

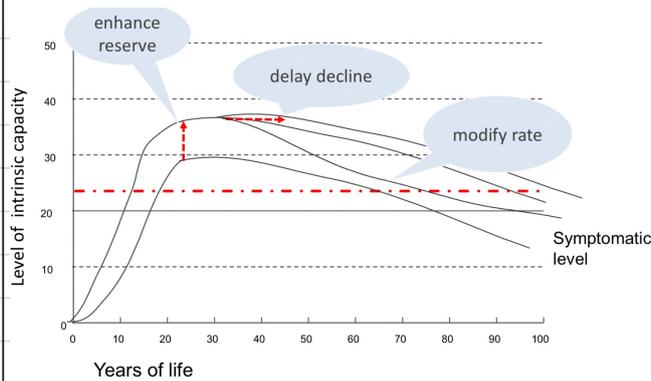


Intervention needed to...

- narrow difference by SEP levels as early as possible
- Delay the onset (start) & slow (magnitude) of decline
- Level up range of capacities across life course

Common Ground in Life course models

- recognizing intergenerational transmission of health
- socioeconomic influences during prenatal period & early childhood, based on critical periods & events have direct or indirect latent impact
- cumulative health impact of molecular & cellular damage, social & economic disadvantage
- inequalities that alter healthy ageing trajectories from birth on



Developing Systems for long-term care

- long-term care systems to meet needs of elderly (e.g. governance systems, infrastructure & workforce capacity to be established)
- WHO's work on long-term care (incl. palliative care) aligned with efforts to enhance universal health coverage, address NCDs & develop people-centred & integrated health services

Ageism = stereotyping/discrimination against individuals or groups based on their age (*institutional policies, discriminatory practices, stereotypical beliefs*)

stereotypes & stigma: older people often assumed to be frail, dependent, burden to society

actions to combat ageism: enable autonomy & support, healthy ageing in all policies & at all levels of government

Productive Ageing

- needs adaptations of societal structures

- **individual & societal benefits**:
 - > offsetting financial strains, economic security
 - > supporting families & civil society (e.g. through adequate levels of volunteering, social coherence)
 - > maintaining health (e.g. feelings of usefulness, belongingness, purpose in life)

Policy response

Against age discrimination in workplace

Protecting Older Workers Against Discrimination Act (H.R. 2852)
Fair Employment Protection Act of 2014 (H.R. 4227)
Workforce Investment Act of 2013 (S. 1356)*
Increased funding for Title V of Older Americans Act ("OAA," S. 1562, H.R. 4122)

Supporting volunteering

Ensure cultural competency and hire more bilingual job counselors
Increased funding for Senior Corps volunteer programs, via OAA
Targeted recruitment/retention by Senior Corps volunteer programs

Support for those in competing productive activities (esp. caregivers)

Family and Medical Insurance Leave Act of 2013 (H.R. 3712, S. 1810)
Schedules that Work Act (H.R. 5159, S. 2642)
Flexible work options for all jobs, including low-skilled
Employers to provide elder and child care benefit and flexibility
Social Security Caregiver Credit Act of 2014 (H.R. 5024)

Gender:

social construction relating to behaviors and attributes based on labels of masculinity and femininity

gender identity is a personal, internal perception of oneself and so the gender category somebody identifies with may not match the sex they were assigned at birth

Sex:

refers to the biological aspects of an individual as determined by their anatomy, which is produced by their chromosomes, hormones and their interactions

Gender equality:

is the absence of discrimination on the basis of a person's sex in opportunities, the allocation of resources and benefits, or access to services

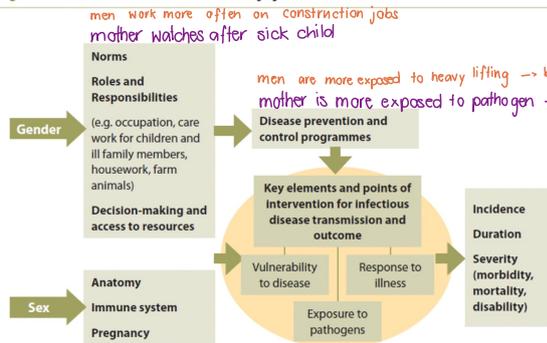
Gender equity:

refers to the fairness and justice in the distribution of benefits and responsibilities between women and men

Gender analysis:

identifies, analyses and informs action to address inequalities that arise from the different roles of women and men, or the unequal power relations between them, and the consequences of these inequalities on their lives, their health and well-being

Figure 2: Framework for Sex and Gender and Emerging Infectious Diseases



Gender as a social determinant of health

Gender and society interact to determine...

- ... who is well or ill
- ... who is treated or not
- ... who is exposed to vulnerable to ill health and how
- ... whose behavior is risk-prone or risk-averse
- ... whose health needs are acknowledged or dismissed

Inequalities stem from...

different sectors of society getting different access to...

- ... scarce & valued material or immaterial resources
- ... based on their position in the social hierarchy

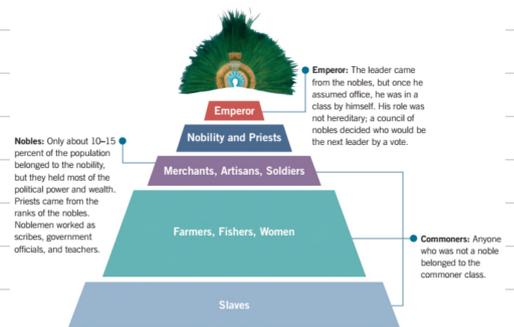
Examples of different forms of resources

social capital: social networks, relationship & all the results out of those (contacts for jobs, informations)

cultural capital: education, titles, books, cultural objects

economic capital: income, wealth

symbolic capital: mostly gained through social, economic and cultural capital (honor, prestige, recognition...)



Men die quicker, but women are sicker

CH: female life expectancy is higher than men

in other countries male life expectancy is higher because giving birth causes many death in young mothers → reduced life expectancy

- at birth there are 105 boys for every 100 girls
- would be even mor, but fetal death is 7% higher for boys
- the mortality gap widens, after first year 21% more boys die than girls (risky behavior?)
- excess male demise continues, by age 65+, there are 75 men for every 100 women

Why do men die quicker? (biological explanation)

- testosterone causes more risky behavior, poorer immune function, poorer fetal lung development
- eunuchs tend to live 14-19 years longer than uncastrated men
- Estrogen is more protective and antioxidant

Behavioral explanations

- men are more likely to smoke, drink excessively and be overweight
- men take more likely life-threatening risks and die mor often in car accidents, brawls or gun fights

Societal explanations

- men risk more often occupational hazards
- men are less likely to seek medical help early, if diagnosed with a disease, they are more likely to be non-adherent to treatment

Relevant public health initiatives

- improve access and quality of antenatal care
- increase the coverage of births assisted by skilled health professional
- improve women's access to contraception
- structural interventions to improve women's power over contraception decisions
- reduce unintended pregnancies

AIDS: public health interventions

- programmes promoting reproductive health
- availability of female contraception
- structural interventions to enable women's empowerment

COVID-19: relevant public health interventions

- collection of disaggregated data
- economic compensation strategies need to be addressed from a gender perspective
- dedicated domestic violence prevention programmes and services