



## **D 6.4**

### **Synthesis Document:**

### **Future Public Health Research Agenda**

#### ***Report Information***

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## EXECUTIVE SUMMARY

- Non-communicable diseases represent a leading threat to human health, and are collectively responsible for almost 70% of all deaths worldwide. WHO estimates that total deaths from NCDs will increase by a further 17% over the next 10 years.
- An important way to control NCDs is to focus on reducing the risk factors associated with these diseases. Monitoring progress and trends of NCDs and their risk is relevant for guiding policy and priorities. For achieving the global target of a 25% relative reduction in the risk of premature mortality from NCDs and to lessen the impact on individuals and society, a comprehensive approach is needed requiring all sectors, including health, finance, transport, education, agriculture, planning and others.
- The FRESHER project is an interdisciplinary research and foresight project with the objective of representing alternative futures where the detection of emerging health scenarios is used to test future policies to effectively tackle the burden of NCDs in Europe. Within the FRESHER project, the policy activity aims to produce recommendations to EU and to national policymakers in both the health and non-health sectors, and to produce an agenda for future European Health Research.
- The Research Agenda intends to identify key research priorities which can be used as starting points for the development of research strategies and funding programmes. This document is the result of consultation processes with research communities and stakeholders from business, government and civil society, as well as open online surveys that received contributions from people in all European countries.
- For an effective tackling of NCDs burden, it is necessary to understand and identify the key public health research needs related to NCDs. The objective is to address both unmet medical need and total economic burden of disease for society from a holistic health and social care approach including prevention, primary and specialist care and social care. It is necessary to develop innovative approaches across all key components of health systems. The role and use of high-cost diagnostic and intervention technologies need to be researched in order to maximize health benefits and equity. Further research need have been identified in the fields of:
  - Personalised medicine
  - Public health and prevention
  - Active and healthy ageing
  - Big data
  - eHealth and mHealth
  - Integration of care
  - Environment and health

Different areas would benefit from research investment so that policy decisions for addressing NCDs will be grounded in evidence-based research. Problem-oriented health policy and systems research has a critical role to play in the effective implementation of evidence-based interventions.

The main points that would need further research to fill the research gap about how best to translate research findings into policy and practice work would be:

- Health Inequalities
- Monitoring and evaluation
- Evidence based Health Policy
- Universal Health Coverage
- Research on Health Systems

## 1. NON-COMMUNICABLE DISEASES

Non-communicable diseases (NCDs), including cardiovascular diseases, cancers, diabetes, chronic respiratory diseases, obesity, musculoskeletal diseases and mental disorders, represent a leading threat to human health, and are collectively responsible for almost 70% of all deaths worldwide with 80% (28 million) in low- and middle- income countries (LMICs), and approximatively 29% of deaths involving people less than 69 years of age (1, 2, 3).

The rise of NCDs has been driven by common, modifiable risk factors including tobacco, harmful use of alcohol, unhealthy diet, insufficient physical activity, overweight/obesity, raised blood pressure, raised blood sugar and raised cholesterol. In addition, these diseases are driven by forces that include ageing, rapid unplanned urbanization and the globalization of unhealthy lifestyles (4).

WHO estimates that total deaths from NCDs will increase by a further 17% over the next 10 years, and NCD burden is projected to increase disproportionately in LMICs populations (1). (Fig. 1 and 2)

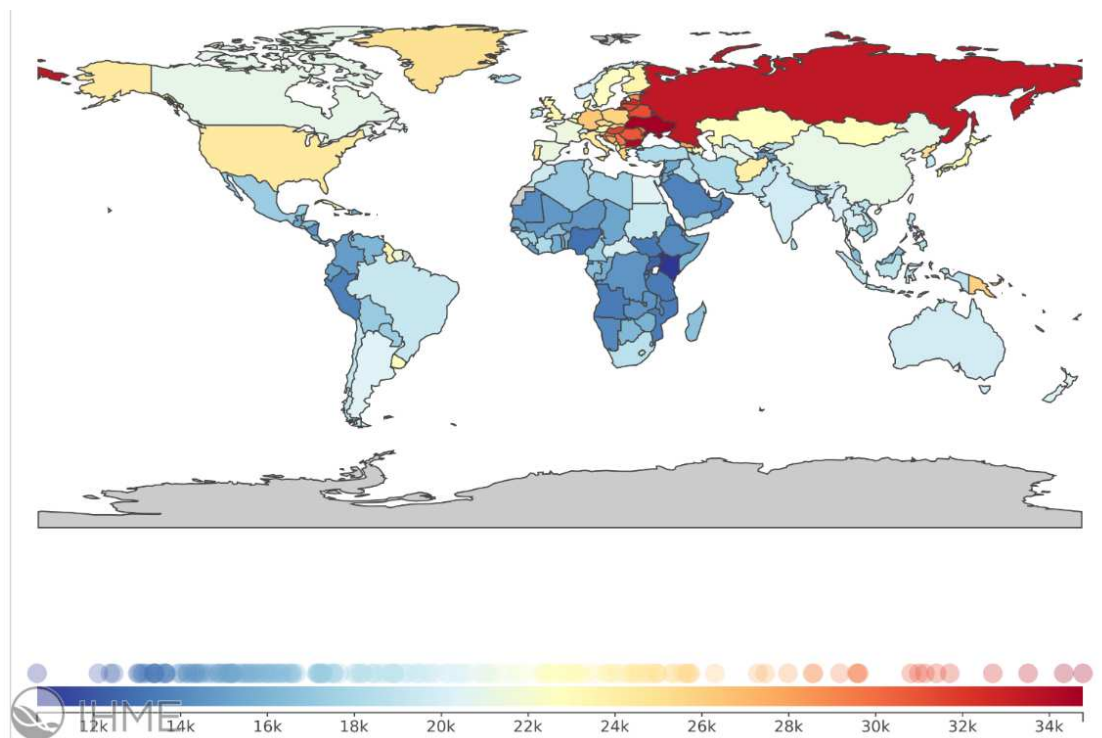


Fig.1 Non- communicable diseases. Both sexes, All ages, 2016, DALYs per 100,00  
From Institute of Health Metrics and Evaluation <http://www.healthdata.org/>

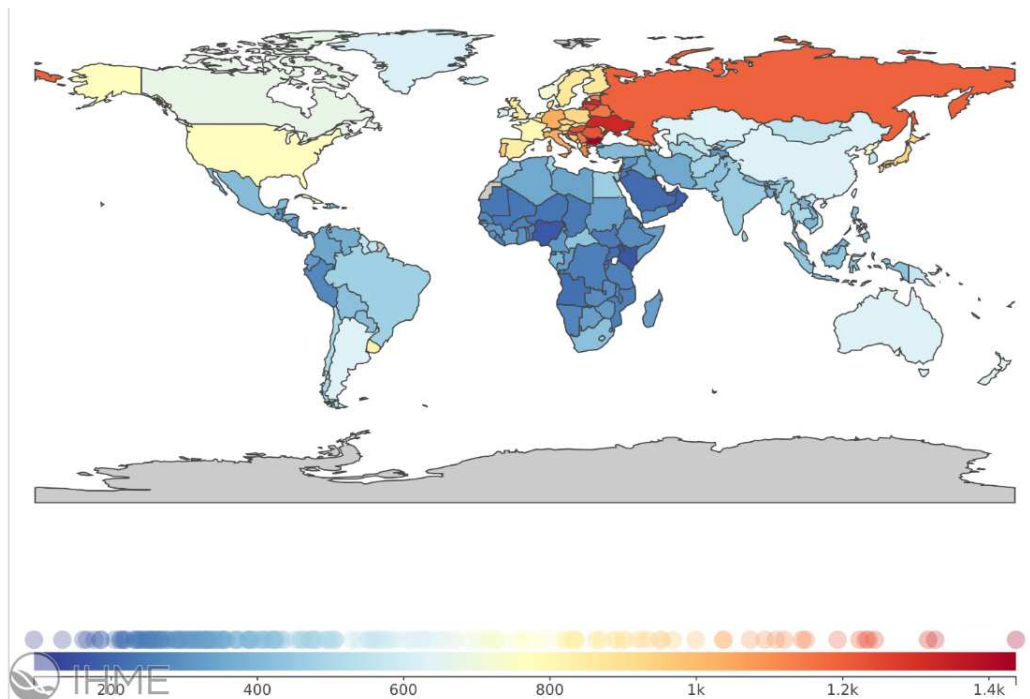


Fig.2 Non- communicable diseases. Both sexes, All ages, 2016, Deaths per 100,00  
From Institute of Health Metrics and Evaluation <http://www.healthdata.org/>

The rapidly increasing magnitude of these diseases disproportionately affects poor and disadvantaged populations, contributing in widening health disparities between and within countries. The rapid rise in NCDs is predicted to impede poverty reduction initiatives in low-income countries, particularly by increasing household costs associated with health care. Vulnerable and socially disadvantaged people get sicker and die sooner than people in higher social positions, especially because they are at greater risk of being exposed to harmful products, such as tobacco, or unhealthy dietary practices, and have limited access to health services.

NCDs threaten progress towards the 2030 Agenda for Sustainable Development, which includes a target of reducing premature deaths from NCDs by one-third by 2030.

An important way to control NCDs is to focus on reducing the risk factors associated with these diseases and low-cost solutions exist for governments and other stakeholders to reduce the common modifiable risk factors. Monitoring progress and trends of NCDs and their risk is relevant for guiding policy and priorities. Prevention of NCDs is important, however, investing in better management, including the detection, screening and treatment of NCDs, is the other key component of the NCD response.

For achieving the global target of a 25% relative reduction in the risk of premature mortality from NCDs and to lessen the impact on individuals and society, a comprehensive approach is needed requiring all sectors, including health, finance, transport, education, agriculture, planning and others, to collaborate to reduce the risks associated with NCDs, and promote interventions to prevent and control them (2-4).

Below a schematic representation of the overall burden of diseases in Western and Eastern Europe (fig.3 and 4):

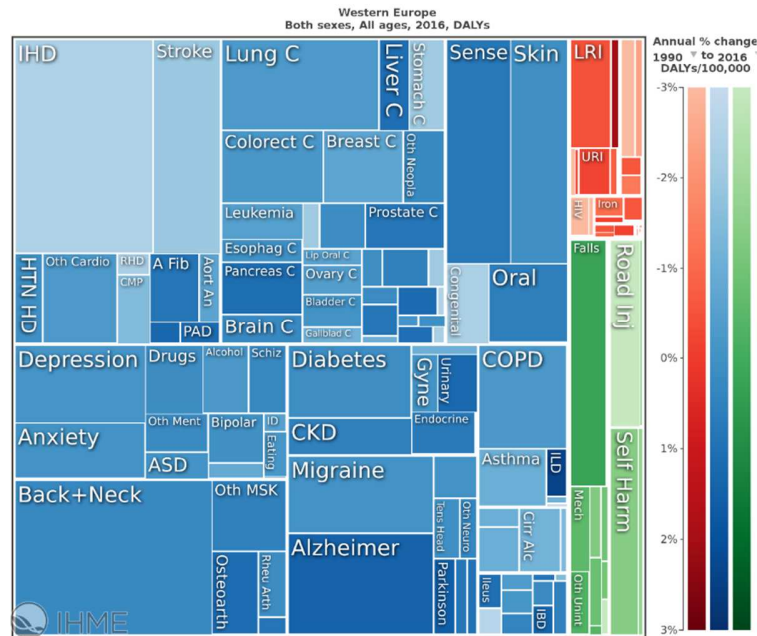


Fig.3 Non- communicable diseases. Both sexes, All ages, 2016, DALYs; Western Europe  
From Institute of Health Metrics and Evaluation <http://www.healthdata.org/>

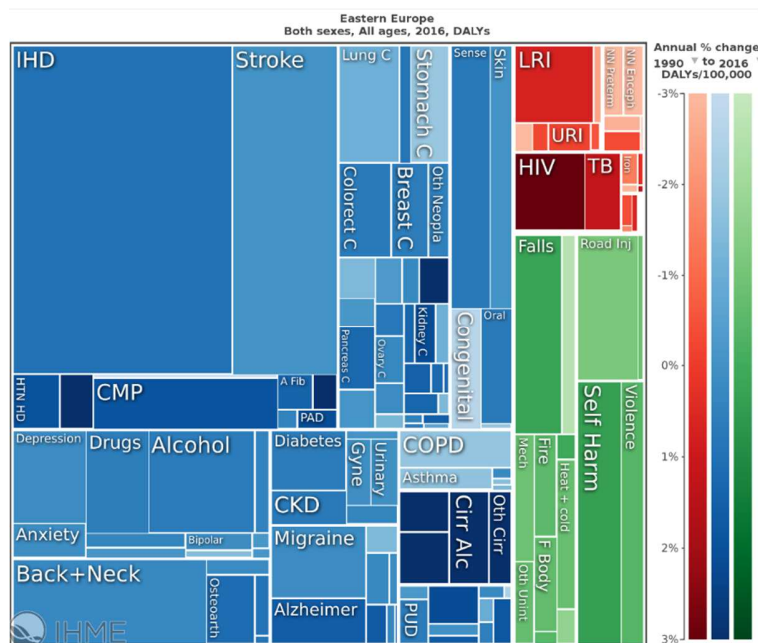


Fig.4 Non- communicable diseases. Both sexes, All ages, 2016, DALYs; Eastern Europe  
From Institute of Health Metrics and Evaluation <http://www.healthdata.org/>

## 2. THE FRESHER PROJECT

FRESHER is an interdisciplinary research and foresight project with as an overall objective the representation of alternative futures where the detection of emerging health scenarios will be used to test future policies to effectively tackle the burden of non- communicable diseases (NCDs) in Europe. As one of the largest threats to public health globally, the exponential growth of NCDs in Europe has a serious negative impact on human development, reduces productivity, contributes to poverty and creates a significant burden on health systems. Therefore, one of the main goals of FRESHER is to identify core determinants that could be targeted to lessen the impact of NCDs, focusing on a set of chronic diseases which currently constitute the bulk of the mortality rate in Europe: cardiovascular diseases, cancers, diabetes, chronic respiratory diseases obesity, musculoskeletal diseases, mental health and neurologic disorder.

Within the FRESHER project, the policy activity aims to produce recommendations to EU and to national policymakers in both the health and the non-health sectors, in order to devise, implement and harmonize European policies and actions that are likely to reduce the burden of NCDs over the next decades. A common European strategy to tackle future NCDs scenarios is needed, overcoming some of the existing limitations of current policies. The policy dialogue must consider all areas of policy intervention, and analyse the combinatorial effect of implementing them simultaneously, and the potential for positive synergies and negative side effects.

A second objective of FRESHER Policy work has been oriented to produce an agenda for future European Health Research, aimed at producing scientific evidence in the main areas of policy intervention, health and non-health determinants and health care systems to make sure that every action and decision is grounded into evidence from research.

During the first part of the project we reviewed the existing policies to tackle NCDs in Europe, mostly directed at the classical risk factors (tobacco, alcohol, unhealthy diet and lack of physical activity), also reviewing the evidence of the impact of these policies on public health impact. (Document D6.1 available on the website <http://www.foresight-fresher.eu/en/Tools/Project-Documents/>)

From this exercise, we ascertained that the key risk factors for NCDs have been clearly identified and specifically targeted with cost-effective, feasible and evidence-informed interventions, that in many cases could effectively reduce the burden of NCDs (Document D6.2 available on the website <http://www.foresight-fresher.eu/en/Tools/Project-Documents/>). Nevertheless, without substantial progress in implementing these measures, and without a new approach to further tackle NCDs, countries are unlikely to meet the global target of a 25% reduction in NCDs mortality by 2025 ("25 by 25") adopted at the World Health Assembly in May 2012.



Therefore, in the second part we shifted our view from policies tackling the risk factors, to policies directed at determinants and drivers of NCDs: policy influence is required in areas that extend well beyond the health sector, and coordinating mechanisms are needed to facilitate inter-sectoral and interdepartmental cooperation. Structural changes in governance, economy and society are needed to influence citizens' behaviours and consequently their health status. Therefore, we addressed the question of which main drivers of change could reshape the socio-economic and political context and have a high impact in creating healthy future.

To select the most important drivers related to health and NCDs, the project team has conducted a "Horizon Scanning" of the short-, medium- and long-term trends and drivers related to health and NCDs by searching into a large variety of sources. To complement the literature review on well-researched risk factors, three regional workshops (Vienna, Brussels, and Lisbon) were organized in 2015 to elicit stakeholders' observations about possible changes, wider correlations and potential indications of emerging issues. The results of these consultations are included in the FRESHER report D3.1 "Horizon Scanning" available on the FRESHER web-site (<http://www.foresight-fresher.eu/en/Tools/Project-Documents/>).

We came up with those trends and drivers that emerged as the most prominent ones within the scientific community of researches working in the field or in related fields. These were aggregated and fine-tuned to group them in eight key trends:

- Demographic change
- Urbanisation
- Climate change and low carbon TRANSITION
- Agriculture and global food chains
- Citizens empowerment
- Innovation in medicine
- Economic innovation
- Equity

These trends were then ranked by launching a survey in June 2016 to collect stakeholders' educated guesses on the importance of each trend in reducing NCDs incidence by 2050. The results of the survey together with a factsheet describing the eight key trends are included in the FRESHER report D4.1 "Health Stories" available on the FRESHER web-site (<http://www.foresight-fresher.eu/en/Tools/Project-Documents/>).

Taking stock of the foresight literature on these trends and in a process of co-creation with the consortium partners, the project team has built four Health Scenarios, which present radically different visions on how the key trends could evolve and influence our health status in the future:



- **Healthy together:** *the priority is to promote health and well-being for all.*
- **We will health you:** *the priority is to maintain a healthy workforce, for the continuation of economic productivity and for ensuring the sustainability of the healthcare systems.*
- **Rich get healthier:** *Freedom and meritocracy are the pillars of societal structure.*
- **Desolation health:** *the European model declined and the European governance, shared values and the common market were destroyed following the economic crisis.*

The full description of each Scenario is available on the FRESHER web-site, and was used as background material for the launch of the second FRESHER survey.

FRESHER Scenarios offer medium – long-term visions aimed at policy-makers for planning future policy actions, delineating policy alternatives and new policy combinations regarding the future of health and NCDs.

The scenarios were used to identify a list of alternative policy options used as a starting point for the document D6.3 “List of alternative policy options for policy makers according to different scenarios”, available on the website (Document D6.3 available on the website <http://www.foresight-fresher.eu/en/Tools/Project-Documents/>).

In Fig.5 is illustrated the path that we followed during the project, that ultimately led us to produce the Research Agenda, as the result of consultation processes with research communities and stakeholders from business, government and civil society, as well as open online surveys that received contributions from people in all European countries.

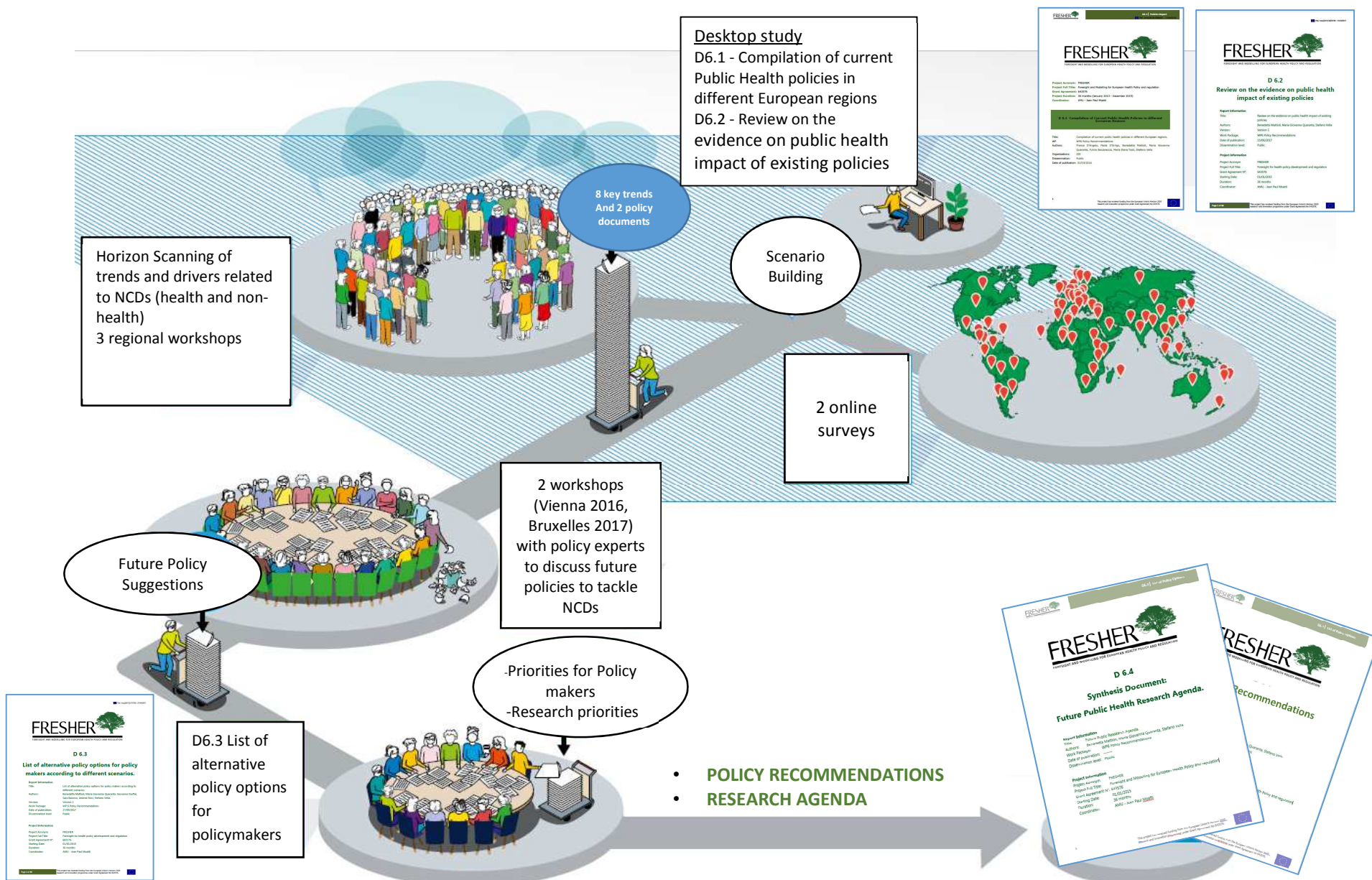


Fig. 5 The FRESHER Policy Work

### 3. MICROSIMULATION MODEL

Quantitative forecasts of the health and economic burden of NCDs in 2050 are obtained from the microsimulation model developed by the OECD for the FRESHER project.

The four scenarios have been integrated into the model starting from expert-based evaluations from the second Fresher survey. Expert-based predictions of key risk factors at the 2050 horizon are complemented with objective measures of the "Best" and "Worst" case scenarios that assume all countries will converge to the minimum (best) and maximum (worst) values as they are observed in 2015 in European countries.

The microsimulation model is used to analyse if the changes in risk factors that have been predicted for the different scenarios may have a significant impact on chronic diseases. Life expectancy is projected to grow compared to current levels but to different degree in the four scenarios and in the three European zones (Northern, Central-Eastern and Southern).

Overall, two scenarios ('Healthy Together' and 'We will health you') are associated with reduced exposure to risk factors compared to the current situation, while the other two ('The Rich Get Healthier' and 'Desolation Health') are generally associated with a worse risk factor outlook. (Analysis based on the new model developed by OECD for the FRESHER project, 2017. <http://www.fresher-explorer.eu/>)

The projected health impacts of the four FRESHER scenarios are important, but relatively small compared with those of underlying demographic trends. None of the scenarios is projected to offset the life expectancy gains envisaged by current population projections. This means that an increase in chronic diseases is to be expected as an effect of population ageing, which could be fuelled or mitigated to some degree by societal trends, but would not be changed fundamentally in the absence of dramatic changes in policy or human behaviour.

The Fresher project has assessed the impacts of a combination of the most efficient policies aimed at tackling the major NCDs risk factors (alcohol, tobacco, unhealthy diet and obesity) finding that life expectancy would be prolonged by one month on average between 2018 and 2050, and the incidence of disease would be reduced. The impact of the policy package in each scenario is also tested: Fig 5 shows impact on cancer incidence of the policy package in the scenario "the rich get healthier" compared to Healthy together. Based on the computer simulation analyses, the policy package would shift downwards the trend of the new cases of cancers: the new cases between 2010 and 2050 is estimated at 60% in "the rich get healthier" while 57% when accounting for the policy package.

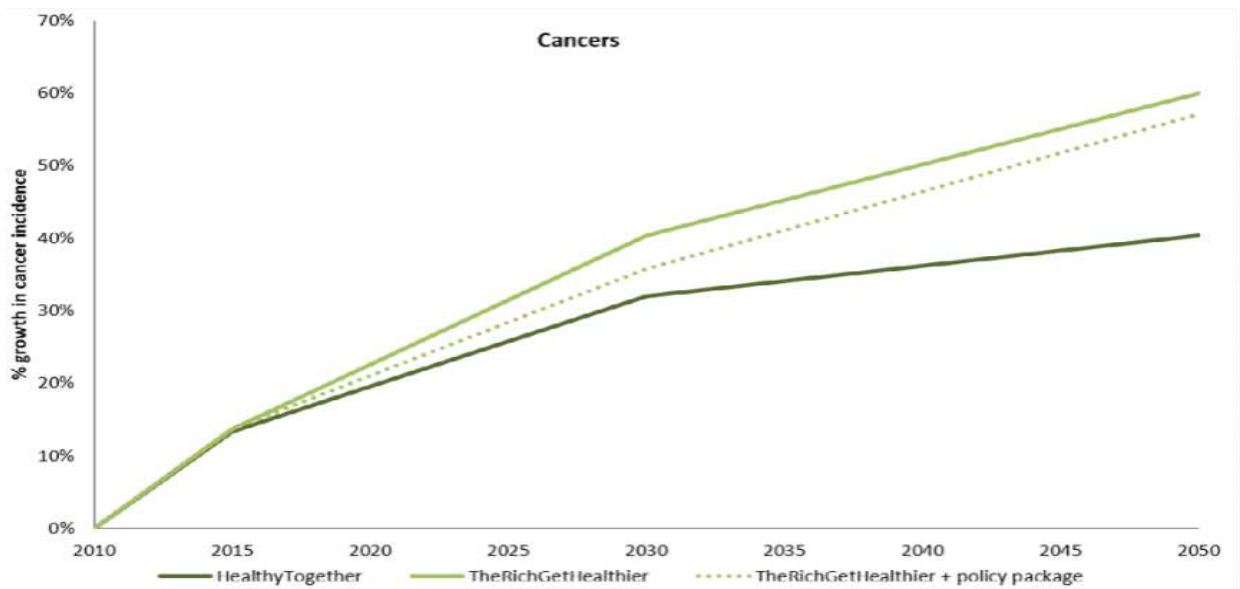


Fig. 5 Impacts of a combined set of policies on new cases of cancers, Southern Europe

Source: Analysis based on the new model developed by OECD for the FRESHER project, 2017.

<http://www.fresher-explorer.eu/>

This shows that current policies alone can, at best, bend the increasing trend of chronic disease but will not be sufficient to offset the impacts of current demographic trends, even if supported by favourable societal trends, as encapsulated in the healthier FRESHER scenario.

#### 4. THE FUTURE PUBLIC HEALTH RESEARCH AGENDA

Reducing the burden of NCDs is essential to put an end to extreme poverty, reduce inequality, and improve health and well-being. It is estimated that NCDs will kill around 38 million people every year, accounting for 68% of all deaths worldwide and causing half of all global disability.

Strong commitments and advocacy has helped to advance the NCD agenda in recent years, with the adoption of the *WHO Global NCD Action Plan 2013-2020* and the first set of global NCD targets, and with agreement by UN Member States on an ambitious 2030 Agenda for Sustainable Development that includes NCDs.

Nevertheless, despite achieving important milestones in recent years, there is no room for complacency.

Evidence shows that a ‘business as usual’ approach will be insufficient to meet the WHO ‘25 x 25’ global NCD targets, an important milestone towards the SDGs.

The imperative for action is further reinforced by persistent gaps and shortcomings in the response, ranging from inadequate resources, a lack of preventative action, vulnerable and ill-equipped health systems to respond to the growing burden, and an absence of the voice of people living with NCDs in the response.

There has been growing awareness in the global health community, of NCDs as primary threats to individuals, communities, health-system infrastructures and economic development. It is now acknowledged that NCDs contribute greatly to rising health care costs and the loss of economic productivity. A range of programs and interventions have been considered and some innovative efforts are underway, but positive outcomes have often been difficult to secure because of global inequities in healthcare access, the globalization of risk factors and the costs of implementing interventions.

Given the global fiscal crisis of recent years, it is unrealistic to expect large pools of new resources from traditional donors. Policy makers need to decide how best to incorporate NCD responses into existing funding streams and programs. We need recommendations for action that are sustainable in the current political and economic landscape.

The Research Agenda intends to identify key research priorities which can be used as starting points for the development of research strategies and funding programmes.

This document is the result of consultation processes with research communities and stakeholders from business, government and civil society, as well as open online surveys that received contributions from people in all European countries.

The *Research Agenda* advocates not just a set of research priorities, but also for a strong emphasis on full integration among scientific disciplines, on producing knowledge that is valuable to decision-makers, and on generating the solutions that society needs.

The goal of this Research Agenda is to guide national NCDs research frameworks and facilitate translation of research findings into policy and practice.



In particular, by ensuring that decisions and actions for addressing NCDs are grounded in evidence from research and by identifying knowledge gaps and strengthen research required for public health action, prevention of NCDs, priority health needs and health equity.

NCDs require long-term care that is proactive, patient centred and community based. Such care is best delivered through a primary health care approach. Priority research needs with regard to NCD in primary health care are mainly related to implementation of existing knowledge. For example, a common research issue concerns the application in primary health care of interventions proven to be effective in randomized control trials. Further primary health care and health systems research needs to be sensitive and responsive to the diversity of health systems as well as different national, social, economic and political contexts.

Many primary prevention activities are ongoing in high-income countries, for example on tobacco control, healthy diet or protection from ultraviolet radiation, but given the still high exposure prevalence the optimization of prevention plans remains a high priority. Where causes are known the challenge is to conduct research into prevention measures that put this knowledge into practice in the specific cultural and regional context.

Where potent NCD medicines have already been developed, innovative ways to improve NCD medicine access in developing countries are needed. Secure and efficient distribution of NCD medicines is far from guaranteed in developing countries. Availability in poor and remote areas remains limited, hefty mark-ups along the supply chain are common, and the share of counterfeited product is substantial. In addition, medicines availability can be hampered by regulatory obstacles.

Limited access to quality primary care is the key obstacle to improving NCD drug treatment in developing countries. In the absence of a robust primary care system, NCDs go unnoticed until complications arise, adequate treatment is not initiated, treatment effect is not consistently monitored and terminally ill patients do not receive palliative care. At the same time, improving access to primary care is a complex challenge requiring that such fundamental issues as resourcing, governance, and capacity building be addressed.

A coordinated and harmonized agenda for research in Europe is a key requirement for effective prevention and control of NCDs, especially since resources for health are limited, and it is essential that policies and programmes are based on scientific evidence to ensure effectiveness.

For an effective tackling of NCDs burden, it is necessary to understand and identify the key public health research needs related to NCDs.

The WHO “Prioritized Research Agenda for Prevention and Control of Noncommunicable Diseases” (5) published in 2011 bases the analysis on six crucial questions:

- What is effective in reducing the NCD burden and disparities?
- How to efficiently apply the evidence base for reducing the burden and disparities?
- How to track the NCD burden and its social determinants?
- How to monitor and evaluate effectiveness of NCD prevention and control?
- What new diagnostics, medicines, technologies and vaccines are required to improve outcomes?

- what are the key research priorities for establishing and scaling up comprehensive national NCD policies and programmes in low- and middle-income countries?

There is a substantial body of knowledge on the causes of NCD burden and its determinants, that also lie outside the health sector. Research required to address the challenges of NCD prevention and control is broad and spans a wide range of domains and requires intersectoral and multidisciplinary efforts, in different domains:

- (i) social and economic determinants in health and non-health sectors;
- (ii) behavioural risk factors (tobacco use, physical inactivity, obesity, unhealthy diet and harmful use of alcohol);
- (iii) prevention, detection and care of major NCDs (CVD, cancer, chronic respiratory disease and diabetes);
- (iv) health policy, health equity and health systems;
- (v) evaluation of effectiveness and impact of prevention policies and programmes;
- (vi) low-resource settings;

#### 4.1 Research priorities for Europe

In 2016 the Horizon 2020 Advisory Group for Societal Challenge 1, "Health, Demographic Change and Well-being", has produced a report with research priorities for Europe (6), to face major challenges in health, for which research, innovation, education and knowledge generation are essential.

Europe has to face rising healthcare costs, an ageing population, migration and other disruptions at the heart of our societies. There are new emerging serious infectious diseases, climate change is influencing health and well-being, and there is a reduction in general security within many sections of society, including problems with inequality and even issues of food security. At the same time, technology continues to develop at an accelerating pace alongside societal attitudes marked by ever greater demands.

Many specific points have been identified, one of them being of course NCDs. Collectively, NCDs and their risk factors and determinants present a substantial burden in terms of morbidity and mortality, particularly amongst the poorest in our society. Different areas would benefit from research investment so that policy decisions for addressing NCDs will be grounded in evidence-based research. The three main points that would need further research work would be:

1. Intervention studies that will bend the curve of morbidity and mortality in NCDs. This would need the development of preventive/therapeutic approaches, including lifestyle interventions that examine behavioural sciences' role in tailoring interventions to change risk profiles/risk behaviour, (including obesity, smoking, alcohol consumption, dietary habits).



2. Understanding the pivotal role of co-morbidities in NCDs. Few diseases occur in isolation, in particular in the elderly and the effects on a person's health may be multiplicative. To develop better therapeutic strategies, one needs better understanding of the synergistic effects of disparate pathobiology, host immune system and metabolism, lifestyle, and environment.
3. Resilience in NCDs. Why do some people not develop disease despite being at risk (e.g. based on their genetic, phenotypic or environment profiles)? We need a strategic approach to identify resilience among individuals at high risk of specific NCDs and/or their co-morbidities to determine and study individuals' unique profiles based on multi-omics, environmental and other health-related data, with the ultimate aim of identifying new approaches for disease prevention based on this knowledge.

Connected with NCDs, many other areas addressed in the document are of interest in the contest of the Fresher project, like:

- Personalised medicine
  1. Building cases for implementation of personalised medicine (PM). Better understanding of disease etiologies at the system level (including their co-morbidities and sex-related differences) across a full course of disease development, leading to better diagnostic re-classification, novel biomarkers and targets.
  2. Focus on specific disease areas for successful implementation of PM. Pilot and implement PM in specific cases, building on new disease knowledge and utilising innovative technologies (e.g. diagnostics, Information and Communication Technologies-ICT, therapies).
  3. Wider acceptance of PM and facilitating development of European market for PM. Scalability of electronic health records (EHR) across Europe.
- Public health and prevention
  1. How to promote well-being and prevent health problems and social exclusion? The identification of personal, social and environmental risk factors and processes responsible for health and disease in society. The interplay between the person and the environment. Determining the causes of psychosocial and health difficulties throughout the lifespan for increasing the mental, physical and social capital of the populations of Europe, will lead to improved prevention because understanding the causes of health problems is the key to promote health and wellbeing.
  2. How effective were already implemented preventive programs on individual and population level? How to improve preventive programmes on evidence-based approaches? Assessments of already implemented programmes of individual and population health promotion is needed to create an evidence-based approach for future initiatives for prevention and public health. Evidence shows that investing money in early interventions leads to lower cost of treatment later, but many programmes are almost ineffective when tested in the real world; and why do few programmes succeed when the burden of disease and mental health problems are so huge?

3. From genes to greens. Examining the individual in the larger context will reveal environmental protective factors against health problems and reduced well-being. Future research needs to span from analyses of the individual's genetic make-up to family harmony and interactions, peer relationships, social institutions (day-care, school, work) and neighbourhoods.

- Active and healthy ageing
  1. What prevention strategies for lifestyle-related diseases and the ageing process can be applied to ensure active and healthy ageing of our population?
  2. Building an evidence-based roadmap to enable faster implementation and adoption of new technologies and better (coordinated) care models, overcoming current barriers to change for the elderly citizen, overcoming current barriers to change.
  3. Maximising opportunities for independent living of elderly citizens by creation of a more age friendly environment, including physical, technological and organisational dimensions. For example, using the latest ICT and Artificial Intelligence technology to better support independent living and active engagement of the elderly citizen in society.
- Big data
  1. Nearly all future health research will be based on analysis of increasingly large datasets ("big data") leading towards stratification of diseases, personalised medicine and systems medicine. A new innovative and integrated research approach is needed to develop existing and future data resources in a harmonised/standardised manner and make them interoperable across the different disciplines. Focus should shift from data generation to data integration and interpretation.
  2. Progress towards use of big data in health research requires better understanding of disease mechanisms, physiology and pathophysiology, disease co-morbidities and contributing environmental, psychological, socioeconomic, nutritional and lifestyle information at the systems level. Systematic characterisation of pathophysiology of selected human diseases, including analysis of co-morbidities and disease trajectories, are seen as the next steps for introduction of big data into healthcare and to lead the way to innovations.
  3. Medical informatics. Widespread introduction of personalised/systems medicine into clinics cannot be envisaged without totally new solutions for translating the big data into meaningful information in the actual healthcare settings.
- eHealth and mHealth
  1. eHealth (delivered via computer) and mHealth (delivered via mobile phone) solutions for improving safe and participatory continuity of care (including for example elderly persons with multi-morbidity) and also for personalised medicine.
  2. The development of best practices in information governance (legal, ethics and privacy protection policies, data sharing arrangements) and in privacy enhancing techniques (privacy and security by design and by default approaches).
  3. Closing the knowledge gap on how molecular medicine can best deliver precision medicine through stratified clinical care pathways and treatment decision support by integrating electronic health record data with other big data (e.g. large scale molecular data).

- Integration of care
  1. How can we foster cross-fertilisation between healthcare and medical research in a coordinated care setting? How can we make use of advanced analytics to learn from data in this expanded care process and generate new medical knowledge? How can we feed this knowledge back with the necessary clinical decision support and dynamic workflows across the coordinated care setting?
  2. How can we capture, organise and visualise distributed health data to enhance care in a coordinated care setting? Contrary to Electronic Medical Records (EMRs), which focus on the patient in the hospital, Electronic Health Records (EHRs) are longitudinal records, spanning across multiple information sources and across multiple care tiers with the patient at its centre.
- Environment and health, green solutions and sustainability including climate change
  1. What are the health impacts of technological innovations in response to climate change: healthy indoor environments and cities?
  2. Electric mobility: what are the benefits and costs of green solutions to mobility?
  3. How to promote active and healthy ageing in urban areas? How can environmental, spatial, economic and social drivers effectively encourage elderly to stay longer active and healthy?
- Inequalities
 

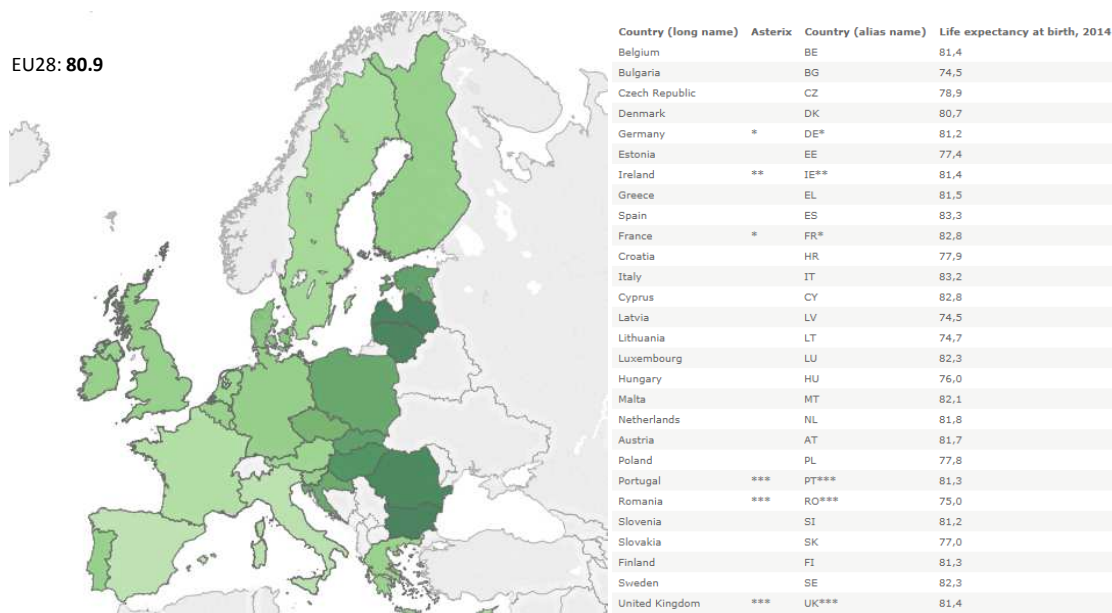
Equitable resource distribution and social determinants of health throughout the life course.

## 4.2 Health Inequalities

Health inequalities (HI) are the systematic, unfair and avoidable differences in health status or in the distribution of health determinants between social groups depending from the unequal distribution of power, money and resources that give rise to inequalities in the conditions in which people are born, grow, live, work and age (7). Over the last 15 years HI have been increasingly recognized and addressed in the European Union political agenda.

In the European Union, HI exist both between and within countries. Within countries, vulnerable (and often socially excluded) population groups are characterized by one or more of the following conditions: low household income, low educational level, unemployment (especially long-term unemployment), low socio-economic status (SES, which often includes one or more of the already mentioned conditions), poverty (or at risk of poverty), migrant background and ethnic minority background (EC 2009). Health tends to worsen from society's richest to poorest, and this is often referred to as a social gradient in health. Age and gender differences can also worsen health inequalities.

Common indicators of health status - part of the European Core Health Indicators (ECHI) – are life expectancy at birth (Fig.7), healthy life expectancy at birth, infant mortality rate and cause-specific mortality rates.



**Fig. 7 Life expectancy at birth, EU28 (both sexes), 2014**

Sources: ECHI European Core Health Indicators Data Tool, European Commission (accessed on 01/08/2016)

<http://ec.europa.eu/health/dyna/echi/datatool/index.cfm>

Eurostat (2017) European Commission, Population (Demography, Migration and Projections) <http://ec.europa.eu/eurostat/web/population-demography-migration-projections/deaths-life-expectancy-data/database>

For mapfunctions please see <https://ec.europa.eu/jrc/sites/jrcsh/files/mapfunctions.pdf>

The table (Tab.1) below shows how these indicators perform in EU member states. It illustrates several differences between countries such as:

- Life expectancy at birth - in 2014 life expectancy at birth differed by almost 9 years between countries with the highest and lowest records (ECHI Data tool, Eurostat 2017); similar inequalities (gaps of 10 years and more) can be seen within some countries between people with different education levels (ECHI Data tool).
- Healthy life expectancy - in 2014, healthy life expectancy at birth in both men and women, ranged from approximately 50 to 70 years, meaning that depending on their country of birth Europeans could expect to have 20 more (or less) years of healthy life (ECHI Data tool, Eurostat 2017). Moreover, the mismatch between life expectancy at birth and healthy life expectancy varied across the EU, from the lowest difference of 10 years to the highest one of 23.6 years.
- Mortality rates for ischemic heart disease, the leading cause of death in the EU, ranged from below 100/100,000 deaths in some Northern and Southern European countries to over 350/100,000 deaths in Eastern European ones in 2013 (9).

Table 1. Life expectancy at birth (years), infant mortality rate and standardized ischemic heart disease (IHD) mortality rate in EU Member States. EU-28 average is represented at the bottom of the table. For some countries, estimates of life expectancy stratified by ISCED education level are available. Sources: [ECHI Data tool](#), [Eurostat 2017](#)

Country	Life expectancy at birth, 2014	Life expectancy at birth, 2013			Healthy life expectancy, 2014		Infant mortality rate (deaths of children <1 y.o. per 1000), 2014	Standard mortality rate IHD (100,000), 2013
		Low education (ISCED 0-2)	Medium education (ISCED 3-4)	Higher Education (ISCED 5-8)	men	women		
Belgium	81.4				64.5	63.7	3.4	78.4
Bulgaria	74.5	68.7	76.3	78.7	62	66.1	7.6	199.5
Czech Republic	78.9	73	78.6	79.6	63.4	65	2.4	364.4
Denmark	80.7	77.6	80.6	82.5	60.3	61.4	4	86.8
Germany	81.2*				56.4	56.5	3.2	155
Estonia	77.4	67.5	77.5	81.7	53.2	57.1	2.7	311.1
Ireland	81.4**				66.3	67.5	3.3	166.5
Greece	81.5	79.4	82.5	83.6	64.1	64.8	3.8	97.9
Spain	83.3				65	65	2.8	72.1
France	82.8*				63.4	64.2	3.5	51.8
Croatia	77.9	76.9	76.9	80.1	58.6	60	5	310.3
Italy	83.2	80.9	85	84.9	62.5	62.3	2.8	104.2
Cyprus	82.8				66.1	66.3	1.4	104.2
Latvia	74.5				51.5	55.3	3.8	462.2
Lithuania	74.7				57.6	61.7	3.9	589.3
Luxembourg	82.3				64	63.5	2.8	89.7
Hungary	76	71	77.1	79.4	58.9	60.8	4.5	396.6
Malta	82.1				72.3	74.3	5	214.2
Netherlands	81.8				63.3	59	3.6	66.5
Austria	81.7				57.6	57.8	3	191.7
Poland	77.8	71.8	76.9	81.5	59.8	62.7	4.2	140.1
Portugal	81.3***	80.1	82.3	84.1	58.3	55.4	2.9	65.6
Romania	75***	71.1	76.7	77.5	59	59	8.4	323.9
Slovenia	81.2	76.7	80.6	83.6	57.8	59.6	1.8	111.2
Slovakia	77	70.1	77	80.1	55.5	54.6	5.8	433.3
Finland	81.3	77.9	81.1	83.4	58.7	57.5	2.2	208.5
Sweden	82.3	79.1	82.3	83.8	73.6*	73.6*	2.2	139.2
United Kingdom	81.4***				63.4	64.2	3.9	126.1
EU28	80.9*				61.4	61.8	3.7	131.9

\* break in time series, \*\* provisional, \*\*\* estimated

The European Commission regards reducing HI as one of the greatest public health challenges in Europe and urgent action is required (7).

Health equity research (HER) can be grouped into three types defined by the investigation's focus on:

1. documenting disparities
2. understanding the mechanisms that give rise to disparities
3. reducing/ eliminating disparities

From 2003 to present days, much has been done. But although geographical inequalities have decreased over time and the gap between Western and Eastern Europe has narrowed down in the last 10 years, yet the 2013 WHO Europe Report on social inequalities in health, led by Michael Marmot, shows that the social gradient in health is still observed. This whichever indicator of socioeconomic position is used (education, occupational class, income or material deprivation) and considering the majority of health outcomes, as overall or by cause mortality, self-perceived health, morbidity, long-standing physical and mental health problems or hospitalization rate (10). In addition, a study on HI trends, published in 2017, comparing mortality patterns in 2005-2009 vs. 1990-1994 in 10 EU MSs, reveals that even if mortality has reduced among all socioeconomic groups in the last 20 years, the social gap has increased, at least in relative terms, in all considered countries (11). At present comparative studies with updated data on European trends are not available, but many national studies confirm that HI have not narrowed in relative terms (12).

The WHO Global Commission on the Social Determinants of Health in 2008 concluded that action on HI requires action across all the social determinants of health (SDH): social inequalities in health arise because of inequalities in the conditions on daily life (condition in which people are born, live, work and age), and the fundamental drivers that give rise to them: inequities in power, money and resources (7). Political, economic and resource distribution decisions made outside the health sector need to consider health as an outcome across the social distribution. New focus is given to the urgency to design, build and implement actions to tackle HI. In fact, while the problem had been defined and the generating mechanisms were understood; what is still necessary at that moment is to start evidence-based and effective actions, promoting Health in All Policies (HiAP) approaches in designing and evaluating policies, even with the support and the engagement of relevant stakeholders.

Policymakers and public health researchers have demanded better evidence of the effects of interventions on public health and health inequalities and have pointed to the relative absence of rigorous outcome evaluations in this area. While most of these commentators agree that health inequalities are a problem, the means of tackling them often seems to rest on poor evidential foundations. New funding initiatives aiming to foster the production of new evaluations of public health interventions are being developed. However, it might be useful to consider further what 'more evidence' might look like, what sort of evidence is needed and how might it be 'stronger' than in the past and also to consider what additional challenges collecting this new evidence might bring.

A recurring issue in addressing health inequalities and identifying measures and policies that effectively diminish them is lack of data. Monitoring schemes and data collection initiatives that allow for data stratification on the basis of socio-economic status, education levels, minorities or religious and migrant backgrounds, gender and age will not only allow for a better assessment of the health gap between different population groups but also allow for a better evaluation of policies and measures that try to address them.

HI, which have been well documented for decades, have more recently become policy targets in developed countries. More research and better methods are needed to measure precisely the relationships between stated policy goals and observed trends in health inequalities.

In the United States, most research has focused on racial/ethnic health inequalities, whereas in other developed countries, most research has focused on health inequalities by socioeconomic status (SES) or class (13). In addition to disparities in health status, inequalities also exist in access to and quality of health care services.

Ultimately, despite significant financial support for health equity research, to date no formal analysis of trends and gaps in research has been conducted to ensure targeted investments focus on priority populations, outcomes, and building an evidence base for solutions to health and health care inequities. Health equity researchers, their funders, and members of the communities whose health they seek to improve could benefit from the identification of research gaps so efforts could be allocated to ensure research-identified solutions are generalizable to the diverse populations that suffer from health inequities.

### **4.3 Monitoring and evaluation**

The dearth of reliable information and capacity, which includes important gaps in surveillance data, is a major challenge to NCD prevention and control in many countries. Tracking NCDs and their risk factors and determinants is one of the three key components of the “Global Strategy for the Prevention and Control of Noncommunicable Diseases” (14). Monitoring and evaluation of the NCD epidemic is fundamental to its prevention and control and need to be seen as essential components of national public health infrastructure. Many countries presently lack effective systems for monitoring the burden of NCDs and associated morbidity and mortality. Moreover, the complexity of NCDs, together with the high prevalence of multimorbidity, means that monitoring of progress is difficult. Baseline data for many countries are scarce.








Strengthening surveillance is a priority for every country; surveillance is critical to providing the information needed for policy and programme development and appropriate legislation for NCD prevention and control, and to support the monitoring and evaluation of the progress made in implementing policies and programmes. Global monitoring serves to raise awareness and reinforce political commitment for stronger and coordinated global action. Three major components of NCD surveillance are: a) monitoring exposures (risk factors); b) monitoring outcomes (morbidity and disease-



specific mortality); and c) assessing health system capacity and response (in terms of policies and plans, infrastructure, human resources and access to essential health care including medicines).

The success of monitoring and evaluation depends upon the continued engagement and common understanding of key stakeholders, effective process and outcome evaluation, development of indicators for transparency and accountability and systematic analysis of data.

In May 2013 the 66th World Health Assembly adopted the comprehensive global monitoring framework (14) and Member States have agreed a set of indicators across the three monitoring components (outcomes, exposure and health systems response) (Fig. 8).

Framework Element	Target	Indicator
<b>OUTCOMES</b>		
Premature mortality from noncommunicable disease	 1. A 25% relative reduction in the overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases	1. Unconditional probability of dying between ages of 30 and 70 from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases
Additional indicator		2. Cancer incidence, by type of cancer, per 100 000 population
<b>BEHAVIOURAL RISK FACTORS</b>		
Harmful use of alcohol	 2. At least 10% relative reduction in the harmful use of alcohol, as appropriate, within the national context	3. Total (recorded and unrecorded) alcohol per capita (aged 15+ years old) consumption within a calendar year in litres of pure alcohol, as appropriate, within the national context 4. Age-standardized prevalence of heavy episodic drinking among adolescents and adults, as appropriate, within the national context 5. Alcohol-related morbidity and mortality among adolescents and adults, as appropriate, within the national context
Physical inactivity	 3. A 10% relative reduction in prevalence of insufficient physical activity	6. Prevalence of insufficiently physically active adolescents, defined as less than 60 minutes of moderate to vigorous intensity activity daily 7. Age-standardized prevalence of insufficiently physically active persons aged 18+ years (defined as less than 150 minutes of moderate-intensity activity per week, or equivalent)
Salt/sodium intake	 4. A 30% relative reduction in mean population intake of salt/sodium	8. Age-standardized mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years
Tobacco use	 5. A 30% relative reduction in prevalence of current tobacco use	9. Prevalence of current tobacco use among adolescents 10. Age-standardized prevalence of current tobacco use among persons aged 18+ years
<b>BIOLOGICAL RISK FACTORS</b>		
Raised blood pressure	 6. A 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances	11. Age-standardized prevalence of raised blood pressure among persons aged 18+ years (defined as systolic blood pressure $\geq 140$ mmHg and/or diastolic blood pressure $\geq 90$ mmHg) and mean systolic blood pressure
Diabetes and obesity	 7. Halt the rise in diabetes & obesity	12. Age-standardized prevalence of raised blood glucose/diabetes among persons aged 18+ years (defined as fasting plasma glucose concentration $\geq 7.0$ mmol/l (126 mg/dl) or on medication for raised blood glucose) 13. Prevalence of overweight and obesity in adolescents (defined according to the WHO growth reference for school-aged children and adolescents, overweight – one standard deviation body mass index for age and sex, and obese – two standard deviations body mass index for age and sex) 14. Age-standardized prevalence of overweight and obesity in persons aged 18+ years (defined as body mass index $\geq 25$ kg/m <sup>2</sup> for overweight and body mass index $\geq 30$ kg/m <sup>2</sup> for obesity)
Additional indicators		15. Age-standardized mean proportion of total energy intake from saturated fatty acids in persons aged 18+ years 16. Age-standardized prevalence of persons (aged 18+ years) consuming less than five total servings (400 grams) of fruit and vegetables per day 17. Age-standardized prevalence of raised total cholesterol among persons aged 18+ years (defined as total cholesterol $\geq 5.0$ mmol/l or 190 mg/dl); and mean total cholesterol concentration



NATIONAL SYSTEMS RESPONSE		
Drug therapy to prevent heart attacks and strokes		8. At least 50% of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes  18. Proportion of eligible persons (defined as aged 40 years and older with a 10-year cardiovascular risk $\geq 30\%$ , including those with existing cardiovascular disease) receiving drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes
Essential noncommunicable disease medicines and basic technologies to treat major noncommunicable diseases		9. An 80% availability of the affordable basic technologies and essential medicines, including generics required to treat major noncommunicable diseases in both public and private facilities  19. Availability and affordability of quality, safe and efficacious essential noncommunicable disease medicines, including generics, and basic technologies in both public and private facilities
Additional indicators		20. Access to palliative care assessed by morphine-equivalent  21. Adoption of national policies that limit saturated fatty acids and virtually eliminate partially hydrogenated vegetable oils in the food supply, as appropriate, within the national context and national programmes  22. Availability, as appropriate, if cost-effective and affordable, of vaccines against human papillomavirus, according to national programmes and policies  23. Policies to reduce the impact on children of marketing of foods and non-alcoholic beverages high in saturated fats, trans fatty acids, free sugars, or salt  24. Vaccination coverage against hepatitis B virus monitored by number of third doses of Hep-B vaccine (HepB3) administered to infants  25. Proportion of women between the ages of 30–49 screened for cervical cancer at least once, or more often, and for lower or higher age groups according to national programmes or policies

Fig. 8. Global Monitoring Framework

There is extreme limited quantity and quality of existing evidence on the effectiveness of policy actions (and particularly of combined strategies) directed at NCD prevention and control. To date, the most robust available evidence for the effectiveness and effect of interventions is to lower the prevalence of the major risk factors. The lack of cost considerations across all studies further limits the generalisability of the evidence.

Better data is the first step in the development and strengthening of mechanisms to identify and track public health challenges within country and globally, and to be able to hold governments and industries accountable for actions and inactions. Priority research areas should include the development, assessment and use of easily accessible indicators and outcome measurement that can be standardized so that data can also be compared across different countries and settings.

#### 4.4 Evidence based Health Policy (EBHP)

By reviewing the existing literature, and by consulting experts in various sectors, it comes out that many interventions to tackle NCDs and control risk factors, have been proposed in some cases with good results and impact.

Nevertheless, many interventions remain in the state of "recommendation" and have not been turned into mandatory and widespread policies.

How can research help to find evidence to convince policy makers and common opinion, on the validity of some apparently unpopular interventions? How can we push further some of the interventions that have proved to be effective? And how can we monitor them over time? Would a "soft" intervention be more accepted by citizens and therefore followed, than a "zero tolerance" intervention?

All these unsolved questions need an evidence based approach in the field of health policy that needs to be followed to avoid what happens most of the time, with policymakers and also citizens that have

to vote them, left to take decisions through a jumble of anecdotes, notions and studies as they try to evaluate policy alternatives.

Having a clear framework for characterizing what is, and isn't, EBHP is a prerequisite for a rational approach to making policy choices, and it may even help focus the debate on the most promising approaches.

In the EBHP approach, a policy is always well specified in all its aspects, the goal or goals it wants to achieve are well defined, and the evidence of the magnitude of the effects of the policy is requested.

What makes for "rigorous enough evidence" in health policy? In the case of clinical guidelines, experts have developed gauges of the strength of evidence needed, and it is time to develop similar estimates for health policy.

The effect of a policy, depends on the design and implementation details and the program particulars and evidence needs to speak to those particulars. It is also important to consider the full range of a policy's effects, its costs and benefits, and how each of these evolves over time (16).

Making health policy on the basis of evidence will always be a hard task with an uncertain outcome. Fully specifying a policy requires the kind of legislative and regulatory detail that is impractical for a high-level policy debate, but often the "policies" being discussed are so poorly specified that it's impossible to bring any evidence to bear. In addition, just as the distinction between policies and goals is often muddled, interpretations of the evidence are often flavoured by the implicit goals of the analyst (17). A given body of evidence can be used to support very different policy positions (depending on what one's goals are — for example, how one weighs costs to taxpayers versus redistribution of health care resources), but different goals shouldn't drive different interpretations of the evidence base. Finally, even a rich body of evidence cannot guarantee that a policy will achieve its goals, and waiting for that level of certainty would paralyze the policy process. In health policy it is often necessary to act on the basis of the best evidence on hand, even when that evidence is not strong. Doing so requires weighing the costs of acting when you shouldn't against those of not acting when you should — again, a matter of policy priorities. As important as evidence is to good policy choices, it can't tell us what our goals should be, which is a normative question of values and priorities.

## 4.5 Universal Health Coverage

At least half of the world's population still do not have full coverage of essential health services, and about 100 million people are still being pushed into "extreme poverty" because they have to pay for health care (18).

Over 800 million people (almost 12 percent of the world's population) spend at least 10 percent of their household budgets to pay for health care.

All UN Member States have agreed to try to achieve universal health coverage (UHC) by 2030, as part of the Sustainable Development Goals. Under the Agenda for Sustainable Development, universal health coverage serves as the primary vehicle for continuing and fully leveraging the momentum on health.

Expanded health coverage has been shown to improve both access to health services and population health, although additional research is needed to inform efforts to maximize the health-promoting benefits of increased health coverage (19).

In addition to linking SDG 3 and efforts to end extreme poverty, universal health coverage also offers a potential platform for integrating diverse health services and approaches. Universal health coverage aims to promote equity in health access and outcomes (20), remove deterrents associated with requirements that health service users pay at the point of care, strengthen national health data and monitoring systems for evidence-based decision-making and promote efficient use of finite health resources. Numerous low- and middle-income countries have made important strides in expanding health coverage, including 24 countries that together account for nearly one-third of the world's population. However, the gap between aspirations and reality for health coverage remains gaping. In many countries working towards universal health coverage, many health services remain inaccessible to beneficiaries, with especially weak coverage reported for services for NCDs.

UHC means that all individuals and communities receive the health services they need without suffering financial hardship. It includes the full spectrum of essential, quality health services, from health promotion to prevention, treatment, rehabilitation, and palliative care.

UHC enables everyone to access the services that address the most important causes of disease and death, and ensures that the quality of those services is good enough to improve the health of the people who receive them.

Protecting people from the financial consequences of paying for health services out of their own pockets reduces the risk that people will be pushed into poverty because unexpected illness requires them to use up their life savings, sell assets, or borrow – destroying their futures and often those of their children.

Achieving UHC is one of the targets the nations of the world set when adopting the Sustainable Development Goals in 2015. Countries that progress towards UHC will make progress towards the other health-related targets, and towards the other goals. Good health allows children to learn and adults to earn, helps people escape from poverty, and provides the basis for long-term economic development.

All countries can take actions to move more rapidly towards it, or to maintain the gains they have already made. In countries where health services have traditionally been accessible and affordable, governments are finding it increasingly difficult to respond to the ever-growing health needs of the populations and the increasing costs of health services (21).

Moving towards UHC requires strengthening health systems in all countries. Robust financing structures are key. When people have to pay most of the cost for health services out of their own pockets, the poor are often unable to obtain many of the services they need, and even the rich may be exposed to financial hardship in the event of severe or long-term illness. Pooling funds from compulsory funding sources (such as mandatory insurance contributions) can spread the financial risks of illness across a population.

Improving health service coverage and health outcomes depends on the availability, accessibility, and capacity of health workers to deliver quality people-centred integrated care. Investments in the primary health care workforce is most needed and cost-effective in improving equity in access to essential health care services. Good governance, sound systems of procurement and supply of medicines and health technologies and well-functioning health information systems are other critical elements.

In adopting the Sustainable Development Goals (SDGs), United Nations member states launched the world on a quest without precedent in human history. The SDGs sharply elevate global health and development aspirations, contemplating a world that is far more prosperous, secure, healthy and equitable than it has ever been, where human rights and dignity are universally respected, and where human development unfolds in a manner that preserves and protects the natural environment.

SDG 3 is specifically referring to UHC and also to NCDs fight (22) as schematized below in fig. 8 and Box1:



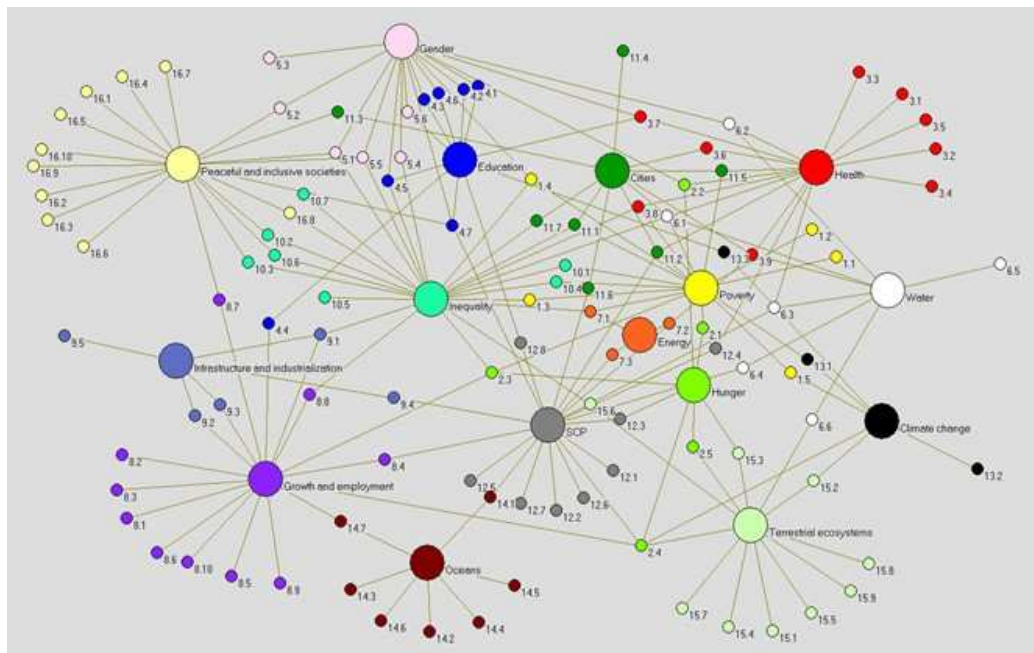
Fig. 9. Sustainable Development Goal 3

### Box.1 Sustainable Development Goal 3- Targets

SDG # 3 – Targets	
1.	By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births
2.	By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births
3.	By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases
4.	By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being
5.	Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol
6.	By 2020, halve the number of global deaths and injuries from road traffic accidents
7.	By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes.
8.	Achieve UHC, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.
9.	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
10.	Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate
11.	Support the research and development of vaccines and medicines for the communicable and noncommunicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all
12.	Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States
13.	Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks



Below, the interlinkage between SDG3 and the other goals. Fig. 10:



## Intersections between SDG #3 and other SDGs





The overarching goals of UHC emphasizes not only *what* services are covered, but also *how* they are funded, managed, and delivered. A fundamental shift in service delivery is needed such that services are integrated and focused on the needs of people and communities. This includes reorienting health services to ensure that care is provided in the most appropriate setting, with the right balance between out- and in-patient care and strengthening the coordination of care. Health services, including traditional and complementary medicine services, organized around the comprehensive needs and expectations of people and communities will help empower them to take a more active role in their health and health system.

Progresses towards UHC must be monitored and measured, and monitoring should focus on 2 things:

- The proportion of a population that can access essential quality health services.
- The proportion of the population that spends a large amount of household income on health.

Together with the World Bank, WHO has developed a framework to track the progress of UHC by monitoring both categories, taking into account both the overall level and the extent to which UHC is equitable, offering service coverage and financial protection to all people within a population, such as the poor or those living in remote rural areas.

WHO uses 16 essential health services in 4 categories as indicators of the level and equity of coverage in countries:

- Reproductive, maternal, new born and child health: family planning, antenatal and delivery care, full child immunization and health-seeking behaviour for pneumonia.
- Infectious diseases: tuberculosis treatment, HIV antiretroviral treatment, use of insecticide-treated bed nets for malaria prevention and adequate sanitation.
- Non communicable diseases: prevention and treatment of raised blood pressure, prevention and treatment of raised blood glucose, cervical cancer screening and tobacco (non-)smoking.
- Service capacity and access: basic hospital access, health worker density, access to essential medicines and health security: compliance with the International Health Regulations.

Being true that each country is unique and may chose to focus on different areas, or develop their own ways of measuring progress towards UHC, there is also big value in a global approach that uses standardized measures that are internationally recognized so that they are comparable across borders and over time. Shared guidelines should be developed at European level, together with evaluation methods on how to render them exportable in different European regions and contexts.

## 4.6 Research on Health Systems

Good and sustainable health care is of major social importance. The vast amount of knowledge of the human body, early detection of disease, prevention, medications and treatments is only effective in a properly functioning system of healthcare.

For decades health systems in developing countries have come under sustained pressure from interlocking social, political and economic influences; ranging from rapid globalisation, evolving disease burdens, natural disasters, fragile governments and governance systems; weak institutions and poor accountability, all of which create and exacerbate widespread socioeconomic and health inequalities. The growing recognition that the challenges confronting health systems in developing countries require a research response that transcends disciplinary boundaries highlights the urgent need for research to foster genuine interdisciplinary collaborations across social science, biomedical science, and other disciplines. Health systems research addresses health system and policy questions that are not disease-specific but concern systems problems that have repercussions on the performance of the health system as a whole. It addresses a wide range of questions, from health financing, governance, and policy to problems with structuring, planning, management, human resources, service delivery, referral, and quality of care in the public and private sector.

While health systems in Europe differ in the way they are financed, organised, governed, and in the outcomes produced, at the same time, they share the common values of universality, equity and solidarity, with the core goal to ensure accessible health care that is of high quality, responsive, affordable and financially sustainable. Indeed, health systems in Europe play a pivotal role in assuring social protection for everyone. They have to respond and adapt effectively to changing demands and challenges in order to ensure a high level of social cohesion, be financially sustainable and contribute to the economy in the EU, and they have to do so with limited resources.

To better address the different constraints but at the same time the values shared, reorganization of health care across institutions, actors and sectors in healthcare system is a central issue.

As a result, countries are engaged in many reforms and policies aiming to adapt the organisation of health care to provide more adequate and efficient health care services (23, 24). However, policies implementation at EU and national level have shown still gaps within the same country and across countries in the EU.

There has been a long-standing interest in cross-national comparisons of health systems among health policy analysts and decision-makers alike. They offer a means to capture the range of approaches countries have adopted to address similar challenges and so allow the experience of each country to provide “an experimental laboratory for others”. They offer opportunities for mutual learning and reconsideration of policies, cross-fertilization, or even policy transfer, where appropriate.

Health systems and services research represents a benefit for every citizen, as a potential sick person, and for society as a whole and is also an opportunity for market players: after the age of medical technologies efficiently oriented to biomedicine, pharmaceuticals, medical devices, diagnosis or inpatient care, a huge demand for wider integrative and organisational solutions is appearing

worldwide. It does not consist only in cutting-edge personalised biomedicine, information technologies and connected devices, but it also deals with their integration in new models of care and transverse organisations (24, 25).

In conclusion, priority areas in health system research can be grouped as follows:

- Research on innovative interventions to improve the quality and safety of healthcare. Research that compares initiatives in different EU Member States, particularly in the area of benchmarking using performance indicators.
- Research to realise the full potential of the integration of care and services (system organization).
- Research to support a shift towards outcomes-based health services.
- Research to identify innovative solutions to the problem of inefficiency in the delivery of health care, including ineffective intervention, inefficient governance and inefficient resource allocation.
- Research to analyse the impact of globalization on population health outcomes and health system.
- Research to analyse the consequences of major long-term trends for health care system and to identify which health care systems are best placed to respond to such trends.

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