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Prevention – a cost-effective way to fight the non-communicable disease epidemic

An academic perspective of the United Nations High-Level NCD Meeting

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Summary

The United Nations General Assembly has convened a Summit on non-communicable diseases (NCDs), an historic moment in the global combat of these disorders. Lifestyles in increasingly urban and globalised environments have led to a steep surge in NCD incidence in low and middle income countries, where two thirds of all NCD deaths occur (most importantly from cancer, cardiovascular and respiratory disease as well as diabetes). Treatment of NCDs is usually long term and expensive, thus threatening patients' and nations' budgets and putting them at high risk for poverty.

The NCD Summit offers an opportunity for strengthening and shaping primary prevention, the most cost-effective instrument to fight major risk factors such as tobacco smoking, alcohol abuse, physical inactivity and unhealthy diet. From a Swiss perspective, we also emphasised the efforts for new laws on prevention and diagnosis registration, in accordance with the recommendations of the NCD summit in order to strengthen primary prevention and disease monitoring. In addition, the need for structural prevention across all policy sectors with leadership in environmental policy making to prevent NCDs as well as the need to adapt and strengthen primary health care are equally relevant for Switzerland. To compliment efforts in primary prevention, the field of NCDs requires special R&D platforms for affordable NCD drugs and diagnostics for neglected population segments in both Switzerland and low and middle income countries. Switzerland has a track record in research and development against diseases of poverty on a global scale that now needs to be applied to NCDs.

Key words: *non-communicable disease; prevention; smoking; alcohol; physical activity; diet; environment; air pollution*

The UN high-level meeting: a historical point in the global fight against the NCD epidemic

Over the past decade the international health community has paid high attention to communicable diseases. The United Nations General Assembly responded to two resolutions (A/RES/64/265 and A/RES/65/238) recognising the unnoticed significant increase of non-communicable diseases (NCDs) and has convened a Summit on NCDs on 19–20 September 2011 in New York. This is an historic moment in the combat against NCDs, as the world's heads of states and governments will attend the meeting [1, 2]. The goal of the summit is to increase awareness and reach common ground among heads of state and government on the prevention and control of cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. Linked to rapidly changing lifestyles, these diseases have undergone a drastic, often epidemic increase in most parts of the world affecting health and well being in many dimensions and levels. Four major risk factors namely tobacco use, harmful use of alcohol, physical inactivity and poor diet govern health and wellbeing in all areas. NCDs are all highly interrelated with environmental factors such as carcinogens or air pollutants as well as occupational exposures. Furthermore the NCD risk factors and their interrelations become most prominent in the context of urbanisation and high population dynamics. Consequently, low and middle income countries are particularly affected and carry the blunt of the burden of NCDs along with the continued struggle with a major communicable disease burden.

The UN General Assembly in a May 2011 document proposed a list of specific recommendations for member states, the private sector, civil society, United Nations agencies and international organisations (table 1, [3]).

The heads of states and governments will doubtlessly appreciate and value the case for strong action against the burden of NCDs, the commitments will hopefully include an action plan to achieve the goals accompanied by a process for monitoring achievements. Much can be learnt from the steps taken after the UN General Assembly Special Ses-

sion for HIV/AIDS in 2001 [1, 2] or the renewed efforts for the control and eradication of malaria [4].

In its draft resolution from December 2010 regarding the September 2011 Summit, the UN General Assembly e*ncourages* Member States to consider, as appropriate and where relevant, including in their national delegations to the high-level meeting parliamentarians, representatives of civil society, including non-governmental organisations, **academia** and networks working on the control and prevention of non-communicable diseases. The present opinion paper aims at providing an academic perspective on public health and epidemiological research needs for Switzerland in order to successfully tackle the NCD challenges.

The NCD epidemic – size, source and relevance

In 2008, 36 million people died from NCDs, representing close to two thirds of global deaths that year. The problem of NCDs is no longer affecting primarily wealthy populations, but has increased substantially in low and middle income countries.

In fact, roughly eighty percent of these deaths occurred in low and middle income countries. The high number of NCD deaths in these countries reflects not only their larger population size as age-specific rates are also higher, mostly as a result of urbanisation and globalisation of trade [1, 2]. Roughly 80% of NCD deaths are due to CVD, cancer, chronic respiratory diseases and diabetes. In Switzerland, among the 60933 deaths reported in 2008, 22321 persons died of cardiovascular diseases (7.6% <65 years), 15'593 of cancer (25.5% <60 years), 4313 of dementia (0.6% <65 years), 1534 of diabetes (8.3% <65 years), and 1752 of chronic bronchitis (8.6% <65 years) (Swiss Federal Office for Statistics, http://www.bfs.admin.ch/bfs/portal/de/index/themen/14/02/04/key/01.html). These NCDs cause disability and the path to death is often painful and long.

In many parts of the world, these diseases are growing in importance alongside the still highly prevalent communicable diseases. As many infectious diseases become more treatable and therefore chronic, populations in low and middle income countries are often faced with a dual burden of disease, "the worst of both worlds". For example, both diabetes mellitus (DM) and tuberculosis (TB) occur at a high rate in India. India accounts for nearly one third of the global burden of both, tuberculosis [5] and diabetes (http://www.who.int/diabetes/facts/en/), with the incidence of diabetes increasing at a steep rate. Previous studies have demonstrated that DM not only increases the risk of active tuberculosis but also puts co-affected patients at increased risk for poor outcomes. It has been suggested that a remarkable 8–10% of TB cases in the UK are attributable to DM [6, 7]. Furthermore, infections, including tuberculosis, often worsen glycaemic control and therefore prognosis in diabetic patients [8]. The harm caused by NCD and its risk factors may therefore be particularly large in poor populations. Due to both, the dual burden of disease and limited health care facilities and therapies, NCD patients in low income countries are more likely to die from the disease when compared to high income countries [1, 2].

Table 1:
Prevention and control of non-communicable diseases. Report of the Secretary-General, UN General Assembly, May 19 2011, A / 66 / 83 [3].

It is recommended that Member States: – Include prevention and control of non-communicable diseases among priorities in national health strategies and plans; – Implement cost-effective population-wide interventions, including through regulatory and legislative actions, for the non-communicable disease related risk factors of tobacco use, unhealthy diet, lack of physical activity and harmful alcohol use; – Strengthen national information systems by implementing a surveillance framework that monitors key risk factors and determinants, morbidity and mortality and health-system capacity. Set standardised national targets and indicators to assess the progress made in addressing non-communicable diseases; – Promote multisectoral and "health in all policies" approaches to address the social determinants and risk factors of non-communicable diseases; – Engage non-health sectors and key stakeholders, including the private sector and civil society, in collaborative partnerships to promote health and reduce non-communicable disease-related risk factors; – Implement international agreements and strategies to reduce risk factors, including the 2003 WHO Framework Convention on Tobacco Control, the Global Strategy on Diet, Physical Activity and Health and the Global Strategy to Reduce the Harmful Use of Alcohol; – Revitalise primary health care and promote access to cost-effective interventions for non-communicable diseases, including access to essential medicines and technologies; – Mobilise additional resources and support innovative approaches to financing essential non-communicable disease health-care interventions within primary health care.
It is recommended that the private sector: – Promote healthy behaviour among workers, including occupational safety through good corporate practices, workplace wellness programmes and insurance plans; – Contribute to improved access and affordability for the essential medicines and technologies for non-communicable diseases; – Ensure responsible and accountable marketing and advertising, especially with regard to children; – Ensure that foods needed for a healthy diet are accessible, including reformulating products to provide healthier options.
It is recommended that civil society: – Mobilise political and community awareness in support of non-communicable disease prevention and control; – Address shortcomings in non-communicable disease prevention and treatment services for marginalised populations and crisis situations and build community capacity in promoting healthy diets and lifestyles; – Mobilise additional resources and support innovative approaches to financing the prevention and control of non-communicable disease.
It is recommended that United Nations agencies and international organisations: – Acknowledge the threat of the non-communicable disease epidemics to sustainable development and integrate cost-effective preventive interventions into the development agenda and related investment programmes, including poverty reduction initiatives, in low and middle income countries; – Develop, in collaboration with member states, a global set of indicators to monitor non-communicable disease trends and assess the progress countries are making to reduce the burden of such diseases; – Ensure the effective engagement of all non-health sectors in health and non-communicable disease policies; – Ensure the active engagement of United Nations agencies, funds and programmes in global and regional initiatives to address the health and socio-economic impacts of non-communicable diseases.

NCDs not only heavily impact health related quality of life, but also jeopardise socio-economic perspectives. It is known that disease and poverty are intimately interrelated. This is particularly the case for NCDs, where poverty and the occurrence of NCDs form a vicious cycle as poverty may expose people to behavioural risk factors which in turn may lead to NCD increasing the poverty burden for the person and their family [9]. Expenditures for NCD treatment result in a tremendous burden on the budget of individuals, families and national health systems. Decreases in productivity due to NCD, unhealthy behaviour and poor physical capacity weaken national economies. In fact, 29 % of non-communicable disease-related deaths in low and middle income countries occur before age of 60 whereas this fraction is only 13% percent in high income countries [9]. All these problems are enhanced by the steadily increasing population dynamics through migration and growth, particularly in urban areas. By threatening the economies of many nations, it is evident that the challenges of NCDs clearly affect the achievement of the Millennium Development Goals (MDG). The World Economic Forum ranks NCDs among the top global threats to economic development [10].

The relevance and priorities of primary prevention

In the current Swiss system, the legal basis for pro-active cross-cutting prevention strategies is very weak. The current draft for a Swiss Law on Prevention and Health Promotion is timely and of central relevance in fighting NCDs (http://www.bag.admin.ch/themen/gesundheitspolitik/07492/index.html?lang=de). Medical treatment of NCDs is a long-term, in many cases lifelong and therefore often very expensive investment. The model of high income countries with the emphasis on treatment is unaffordable, as seen in the ever increasing costs for health care. This is becoming particularly evident in middle and low income countries [1] where health care coverage for treatment is usually lacking. Costly and prolonged care therefore diverts a substantial part of family resources to medical care. These families are at risk for financial ruin. For example, in India the costs of diabetes treatment add up to 15–25% of a household's income and push many families into poverty [12].

The primary prevention of NCDs and their risk factors is the most cost-effective control of the epidemic and its adverse socio-economic effects. The strengthening of primary prevention has also been recommended for Switzerland in a recent evaluation of its health care system [13]. Primary prevention allows efficient tackling of risk factors and patterns that are shared by several NCDs. The implementation of primary prevention measures at the individual and structural levels are urgent. Many NCD's have aetiologic roots in early life with a long latency period until the expression of diseases, thus preventive action taken (or not taken) today will impact public health in the distant future.

The Lancet NCD Action Group – an informal collaboration of academics, practitioners and civil society organisations-together with the NCD Alliance – a collaboration between the Union for International Cancer Control, International Union against Tuberculosis and Lung Disease, International Diabetes Federation and World Heart Foundation – name tobacco control and salt reduction as the top priority in prevention, as these cost-effective measures are highly feasible at the population level and exhibit short term benefits [1,2,14]. As Switzerland lags behind many other high income countries with regard to the implementation of tobacco control, it is of paramount importance to enforce the new laws and to close the remaining policy gaps.

In a high income country like Switzerland, addressing all major risk factors ranging from smoking, alcohol, overeating and poor diet to lack of physical activity is of high priority and - most importantly – is affordable. As highlighted in the Lancet NCD Action Group and NCD Alliance health-in-all policies are essential to steer the adverse effects of globalisation in markets and urbanisation as the primary contributors to all major NCD risk factors [15]. In the strategies against NCDs it will be crucial to adopt a systemic view, underscoring the high relevance of structural primary prevention.

The relevance of a holistic systems approach to structural primary prevention

Access to, affordability and awareness of, as well as attitude towards processed food products, cigarettes, or alcohol products are substantially influenced by system factors, e.g. national policies on taxes or advertisements or global rules and ethics of marketing. Physical activity is not just a personal choice but influenced by the built environment, infrastructures for public transport, urbanisation patterns, physical activity education in childhood, safety issues, and many other systemic factors not addressed in any strategies focusing on individuals. The decision of a person to seek screening or medical treatment is not only influenced by the availability of adequate methods, but also by its affordability, the distance to and connectivity with the next health care centre, cultural health views and issues of stigmatisation.

The complex interplay of personal, political, cultural and environmental factors makes it evident that for the control of NCDs, health must become an explicit objective in all policies. This requires a holistic government approach that includes not only the health agencies but all sectors such as education, trade, agriculture, food security, and the occupational as well as environmental agencies. Much of this has already been laid out in reports (i.e. WHO Framework Convention on Tobacco Control: http://www.who.int/fctc/text_download/en/index.html; WHO Global Strategy on Diet, Physical Activity and Health: http://www.who.int/dietphysicalactivity/en/), which form the basis in part for the UN General Assembly recommendations for the September 2011 Summit in New York (see table 1). The Swiss National Programme on Diet and Physical Activity 2008–2012 is a good example of integrated cross-agency attempts (http://www.bag.admin.ch/themen/ernaehrung_bewegung/05141/05142/index.html?lang=en). Adoption of strategies must be tailored to local and national situations and the socio-political context, and accompanied by research activities.

Urban planning and NCD prevention

Consideration of public health issues in urban planning and environmental policy making are key factors in the prevention of NCDs and the promotion of healthy lifestyles [16]. Physical and built environments are relevant determinants of lifestyle, social network as well as exposure to environmental health hazards such as air pollution, noise or industrial pollutants mediating health problems through soil, water, air and consumer products. It is striking to note that not all of these factors are sufficiently mentioned in recommendations for the UN NCD Summit meeting.

Many aspects of the physical environment offer opportunities for health promotion that are relevant for Switzerland, namely [17]: facilitation of non-motorised travel by promoting public transportation and bicycle lanes; provision of safe housing and urban spaces through policies of non-segregation and by keeping the urban environment appealing and culturally attractive; maintaining and creating green spaces and parks in proximity to home, work and schools that are accessible to all, providing stress release and promoting physical activity and well being; attraction of healthy food providers and regulation of over abundance of unhealthy food and alcohol provision into neighbourhoods; incentives promoting local and regional production of healthy organic food to reduce the environmental, thus, health impact of the food chain; decrease of exposure to toxicants in air, water and soil through various legal policies and technological changes.

Promotion of walking, bicycling and use of public transportation may contribute to a physically active life while decreasing air pollution. Air pollution is a relevant risk factor for many NCDs, most importantly respiratory and cardiovascular diseases and lung cancer with novel findings indicating a possible role in type 2 diabetes and mental development [18–23]. Future clean air policies need to tackle the high exposure to primary traffic-related toxicants such as ultrafine particles along traffic arteries. Switzerland with its pro-active role in clean air policies may take a lead in tackling these unresolved policy challenges. Countries like Switzerland should also share the expertise in clean air regulations with low income countries now facing extremely high levels of pollution as a consequence of unprecedented urbanisation and sprawl combined with a lack of environmental policies [24]. Such strategies are rewarding as the evidence for health benefits of stringent clean air policies is strong [20] with benefits being an order of magnitude larger than the costs of clean air policies [25]. Furthermore, fossil fuel combustion causes both air pollution and climate change which itself affects public health and NCDs [26], thus amplifying the benefits of clean air policies.

The need for refined monitoring and surveillance to strengthen primary prevention

Country-specific disease and risk factor surveillance and monitoring data are crucial for obtaining political support, setting evidence-based priorities and monitoring progress in the fight against the NCD epidemic [27]. Internationally harmonised mortality data and repeated population surveys on risk factors and health are central, but insufficient cornerstones.

Health surveys as they are regularly conducted in Switzerland must be complimented by additional parameters. To obtain a realistic picture on the prevalence of respiratory diseases or diabetes, both of which are associated with a substantial degree of under-diagnosis, it will be essential to conduct lung function measurements or to obtain fasting blood samples from representative population samples. Similarly, monitoring of early pre-clinical markers of the development of atherosclerosis will be important elements in NCD research and prevention. Monitoring of the key environmental causes and determinants of NCDs need to be explicit elements of the NCD prevention strategy to understand trends, to monitor progress of environmental health policies and to provide central data for environmental health research.

Mortality is a late downstream indicator for monitoring progress in the prevention of diseases with a long latency or a highly likelihood of survival. Disease registries such as cancer registries provide important data on disease occurrence. In addition, they are important in understanding patterns of screening and treatment practices as applied in the general population, including quality of the care provided beyond the context of clinical trials [28]. Attempts to create a national cancer registry law in Switzerland are therefore timely [29]. Yet, disease registration and engagement of the population in providing data and biospecimens for NCD research has been hampered in the past by stringent laws on the confidentiality of medical data. Professional and public debates on these issues often neglect the fact that not having population-based data poses an equal or greater threat to the health of the population than breaches of confidentiality. Policies must be discussed and implemented that would motivate the population for active or passive engagement in research and monitoring by consenting to the use of medical data and biospecimens as well as to the participation in research studies. One way to achieve this goal may be through higher health insurance costs in subjects not willing to contribute to surveillance, monitoring and research, yet benefiting from the outcome of these fundamental public health activities.

The value of health statistics data in advancing health systems of low and middle income countries is evidenced by the role of INDEPTH Health and Demographic Surveillance System (http://www.indepth-network.org). In the absence of national vital statistics and health surveys it monitors population dynamics and evaluates various health interventions in order to influence health related policy and practice. A recent paper published by a number of Asian InDepth sites provided important data for these countries demonstrating a) high prevalence of NCD risk factors and health-related outcomes in rural and not just in urban populations and b) a substantial clustering of risk factors stressing the relevance that comprehensive rather than single risk factor or disease centred approaches are needed to fight the NCD epidemic [30]. The up to 98% participation rates in surveys on NCDs in the InDepth Network proves that high acceptance for disease surveillance and research can

be achieved in the population if the purpose and benefit of is well explained [30].

Improving the data base leads to the need for strengthening information and evidence based health planning. This in turn entails a re-thinking of the health management information system and its link to a coherent approach to burden-based health planning and resources allocation that is of particular importance for a decentralised health system. A series of analyses have demonstrated how in low and high income countries a burden based approach to health planning and resources allocation can mitigate the challenges of resources constraints and the discussions on rationalisation and rationing of health care [31–33].

Strengthening of primary prevention through adaptations in the health care system

First and foremost, the strengthening of primary prevention also calls for the strengthening of epidemiology and public health in training curricula of the health care work force. The curricula and expertise available in Switzerland and other high income countries should be applied to capacity building in low and middle income countries.

The interrelationships between different NCDs and their risk factors as well as the importance of strengthening primary prevention have implications for organising medical care. Firstly, the provision of primary health care has to be strengthened over specialised care. General practitioners are well positioned for preventive counselling. Paediatricians, obstetrics/gynaecology practitioners, nurse practitioners as well as pharmacists should be additionally engaged in providing evidence based preventive services. Given the fact the prenatal phase and childhood are essential periods for NCD aetiology and adoption of behaviour, primary care services provided to children, mothers and families must include preventive counselling for NCD and its risk factors.

The implementation of evidence-based guidelines for screening, diagnosis and treatment of NCDs is of great relevance to assure the (cost) effective use of novel screening, diagnostic and treatment options [34]. The UK has established an independent organisation responsible for providing national guidance on promoting good health and preventing and treating ill health (National Institute for Health and Clinical Excellence NICE http://www.nice.org.uk/). Forming an independent screening committee in Switzerland has been proposed to avoid unjustified opportunistic screening and to promote evidence-based, organised and well evaluated screening programs [34]. Certainly, a more coordinated evaluation of prevention and screening efforts would have prevented the introduction of an expensive vaccination against cervical cancer in the absence of nationally coordinated evaluation efforts on its public health impact (i.e. screening rates in older women or women with a migration background; vaccination rates in women with a migration background).

Research needs

To strengthen primary prevention of NCDs further, understanding of the complex aetiology at all levels is of paramount relevance. While the aetiological role of cigarette smoking and high salt intake are acknowledged beyond doubt, this is not equally true for other risk factors. Most importantly, the aetiological role and the relevant susceptibility factors of complex environmental factors such as indoor and outdoor air pollution or noise, which are in part interrelated, linked to social factors, and often consisting of complex mixtures is not understood beyond reasonable doubt. The role of indoor air pollution caused in many parts of the world by the use of biomass fuel for heating and cooking disproportionally affects children and women, yet the health impact on NCDs has not been addressed by many studies and could be the focus of large scale intervention trials. The impact of in utero and early life exposures on the development of NCD remain generally very poorly understood although they may play a fundamental role for the occurrence of NCDs later in life [35,36]. Among childhood factors with a strong need for additional research is the influence of media consumption on NCD, given its correlation with behaviour, most importantly physical inactivity and snacking. Its contribution to the vicious circle of poverty and NCD needs to be further addressed. Mental health as an NCD outcome and stress as important NCD risk factors are underrepresented as a priority among the recommendations for the NCD Summit [37]. In addition to personal factors, societal factors such as social network, peer-pressure, religious beliefs or cultural perceptions also influence disease occurrence. On the one hand ignoring these structural risk factors limits generalisability of risk factors disease-associations from one population to another. On the other hand integrating these non personal risk factors into research may enhance understanding of the NCD epidemic and provide sensitive and adapted means for primary prevention.

To improve understanding of the risk patterns in complex non-communicable diseases research in the context of large and internationally harmonised mega-cohorts with associated biobanks must be pursued. In the area of public health and epidemiology, funding priority should be given to the setup of accordingly large well standardised studies that bring together partners from various fields and scientific interests rather than investing in the performance of small and isolated study populations with limited statistical power. A highly relevant element of the population-based research relates to improving the definition of NCD phenotypes combining endogenous (biological) information with exogenous factors including socio-cultural characteristics, gender, lifestyle and environmental conditions. This will lead to more coherent definitions of chronic disease phenotypes, allowing more targeted prevention and treatment. This need has recently been emphasised in the case of asthma, promoting definitions of asthma based on ‘endotypes’ or clusters of mechanistic pathways. This challenge applies to many NCD’s [38].

The pathophysiological impact of the dual burden of disease linking non-communicable and communicable diseases and risk factors [39] needs to be addressed by ex-

panding cohort and biobanking efforts to low and middle income countries. It can be hypothesised that the relative risks associated with NCD risk factors may be stronger and diseases may occur at younger ages due to the co-occurrence of these disorders. A high percentage of cancers, especially in low income countries is linked to chronic infections. HIV carriers have an increased risk for several types of cancer [40]. Infections such as chronic tuberculosis are having an adverse impact on the effectiveness of treating diabetes and possibly even on its aetiology. At the same time, diabetics are more vulnerable for active TB [7,39]. Exposure to tobacco smoke is likely to have stronger adverse effects if it occurs in persons repeatedly affected by acute respiratory tract infections since early childhood.

Beyond aetiological research in the context of longitudinal mega-cohorts, further research is needed on the impact of the social networks, peers and policies regulating urban and food environment on eating and physical activity behaviour. Scientific evidence and thus evidence-based regulations to improve food environments as a means of controlling the obesity epidemic and physical inactivity are broadly inconsistent or lacking, as obesity has long been viewed as the result of individual choices rather than of social and environmental influences. Promising directions to fight the obesity epidemic have been suggested and include menu labelling for calories and contents; reduction of exposure to food cues and the immediate availability of snacks by making sales of discretionary calories from snacks and sodas less profitable (i.e. beverage tax; snack tax); or counter-advertising [4, 17].

Evidence linking urban space and the built environments to non-motorised travel and physical activity is convincing, but more research with longitudinal data on the causality and geographical heterogeneity of these associations is needed. Issues such as whether or not health-conscious subjects seek out "walkable" neighbourhoods for their living or vice-versa remain to be better understood. The influence of outdoor space on physical activity is certainly very different in hot and humid climates when compared to colder climates. Given the fast urbanisation and climate change the question of how heat islands in urban space impact on the interrelation between open space, physical activity and health deserves a close look.

Furthermore the interrelation between urban space and social networks is an important health issue; the strengthening of social networks, the provision of norms for behaviours and attitudes and the community engagement deserve close attention at the intersection between public health and urban planning. The relevance of role models cannot be undervalued in this context. Non-communicable diseases are still broadly viewed as wealthy white man's disease, even though more NCD deaths occur in low and middle income than in high-income countries. In a parallel manner, being obese in low and middle income countries is currently judged as a sign of wealth and health, given that in many countries being undernourished or underweight is in fact a sign of poverty or AIDS. Yet, being obese is mostly linked to poverty on a global scale. The behaviour of populations in high income countries will therefore be of importance as a role model for people in other parts of world. How to get the message across that smoking cigarettes, eating fast food and driving cars do not represent freedom but rather shortness of breath, missing the expertise of extended and delicious family diners, being stuck in rush hour traffic and wanting to but being unable to engage in sports and outdoor activities is a question that cannot be resolved by health researchers alone, but only in the context of a highly interdisciplinary scientific exchange.

Switzerland has an impressive track record of creating and hosting PDPs (Product Development Partnerships) for R&D (research and development) against diseases of poverty and neglected tropical diseases as demonstrated in MMV (Medicines for Malaria Venture) and DNDi (Drugs for Neglected Diseases initiative), both hosted in Geneva. The field of NCDs also requires special R&D platforms to improve access to drugs and diagnostics for NCDs to make them affordable, particularly for low and middle income countries as well as for neglected population segments in Switzerland, where health is also strongly dependent on socio-economic status [41]. The creation of a respective R&D PDP incubated and hosted in Switzerland with founding members from all parts of the world would be a further appropriate answer to the declarations and action plans of the forthcoming summit and would nicely complement all the efforts made, raised and discussed in the field of health promotion and primary prevention in order to tackle the current burden and further challenges presented by NCDs.

Conclusions

NCDs are increasingly diseases of the poor and a major risk factor for poverty. Primary prevention is the most cost-effective instrument to fight the surge in NCDs. Structural prevention efforts were successful in decreasing deaths from tobacco smoking in high income countries. However, in general, changing individual habits typical for urban lifestyles has proven difficult in these countries. Early on, urban planning in low and middle income countries must consider health and integrate lessons learnt by high income countries. Wealthy countries in return must integrate effective prevention policies into their health care systems that are increasingly overwhelmed by the economic burden of treating NCD patients. A law on prevention, refined disease monitoring and the strengthening of primary health care are essential policy steps in that direction. More importantly, NCDs are a global emerging priority challenge that needs to be addressed in international co-operation and calls for exchange of experience and expertise at all levels.

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Table 2:
Recommendations from an academic perspective for Switzerland to successfully tackle the NCD challenges.

Priorities of primary prevention	– Pass Law on Prevention and Health Promotion. – Promote primary prevention and health promotion. – Target smoking, salt intake, physical inactivity, unhealthy diet.
Holistic systems approach to structural primary prevention	– Promote structural primary prevention. – Promote health-in-all policies and inter-sectoral collaboration.
Environment, urban planning and NCD prevention	– Target environmental NCD risk factors. – Promote health aspects in urban planning. – Promote health aspects in environmental policy. – Promote clean air policies.
Refined monitoring and surveillance	– National cancer registry. – Refined health surveys (include pre-clinical markers; monitor environmental risk factors). – Improved health management and information systems; access to health data and balanced data protection vs. data needs. – Move towards a burden-based health planning and resources allocation.
Adaptations in the health care system	– Strengthen the aspect of primary prevention in training curricula for health care work force. – Strengthen primary health care. – Promote or implement independent organisations responsible for providing national guidance on promoting good health and preventing and treating ill health.
Research needs	– Funding of large cohort(s) and biobank to improve understanding of NCD aetiology and phenotypes. – Improve understanding of interrelation between structural and cultural environment, social network and behaviour. – Make Swiss research expertise available to contribute to evidence building for policy on NCDs in low and middle income countries. – Offer Swiss public and private platforms for an innovative product development partnership (PDP) for R&D against NCDs, particularly for low and middle income countries.

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