



URBAN HEALTH
AND WELLBEING
A SYSTEMS APPROACH

Franz W. Gatzweiler
Yong-Guan Zhu
et al.

Advancing Health and Wellbeing in the Changing Urban Environment

Implementing a Systems Approach



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Foreword

With now over 50% of the global population in urban areas and this percentage projected to continue to increase, a research focus on urban areas and the health and wellbeing of their huge populations is central to the Mission of the International Council for Science which is “to strengthen international science for the benefit of society” and we mean all societies, including those urban societies around the world. One of our key priorities is Science for Policy and as part of that role, the International Council for Science has been the lead for the Science and Technological Major Group in many United Nations processes, including the negotiations of the Sustainable Development Goals. Many of the resulting SDGs relate to urban health and specifically Goal 11 on cities and human settlements and Goal 3 on healthy lives. The Council played a similar role in the negotiations of the Sendai Framework for Disaster Risk Reduction 2015–2030 which has as 2 of its 4 priority areas relating to understanding risk and risk governance. One of the Sendai Targets for Disaster Risk Reduction 2015–2030 is to lower average global mortality.

Recognizing that urban areas are often most vulnerable to hazards and where most of the people are, there is a clean connection with urban health and wellbeing. At the 21st Conference of the Parties under the UN Framework Convention on Climate Change in Paris, the Paris Agreement was concluded which includes Article 7, Paragraph 1. “... enhancing adaptive capacity, strengthening resilience and reducing vulnerability ...”. Article 5 states that: “... adaptation action ... the best available science ... integrating adaptation into relevant socioeconomic and environmental policies and actions.” Again, the urban health and wellbeing connections are clear.

These are complex intersecting issues – urban area, healthy lives, governance, disaster risk, resilient and reduced vulnerability, climate change

adaptation, vulnerable groups, communities and ecosystems, indigenous people and local knowledge – and addressing them in effective ways to provide information and advice for policy makers is a challenge and also part of the Council’s priority on science for policy. The programme “Urban Health and Wellbeing: A Systems Approach” will bring together a research focus on these complex intersecting issues. Recognizing the human needs and challenges requires a systems approach that is transformative, trans-disciplinary and integrative. Having the United Nations University and the InterAcademy Medical Panel as co-sponsored makes for a very valued partnership.

Another of the Council’s priorities is International Research Collaboration. This has been a focus for many decades of sponsoring or co-sponsoring global research programs on the broad aspects of human-environmental interactions. As the global communities need to work together to address the intersecting issues of sustainable development, climate change and disaster risk reduction, the International Council for Science, as the common co-sponsor of each of the Urban Health and Wellbeing, World Climate Research Programme, Future Earth: Research for Global Sustainability and Integrated Research on Disaster Risk, will work with our programs and the global science community to deliver the information and outputs that will enable governments and societies around the world to effectively address these global challenges.

On behalf of the International Council for Science and its members, I thank the scientific leaders of the Urban Health and Wellbeing program for their insights and energies in bringing this program forward towards implementation and look forward confidently to seeing the scientific advances for the benefit of all.



Gordon McBean
President, International Council of Science (ICSU)

Preface

Cities are now humans' dominant habitat and urbanization is currently one of the most profound global development forces. As urbanization trends are projected to continue, reaching the global Sustainable Development Goals (SDGs) requires cities to be sustainable by ensuring that they are healthy places to live in and providing opportunities to improve the wellbeing of its inhabitants. Human health and wellbeing in cities is closely linked to the structures and functions of cities. They provide a wide range of benefits and are supported by the global ecosystem. Despite being complex systems which provide goods and services, cities also have ecological footprints many times larger than the area they physically occupy. Therefore, for cities to become sustainable it requires not only to strive for better human lives but to see the city system embedded in the global ecosystem and to find a path from urban health to planetary health. Urban health and planetary health are inseparably linked. This is strongly emphasized in the many articles of the New Urban Agenda agreed on in Quito, Ecuador October 17-20, 2016, which refer to urban-rural linkages.

The definition and concept of health applied in this book can be seen as a natural integrator cutting across various urban sectors and relevant, as progress indicator, for many urban policies. Applying health as a natural integrator should be seen as an attempt to change from a siloed urban planning and management approach to an integrated one. In that context, the WHO (World Health Organization) paper entitled "Health as the Pulse of the New Urban agenda" includes contributions from members of this Urban Health and Wellbeing: a Systems Approach programme. It clarifies the linkages between health and urban development and provides a vision for integrating health into urban planning and governance. The New Urban Agenda recognizes that urban development and governance can mitigate the risks and promote the health and wellbeing of urban populations. Implementing it requires agreement on definitions, concepts, con-

texts, frameworks and possible pathways of change towards urban health and wellbeing. This volume provides that foundation for implementation.

The systems approach we develop in this volume goes beyond the mere recognition that cities function as complex systems and are themselves part of the planetary ecosystems. It is rooted in complex system science, recognizes the knowable and unknowable, plannable and unplannable aspects of cities, suggests scientific and societal responses to both and the type of decision making required to improve the health and wellbeing of people in urban environments. That systems approach embraces ecological, economic and social determinants of health and offers a trans-disciplinary approach for translating science into action. Without a systems approach to urban health and wellbeing, the sustainable urban development goals of the New Urban Agenda are unlikely to be achieved.

This book, builds on the science plan (ICSU 2011) which led to the establishment of the programme and conceptualises core elements for its implementation. It provides an overview of historical and current urban developments and related health challenges and proposes a theoretical and conceptual model for understanding how human health and wellbeing can be achieved in cities. Eventually it proposed guiding principles and thematic areas for a range of implementation activities. Implementing activities which enhance health and wellbeing in the changing urban environment by taking a systems approach requires clarity on what a system approach encompasses. This volume attempts to do so by defining a systems approach for urban health and wellbeing and by developing an innovative conceptual model which explains how cities function as complex urban systems for the health and wellbeing of its residents.

The vision of the programme, are cities functioning as integrated complex systems which sustainably provide benefits for the health and wellbeing of its residents. The Urban Health and Wellbeing: a Systems Approach programme aims at promoting and coordinating research projects which take a systems approach to urban health and wellbeing, developing methodologies and identifying data needs, building and strengthening capacity for applying systems methods and thinking and communicating new knowledge on systems approaches to urban constituency groups. To become effective, new collaborative networks need to be established, which collaborate with ICSU member organizations and research programmes, with universities, community initiatives, scientific projects, and educational as well as cultural projects. The programme aims at facilitating the creation of networks and forums to promote the exchange of different types of knowledge in order to advance the evidence base for policy and decision making showing the added value of a systems approach for urban health and wellbeing.

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This report is the collaborative outcome of the members of and advisors to the scientific committee and co-sponsors of the ICSU programme on “Health and Wellbeing in the Changing Urban Environment: a Systems Analysis Approach”: Indira Nath, Ana V. Diez Roux, Anthony Capon, Carlos Dora, Christl Donnelly, Gérard Salem, Hany M Ayad, Ilene Speizer, Jo Ivey Boufford, Keisuke Hanaki, Luuk Rietveld, Pierre Ritchie, Saroj Jayasinghe, Susan Parnell, and Yong-Guan Zhu. The book builds on inspiring discussions and exchanges with Trevor Hancock, José Gabriel Siri, Uta Dietrich, Barry Newell, Katrina Proust, Roderick Lawrence, Peter Head, Fabien Pfaender, Stefan Reis, Feng Feng, Yi Zhang, Armin Bobsien, Christoph Graf von Waldersee, Denise Young, Muhammad H. Zamman, De-Yu Zhao, Basile Chaix, Vittoria Colizza, Martin O’Connor, Gabriele Harrer-Puchner and all participants of the science-policy dialogue on “Modelling Urban Health and Wellbeing” which took place on the island of Gulangyu, Xiamen Apr. 28–29, 2016. Contributions from Lucilla Spini, Xiao-Xia Ruan and David Marc Jones are highly appreciated.

This book has further greatly benefited from discussions with colleagues at ICSU’s headquarters in Paris, ICSU’s Future Earth programme, ICSU’s Regional Office for Asia-Pacific, the United Nations University International Institute of Global Health (UNU-IIGH) in Kuala Lumpur, the United Nations University Institute for Environment and Human Security (UNU-EHS) in Bonn, the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS) in Tokyo, the Center for Development Research (ZEF) at the University of Bonn, the School of Public Affairs at Zhejiang University in Hangzhou, the Complex City Lab at Shanghai University, and from the insights gained from discussions with the World Social Science fellows, who held a seminar on “Big Data in the Urban Context”, hosted and co-organized by the Urban Health and Wellbeing programme in Xiamen, Dec. 2015.

As noted in the background chapter, hundreds of colleagues contributed to the development of the Urban Health and Wellbeing (UHWB) Programme. Marvalee Wake and Thomas Roswall are identified in the background chapter. Carthage Smith, ICSU Deputy Executive Director from 2002 to 2014, provided high-level substantive and technical support to the UHWB initiative throughout his tenure. José Siri's work as Research Associate in the several years that spanned the Planning Group and establishment of the Scientific Committee (SC) was appreciated by both entities. Dov Jaron co-chaired the 2008 Vienna workshop that demonstrated the scope of support and the potential for an interdisciplinary programme dedicated to urban health and wellbeing using a systems approach. Gérard Salem was instrumental in organizing the 2013 Paris Conference that confirmed the Program's potential at a critical moment and continued on the SC. Jo Ivey Boufford played a key role in facilitating the partnership with the InterAcademy Medical Panel, now the InterAcademy Partnership (IAP); Anthony Capon has played a similar role with the United Nations University as well as participating at earlier stages. Both are now members of the SC. Pierre Ritchie has contributed to each of the bodies created to further the UHWB initiative, from the initial meeting of Unions in 2002, to current service on the SC. Indira Nath participated at multiple stages and has provided essential direction as the initial Chair of the Scientific Committee.

We are particularly thankful for the igniting thoughts presented by all the participants of the first Xiamen Expert Workshop and inauguration ceremony of the International Programme Office in Xiamen, China, Oct. 2014. We acknowledge the generous support of the Institute of Urban Environment (IUE), the Chinese Academy of Sciences, the Chinese Academy of Science and Technology and the municipality of Xiamen, without which the publication of this book would not have been possible.

Introduction to ICSU, UNU, IAP & IUE

ICSU

Founded in 1931, the International Council for Science (ICSU) is a non-governmental organisation representing a global membership that includes both national scientific bodies (120 National Members representing 140 countries) and International Scientific Unions (30 Members). The ICSU 'family' also includes upwards of 20 Interdisciplinary Bodies—international scientific networks established to address specific areas of investigation. Through this international network, ICSU coordinates interdisciplinary research to address major issues of relevance to both science and society. In addition, the Council actively advocates for freedom and responsibility in the conduct of science, promotes equitable access to scientific data and information, and facilitates science education and capacity building. [www.icsu.org]

UNU

The United Nations University (UNU) is a global think tank and postgraduate teaching organization headquartered in Japan. The mission of the UN University is to contribute, through collaborative research and education, to efforts to resolve the pressing global problems of human survival, development and welfare that are the concern of the United Nations, its Peoples and Member States. In carrying out this mission, the UN University works with leading universities and research institutes in UN Member States, functioning as a bridge between the international academic community and the United Nations system. Through postgraduate teaching activities, UNU contributes to capacity building, particularly in developing countries. [www.unu.edu]

IAP

The InterAcademy Partnership (IAP), was formally launched in South Africa in March, 2016. It brings together established networks of academies of science, medicine and engineering, namely IAP, the global network of science academies, the InterAcademy Medical Panel (IAMP) and the InterAcademy Council (IAC). Under the new InterAcademy Partnership, more than 130 national and regional members / academies will work together to support the special role of science and its efforts to seek solutions to address the world's most challenging problems. In particular, the new IAP will harness the expertise of the world's scientific, medical and engineering leaders to advance sound policies, promote excellence in science education, improve public health, and achieve other critical development goals.

IUE

The Institute of Urban Environment (IUE) of the Chinese Academy of Sciences (CAS) was established on 4 July, 2006. IUE-CAS is a national research institute engaged in comprehensive studies on the world's urban environment. IUE is a multi-disciplinary research institute engaged in fundamental and applied research on the cutting edge of environmental and resource sciences, as well as the development of new technologies for environmental remediation and waste management, which encompasses the impacts of urbanisation on ecosystems and the social economy.

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Background

The genesis of an interdisciplinary program on urban health and wellbeing was a meeting in Rio de Janeiro, Brazil on the occasion of the 27th General Assembly of the International Council for Science (ICSU) in September, 2002. With the support of ICSU Executive Director, Dr. Thomas Roswall, the meeting was convened by Professor Marvalee Wake, President of the International Union of Biological Sciences. It was attended by representatives of nine ICSU member Unions. This is the first recorded discussion within ICSU of health as an important focus for science.

As noted in the summary prepared by Professor Wake, this initial meeting struck a bold vision for health as an area of common legitimate interest for the international science community. The nine Unions agreed to initiate the development of an action plan anchored by the theme of Science for Health and Wellbeing. From the outset, health and wellbeing were both regarded as the fundamental pillars for building a common vision and undertaking collaborative, interdisciplinary activities. A second outcome of the Rio meeting was a commitment ‘to facilitate interdisciplinary by forming effective partnerships that transcend disciplinary borders’.

Only a few months later, a second meeting occurred at ICSU headquarters in Paris in February, 2003. Unlike the short meeting in Rio, this was a two-day meeting. It was attended by representatives of ten ICSU Unions and three ICSU affiliated interdisciplinary bodies. Although the meeting was structured around a detailed agenda, it was characterised as a ‘brain-storming session to delineate the scope of the initiative and to formulate a mission statement, as well as potential areas for collaboration’. More than twenty focal topics were identified.

The more immediate contribution of the second meeting was agreement on a statement of scope and mission for the initiative:

“We recognise that the health sciences require the partnership of a broad range of sciences and technologies to advance human health and wellbeing. The initiative ‘Science for Health and Wellbeing’ is a collaborative effort by ICSU Unions and other ICSU bodies to promote the elaboration and utilisation of the scientific information appropriate to understanding human and environmental health and wellbeing in its many dimensions.”

The goals of the initiative are to: a) demonstrate the extent to which a range of science and technology is important to health and wellbeing; b) educate (at multiple levels) about science and technology using modern means of communication; c) collaborate to identify areas unmet and produce new ideas, science and technology partnerships to look to the future; d) develop an inventory of ongoing programmes, activities in order to identify unmet needs; in order to empower the science community, the public and policy-makers and in all countries with the knowledge base to affect their health and wellbeing.

While focal topics varied to some degree over time, it is remarkable that the broad vision was sustained over the dozen years between the initial meetings organized by the initiating ICSU Unions and the official launch of the UHWB International Program Office in 2014. In particular, a broad and encompassing understanding of health, a commitment to partnerships, and using pertinent scientific information to empower the public and policy makers have been embedded in all the work that led to the creation of the Programme.

A full review and analysis of the steps taken between 2002–2003 and 2014 will not be offered here. Nonetheless, the main steps of what is best construed as an iterative process merits brief mention.

Following the 2003 meeting, the next major event was convened in conjunction with the 2004 ICSU mid-triennium Unions meeting. Hosted at the French Academy of Medicine, representatives from eighteen ICSU Unions and three ICSU interdisciplinary programs participated. The increasing attendance reflected a growing interest in the ICSU community in health as potential area for common work. ICSU Executive Director Thomas Roswall stated that the Health and Wellbeing initiative was consistent with ICSU’s efforts to strengthen its collaboration with scientific fields beyond those in which ICSU had traditionally concentrated its efforts. He noted achievements in other areas, but observed that these had yet to include the health sector.

The following year, 2005, was a critical one in significantly moving the initiative forward. ICSU’s Committee on Scientific Planning and Re-

view (CSPR) approved a grant submitted on behalf of multiple Unions to support further work aimed at laying the groundwork for a comprehensive science driven health and wellbeing program. The letter announcing the grant's approval accurately reflected the internal debate at ICSU about making health a strategic priority. It noted 'the enthusiasm of CSPR for an initiative that builds on the strengths of so many Unions', as well as the committee's words of caution that 'there is a long way to go before this can be considered as a cutting edge ICSU programme'.

CSPR was concurrently working on ICSU's first ever Strategic Plan. Later in 2005, at the 28th ICSU General Assembly in Suzhou, China, a Strategic Plan (2006–2011) was adopted. It included explicit provisions addressed to health, with an overall goal "to ensure that health considerations are duly taken into account in the planning and execution of future activities by building on the relevant strengths of Scientific Unions and Interdisciplinary Bodies". The associated specific action was the establishment of a Scoping Group to more clearly define how ICSU might contribute to science for human health. The Scoping Group had a dual role: a) to liaise with and ensure coordination, where necessary, of the major health initiatives that were already being developed within the ICSU community; and b) to identify additional areas or approaches where ICSU might add value to these initiatives.

While there was debate about whether health should be a scientific focus for ICSU, the outcomes of the General Assembly's deliberations confirmed that the initiative was no longer anchored in a sub-group of ICSU's Unions. There was now clear interest among a growing number of Unions as well as widespread support from ICSU's National members.

The Scoping Group worked during the 2006–2007 period. Its final report was subsequently endorsed by CSPR and the ICSU Executive Board. It set the stage for shifting the focus from 'whether' ICSU should develop a health and wellbeing program to 'what' such a program should be and 'how' it should function. Its conclusions and recommendations were clustered in two parts.

One set of recommendations set the criteria for what the program should be. The Scoping Group proposed that an ICSU health initiative should:

- be international (relevant to more than one region) and interdisciplinary;
- build on the synergies between existing activities and interests of the ICSU membership;
- add value to other ongoing or planned activities;