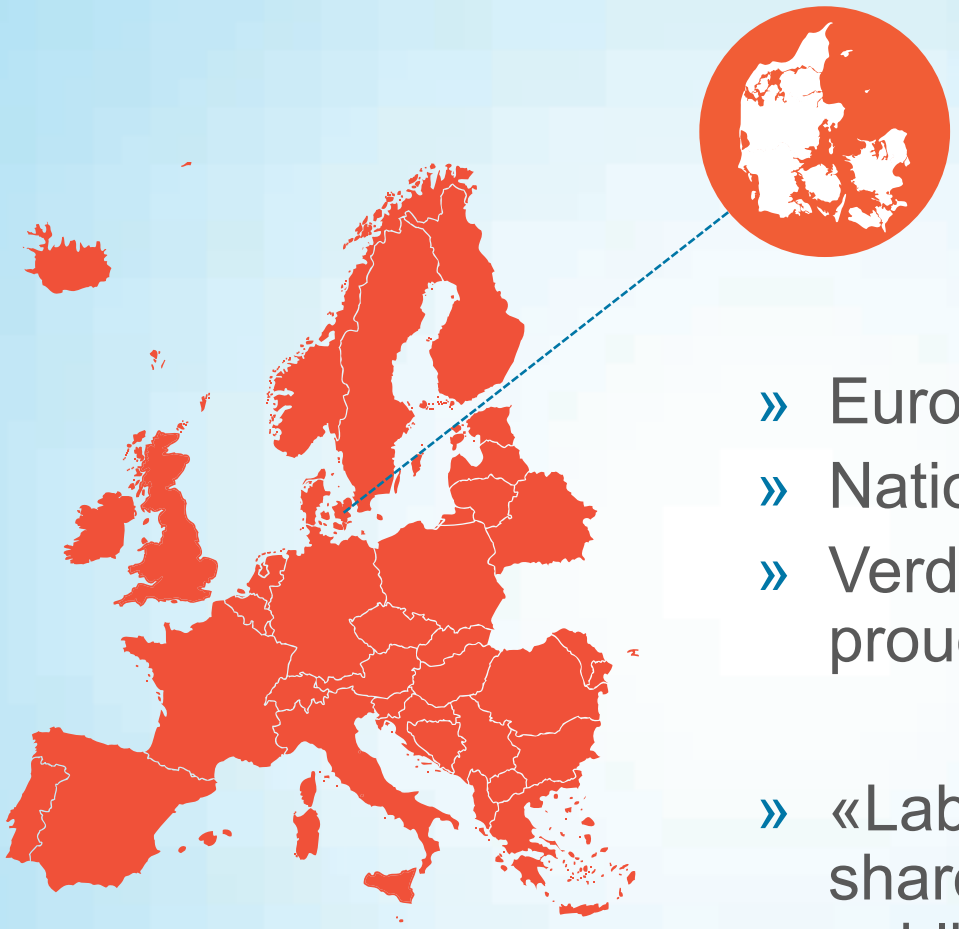
Livskvalitet og vekst

Health in all policies in a local context

The Municipal Master Plan as a strategic tool to promote public health and health equity

Dina von Heimburg, Public Health Coordinator in Innherred samkommune (joint municipality)

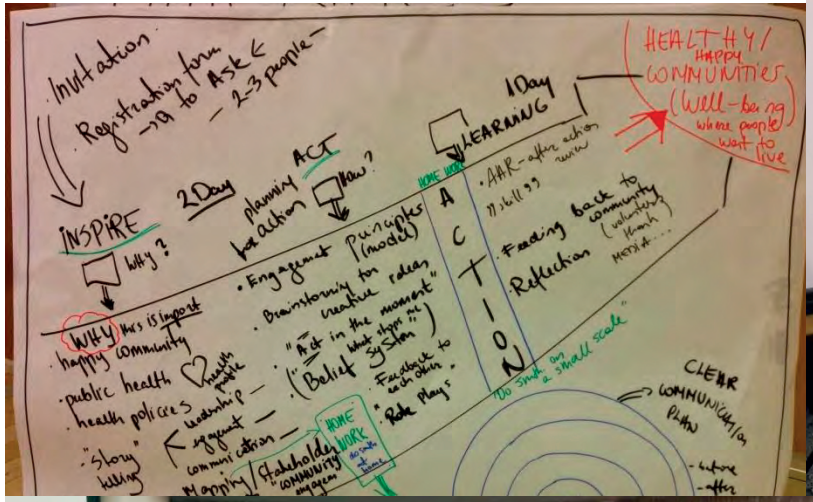
WHO Healty Cities

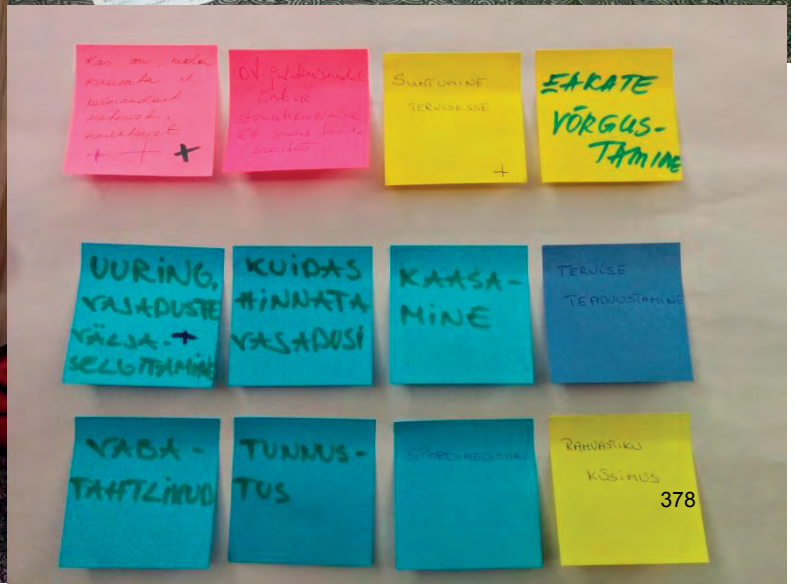


- Euro Healthy Cities network
- National network in Norway
- Verdal and Levanger are proud members

- «Laboratory»: Develop and share «best practice» of public health work at the local and regional level.

Seminar in Estonia 2014





Study trip to Poland 2015

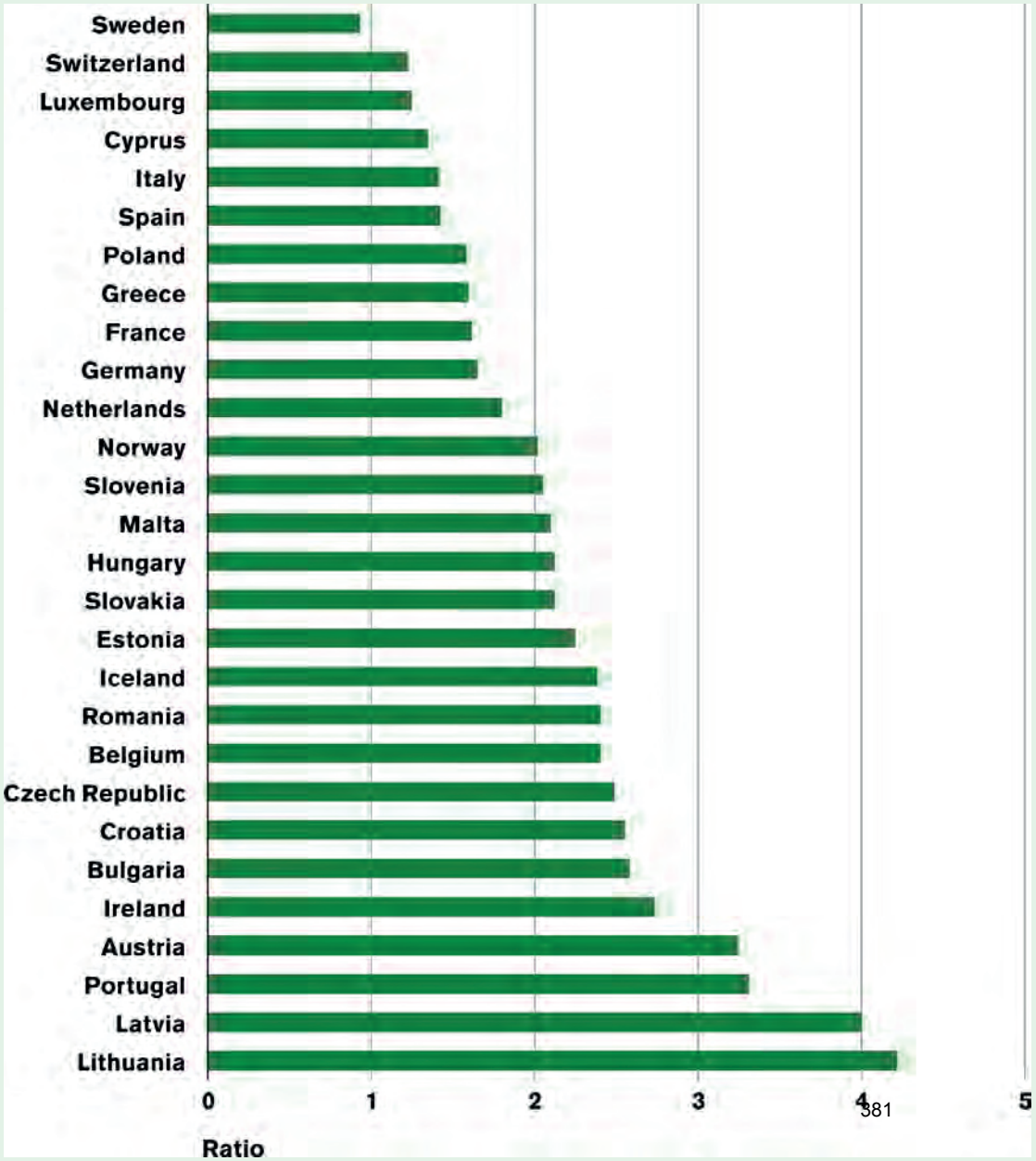
UCL Institute of Health Equity

Review of social determinants and the health divide in the WHO European Region

Professor Peter Goldblatt, UCL,

Presentation in Levanger 2014

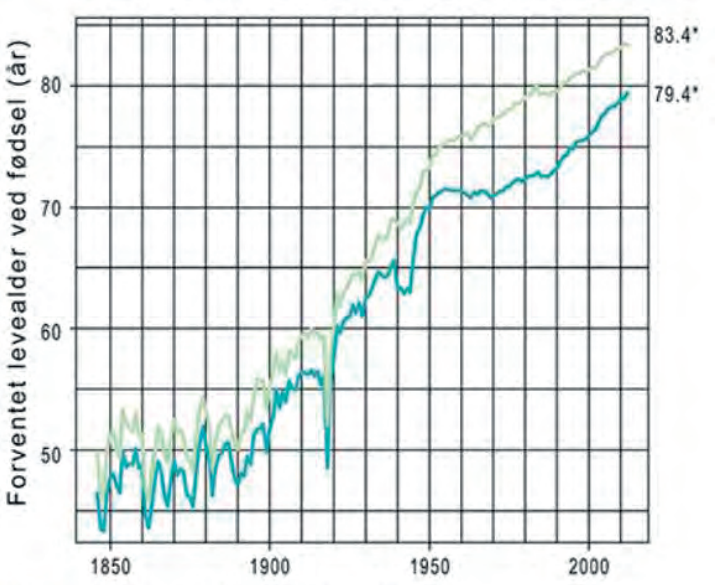
Ratio of poor health among people with primary-level education (level 1) to poor health among those with basic tertiary education (level 5) in selected European Region countries, 2010



Source: EU–SILC

Public health in Norway

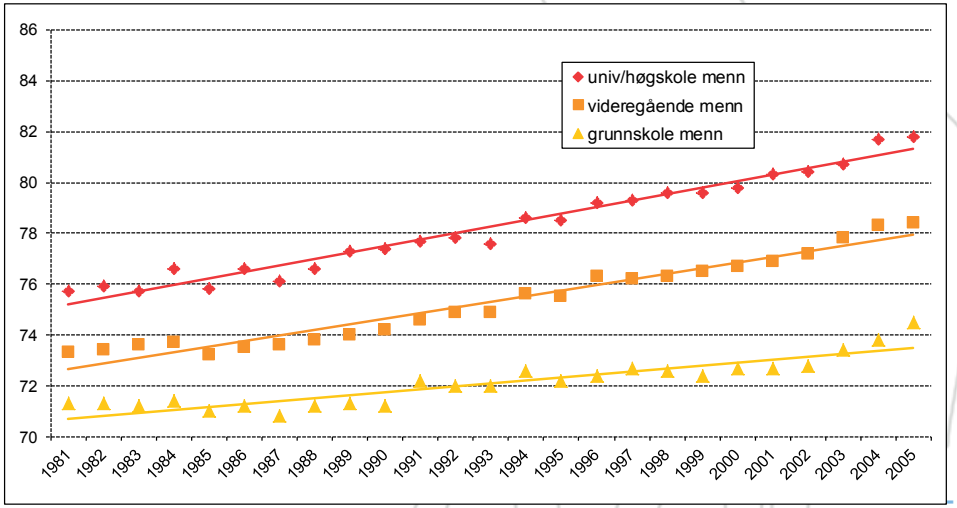
In general, Norwegians have good health, but we still face major challenges….



Figur 2.2 Utvikling i forventet levealder
Kilde: Statistisk sentralbyrå

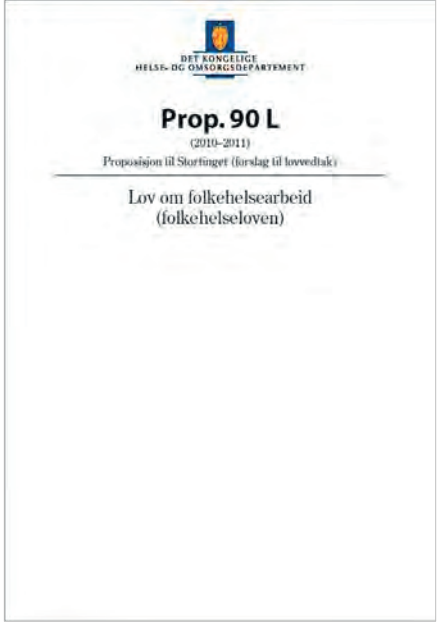
1. Social inequalities in health is increasing
2. Demographical changes in the population
3. Changes in lifestyle caused by societal structures
4. NCD's and mental health

Life expectancy – men by educational level



382

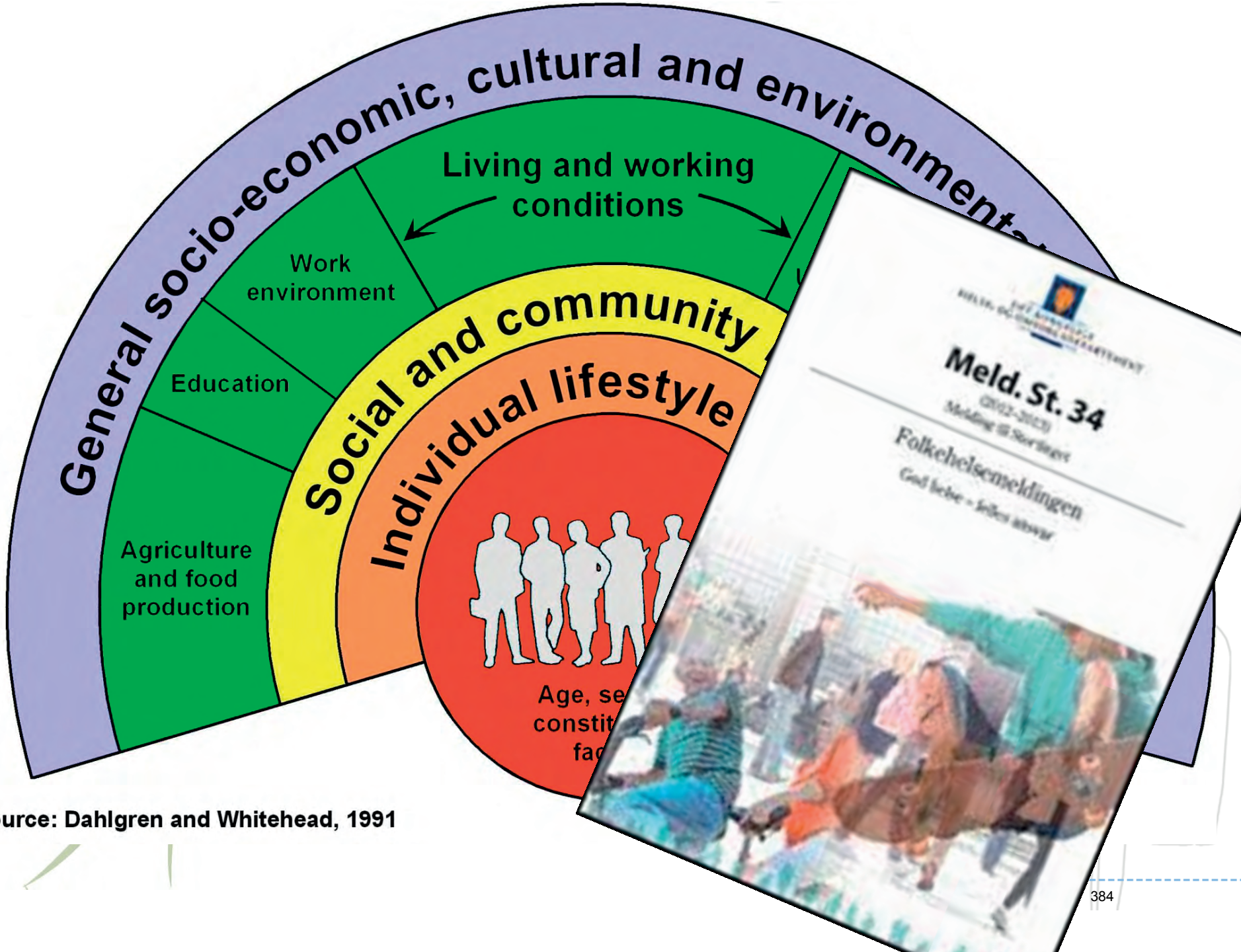
The «new» Public Health Act


DET KONGELIGE
HELSE- OG OMSORGSDEPARTEMENT

Prop. 90 L
(2010-2011)
Proposisjon til Stortinget (forslag til lovvedtak)

Lov om folkehelsearbeid
(folkehelseloven)

- New challenges in public health
- Previous legislation had not worked out as intended
- «Bottom up» - public health advocacy from municipalities and counties
- The *coordination health reform of 2012* points out the need for strengthening health promotion and early prevention in order to facilitate a sustainable development – locally, nationally and internationally

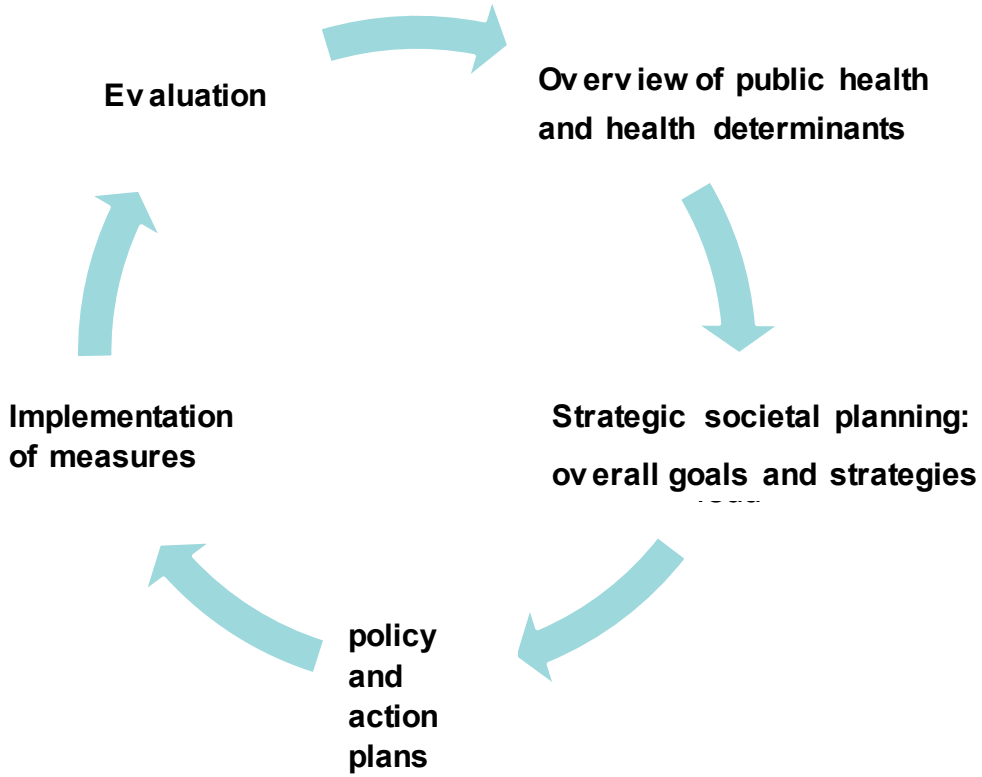


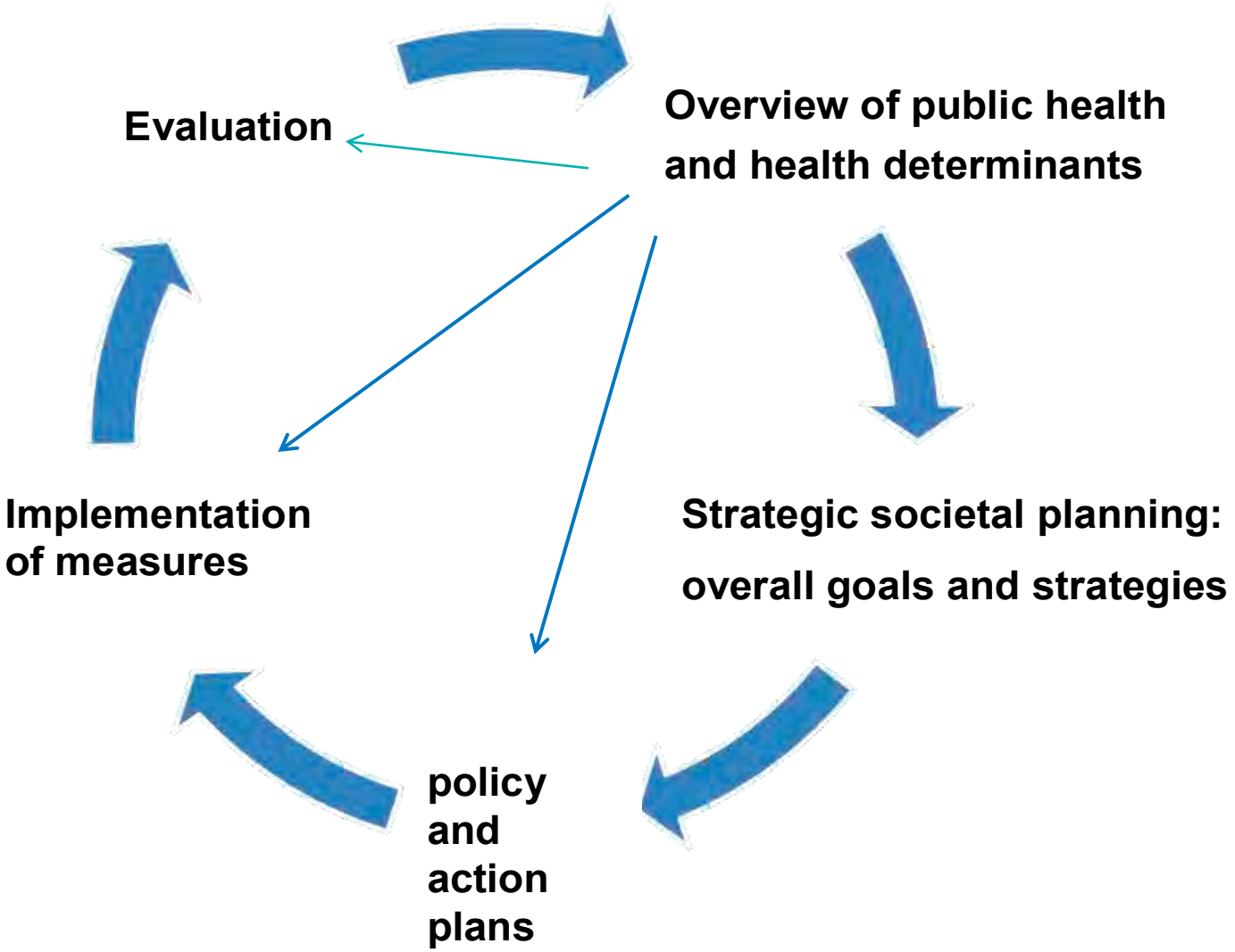
Source: Dahlgren and Whitehead, 1991

Empowering communities through The Public Health Act

Main objective:

Societal development in order to promote public health and reduce health inequalities




Overview of public health and health determinants
Strategic societal planning: overall goals and strategies
policy and action plans
Implementation of measures
Evaluation

Underpinning principles – Public Health Act

1. ***Health equity:*** Health inequities arise from the societal conditions in which people are born, grow, live, work and age – the social determinants of health. Social inequities in health form a pattern of a gradient throughout society. Levelling up the gradient by action on the social determinants of health is a core public health objective. A fair distribution of societal resources is good public health policy.

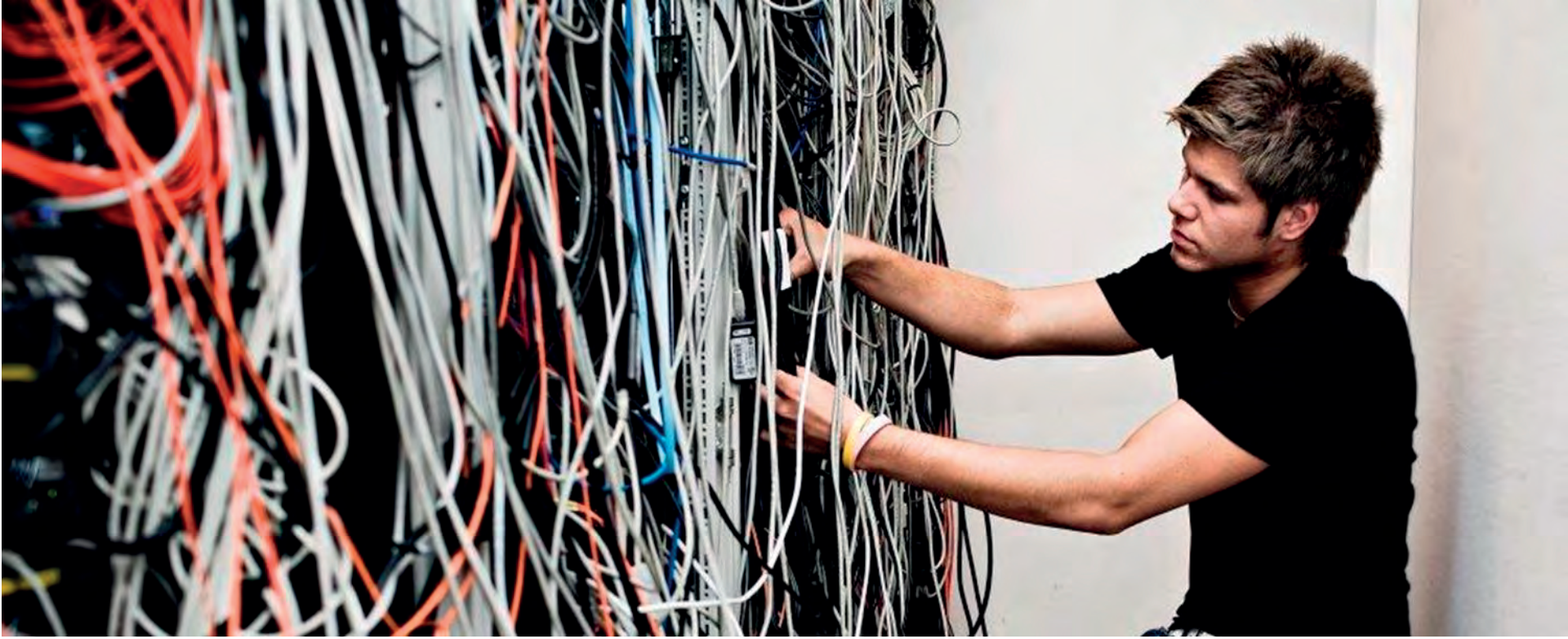
2. ***Health in all policies:*** Equitable health systems are important to public health, but health inequities arise from societal factors beyond health care. Impact on health must be considered when policies and action are developed and implemented in all sectors. Joined up governance and intersectoral action is key to reduce health inequities.

Principles of public health cont.

3. ***Sustainable development:*** Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Public health work need to be based on a long term perspective

4. ***Precautionary principle:*** If an action or policy has a suspected risk of causing harm to the public or to the environment, the absence of scientific consensus that the action or policy is harmful, cannot justify postponed action to prevent such harm

5. ***Participation:*** Public health work is about transparent, inclusive processes with participation by multiple stakeholders. Promotion of participation of civil society is key to good public health policy development



Health promotion requires systematic wiring

However, organizing tons of wires to get the machinery working, is not an easy task…

3 Main messages from Verdal and Levanger:

- Public Health Strategy = Municipal Master Plan.
  A holistic approach to HiAP.
- Local knowledge and research-based arguments have been extremely important
- Sufficient anchoring in the political and administrative leadership has been crucial to success.

… Verdal and Levanger try our very best to fulfill the systematic public health circle….


DET KONGELIGE
HELSE- OG OMSORGSDEPARTEMENT

Prop. 90 L

(2010-2011)

Proposisjon til Stortinget (forslag til lovvedtak)

Lov om folkehelsearbeid
(folkehelseloven)

Central principles in Verdal and Levanger:

- Public health and equity are political choices. The Mayors are our «public health leaders», and the chief of administration and all the rest of us support them in this task.

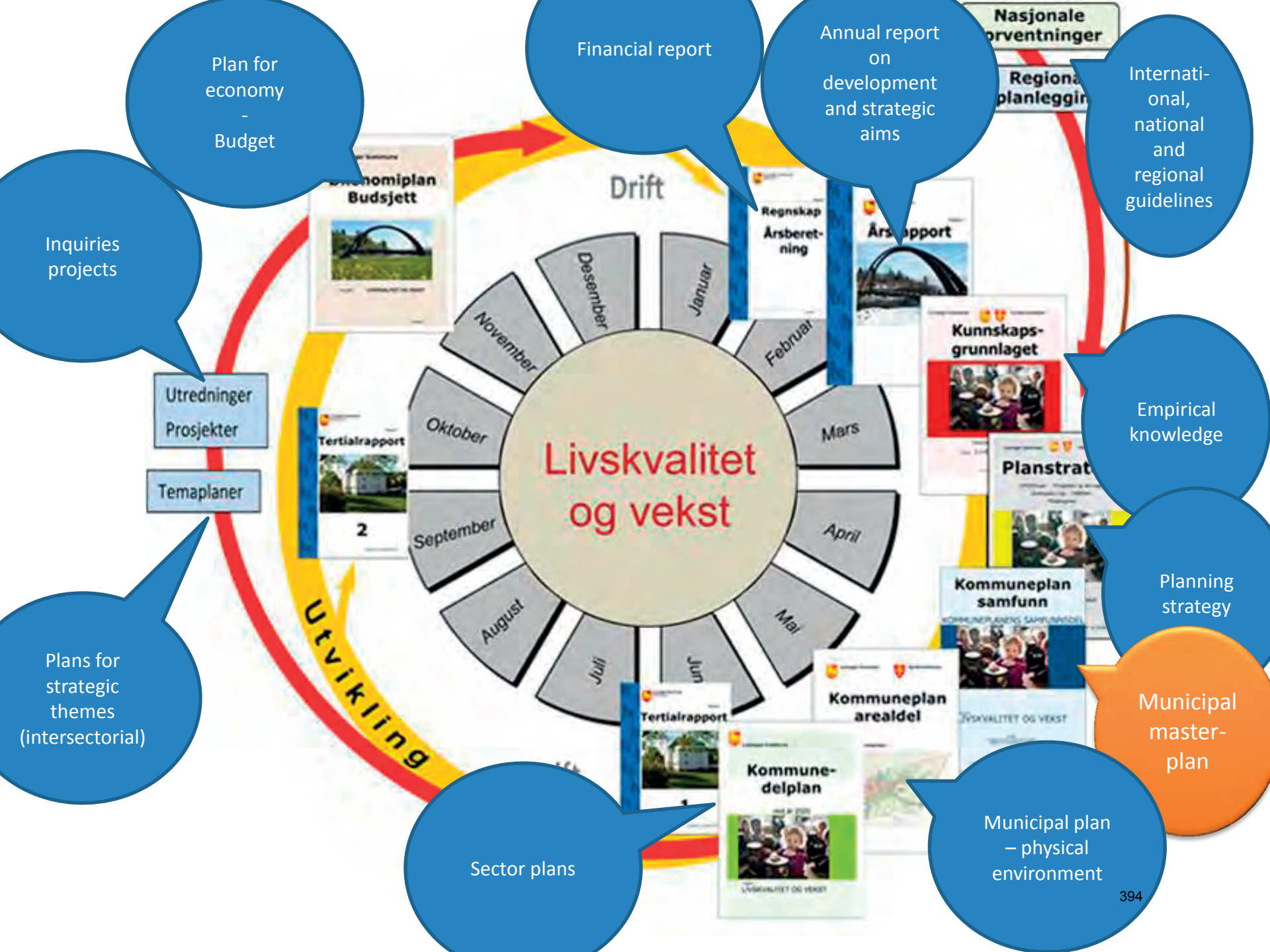
- We develop our work through processes anchored within the municipality organization prior to loosely connected projects.

- Strategic development of services and communities with a focus on overall planning, co-creation and leadership

…Policy and governance must be conducted on the basis of procedures that unites knowledge, goals, strategies, actions and priorities, so that we can deal with a complex world …

Yes!
I have a plan
(which handles complexity and wholeness!)

Robert Svarva
Mayor ISK


Plan for economy - Budget
Financial report
Annual report on development and strategic aims
Internati-onal, national and regional guidelines
Inquiries projects
Empirical knowledge
Planning strategy
Municipal master-plan
Municipal plan – physical environment
Sector plans
Plans for strategic themes (intersectorial)
Utredninger
Prosjekter
Temaplaner
Drift
Utvikling
Livskvalitet og vekst
Januar
Februar
Mars
April
Mai
Juni
Juli
August
September
Oktober
November
Desember
Budsjett
Regnskap
Årsberet-ning
Kunnskaps-grunnlaget
Planstrat
Kommuneplan samfunn
Kommuneplan arealdel
Kommune-delplan
Tertialrapport
2
Nasjonale

Municipal plan – public health strategy

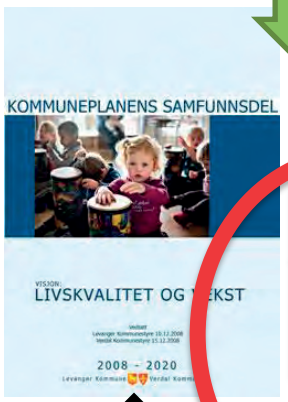
Process 2014

Planning strategy 2013-2016

GUIDELINES
VALUES
KNOWLEDGE

Holistic solutions – Municipal plans

Health | Childhood education | Culture | Buisiness | City Centre



Revision of public health strategy

Developement of services and local community

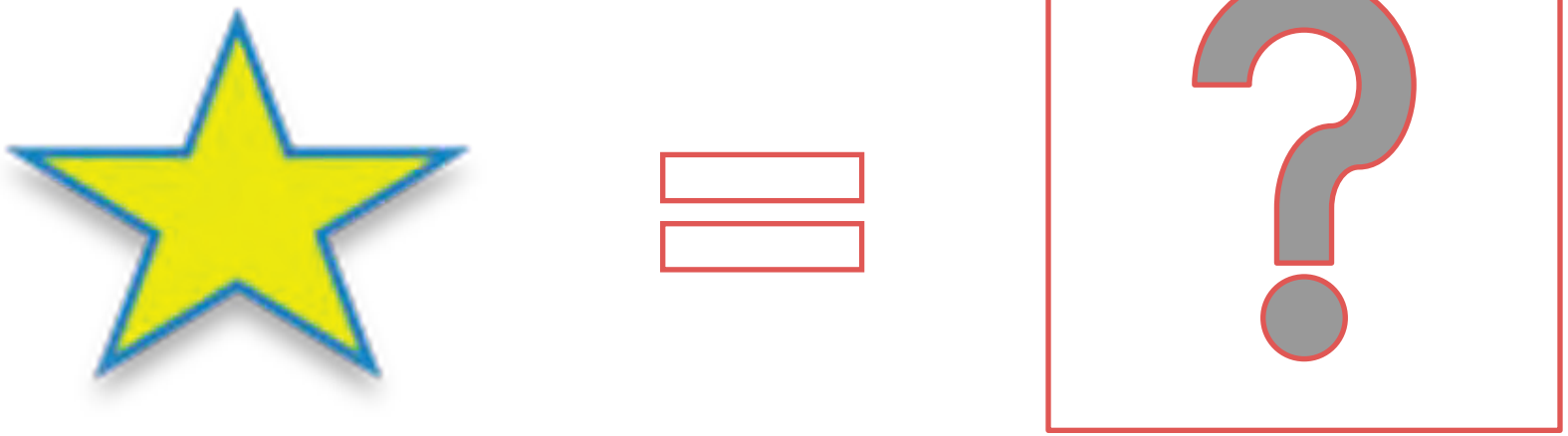
Defining perspectives

Existing municipal plans

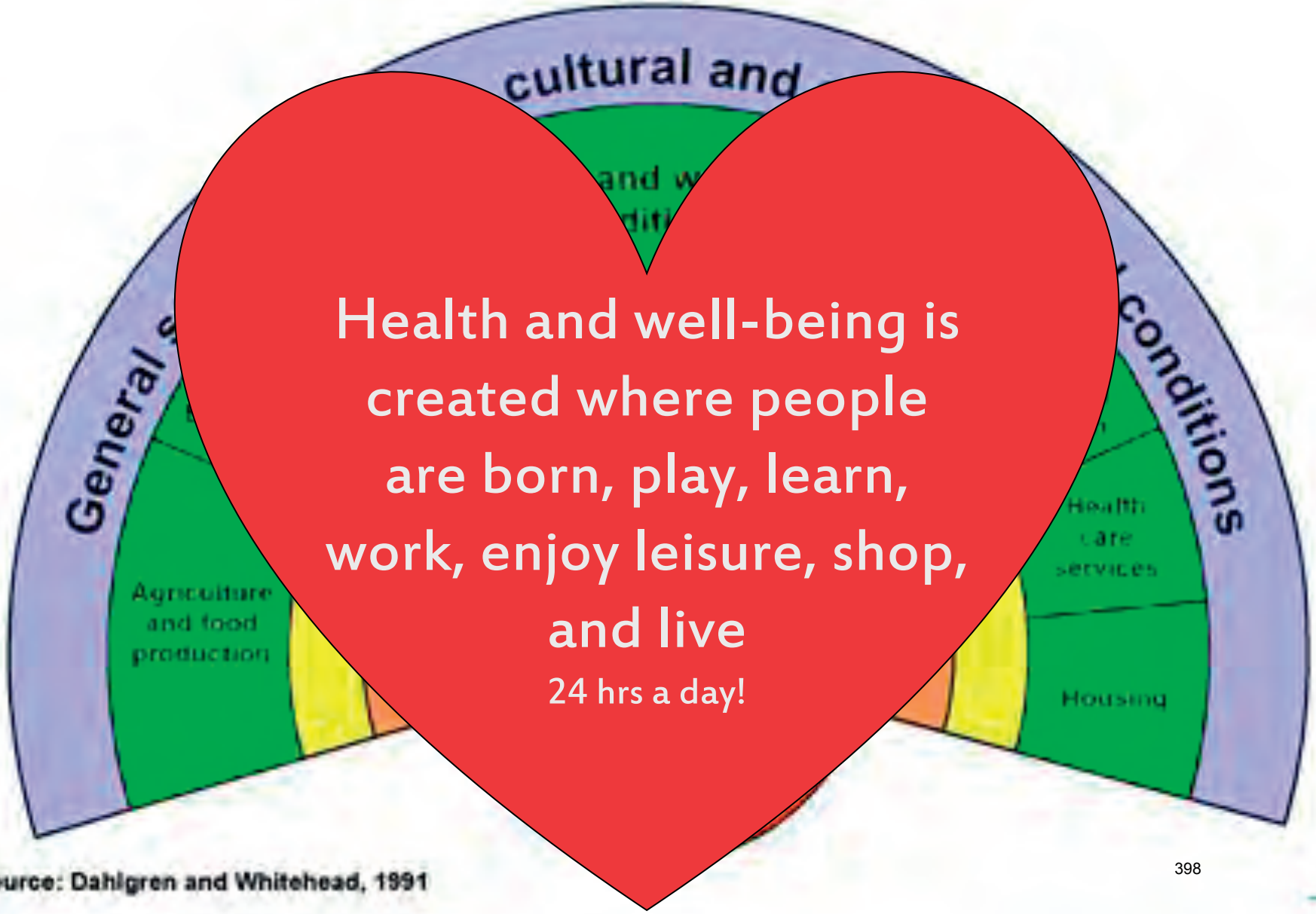
Municipal Masterplan 2015-2030

Vision: Quality of life and growth

sustainable societies - a good start and coping throughout the lifespan - generous and robust life environments



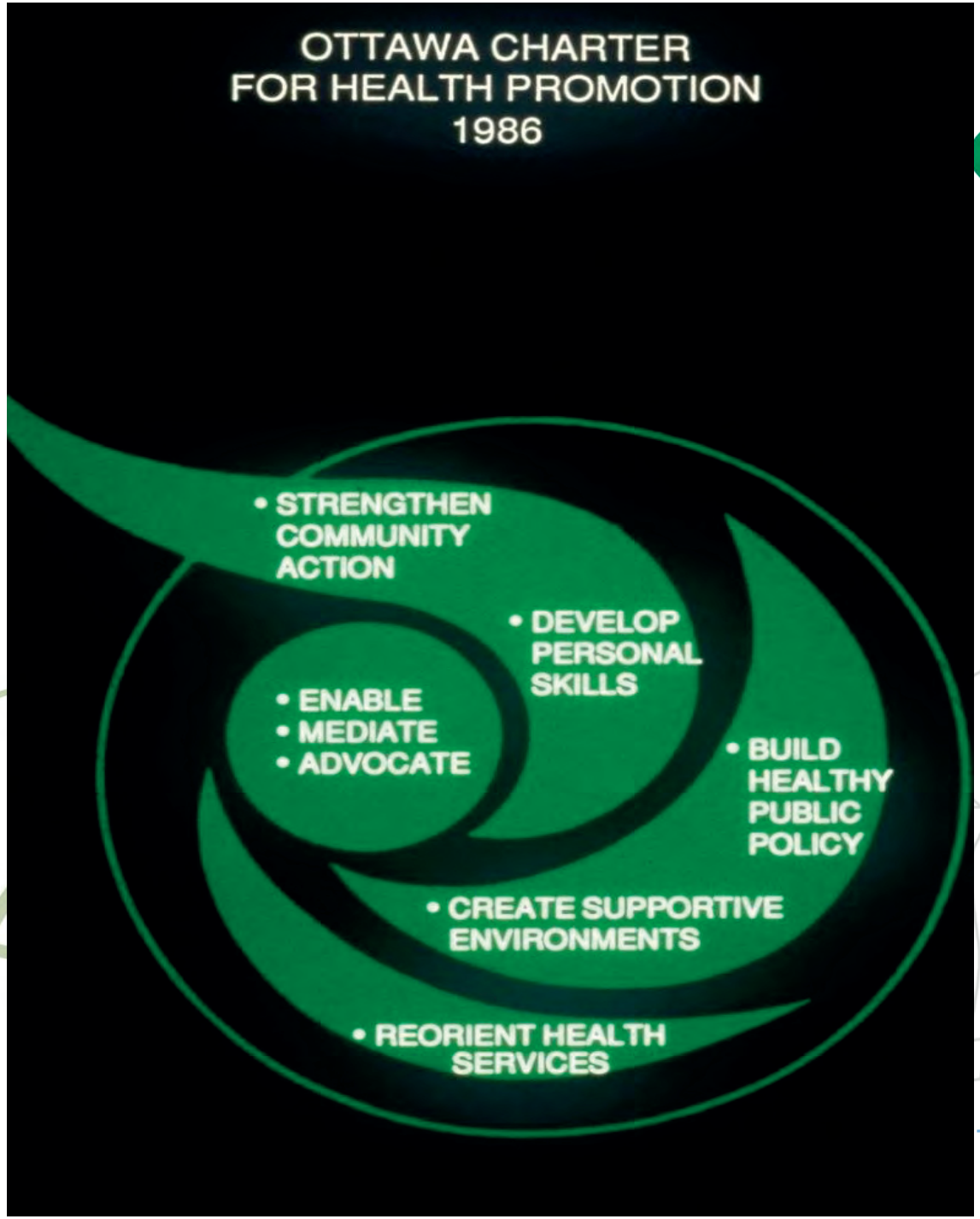
What are we really planning for??



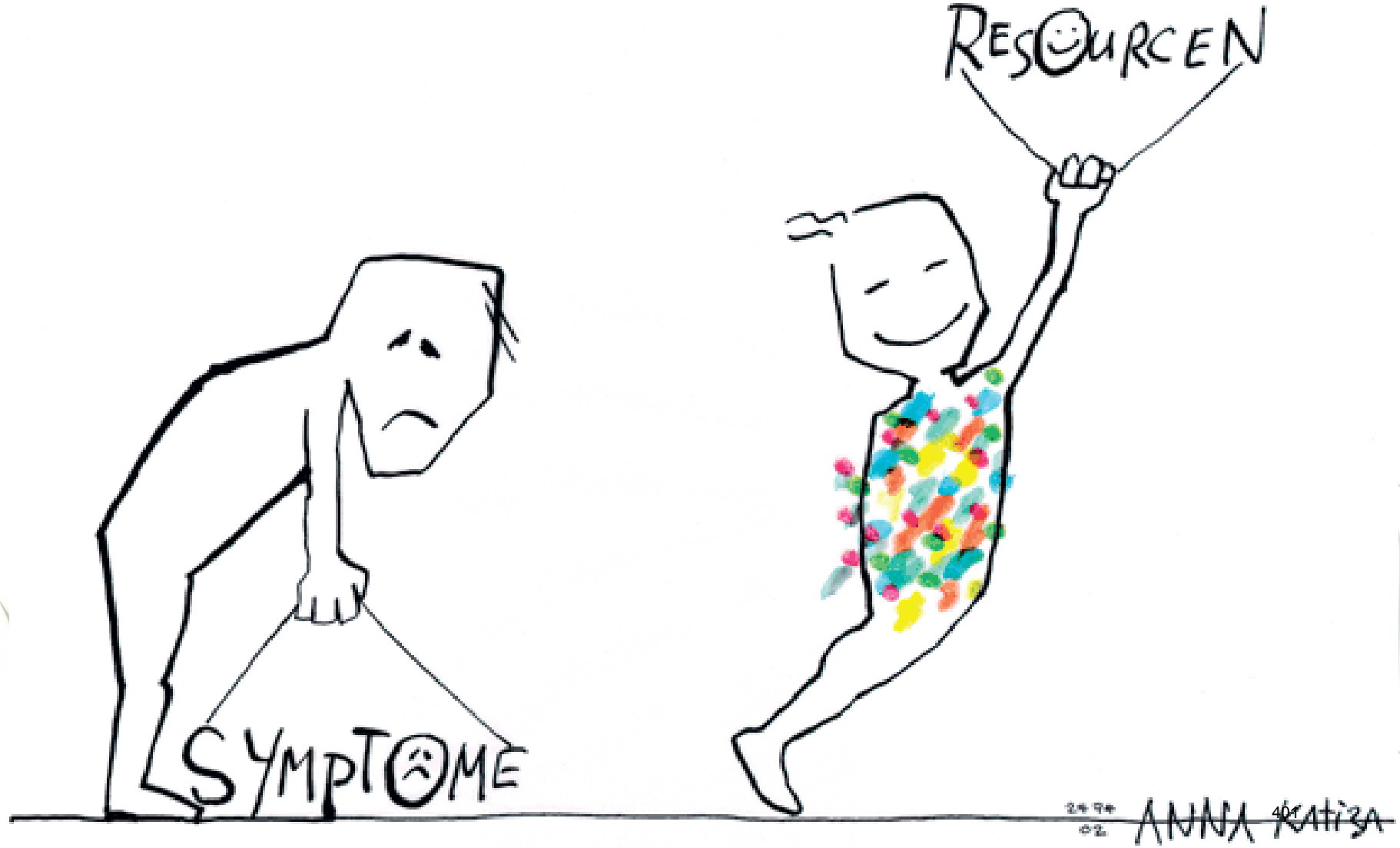
Source: Dahlgren and Whitehead, 1991

Health in All Policies!

OTTAWA CHARTER FOR HEALTH PROMOTION 1986



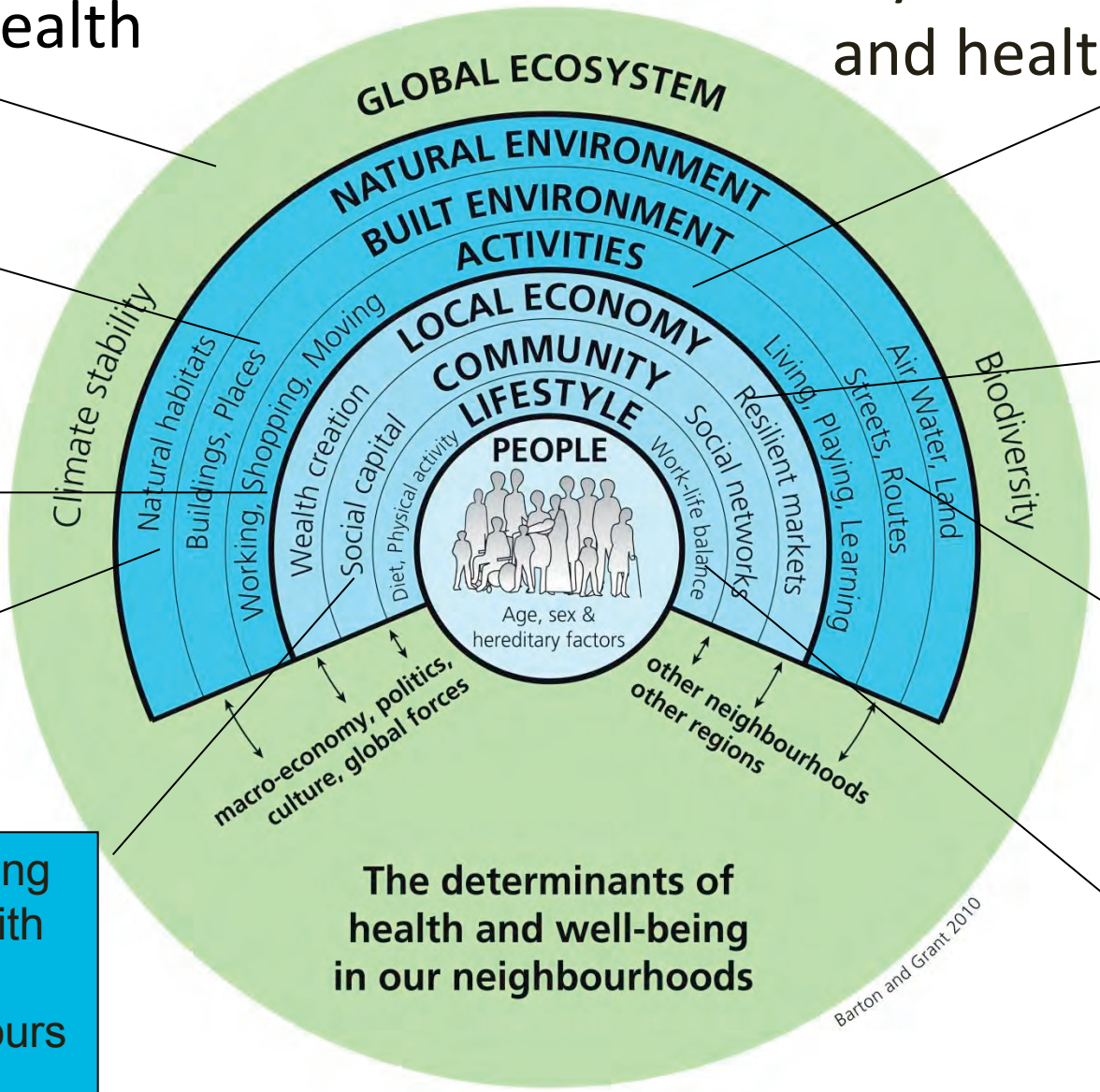
Redefine our perspectives: What creates health, well-being and resilience?



Mike Grady, UCL/Marmot review team, 2014)

What enhances my wellbeing and health

What is detrimental to my wellbeing and health



Recycling facilities

Green spaces that I can use

Affordable healthy food

Affordable transport

Spending time with my neighbours

Lack of interesting activities in winter

Poor local job prospects

Poor street lighting and uneven pathways

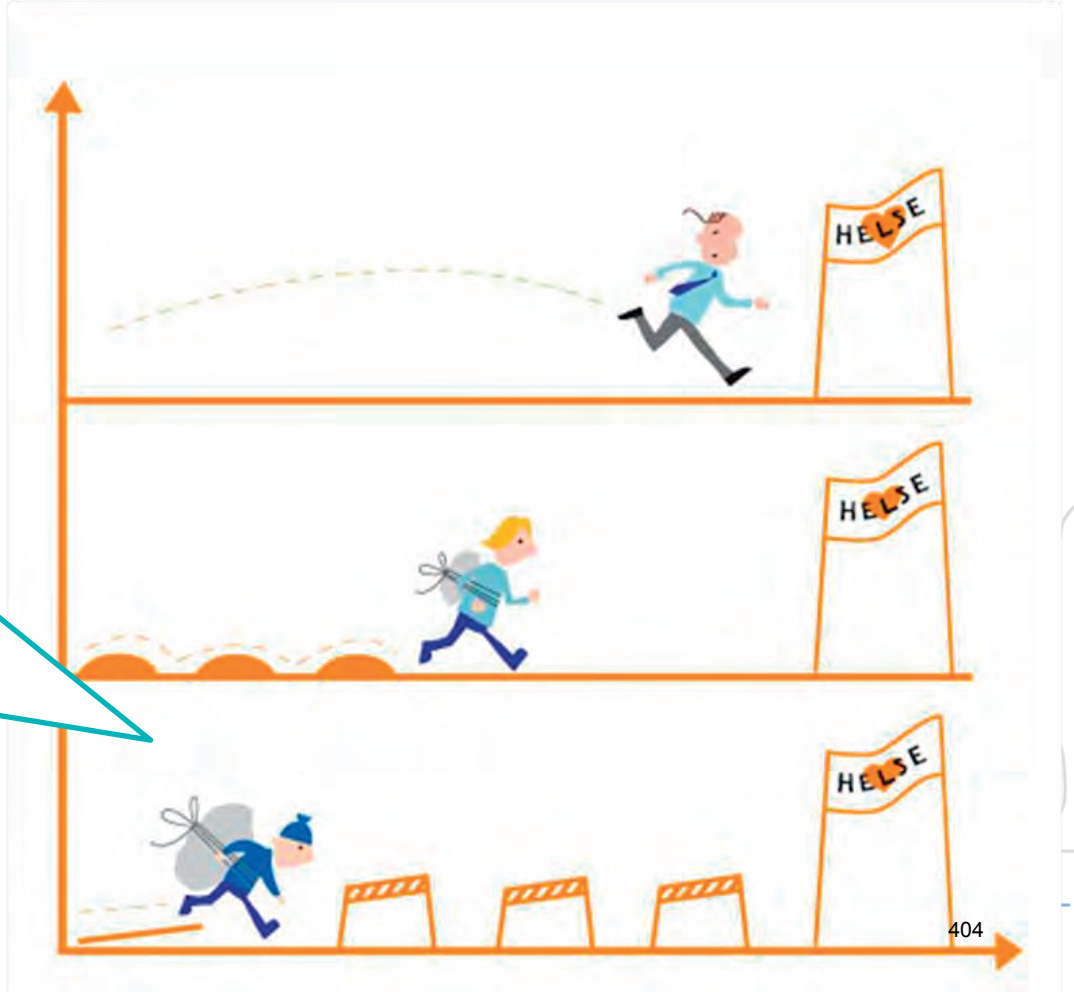
Soaring fuel bills and poor insulation

Half full or half empty?

http://www.abcdinstitute.org

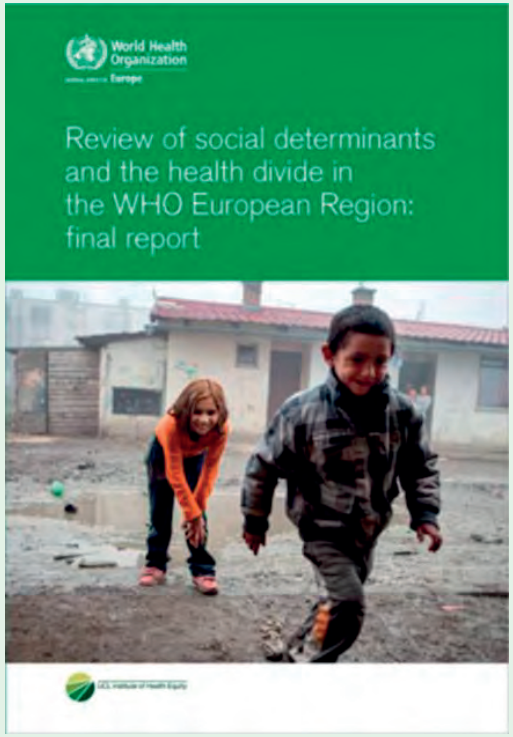
Social inequalities in health is unfair and unavoidable

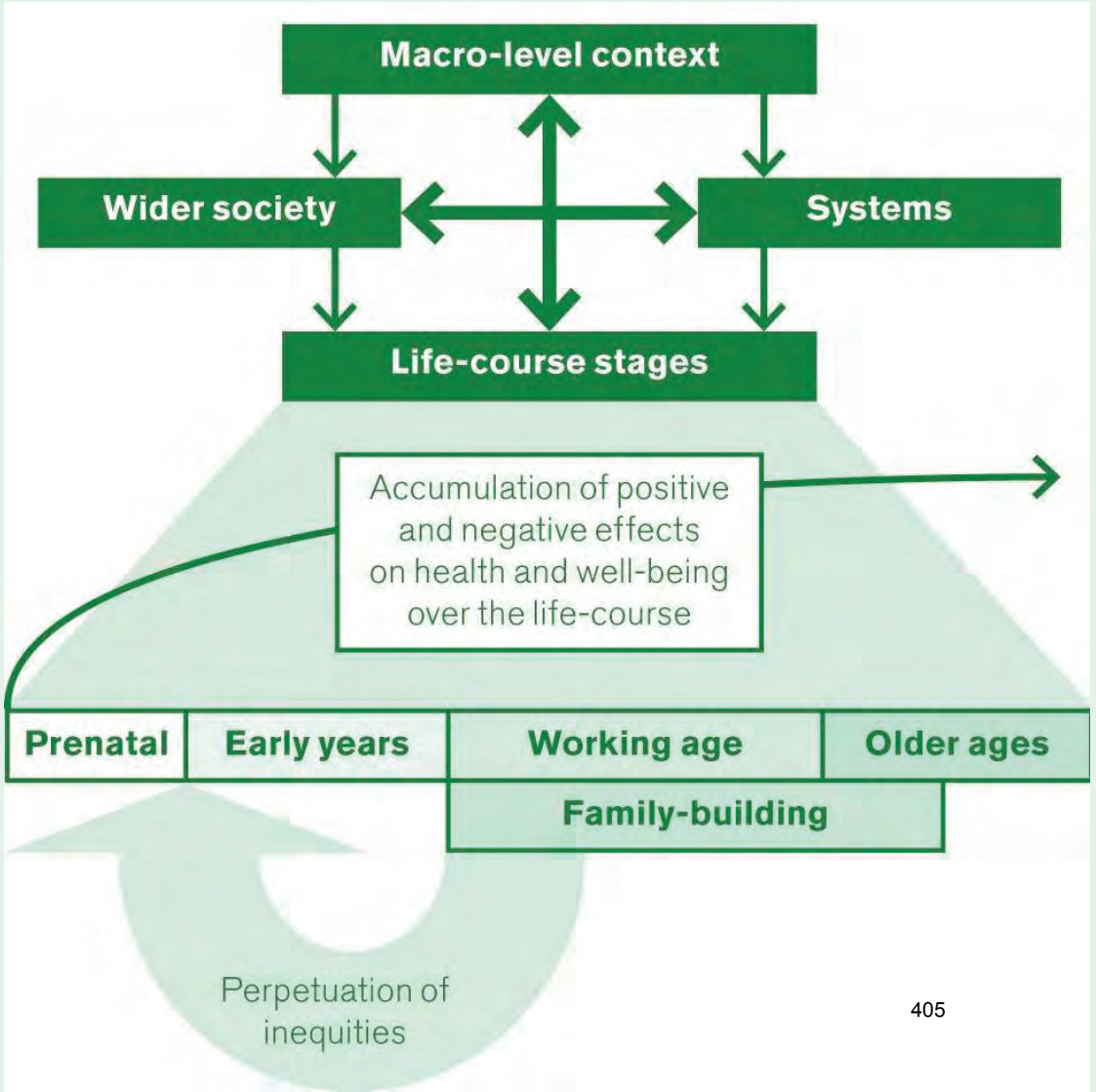
I can get strong and resilient by carrying this burden, but it basically depends on my social conditions, and if I learn proper tecniques to carry these stones on my back…



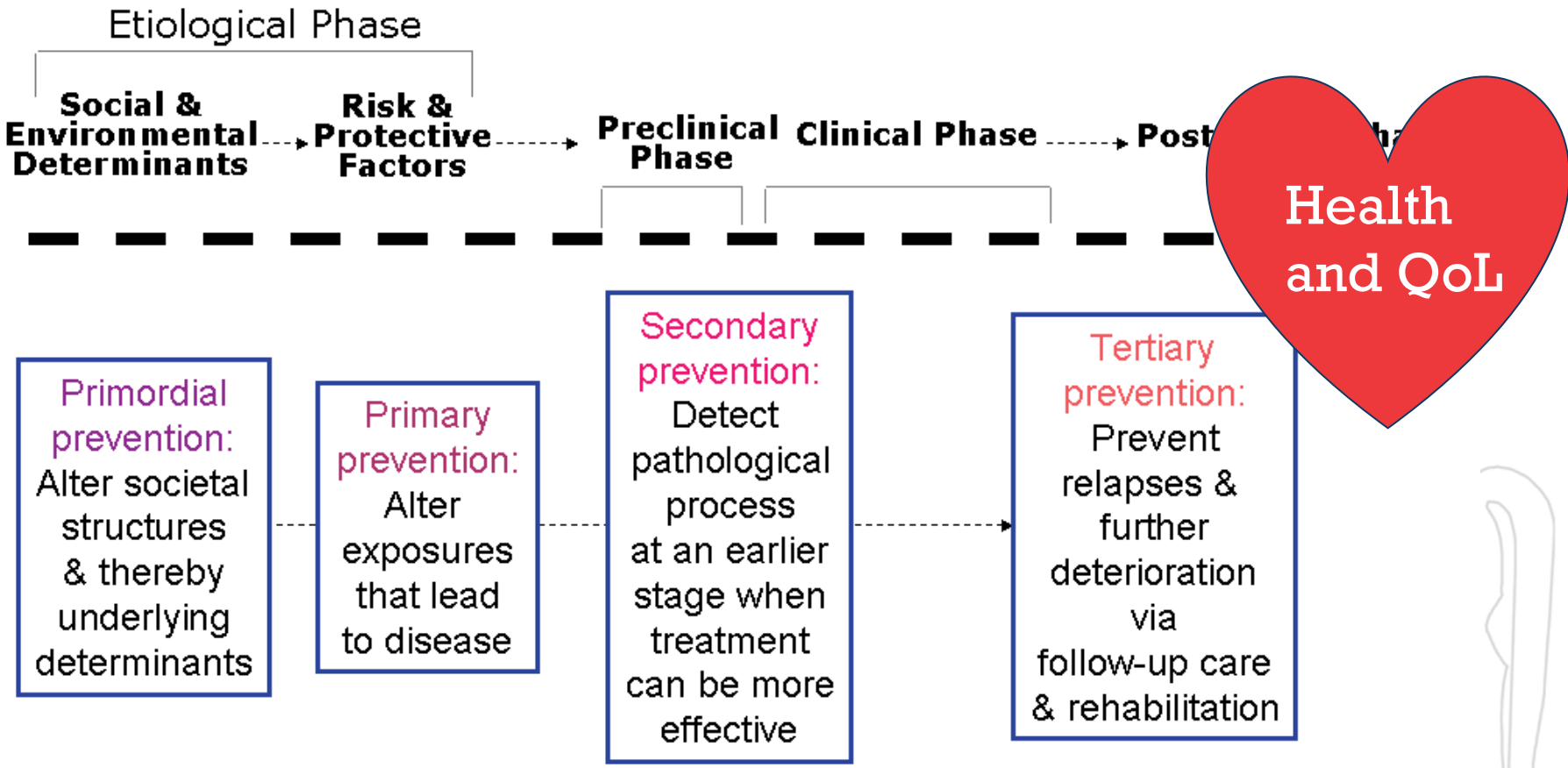
UCL Institute of Health Equity

Life course and generational perspective



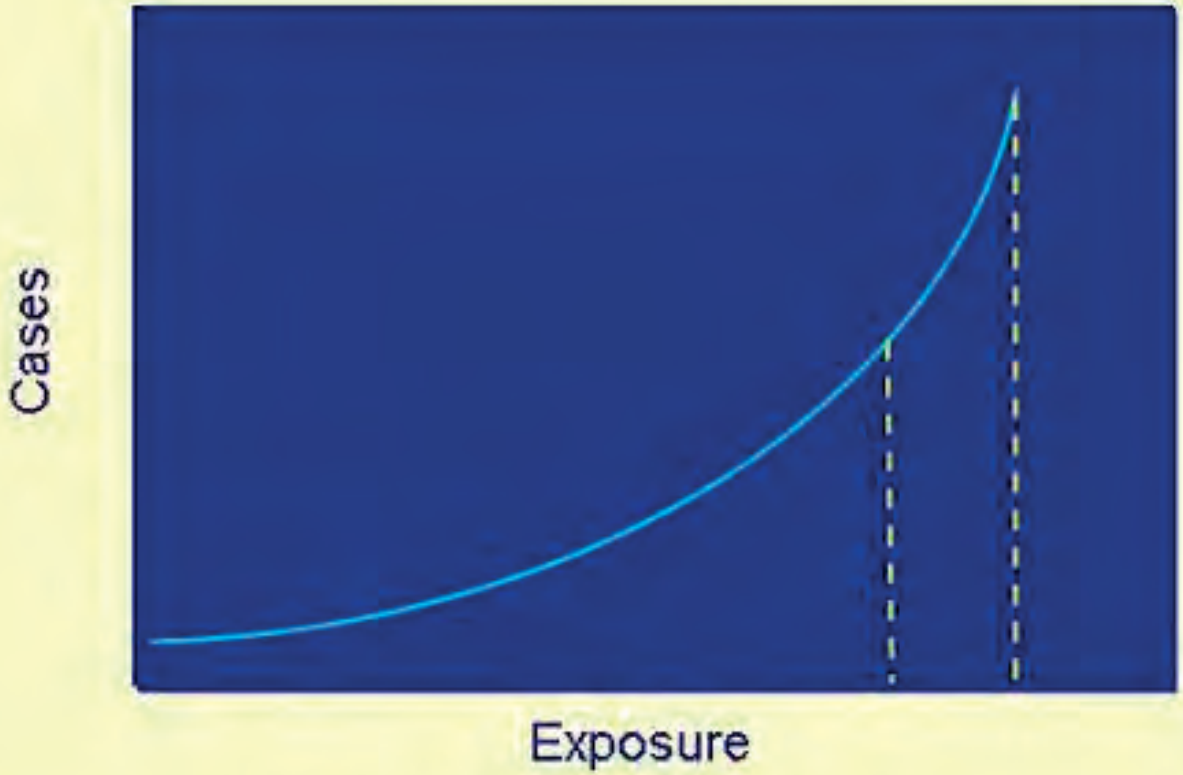


Clinical Course of a Disease, linked to prevention stages



Rose G (1985). Sick individuals and sick populations.

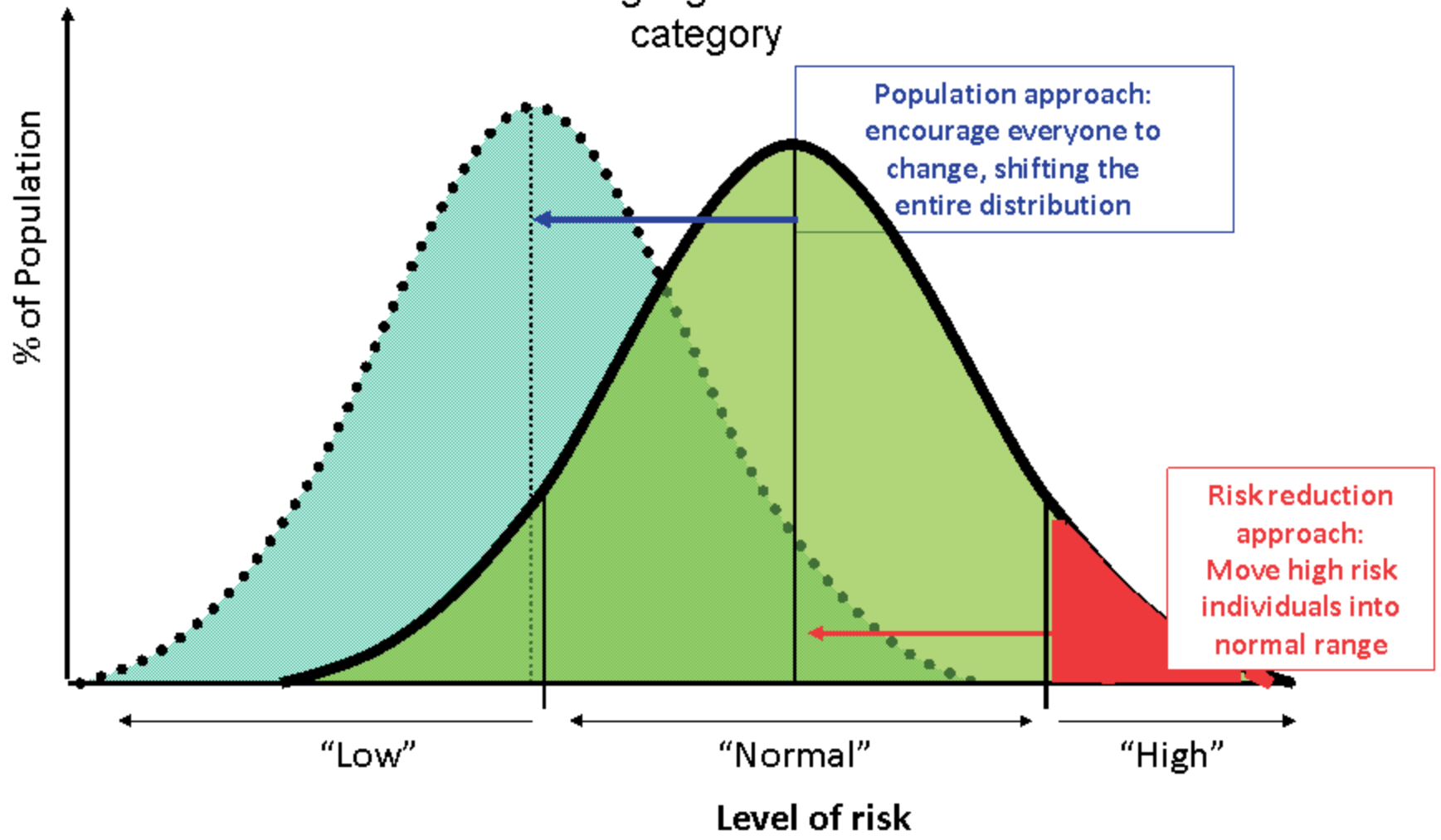
The Prevention Paradox



A large number exposed to a small risk generate more cases than a small number exposed to a large risk

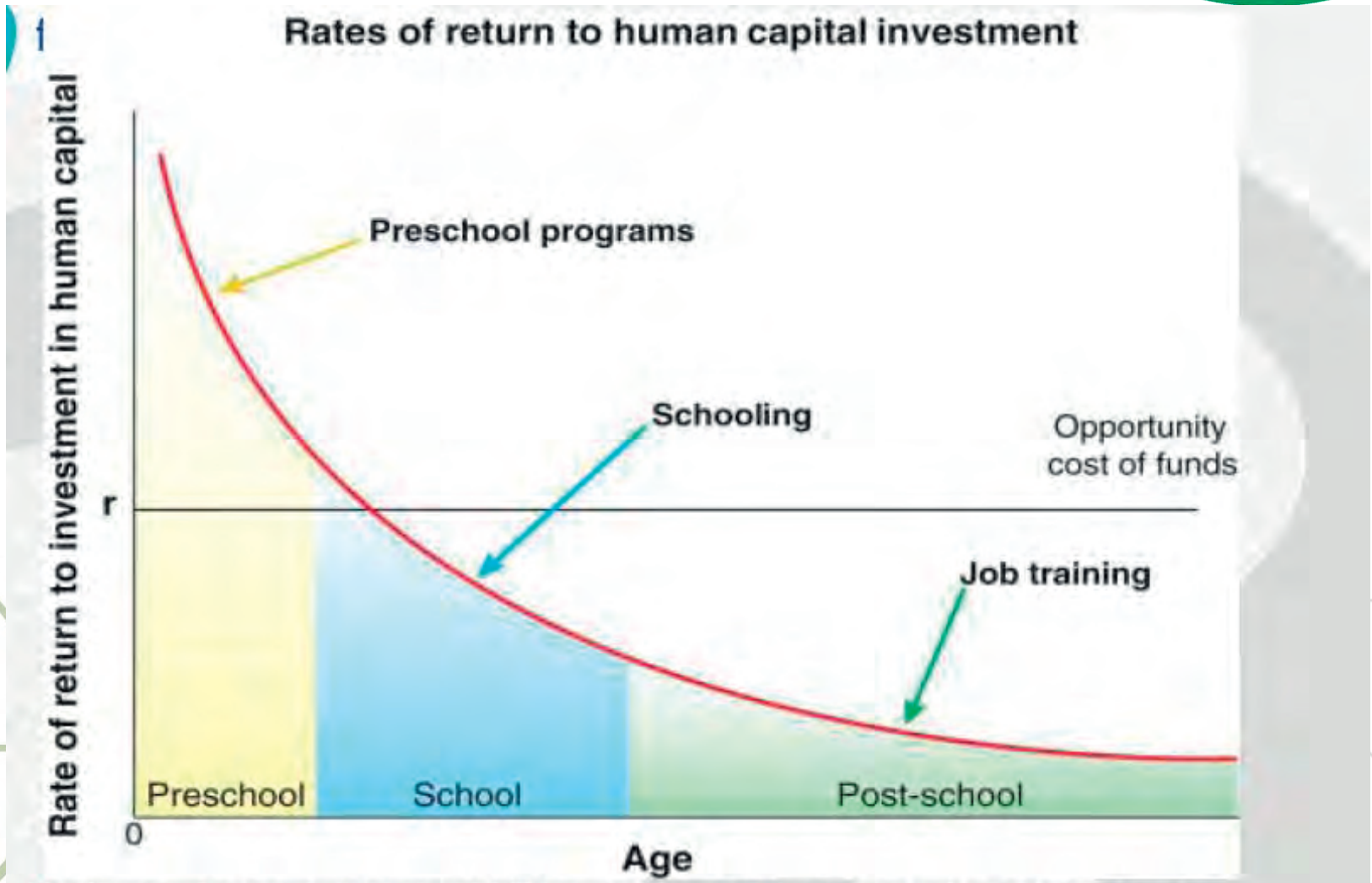
The Bell-Curve Shift in Populations

Shifting the whole population into a lower risk category benefits more individuals than shifting high risk individuals into a lower risk category

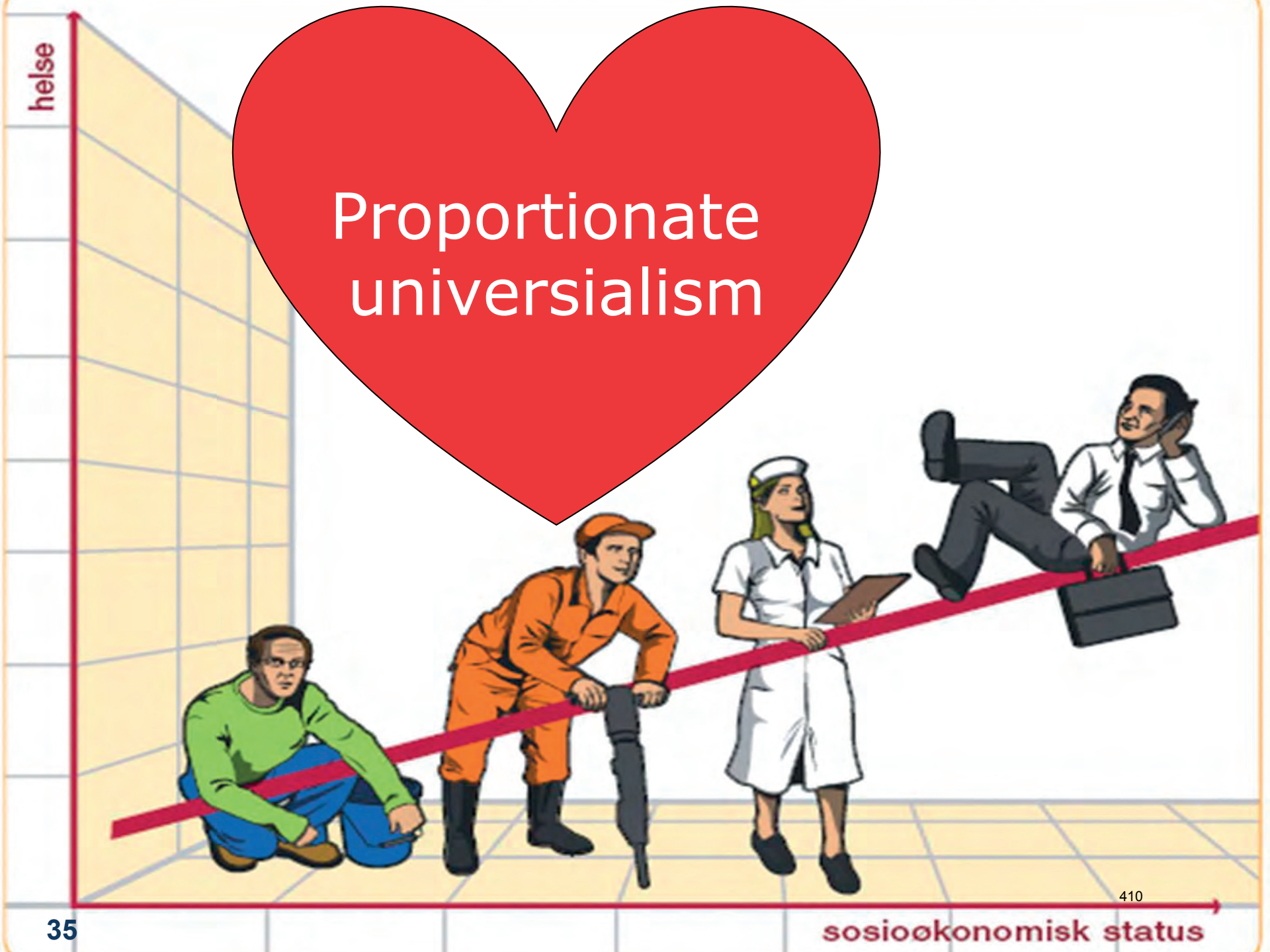


Source: Rose G. Sick Individuals and sick populations. *Int J Epidemiol.* 1985; 12:32-38.

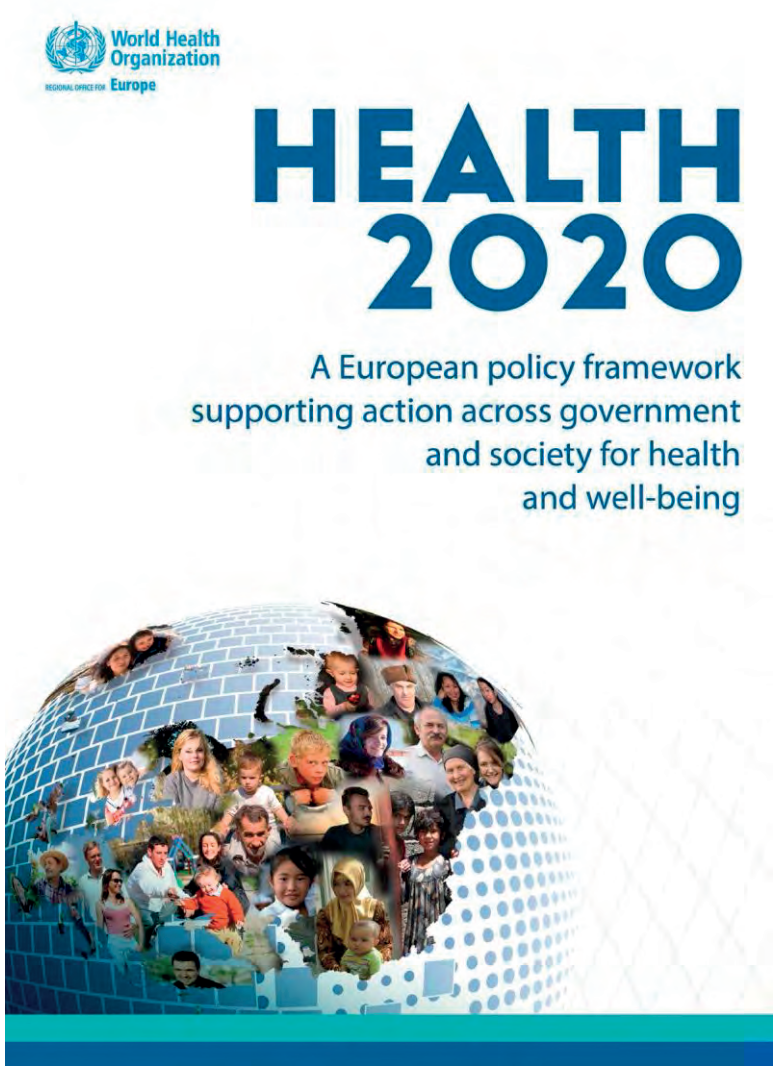
Early Childhood = investment



Heckman, James J. (2006). " Skill Formation and the Economics of Investing in Disadvantaged Children, *Science, 312(5782):* 1900-1902.


Proportionate universialism
helse
sosioøkonomisk status
410

WHO Health 2020



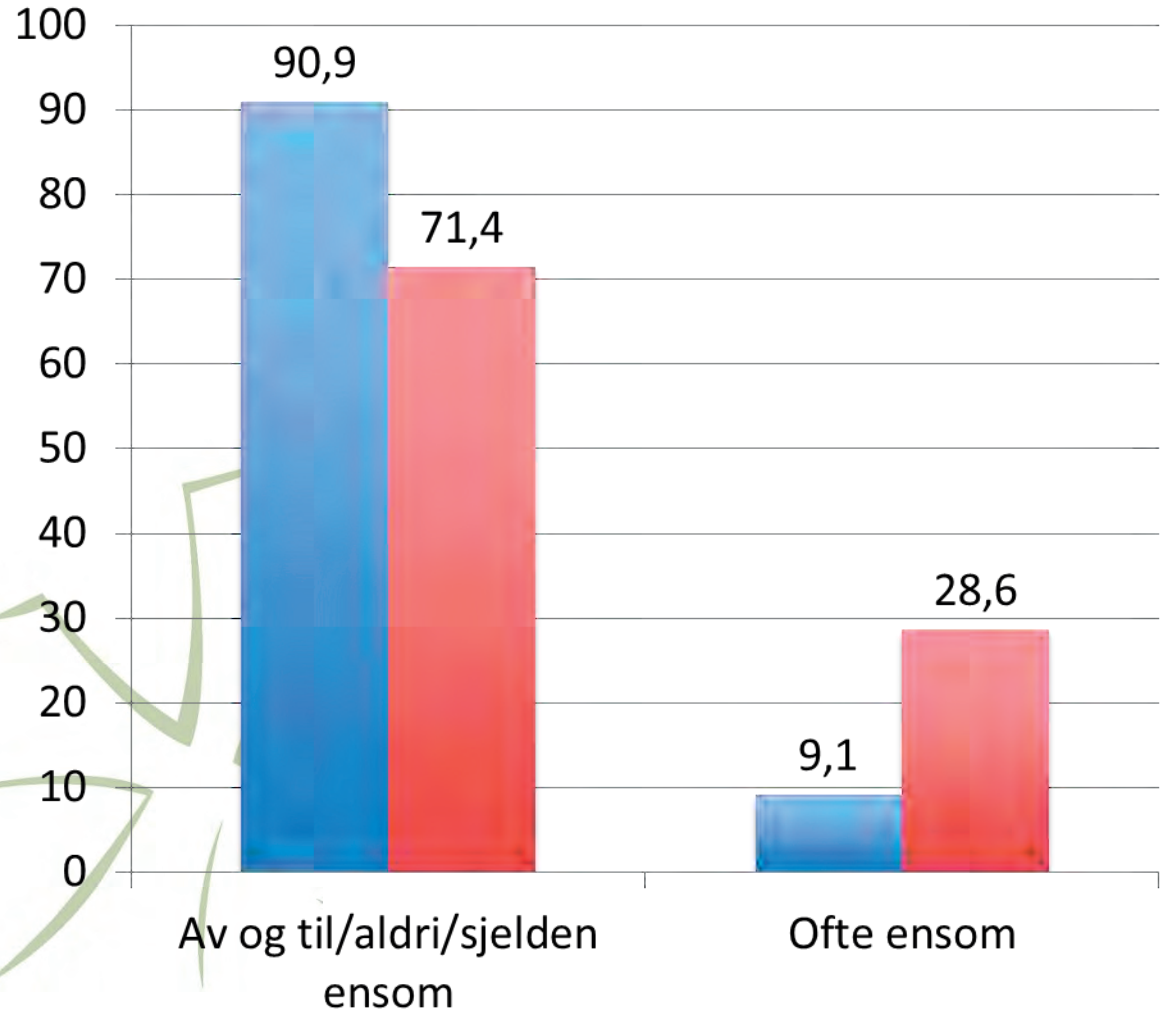
Health 2020 recognizes that successful governments can achieve real improvements in health if they work across government to fulfill two linked strategic objectives:

- ***improving health for all and reducing health inequalities***
- ***improving leadership and participatory governance for health.***

The Trondheim Declaration (2014): Fair distribution of health and well-being - a political choice

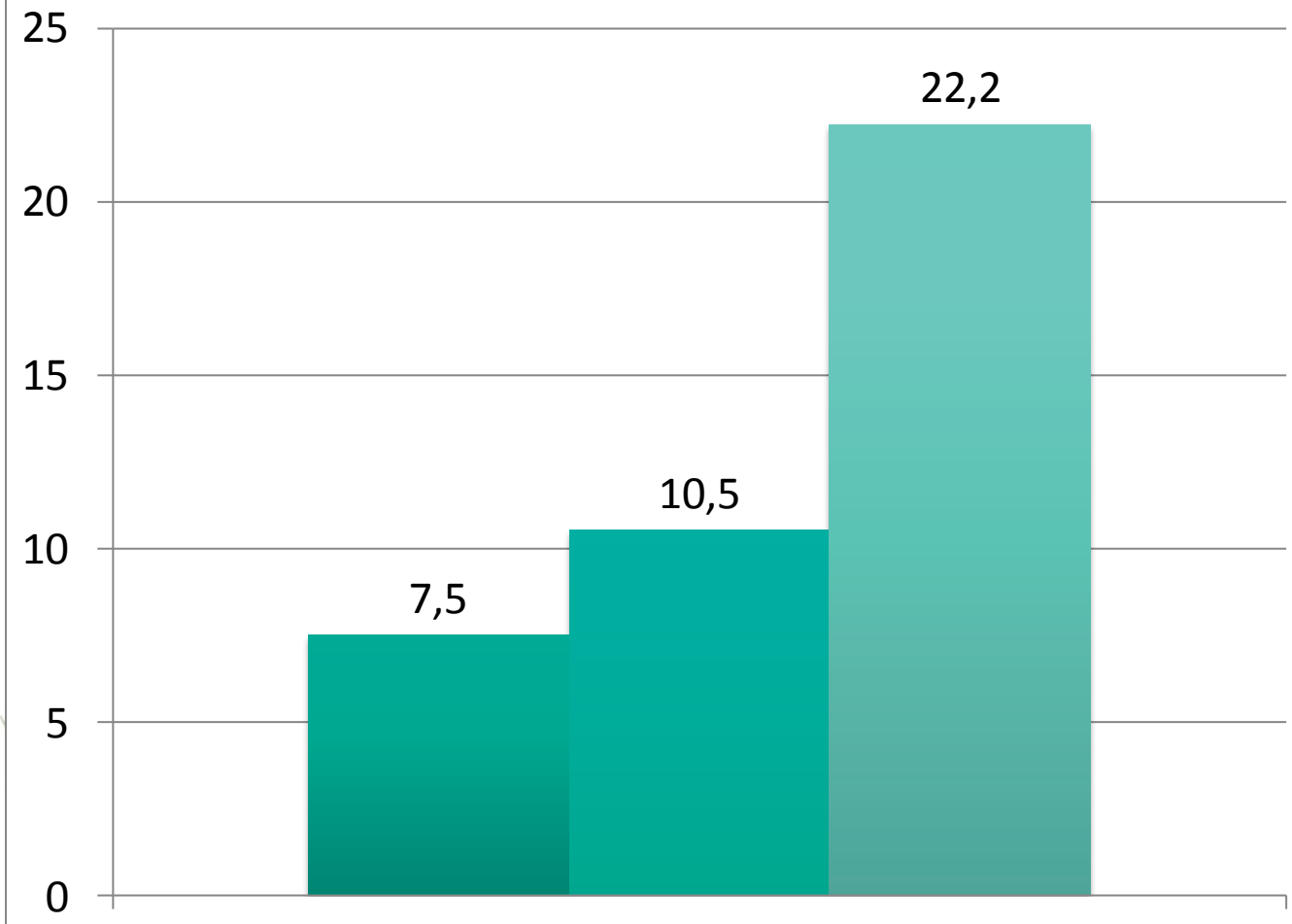
Local empirical data on population health and determinants

UNG-HUNT 3: Social inequalities – loneliness amongst youth in Levanger



Ungdata 2012 – Levanger

«feels like everything is a struggle» - Family economic resources

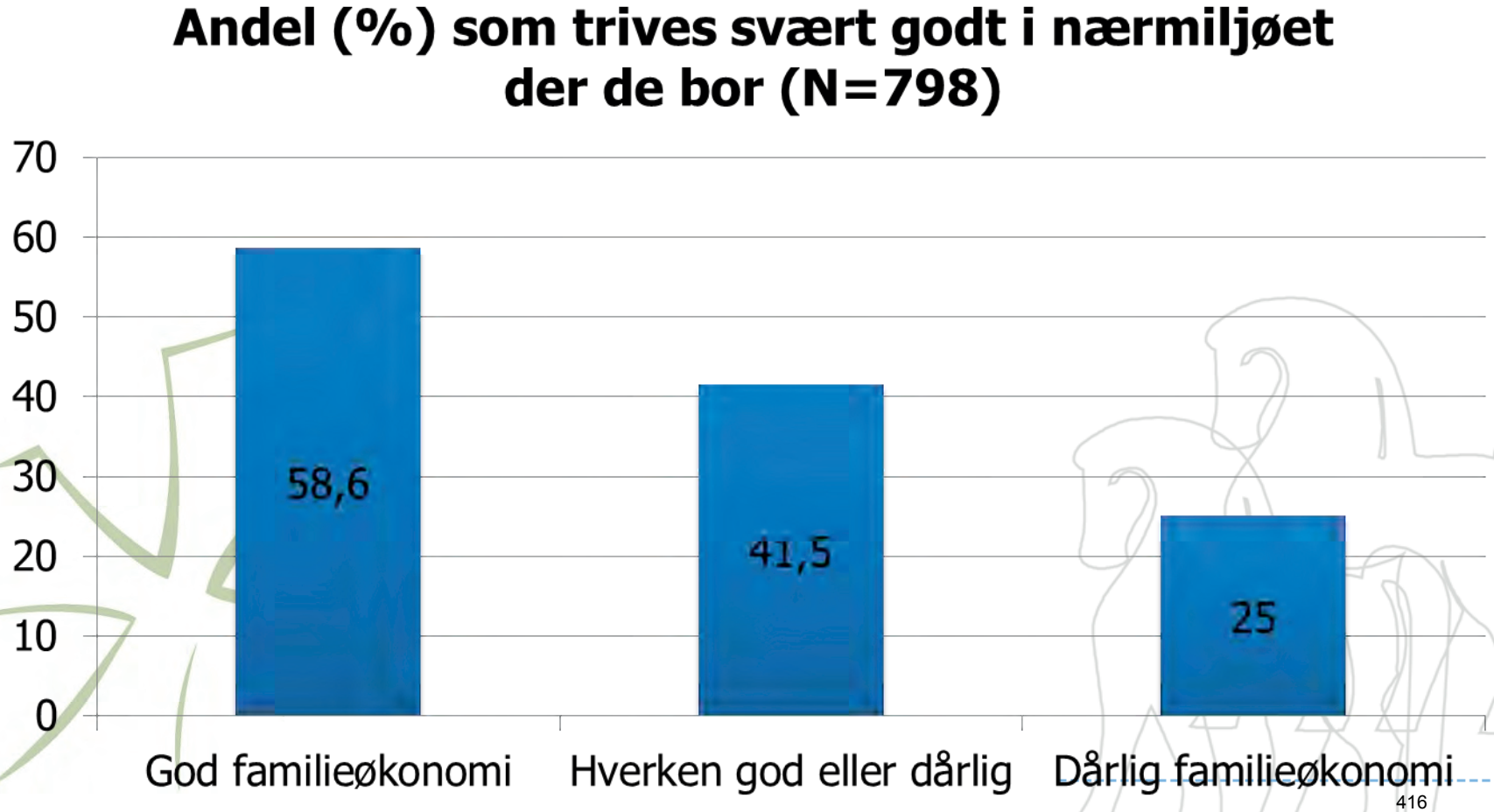


Andel ungdommer (%) som i løpet av siste uke har vært veldig mye plaget med følelsen av at alt er et slit

«Har familien din hatt god eller dårlig råd/økonomi de siste to årene?»

- God råd
- Hverken god eller dårlig
- Dårlig råd

Ungdata Verdal 2013
Percentage of young people who thrive very well in the community – family economy



Paradigm shift???

FROM DISEASE PREVENTION TO SOCIETAL DEVELOPMENT!

The power of definitions and «framing»

We chose the definition of health provided by Peter F. Hjort as the basis for the development of our goals and strategies:

"Good health is what a person has when he has the ability and the capacity to cope with and adapt to life's inevitable difficulties and day-to-day requirements."

Definitions and perspectives provided in the MMP

We shall therefore focus our work on community development that promotes public health and reduces social inequalities in health and conditions of life. The focus on the residents will give everyone the opportunity to participate in the community regardless of age, gender, orientation, social and cultural background and disability. Public health is affected by all social sectors, as shown in Figure 1. That is why public health strategy is woven like a red thread through the entire local government plan, in which quality of life, health and control are key concepts.

We have chosen the definition of health[1] provided by Peter F. Hjort as the basis for our goals and strategies for the community: "Good health is what a person has when he has the ability and the capacity to cope with and adapt to life's inevitable difficulties and day-to-day requirements."

What affects health and quality of life?

The factors affecting quality of life and health may be presented in a causal chain that stretches from the general community situation to the characteristics of the individuals. This is illustrated in Figure 1[4].

Although social networks and living habits have a more immediate impact on health and quality of life, they are also greatly affected by underlying factors in which all the social sectors play an important role.

We must therefore consider the consequences for health, quality of life and a fair distribution of the conditions of life in everything we do.

Figure 1 Public health is affected by all sectors

Page 4 in the Municipal Master Plan


ORGANIZING +
MOBILIZING
=
SOLUTION

Creating solutions together

«Health in all policies»

Process 2014

Planning strategy 2013-2016

GUIDELINES
VALUES
KNOWLEDGE

Holistic solutions – Municipal plans

Health | Childhood | Culture | Buisiness | City Centre

Revision of public health strategy

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Municipal Masterplan 2015-2030

Vision: Quality of life and growth

sustainable societies - a good start and coping throughout the lifespan - generous and robust life environments

GOALS

We are working to achieve the following objectives:

- Our municipalities are good communities to live in for a whole lifetime, and everyone feel as a valued part of the community
- All children must be given the best possible start in life
- All the inhabitants feel secure, they have control of their everyday life and they have added several active years of life with good health and well-being
- Our municipalities are a force for development in a sustainable and robust part of Central Norway

A) ensure sustainable societies
B) give priority to a good start and coping throughout the lifespan
C) create generous and robust living environments

societies, B) give priority to a good
ing environments. The blue text boxes

A) E

- Prior
- Prioritis
- Ensuring th ens' needs
- Arranging for a ss world and increased food production
- Taking still clearer resp climate challenges
- Mobilising local community resources through transparency, the involvement of citizens and collaboration and alliances with knowledge institutions, business, the cultural and the voluntary sector and public players
- Ensuring holistic solutions, coordinated work processes and future-oriented and knowledge-based services
- Reconciling policy and service provision through binding, coherent and economically sustainable planning
- Contribute to a sustainable development in the region with emphasis on infrastructure, business and cooperation with other municipalities

…We need to evaluate our efforts …

INDICATORS AND PERFORMANCE REVIEW

The target indicators shown below are ass for the assessment of the results in the annual report. The assessment is performed in the light of the ipal objectives and is intended to give an indication of whether the development is in line with them. Where pos assessment must be based on a breakdown by geography, age, gender and social status. It must presupp bition for the situation to be improved for all and for inequality to be reduced.

- Life Expectancy (Public Health Institute of
- Self-reported health and quality of life (
- Years of life with good health (HUNT4)
- Access to trusted friends/networks w
- Participation in further education (Co
- Long-term unemployment (Nav)
- Disability (Nav)
- Households with persistent p
- Participation in cultural activit
- Physical activity (bicycling and
- Infrastructure for walking and bic
- Traffic (number of passengers us
- Civil Index (The Civil Survey)
- Democracy Index (The Civil Surv
- The Municipal Barometer (Munici
- Source Separation (Innherred Renovati
- The Industrial Index (Central Industrial Orga
- Commercial Institutions (Innovation Norway)
- Net and gross operating profit as a percentage of operating reve accounts)
- Provision reserve as a percentage of operating income (Municipal accounts)

A lot of public health-related indicators!

Where possible, the assessment must be sorted by geography, age, gender and social status. Ambition: improve situation for all and reduce inequality

Direct links between strategies, measures and (joint) budgeting

8.3 Driftstiltak

Strategier i Kommuneplanens samfunnsdel			Tiltak	Kostnad (mill. kr.)					Finansiering av helårsvirkning		
Sikre en bærekraftig politikk	Prioritere en god start og mestring hele livet	Skape rause og robuste livsmiljøer		2015	2016	2017	2018	2019 -2022	Omlegging drift	Ekstern finans.	Nye midler i økonomi-planen
Strategi 1: **Forebyggende, tidlig og tverrfaglig innsats**											
x	x		Styrking av ordinær opplæring gjennom kompetanseutvikling, bevisstgjøring av lærere.	X	X	X	X	X	X		
	x		Økt pedagogtetthet. Statlig satsing i to av ungdomsskolene våre (2013 – 16).	X	X					X	
x			Realisere Familiens hus.	X	X	X	X	X	X		
x	x		Styrke skolehelsetjenesten opp mot nasjonal norm (Helsedir. IS-1798).	X	X	X	X	X		X	X
x	x		Etablere to 100%-stillinger for kommunepsykologer	X	X	X	X	X		I 2015	Fra 2016

…With a little help from our friends….

Vital to reach out for help (to our friends) in order to create the skills, the willingness and the abilities needed to implement and evaluate HiAP efforts and effects of interventions.

- People, neighbourhoods, NGOs, public and private organizations and businesses everyone that might contribute in the local community
- The Norwegian Healthy Cities Network (WHO)
- Partnership with University College of London/Marmot Review Team
- HUNT, University College of Nord Trøndelag, local hospital (HNT), KS, NT County government, National centre of arts and health
- Other local, regional, national and international resources

SUNNE KOMMUNER

-Folkehelse i alt vi gjør

«How can it be organized?»

Process 2014

Planning strategy 2013-2016

GUIDELINES
VALUES
KNOWLEDGE

Holistic solutions – Municipal plans

Health | Childhood | Culture | Buisiness | City Centre

Revision of public health strategy

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Existing municipal plans

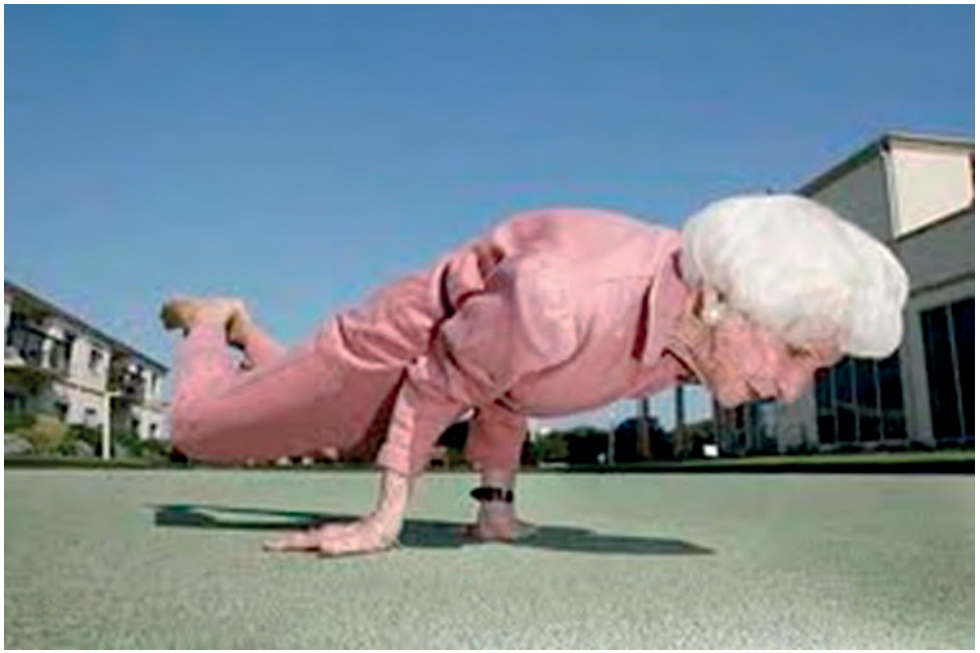
3 Main messages from Verdal and Levanger:

- Public Health Strategy = Municipal Master Plan.
  A holistic approach to HiAP.
- Local knowledge and research-based arguments have been extremely important
- Sufficient anchoring in the political and administrative leadership has been crucial to success.

Health is a human right
Do something
Do more
Do better

Peter Goldblatt, 2014

Thank you for listening!!

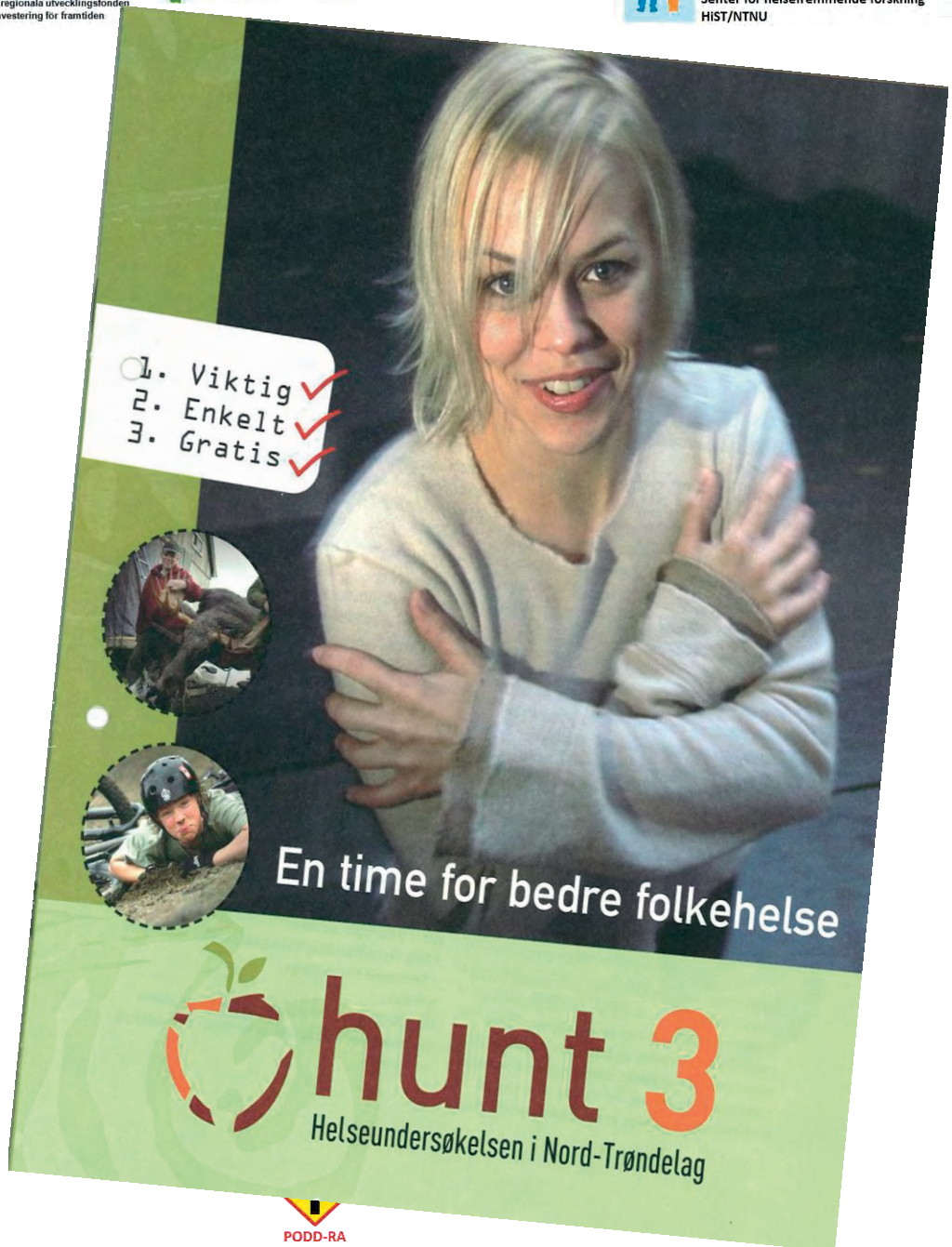


Contact information:

Email: dihe@innherred-samkommune.no

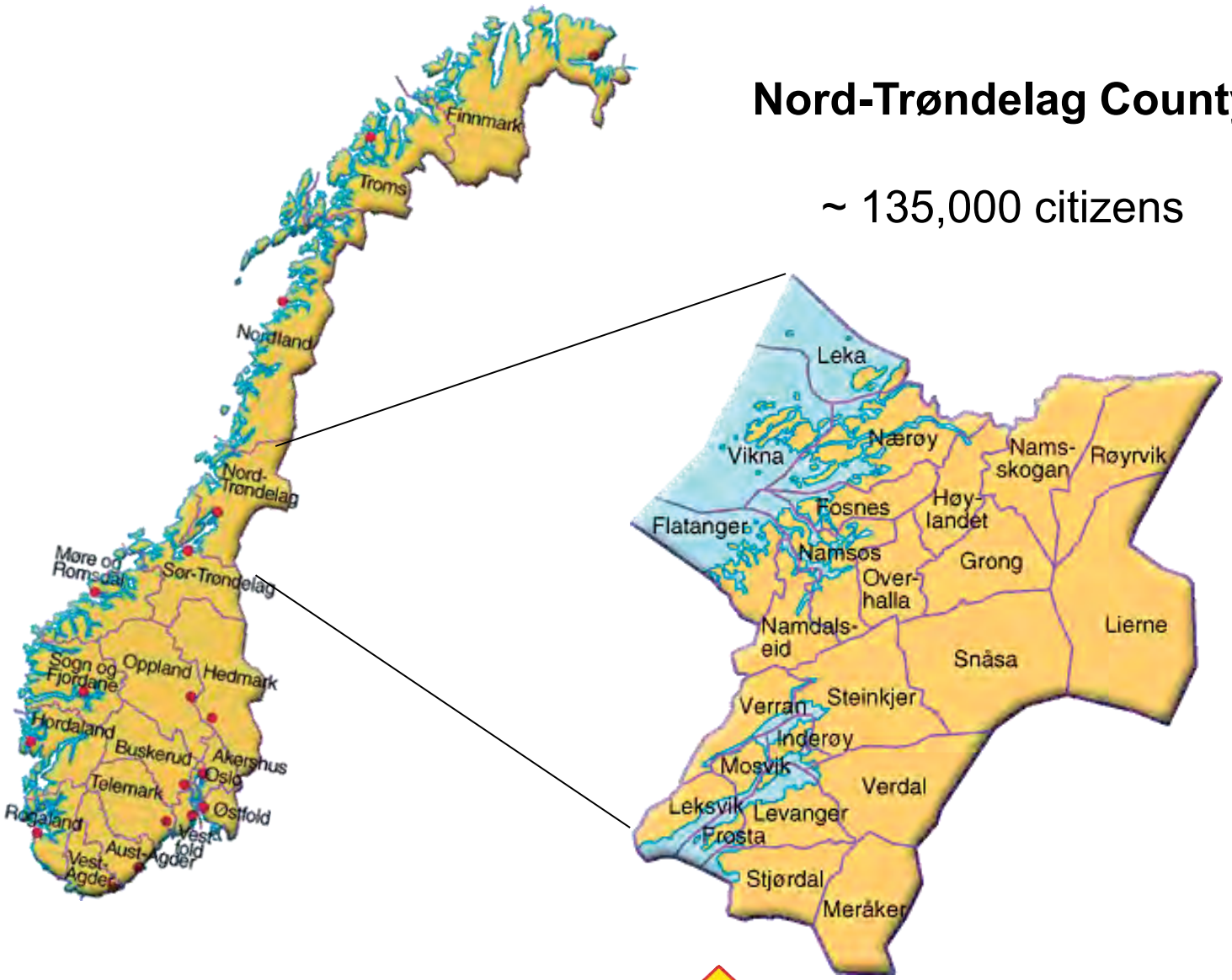
Phone: +47 93043714

The HUNT Study



Nord-Trøndelag County

~ 135,000 citizens



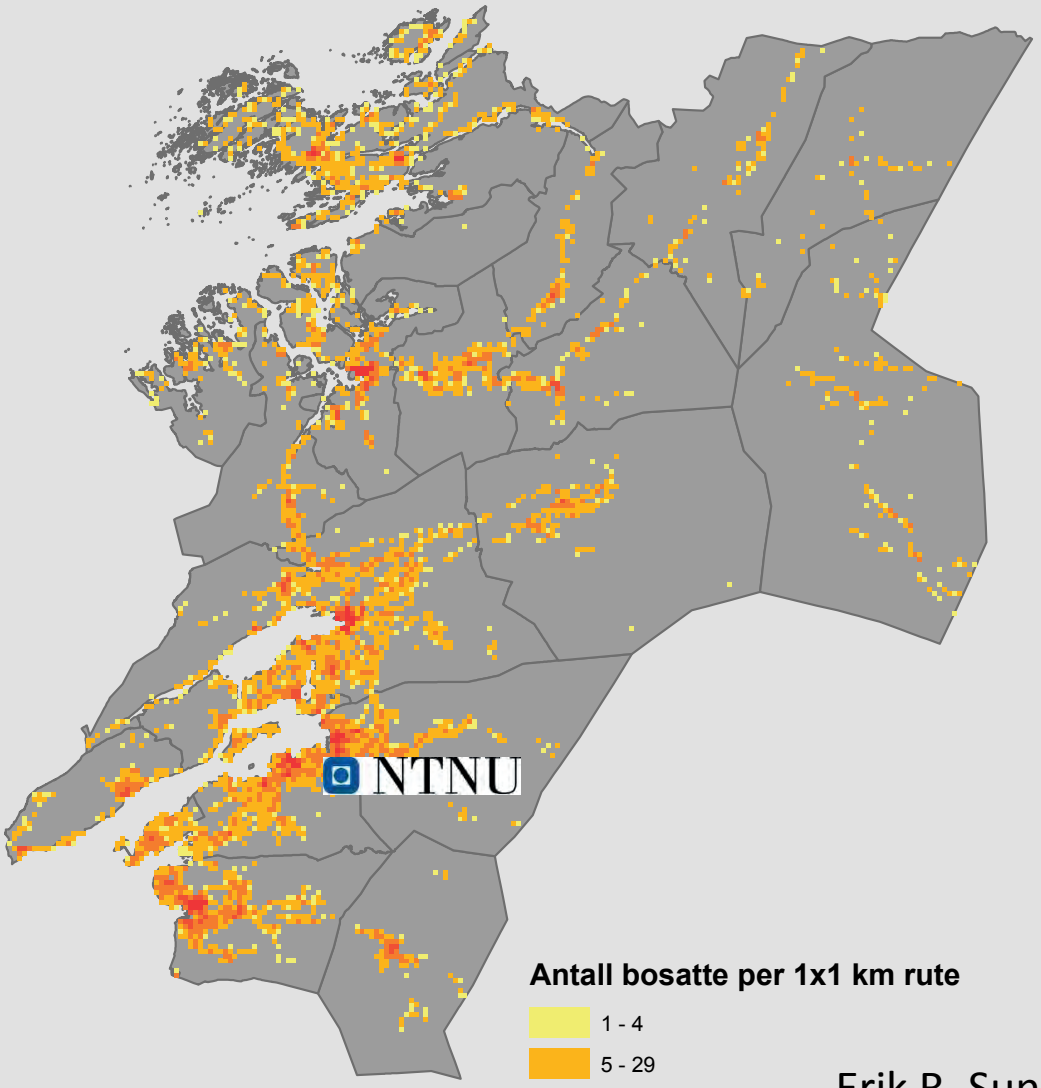
PODD-RA

Nord-Trøndelag fylkeskommune

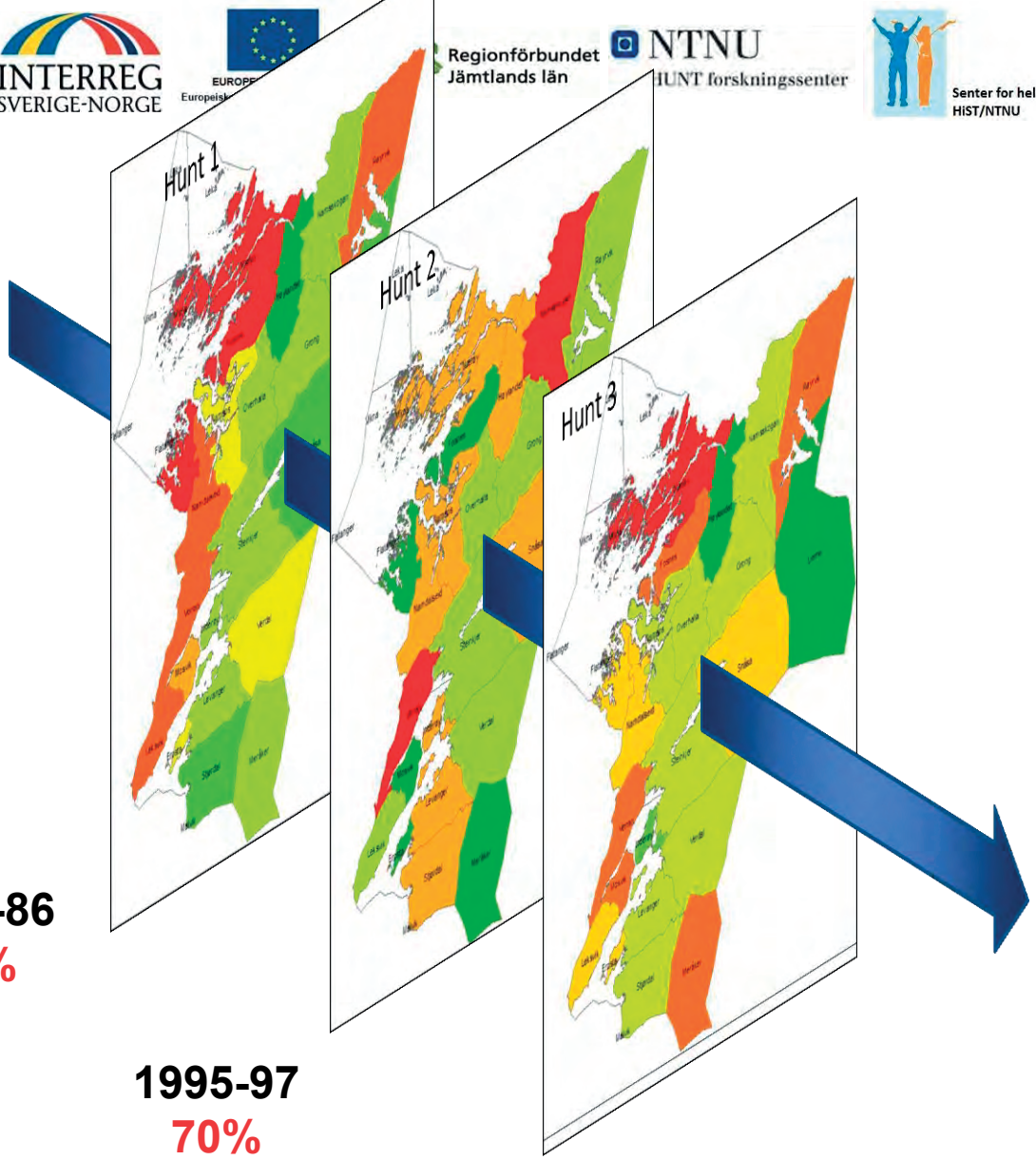
SØR-TRØNDELAG FYLKESKOMMUNE

INTERREG SVERIGE-NORGE

Where people live



Erik R. Sund



1984-86
88%

1995-97
70%

2006-08
60%

Nord-Trøndelag fylkeskommune

SØR-TRØNDELAG FYLKESKOMMUNE

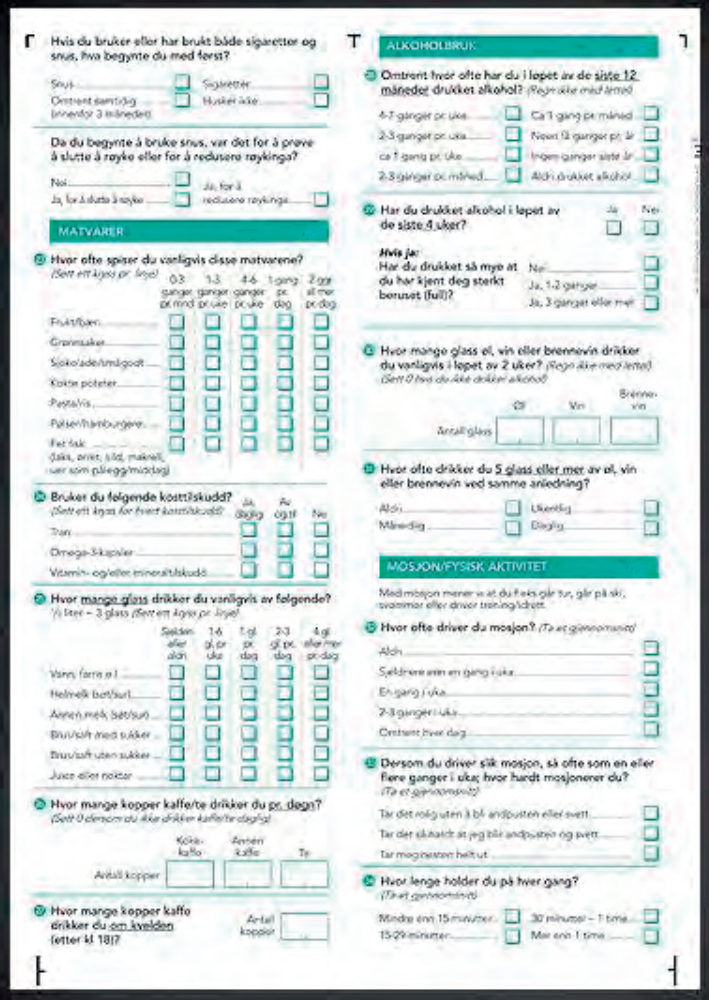
INTERREG SVERIGE-NORGE

EUROPEISKA UNIONEN
Europeiska regionala utvecklingsfonden
En investering för framtiden

Regionf
Jämtlan

Health data from 120,000 individuals

Measuring health



Hvis du bruker eller har brukt både sigaretter og snus, hva begynte du med først?

Snus
Sigaretter
Omtrent samtidig (innenfor 3 måneder)
Husker ikke

Da du begynte å bruke snus, var det for å prøve å slutte å røyke eller for å redusere røyking?

Nei
Ja, for å slutte å røyke
Ja, for å redusere røyking

MATVARER

Hvor ofte spiser du vanligvis disse matvarene?
(Sett ett kryss pr. linje)

	0-3 ganger pr. mnd	1-3 ganger pr. uke	4-6 ganger pr. uke	1 gang pr. dag	2 ganger el. mer pr. dag
Frukt/bær					
Grønnsaker					
Sjokolade/smågodt					
Kokte poteter					
Pasta/ris					
Pølser/hjemburgere					
Fet fisk (laks, ørret, sild, makrell, ikke som pålegg/mat dag)					

Bruker du følgende kosttilskudd?
(Sett ett kryss for hvert kosttilskudd)

	Ja, daglig	Av og til	Nei
Tran			
Omega-3-kapsler			
Vitamin- og/eller mineraltilskudd			

Hvor mange glass drikker du vanligvis av følgende?
½ liter = 3 glass (Sett ett kryss pr. linje)

	Sjelden eller aldri	1-6 gl. pr. uke	1 gl. pr. dag	2-3 gl. pr. dag	4 gl. eller mer pr. dag
Vann, farris o.l.					
Helmelk/sur/sur					
Annen melk, sør/sur					
Brus/saft med sukker					
Brus/saft uten sukker					
Juice eller nektar					

Hvor mange kopper kaffe/te drikker du pr. dag?
(Sett 0 dersom du ikke drikker kaffe/te daglig)

	Kokekaffe	Annen kaffe	Te
Antall kopper			

Hvor mange kopper kaffe drikker du om kvelden (etter kl 18)? Antall kopper

ALKOHOLBRUK

Omtrent hvor ofte har du i løpet av de siste 12 måneder drukket alkohol? *(Regn ikke med lettøl)*

4-7 ganger pr. uke
2-3 ganger pr. uke
ca 1 gang pr. uke
2-3 ganger pr. måned
Ca 1 gang pr. måned
Noen få ganger pr. år
Ingen ganger siste år
Aldri drukket alkohol

Har du drukket alkohol i løpet av de siste 4 uker? Ja / Nei

Hvis ja:
Har du drukket så mye at du har kjent deg sterkt beruset (full)?
Nei
Ja, 1-2 ganger
Ja, 3 ganger eller mer

Hvor mange glass øl, vin eller brennevin drikker du vanligvis i løpet av 2 uker? *(Regn ikke med lettøl)*
(Sett 0 hvis du ikke drikker alkohol)

	Øl	Vin	Brennevin
Antall glass			

Hvor ofte drikker du 5 glass eller mer av øl, vin eller brennevin ved samme anledning?

Aldri
Månedlig
Ukentlig
Daglig

MOSJON/FYSISK AKTIVITET

Med mosjon mener vi at du f.eks går tur, går på ski, svømmer eller driver trening/idrett.

Hvor ofte driver du mosjon? *(Ta et gjennomsnitt)*

Aldri
Sjeldnere enn en gang i uka
En gang i uka
2-3 ganger i uka
Omtrent hver dag

Dersom du driver slik mosjon, så ofte som en eller flere ganger i uka; hvor hardt mosjonerer du?
(Ta et gjennomsnitt)

Tar det rolig uten å bli andpusten eller svett
Tar det såpass at jeg blir andpusten og svett
Tar meg nesten helt ut

Hvor lenge holder du på hver gang?
(Ta et gjennomsnitt)

Mindre enn 15 minutter
15-29 minutter
30 minutter – 1 time
Mer enn 1 time

23 municipalities

ndet
n

NTNU
HUNT forskningssenter

Senter for helsefremmende forskning
HiST/NTNU

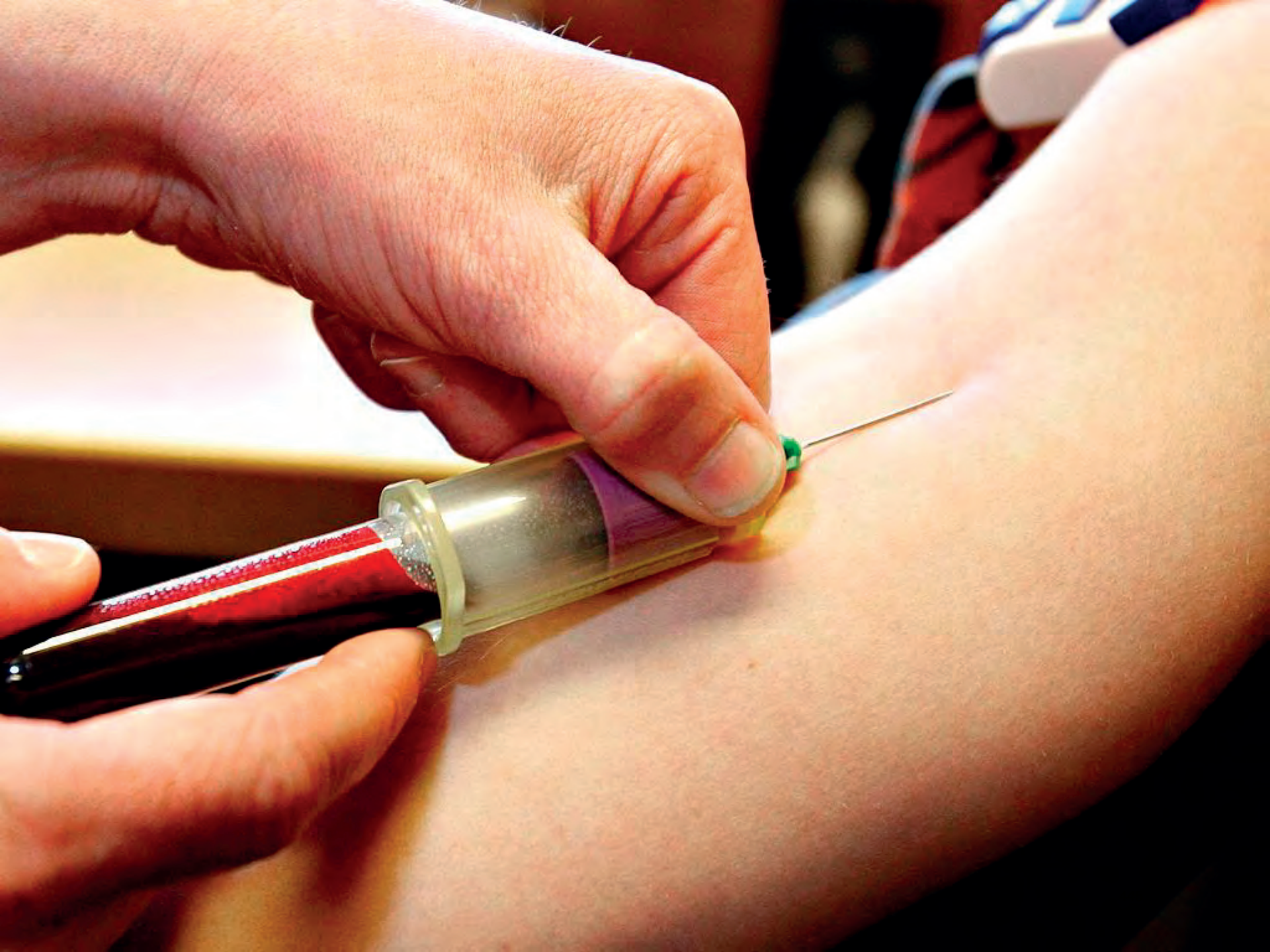
sentio research group

Height, weight

Blood pressure

Lung function

Bone scan

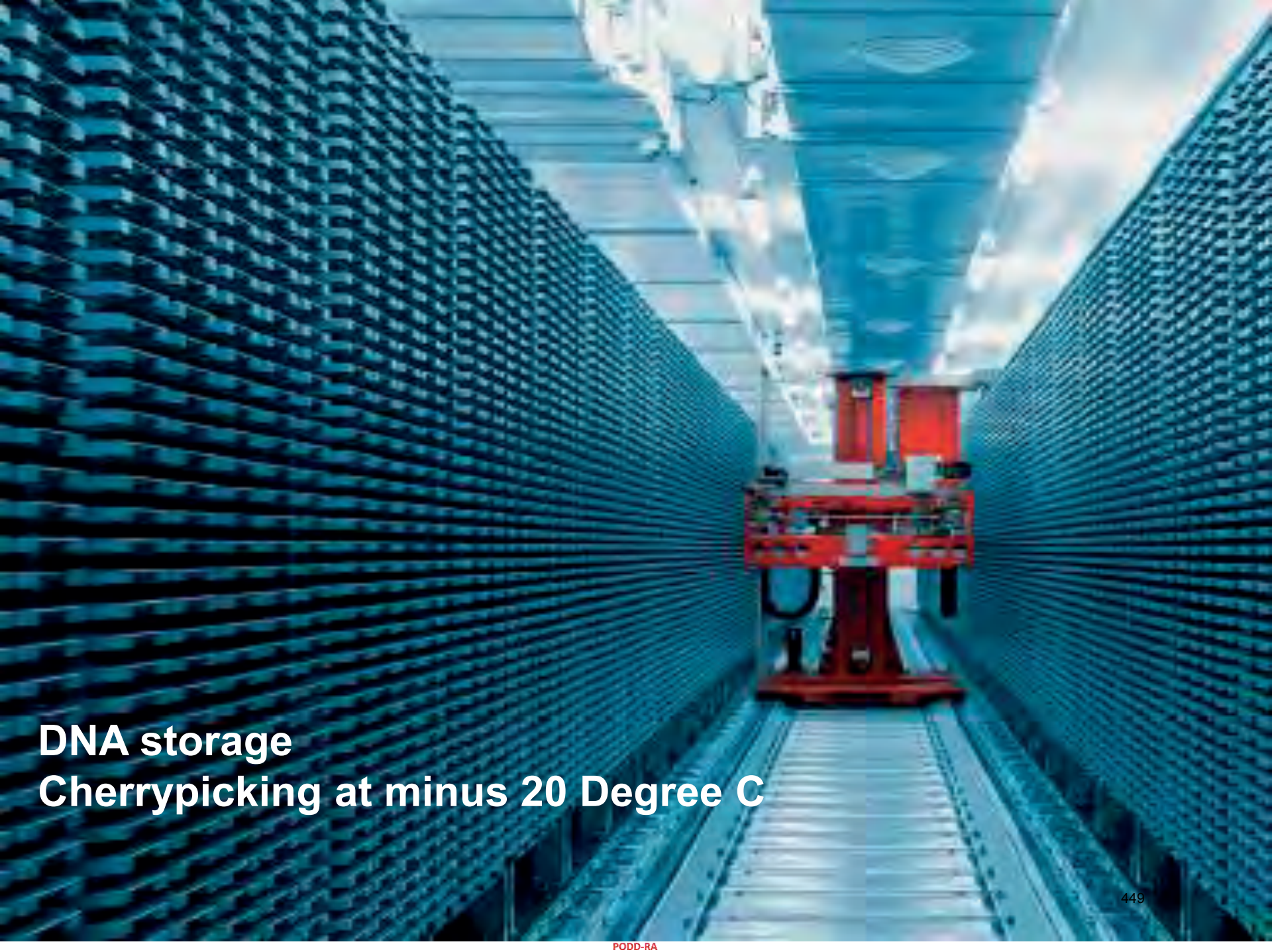


Transportation of blood samples, cooled, same day

HUNT Research Centre, Nord-Trøndelag

HUNT 3:

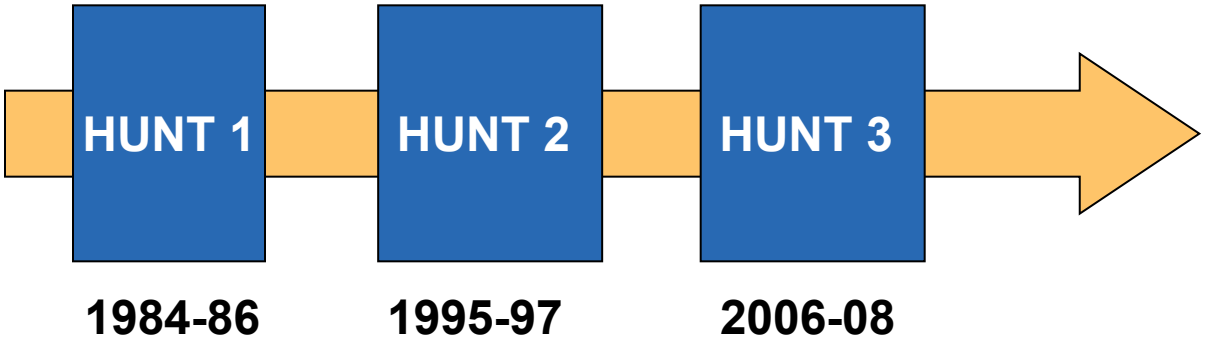
30 small tubes per person


DNA storage
Cherrypicking at minus 20 Degree C

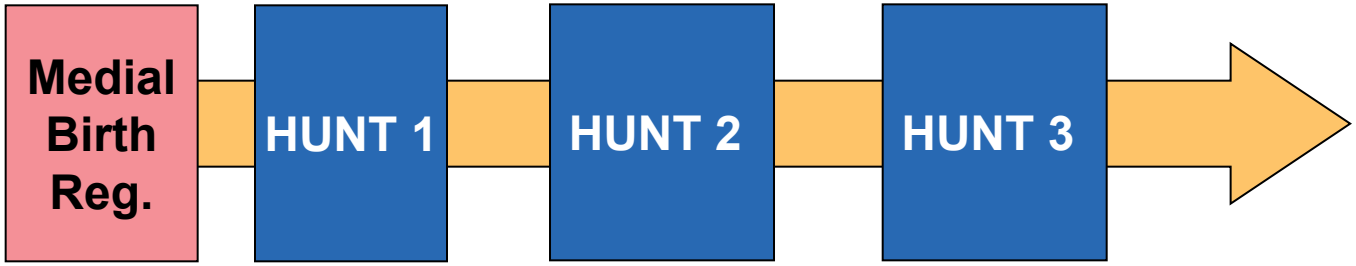
Cryo tubes at - 196°C


STATEBOURNE
biosystem 80

DNA-extraction
Genotyping



Key:
The 11-digit personal identification number



Key:

The 11-digit personal identification number

- Cause of death
- Cancer
- Family register
- Drug prescriptions
- Stroke
- Myocardial infarction
- Venous trombosis
- Dementia
- Multiple sclerosis
- Bipolar
- Scizofrenia

Nord-Trøndelag fylkeskommune
SØR-TRØNDELAG FYLKESKOMMUNE
INTERREG SVERIGE-NORGE
EUROPEISKA UNIONEN
Europeiska regionala utvecklingsfonden
En investering för framtiden
Regionförbundet Jämtlands län
NTNU
HUNT forskningssenter
Sente
HiST/

Scientific papers:

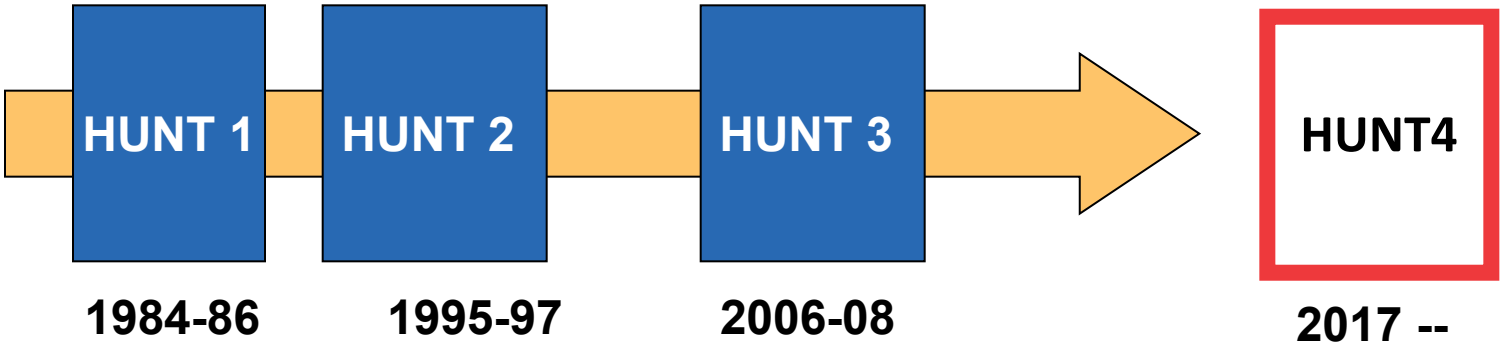
~ 60-70 each year

Totally ~ 700

130 PhD degrees

PODD-RA

European collaboration


HUNT 1
HUNT 2
HUNT 3
HUNT4
1984-86
1995-97
2006-08
2017 --

Political support

The Norwegian government

The County Council

The 23 municipalities

PODD-RA

TRUST

Viking spirit

The aim:

Longer -
and better life

http://www.ntnu.no/hunt

The Nord-Trøndelag Health Study (HUNT)

HUNT is one of the largest and most comprehensive population-based health surveys ever performed. HUNT is a unique databank of personal and family medical histories, clinical measurements, exposure variables and biological material collected in three consecutive studies from 1984–2008. In total, more than 100,000 persons from the County of Nord-Trøndelag in Norway have participated.

HUNT collaborates with national and international research groups on some of the most important health challenges facing our world today, such as diabetes, cancer, musculoskeletal disease, mental illness, migraine, prostate problems, urinary incontinence, reproduction, weight and cardiovascular disease.

Built on trust

The fundamental strategy of HUNT is to earn and maintain the confidence of the population we work in and with. This strategy has been successful and has resulted in extraordinarily high participation rates. There is enthusiastic public and political support for HUNT and for the HUNT Research Centre. This has created a good basis for further health surveys in the County and an excellent research environment.

Extensive data

The HUNT studies have compiled extensive medical, lifestyle and environmental data associated with each biological sample, comprising in total about 800 exposure variables and nearly 3000 different variables per individual. These datasets allow for prospective correlations to be made between genetic, epigenetic, lifestyle, environmental and health/disease profiles. Through an individual personal identifier (PIN) linkage to registries at the national level can be established to access additional information. Participants have provided very detailed information through the HUNT surveys. This has been validated in several studies based on HUNT data and has greatly contributed to the overall value of the HUNT Biobank for research projects.

The Nord-Trøndelag Health

Contact information

HUNT Research Centre is part of the Faculty of Medicine at the Norwegian University of Science and Technology (NTNU), Trondheim, Norway. HUNT Research Centre is located in Verdal in the County of Nord-Trøndelag.

Read more: **www.hunt.ntnu.no**

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Ass. Professor Steinar Krokstad
E-mail: Steinar.Krokstad@ntnu.no

Director HUNT biobank:
Professor Kristian Hveem
E-mail: Kristian.Hveem@ntnu.no

Selected publications

Close to 500 publications and 40 PhD's, based on HUNT data, are an important part of our scientific output.

Dale AC, Vatten LJ, Nilsen TI, Midthjell K, Wiseth R. Secular decline in mortality from coronary heart disease in adults with diabetes mellitus: cohort study. BMJ. 2008 Jul 1;337:a236.

Rayjean J. Hung, James D. McKay, Valerie Gaborieau, et al. A genome-wide association study identifies a susceptibility locus for lung cancer encompassing nicotine acetylcholine receptor subunit genes at 15q25. Nature. 2008 Apr 3;452(7187):633-7

Eleftheria Zeggini, Laura J Scott, Richa Saxena, Benjamin F Voight, Jonathan L Marchini Tianle Hu, Paul IW de Bakker et al . Metanalysis of genome-wide association data and large-scale replication identifies additional new susceptibility loci for type 2 diabetes. Nature Genetics 40, 638 - 645 (2008). Published online: 30 March 2008

Johansson S, Raeder H, Eide S, Midthjell K, Hveem K, Sovik O, Molven A, Njølstad P. Studies in 3,523 Norwegians (HUNT2) and Meta-Analysis in 11,571 Subjects Indicate that Variants in the HNF4A P2 Region are Associated with Type 2 Diabetes in Scandinavians. Diabetes. 2007 Dec;56(12):3112-7.

Hallan S, Astor B, Romundstad S, Aasarød K, Kvenild K, Coresh J. Association of kidney function and albuminuria with cardiovascular mortality in older vs younger individuals: The HUNT II Study. Arch Intern Med. 2007 Dec 10;167(22):2490-6.

Mykletun A, Øverland S, Dahl AA, Krokstad S, Bjerkeset O, Glozier N, Aarø LE, Prince M. A population-based cohort study of the effect of common mental disorders on disability pension awards. Am J Psychiatry. 2006 Aug;163(8):1412-8

Aegidius K, Zwart JA, Hagen K, Schei B, Stovner LJ. Oral contraceptives and increased headache prevalence: the Head-HUNT Study. Neurology 2006; 66: 349-353

Krokstad S, Westin S. Disability in society. Medical and non-medical determinants for disability pension in a Norwegian total county population study. Soc Sci Med 2004;58:1837-48

Romundstad S, Holmen J, Hallan H, Kvenild K, Ellekjaer H. Microalbuminuria and all-cause mortality in treated hypertensive individuals: does sex matter? The Nord-Trøndelag Health Study (HUNT), Norway. Circulation 2003; 108: 2783-2789

Nilsson M, Johnsen R, Ye W, Hveem K, Lagergren J. Obesity and estrogen as risk factors for gastroesophageal reflux symptoms. JAMA 2003; 290: 66-72

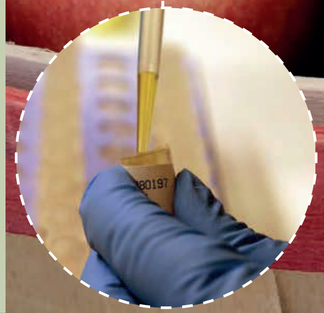
Rørtvet G, Daltveit AK, Hannestad YS, Hunsår S. Urinary incontinence after vaginal delivery or cesarean section. N Eng J Med. 2003 Mar 6;348(10):900-7


HUNT Biobank in Levanger

Utforming og trykk: Tapir Uttrykk 2008

The Nord-Trøndelag Health Study (HUNT), Norway

NTNU
Faculty of Medicine



NTNU
Norwegian University of Science and Technology

HUNT 1-2-3

In 1984, a population-based health study was launched in the central Norwegian region of Nord-Trøndelag. The study was intended to stimulate epidemiological research and to provide a new basis for clinical and preventive medicine projects. The study was named the HUNT Study.

The County of Nord-Trøndelag has a scattered rural population of about 130,000, which can be characterized as stable and homogeneous. Urban centres are small, with fewer than 25,000 inhabitants, and the population is served by two well-established local hospitals. To date, three surveys have been completed.

The **HUNT1** study (1984–1986) recruited 75,000 participants above 20 years of age, with no upper age limit. The participation rate was 88 %, a remarkable result in national and international terms. The survey was based on questionnaires and clinical examination, a capillary glucose test was taken, but no biological samples were stored.

The **HUNT2** study (1995–1997) comprised 74,000 participants, once again achieving a very high participation rate of 72 %. The age group between 13 and 19 was included in a sub-study called *YoungHUNT*. In addition to questionnaires and clinical examination, 65,000 blood samples (serum, whole blood) were collected from all participants aged 20 or older, resulting in the current collection of purified DNA material.

The **HUNT3** study (2006–2008) was completed in June 2008 with a attendance rate of close to 60 %, comprising about 60,000 participants, including the YoungHUNT sub-study. The study introduced a strict protocol for collection, sample handling and storing of blood samples, thus ensuring biological samples of optimal quality.

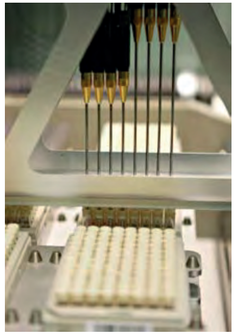
Covering more than 20 years

HUNT offers unique opportunities for longitudinal studies, given that 46,000 individuals participated in both HUNT1 and HUNT2, covering a period of 10 years. Of these, 27,000 have also participated in HUNT3, allowing for 20 years of longitudinal follow-up. In HUNT 3, 37,000 of the participants in HUNT2 were re-examined.

The combination of health data and biological material with a very large number of other exposure variables, is ideal for studies of interactions between genetic variation, lifestyle and environmental factors. The value of HUNT lies also in the possibility of linking to well-classified phenotypic information sources, such as local and national disease registries.

The homogeneous and stable population of Nord-Trøndelag in Norway is a unique source of health information and biological material

YoungHUNT: In 1995, YoungHUNT was established covering the age group from 13 to 19 with a attendance rate of 90 % of the invited.



HUNT Biobank and the National CONOR Biobank

HUNT Biobank is one of the most modern and extensive international biobanks, storing whole blood and DNA from 200,000 individuals, serum and plasma samples from more than 100,000 individuals as well as urine, RNA tubes, cells, buffy coat and Na-heparin tubes for environmental analysis for as many as 50,000 individuals.

All bio-specimens from the HUNT surveys are collected, processed and stored at the HUNT Biobank in Levanger, which was officially opened in March 2007. The Biobank is a new laboratory and storage facility (2000 m²) specially designed for the purpose and equipped with state-of-the-art infrastructure, including a fully automated DNA storage facility, in which all samples are stored at the appropriate temperature.

The National CONOR Biobank is located on the same site, where it serves as a central research repository for DNA samples from all the largest Norwegian health surveys. These make up "the Cohorts of Norway" (CONOR), which include samples from more than 200,000 individuals.

International collaboration and ongoing studies

The HUNT databank provides data on a large number of diseases observed in the general population. The data have been utilized in more than 250 ongoing or completed research projects, with particular emphasis on major disease areas such as diabetes type 2, cardiovascular, kidney and pulmonary disease, and bone density - as well as in studies on urine incontinence, haemochromatosis, reflux disease/dyspepsia, thyroid disease, headache and skeletomuscular complaints, anxiety and depression.

HUNT is an integral part of several EU projects in the Sixth and the Seventh Framework Programme and its role in EU-funded health research is expected to be further extended in years to come. HUNT also participates in major collaborative transatlantic projects funded by the National Institutes of Health (NIH) and the National Cancer Institute (NCI).

HUNT has cooperated actively with the UK Biobank, on the basis of a bilateral national agreement signed in 2005, including the development of integrated solutions for data management and automated sample handling.

In 2007, NTNU and the International Agency for Research on Cancer (IARC/WHO) signed a memorandum of understanding promoting cancer research, based on HUNT studies.

HUNT Biobank is also collaborating with partners in India to establish population-based health cohorts and biobanks.

HUNT Biosciences Ltd

HUNT Biosciences Ltd is the commercial arm of the HUNT Biobank and CONOR. HUNT Biosciences was established in 2007 in order to offer a professional interface with industry and facilitate commercial use of HUNT data, without compromising the trust of the donor population. HUNT Biosciences is publicly owned, and any profits made by the company will be returned to the community as a financial basis for further research.

Contact information: Neptunveien 1, N-7650 Verdal, Norway. Tel: + 47 74 07 51 80 Fax: +47 74 07 51 81 www.hunt.ntnu.no

HUNT phenotype, genotype and environmental data support R&D for major disease areas such as:

Diabetes & Obesity

Phenotype /medical data:
- Medical examination results include height, weight, waist/hip ratio, Body Mass Composition, blood pressure and heart rate
- Serum values including total cholesterol, HDL, triglycerides and glucose
- Family medical history include data on diabetes and cardiovascular disease among relatives
- Glucose tolerance test for all those at risk for diabetes
- Self-reported health and disease status
- Crosslink with clinical records and local end-point registries via local hospitals
- Medication via Prescription registry

HUNT Diabetes Project:
- Specific questionnaire
- Individual follow-up study with interventions

Lifestyle & environmental data:
- Data on smoking, alcohol consumption and drug consumption
- Physical activity
- Personal circumstances
- Housing
- Employment
- Local environment

Genotype information:
- DNA samples for analysis
- Extensive genotyping results will be available from an increasing number of samples in the HUNT Database
- Infrastructure for replication studies in place
- In-house genotyping facility

Arthro-sclerosis & Thrombosis

Phenotype /medical data:
- Medical examination results incl. height, weight, waist/hip ratio, Body Mass Composition, blood pressure and heart rate
- Serum values including Total cholesterol, HDL, Triglycerides and Glucose
- Self-reported health and disease status
- Medication from Prescription Registry

Link to local endpoint registries:
- Venous Thromboembolism with 750 retrospective cases from 1996–2000, and new cases from 2000–2007 to be added.
- Myocardial Infarction with 300–350 incident cases/year, retrospectively for 1996–2000 and prospectively from 2001

Lifestyle & environmental data:
- Data on smoking, alcohol and drug consumption
- Physical activity
- Personal circumstances
- Housing
- Employment
- Local environment

Genotype information:
- DNA samples for analysis
- Extensive genotyping results will be available from an increasing number of samples in the HUNT Database
- Infrastructure for replication studies in place
- In-house genotyping facility

Biomarker discovery and validation

Phenotype/medical data:
- Results from clinical examination and serum analysis
- Family medical history
- Crosslink with National Registries
- Crosslink with clinical records and local end-point registries via hospitals
- Information on medication via National prescription registry
- Serum samples available for additional analyses
- Longitudinal data covering more than 20 years

Subprojects collecting detailed disease specific information
- Disease-focused questionnaires
- Individual follow-up study with interventions (e.g. diabetes)

Lifestyle & environmental data:
- Data on smoking, alcohol and drug consumption
- Physical activity
- Personal circumstances
- Housing
- Employment
- Local environment

Genotype information:
- DNA samples for analysis
- Extensive genotyping results will be available from an increasing number of samples in the HUNT Database
- Infrastructure for replication studies in place
- In-house genotyping facility

Oncology

Phenotype /medical data:
- Results from clinical examination and serum analysis
- Family medical history incl. cancer cases
- Crosslink with National Cancer Registry
- Crosslink with clinical records via local hospitals
- Information on medication via National prescription registry
- Serum samples available for additional analyses
- Longitudinal data covering more than 20 years

HUNT3: subprojects for specific cancers
- Questionnaires for breast, prostate and colorectal cancer
- Links to clinical biobanks collecting tissue samples of HUNT participants that developed cancer

Lifestyle & environmental data:
- Data on smoking, alcohol and drug consumption
- Physical activity
- Personal circumstances, housing and employment
- Local environment
- More than 800 exposure variables

Genotype information:
- DNA samples for analysis
- Extensive genotyping results will be available from an increasing number of samples in HUNT Database
- Infrastructure for replication studies in place
- In house genotyping facility
- Access to tissues possible via clinical biobanks