



SENET-HUB
SINO-EUROPEAN HEALTH NETWORKING HUB

Scoping paper: Review on health research and innovation priorities in Europe and China

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Abbreviations and Acronyms

Abbreviation, Acronym	Description
AAR	Accelerated Access Review
AC	Associated Countries
ACC	Alliance Against Cancer
AMR	Antimicrobial Resistance
AMU	Antimicrobial Use
ASEAN	Association of Southeast Asian Nations
AAR	Accelerated Access Review
BMBF	Federal Ministry of Education and Research
B&R	Belt and Road Initiatives
BMWF	Austrian Federal Ministry of Science, Research and Economy
BWP	Biennial Work Plans
CACMS	China Academy of Chinese Medical Sciences
CAMS	Chinese Academy of Medical Sciences
CAS	Chinese Academy of Sciences
CBTC	China Belgium Technology Centre
CCB	Coordinating Competent Body
CDC	Centre for disease control and prevention
CEEC	Central and Eastern Europe
CFDA	China Food and Drug Administration
CFM	Co- Funding Mechanisms
Chafea	Consumers Health Agriculture and Food Executive Agency
CJ	Tulcea County Council
CML	Christophe Mériex Laboratory
CSA	Coordination and support action
CSTEC	China Science and Technology Exchange Centre
DG-RTD	Directorate-General for Research and Innovation
EC	European Commission
ECDC	European Centre for Disease Prevention and Control
EDCTP	European and Developing Countries Clinical Trials Partnership

Abbreviation, Acronym	Description
EJP	European Joint Programme
EJP RD	European Joint Programme on Rare Diseases
ENP	European Neighbourhood Policy
EP	Executive Programme
ERC	European Research Council
EU	European Union
FCT	Foundation for Science and Technology
FP7	Framework Programme 7
FYP	Five Year Plan
GACD	Global Alliance for Chronic Diseases
GDP	Gross Domestic Product
GloPID-R	Global Research Collaboration for Infectious Disease Preparedness
H2020	Horizon 2020
HIV/AIDS	Human Immunodeficiency Virus
IA	Innovation actions
ICT	Information and Communication Technologies
IRDiRC	International Rare Diseases Research Consortium
ISS	Italian National Institute of Health
ISCP China	International Strategic Collaboration Programme – China/Ireland
JRC	Joint Research Centre
MAECI	Ministry of Foreign Affairs and International Cooperation
MERS	French Ministry of Higher Education and Research
MHRA	Medicines and Healthcare products Regulatory Agency
MoST	Ministry of Science and Technology of the People's Republic of China
MoU	Memorandum of Understanding
MSCA-ITN	Marie Skłodowska-Curie Actions-Innovative Training Networks
MSCA-RISE	Marie Skłodowska-Curie Actions-Research and Innovation Staff Exchange
MS	Member States
NC	National Coordinator
NCDs	Non-communicable diseases



Abbreviation, Acronym	Description
NDRC	National Development and Reform Commission
NFPs	National Focal Points
NHC	National Health Commission
NHFPC	National Health and Family Planning Commission
NHS	National Health Service
NIPH	National Institute of Public Health
NKPs	National Key R&D Programme
NMP	National Science and Technology Major Project
NSFC	National Natural Science Foundation of China
OBOR	One Belt One Road
OCP	Operational Contacts Points
PAHO	Pan American Health Organisation
PhD	Doctor of Philosophy
PHE	Public Health England
PM	Personalised Medicine
PoC	Proof of Concept
PRC	People's Republic of China
PUMC	Peking Union Medical College
R&D	Research and Development
RD	Rare Diseases
RIVM	Dutch National Institute for Public Health and the Environment
RIA	Research and innovation actions
RKI	Robert Koch Institute
S&T	Science and technology
SARS	Severe Acute Respiratory Syndrome
SD PPM	Sino-Dutch Centre for Preventive and Personalized Medicine
SDC	Sino-Danish Centre for Education and Research
SDGs	Sustainable Development Goals
SHUTCM	Shanghai University of Traditional Chinese Medicine
SIHE	Danish Ministry of Science, Innovation and Higher Education

Abbreviation, Acronym	Description
SIMM	Shanghai Institute of Materia Medica, Chinese Academy of Sciences
SMART	Systematic Medical Assessment, Referral and Treatment
SME	Small and medium-sized enterprises
SSN	Italian National Health Service
STI	Science Technology and Innovation
TCM	Traditional Chinese Medicine
UCAS	University of Chinese Academy of Sciences
UCL	Catholic University of Louvain
UHC	Universal Health Coverage
UHHK	University Hospital Hradec Králové
UK	United Kingdom
UN	United Nations
US	United States
VIB	Vlaams Instituut voor Biotechnologie
VR	Swedish Research Council
WP	Work Package
WHIBI	Wuhan East-Lake Hi-Tech Innovation Centre
WHO	World Health Organisation
WTZ	Wissenschaftlich-Technische Zusammenarbeit

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Executive summary

This document has been developed under the Sino-European Health Networking Hub – SENET project, funded by the Horizon 2020 (H2020) research and innovation programme from the European Commission (EC). SENET was launched in January 2019 and aims to create a sustainable dialogue between health research and innovation actors from the European Union (EU) and China. This report aims to describe, identify and assess the main health research and innovation priorities between the EU and China, and also on the global level, providing the readers with a comprehensive understanding of the state of play of EU-China research and innovation collaboration on health. In this regard, the report includes sections on health-related bilateral cooperation agreements between the EU, EU Member States (MS) and China, identifying health research priorities and action plans in the EU and China, matching the priorities and developing a comprehensive analysis of European and Chinese healthcare funding mechanisms.

The bilateral agreements identified in this report provide information on health-related cooperation agreements initiated by governmental organisations at national and institutional levels between the EU MS and China. The selected agreements are mainly focused on health cooperation within different research fields. In total, the report identified 49 agreements on health cooperation that were signed between the EU MS and China.

In addition, the scoping paper provides an overview of the health priorities in the EU and China, highlighting the action plans and its main research priorities on health. According to the analysis developed under this document, the EU and China have cooperated, through the establishment of Memorandums of Understanding (MoU), governmental declarations and institutional agreements, on health research and innovation priorities in the following fields:

- Strengthening health systems,
- Improving the prevention measures and treatment of diseases, notably infectious diseases and chronic non-communicable diseases;
- Provision of Research and Development (R&D) progress in health in order to develop new medicines or improve the already existent ones;
- Building a supportive and inclusive social environment;
- Development of a health wellness industry;
- Strengthening international cooperation and communication (including Traditional Chinese Medicine (TCM) and Western Medicine cooperation);
- Responding to global threats.

Furthermore, the scoping paper presents an overview of the global WHO Group of Seven (G7) health priorities and EU-China health programmes, emphasising European health programmes from FP7 to H2020, and a number of Chinese health programmes initiated by the National Science and Technology Major Project (NMP), the National Natural Science Foundation of China (NSFC) and the Chinese Academy of Medical Sciences (CAMS). It is important to state that European and Chinese health-related actors have been cooperating in the area of rare diseases through the International Rare Diseases Research Consortium (IRDiRC) and of chronic diseases in the framework of the Global Alliance for Chronic Diseases (GACD). The report identifies the main agencies that are part of these initiatives.

Regarding the European and Chinese funding mechanisms, the report also provides an overview of the main health research areas included under different funding programmes. Also, the report presents a comparison between the funding available through the NSFC and the H2020, including information on the programmes, eligibility, funding and duration. According to the analysis developed, funding programmes from both H2020 and the NSFC are open to domestic and international applicants, in particular in the case of health research and innovation actions. However, there is no proven correlation between the availability of co-funding leading automatically to an increase in participation in the respective framework programmes. Other factors play a role (see recommendation number 5 below). Moreover, the report identifies the health research areas that are part of the EU-China Co-funding Mechanism for Research and Innovation (CFM) for H2020, providing direct support for EU-China cooperation on different research and innovation topics, including: advanced, effective, safe and convenient health technologies, covering biopharmaceuticals, precision medicine, high-performance medical devices, prevention of major infectious diseases, antibiotic resistance, regenerative medicine, big data in medicine, medical robotics, services for aging technologies and TCM.

According to the analysis developed under this report, the following EU-China research and innovation priorities have been identified as major recurrent themes in the literature:

Table 1 - EU and China health research priorities

Infectious diseases	Chronical diseases	Rare diseases
HIV/AIDS, malaria, tuberculosis, avian influenza and viral hepatitis (hepatitis B) and outbreaks of global outreach e.g. Ebola	Cancer, cardiovascular and chronic respiratory diseases, hypertension diabetes and risk factors such as smoking and obesity	Molecular genetics, metabolic diseases, neurology, mental health and psychiatric diseases, immunology (SCID allergies, immune deficiency and other immune disorders), neuromuscular and musculoskeletal disorders, cardiovascular, haematological disorders, and dermatology

Finally, this document provides a set of main recommendations for supporting health research and innovation cooperation between the EU and China. The main recommendations are as follows:

- 1) Reinforcing the prevention and control of major and infectious diseases;
- 2) Strengthening the management of environmental problems affecting health;
- 3) Promoting the development of sustainable healthcare systems;
- 4) Cooperating on standardisation and research ethics;
- 5) Improving the health funding mechanisms in China.

The terms and provisions of the EU Grant Agreement (and its annexes) and the SENET Consortium Agreement will prevail in the event of any inconsistencies with recommendations and guidelines defined in this report.



1. Introduction

Given the solid framework for successful collaboration between China and the EU, both sides claimed to further intensify their cooperation through several joint flagship initiatives in a number of focus areas, including biotechnologies for the human health.

In this respect, and through thorough desk research, literature review and comparative analysis, SENET aims to research and present the current strategic health priorities and initiatives between Europe and China, including the health-related cooperation agreements and programmes. This will allow a comprehensive and representative image of the state of play in the field of EU-China research and innovation collaboration on a broad level.

This report (Scoping paper - Review on health research and innovation priorities in Europe and China) is part of work package (WP) 1 (Assessment of strategic health priorities and the health research and innovation landscape in Europe and China) of the SENET project. It analyses and consolidates existing knowledge on current strategic health priorities and initiatives between Europe and China. Specifically, this categorises the current and further priorities, action plans in health research and innovation in the EU and China, as well as relevant bilateral and multilateral agreements.

Thus, this report is developed under task 1.1, and aims to identify the priorities and action plans in health research and innovation in the EU and China as well as relevant bilateral and multilateral agreements. The main objective of the report is to identify health research and innovation priorities specifically on:

- Bilateral / multilateral agreements related to health research and innovation;
- Health research priorities and action plans in the EU and China, as well as collaboration priorities EU-China, and global perspective;
- Matches between the priorities of EU and China;
- Comparative analysis of European and Chinese healthcare funding mechanisms.

In addition to this introductory section, the report consists of four additional sections that aim to address the main objectives. The sections are:

- Overview of the bilateral cooperation agreements in the health sector: describes the background on the science and technology (S&T) cooperation, bilateral cooperation agreements in the health sector between the EU and China and health-related initiatives and programmes.
- Overview of health collaboration priorities in the EU and China: presents the current health collaboration priorities, and introduction to EU and China health priorities.
- Synergies between the priorities of EU-China and Global WHO-G7: highlights the key initiatives of health and comparison with WHO – G7.
- Comparative analysis of European and Chinese healthcare funding mechanisms: presents healthcare funding mechanism at EU and China level.
- Summary and conclusions: summarises the key outcomes of the report.

2. Overview of bilateral cooperation agreements in the health sector

This section provides the main bilateral cooperation agreements between the EU and China in the health sector, highlighting the key agreements initiated between the EU Member States and China. The existing cooperation agreements are provided in order to give an overview understanding of the background information regarding policy dialogue, key initiatives and the major impacts on health.

1.1. Methodology

This sub-section provides detailed information regarding the methodology used to identify a set of bilateral cooperation agreements in the health sector. In order to collect the relevant health-related bilateral agreements, the methodologies used include extensive desk research, literature review and comparative analysis to categorise the current and future priorities as well as action plans in health research and innovation in the EU and China.

The bilateral cooperation agreements between China, the EU and its Member States (MS) are mainly initiated by governmental organisations at national and institutional level. EC-funded projects also contributed to this scoping paper, namely through the outcomes from the DragonSTAR Plus (H2020 project) and EURAXESS projects.

In sub-section 2.3, the project team selected a set of bilateral cooperation agreements on health through the various levels. In addition, there are also a number of agreements or activities carried out with other Chinese S&T governmental ministries or agencies. All project partners contributed actively to the desk research and the selection of the health cooperation agreements. Moreover, the creation of a joint-centre between the universities and research institutes is also an important feature of Europe-China research and innovation co-operation at EU MS / AC level.

In order to develop a list of cooperation agreements, the following selection criteria were applied:

- Agreements that were signed between an EU MS and China;
- Agreements that were initiated at the national government level;
- Bilateral S&T agreements with health-related areas;
- Agreements that are still in place, have been in place recently or have been in place for a significant amount of time;
- Joint structures with a focus on health research.

This report includes a non-exhaustive list of agreements between the EU and the EU MS with China. It is important to refer that the consortium has selected agreements which meet the aforementioned criteria and based on the partners' knowledge from. It is possible that other agreements exist which are not identified in the report.

1.2. Background of S&T cooperation agreements between the EU and China

Governed by the Science & Technology Agreement¹, the EU and China have established a long-term scientific, research and innovation cooperation since 1998. A Joint Statement between the Ministry of Science and Technology of the People's Republic of China (MoST) and DG Research and Innovation on energy research and innovation was signed in December 2010, aiming to support the twinning of

¹ http://eeas.europa.eu/archives/delegations/china/eu_china/research_innovation/st_relations/index_en.htm

projects, joint programmes or joint calls based on mutual interest and equal partnership. Moreover, an annual joint steering committee is held between MoST and DG Research and Innovation.

In addition to the agreement, the EU-China Joint Declaration on Innovation Cooperation Dialogue was signed in September 2012 to create an official platform for exchanges and cooperation on innovation between both sides.

The current Framework Programme H2020 offers plenty of opportunities for the EU and China to collaborate. H2020 allows China to cooperate with Europe in all sectors and areas, including the fields of Food, Agriculture and Biotechnology, Water, Energy, Information and Communications Technologies, Nanotechnology, Space and Polar research. More than 116 participants of Chinese entities were involved in 49 H2020 projects until February 2016. China ranks currently among the top three international partners in terms of numbers of participations².

To continue implementing the EU framework programmes, Horizon Europe is the next EU Research & Innovation Programme (2021 – 2027). It is the European Commission's (EC) proposal for 100 billion EUR on the next research and innovation funding programme, aiming to strengthen the EU's scientific and technological bases, to boost Europe's innovation capacity, competitiveness and jobs and to deliver on citizens' priorities and sustain its socioeconomic model and values³.

In addition to the EU framework programmes, the Chinese national funding programmes are currently reforming the R&D funding programmes. The reform aimed to combine the increased budget for research and innovation and to replace with the previous 863, 973 other ministerial programmes, as well as the Major S&T Special Projects. It is expected that more opportunities for international cooperation will be offered by National Natural Science Foundation of China (NSFC) or the Chinese Academy of Sciences (CAS).

1.3. Cooperation agreements on health between the EU and China

During the 16th China-EU Summit in 2013, China and the EU jointly adopted the China-EU 2020 Strategic Agenda for Cooperation, where both sides committed to continue promoting cooperation on the environmental flagship initiatives developed respectively by China and the EU, maximising the mutual synergies between China's sociological civilisation and the EU's resource efficiency agenda.

China and the EU agreed that innovation is the main factor to achieve sustainable development. In order to ensure sustainable development, the Strategic Agenda identified a number of social challenges that need to be addressed, including social security and healthcare, high and quality employment, demographic ageing and medical technology development⁴.

To strengthen the S&T cooperation between the EU and China, the Commissioner for Research, Science and Innovation and China's Minister of Science and Technology have agreed to create a new package of flagship initiatives targeting the areas of food, agriculture and biotechnologies, environment and sustainable urbanisation, surface transport, safer and greener aviation, and biotechnologies for environment and human health at the 3rd EU-China Innovation Cooperation Dialogue, a side event of the 19th China-EU Summit in 2017⁵. These initiatives will be elaborated in a number of topics for cooperation with China under H2020.

² http://eeas.europa.eu/archives/delegations/china/eu_china/research_innovation/st_relations/index_en.htm

³ Commission proposal for "The Next EU Research & Innovation Programme (2021 – 2027) Horizon Europe"
https://ec.europa.eu/info/sites/info/files/horizon-europe-presentation_2018_en.pdf

⁴ <http://ozs.mofcom.gov.cn/article/hzcg/201601/20160101233963.shtml>

⁵ <http://ec.europa.eu/research/iscp/index.cfm?pg=china>

The Commission and the State Food and Drug Administration of China jointly established an EU-China consultation and cooperation mechanism in 2010, aiming to promote information exchange, mutual understanding on pharmaceuticals, medical devices, cosmetics and related administrative regulatory scientific matters.

Both sides aimed at ensuring the safety and health of European and Chinese consumer and contributing to sustainable trade relations between the EU and China in the pharmaceuticals, medical devices and cosmetics sectors in accordance with international commitments. The annual meetings to discuss issues related to the consumer safety and health will be held in the EU and China⁶.

The tables below provide an overview of some of the main bilateral agreements between the EU MS and China regarding the health – 49 initiatives listed in total. These initiatives were selected through desk research and according to the selection criteria described under the methodology section.

China and Austria

Table 2 - Agreement between the Government of the People's Republic of China and the Government of Austria on public health cooperation signed in 2010

Name of agreement	Agreement between the Government of the People's Republic of China and the Government of Austria on public health cooperation signed in 2010
Year of implementation	2010
Objectives	The two sides will cooperate mainly in the following areas: <ul style="list-style-type: none"> • TCM, especially research and evaluation • Western medicine • Community Health Food Safety Exchange of pharmaceutical products market licensing regulations and exchange of drug vigilance information
Relevance	It aims to promote the exchange of information on laws and regulations in the field of public health, in line with the respective needs and conditions, including medical journals, books, monographs and other technical literature on public health and Applied Medical research published by the Government's health administration.
Link	http://treaty.mfa.gov.cn/tykfiles/20180718/1531876950028.pdf

Table 3 - Austria / China Scientific & Technological Cooperation (Wtz Programme) Call For Applications For Joint Projects In 2020-2021

Name of agreement	Austria / China Scientific & Technological Cooperation (Wtz Programme) Call For Applications For Joint Projects In 2020-2021
Year of implementation	2019
Objectives	The programme for Scientific and Technological Cooperation (Wissenschaftlich-Technische Zusammenarbeit WTZ) is financed by the Austrian Federal Ministry of Science, Research and Economy (BMWF) and the

⁶ <https://www.asktheeu.org/en/request/502/response/1828/attach/12/Memorandum%20of%20understanding%201.pdf.pdf>

	Chinese Ministry of Science and Technology. The programme aims to stimulate international research cooperation by promoting the mobility of researchers to carry out joint research projects in specified thematic areas.
Relevance	<p>Prioritised fields of research are low carbon technology, environmental technology, new materials, renewable energy, agricultural research and health research including TCM.</p> <p>During Sino-Austrian Cooperation project seminar on Chinese Medicine in 2019, the cooperation projects include analysis of composition of traditional Chinese medicine, quality evaluation of traditional Chinese medicine, identification of active ingredients of traditional Chinese medicine, clinical study of acupuncture analgesia, metabolomics study of cardiovascular diseases by traditional Chinese Medicine, study on the mechanism of Traditional Chinese medicine in treating diabetes.</p>
Link	http://www.austria-scitech-china.at/news/2016-wtz-call-launched/

Table 4 - Eurasia-Pacific Uninet

Name of agreement	Eurasia-Pacific Uninet
Year of implementation	2007
Objectives	Supported by the Austrian Federal Ministry of Education, Science and Research and the Austrian agency for international mobility and cooperation in education, science and research, Eurasia-Pacific Uninet is a network aiming at establishing contacts and scientific partnerships between Austrian universities, universities of applied sciences, other research institutions and member institutions in East Asia, Central Asia, South Asia and the Pacific region.
Relevance	<p>Eurasia-Pacific Uninet has initiated the joint-centre between China and Austria as follows:</p> <ol style="list-style-type: none"> 1. Sino-Austrian Collaborating Centre for Chinese Medical Sciences The Sino-Austrian Collaborating Centre for Chinese Medical Sciences, as a base for Chinese and Austrian experts to conduct research, provides a solid foundation for a more practical cooperation and meanwhile, a condition for linking the experts of two countries to jointly conduct the research. 2. Sino-Austrian Biomarker Research Centre 3. TCM and Chinese Medical Sciences
Link	<p>http://www.eurasiapacific.net/index.php</p> <p>http://www.cacms.ac.cn/zykxyenglish/newsinbrief/201603/a98ffe824628426986c3b8d4d68341fc.shtml</p>

China and Belgium

Table 5 - Cooperation framework agreement on building China-Belgium Hi-tech Incubation Park - China-Belgium Technology Centre (CBTC)

Name of agreement	Cooperation framework agreement on building China-Belgium Hi-tech Incubation Park - China-Belgium Technology Centre (CBTC)
Year of implementation	2010
Objectives	<p>On March 31st, 2014, a signing of the Cooperation Framework Agreement on building China-Belgium Hi-tech Incubation Park was made between government of China and Belgium. The China-Belgium Technology Centre (CBTC) is a project initiated by the Wuhan East-Lake Hi-Tech Innovation Centre (WHIBI) and the scientific Park of the Catholic University of Louvain (UCL) in 2010.</p> <p>CBTC is the largest investment project in Belgium and serves as the platform for Chinese enterprises to enter Europe while helping European companies' market entry in China. Its objective is to facilitate the cooperation and innovation between Chinese and EU companies.</p>
Relevance	<p>The CBTC will operate on the basis of the cross-incubation principle. It will promote scientific, technological and business agreements between Chinese companies and Belgian laboratories and research centres.</p> <p>The MOU was also signed between CBTC and Biolake, which lays the foundation for the future establishment of China-Europe (Belgium) Cooperation Base of Wuhan Biolake in CBTC, focusing on the areas of bio-medicine, biomedical engineering, bio-agriculture, precision diagnosis, smart health, aiming to create a new city integrating R&D, incubation, manufacturing and logistics.</p>
Link	https://www.uieurope.eu/home-en

Table 6 - Sino-Belgian Collaboration Laboratory for Single Cell Analysis Technologies

Name of agreement	Sino-Belgian Collaboration Laboratory for Single Cell Analysis Technologies
Year of implementation	2019
Objectives	Sponsored by the Shanghai Institute of Materia Medica, Chinese Academy of Sciences (SIMM) and Vlaams Instituut voor Biotechnologie – Flanders Institute of Biotechnology (VIB, Belgium), the 'Sino-Belgian Collaboration Laboratory for Single Cell Analysis Technologies' was official opened on April 12, 2019. This joint laboratory intends to share resources, technologies, talents and projects through a network mechanism with the spirit of open innovation.
Relevance	<p>Chinese parties will use this platform to cooperate with VIB, a world leader in single cell analysis technologies, thereby making Shanghai a hub of the development and application of single cell analysis technologies and thus promote precision medicine.</p> <ul style="list-style-type: none"> • Single cell analysis to support the development of more effective and reliable drugs.
Link	http://en.screen.org.cn/2637/55163/136223.shtml

China and Bulgaria

Table 7 - Agreement between the Ministry of Health of the People's Republic of China and Ministry of Health of Bulgaria

Name of agreement	Agreement between the Ministry of Health of the People's Republic of China and Ministry of Health of Bulgaria
Year of implementation	2000
Objectives	In accordance with the Agreement on Health and scientific cooperation between the Government of the People's Republic of China and the Government of the Republic of Bulgaria, signed by the governments of the People's Republic of China and the Republic of Bulgaria in Sofia on June 28, 2000., The Ministry of Health of the People's Republic of China and the Ministry of Health of Bulgaria agreed to promote and facilitate health and medical cooperation.
Relevance	<p>Priorities of health cooperation in the following fields:</p> <ul style="list-style-type: none"> • Health reform; • Infectious diseases (especially AIDS and avian influenza prevention and control); • TCM. <p>Although this agreement goes back to the year 2000, from the desk research developed, the project team was unable to find other agreement between China and Bulgaria in fields of health. Thus, besides being the most recent agreement, the consortium agreed that it is relevant enough to select for the report.</p>
Link	http://bg2.mofcom.gov.cn/article/bilateralcooperation/inbrief/200707/20070704898691.shtml

China and Cyprus

Table 8 - Plan of Cooperation in the Fields of Health and Medical Sciences for the years 2010-2015

Name of agreement	Plan of Cooperation in the Fields of Health and Medical Sciences for the years 2010-2015
Year of implementation	2010
Objectives	The Ministry of Health of the Republic of Cyprus and Ministry of Health of the People's Republic of China signed a health cooperation agreement in 1999. In December 2006, both sides signed a health cooperation plan for 2006-2009, and signed a health cooperation plan for 2010-2015 in 2010. China has been working very closely with Cyprus in order to achieve the objectives set by the WHO.
Relevance	The two sides maintained visits and exchanges between the Ministry of Health and the medical expert inspection team.
Link	http://www.olc.gov.cy/olc/olc.nsf/all/DACDF5267382823142257A240035E47E/\$file/Bilateral0817.pdf?openelement

China and Croatia

Table 9 - Plan of cooperation between the Ministry of Health of the Republic of Croatia and the National Health and Family Planning Commission of the PRC in the field of health and medicine for the period 2018 – 2020

Name of agreement	Plan of cooperation between the Ministry of Health of the Republic of Croatia and the National Health and Family Planning Commission of the People's Republic of China in the field of health and medicine for the period 2018 – 2020
Year of implementation	2018
Objectives	The Contracting Parties agree to encourage exchanges and cooperation in the fields of health and medical science, and encourage direct cooperation between health, medicine, research and educational institutions, on the basis of mutual benefit, within their respective jurisdictions.
Relevance	The Contracting Parties agree to conduct bilateral health cooperation in the activities of the World Health Organisation and other international organisations. Moreover, they prioritise cooperation in the following areas: <ul style="list-style-type: none"> • Health policy and research; • Medical education and scientific research; • Health supervision; • Disease prevention and treatment; • Medical and health care services; • Maternal and child health; • Traditional medicine.
Link	http://www.mvep.hr/en/foreign-politics/bilateral-relations/overview-by-country/china,66.html

China and Czech Republic

Table 10 - Czech-Chinese Centre for TCM Research

Name of agreement	Czech-Chinese Centre for TCM Research
Year of implementation	2015
Objectives	the first Czech-Chinese Centre for TCM Research was opened at the University Hospital Hradec Králové (UHHK) in East Bohemia was opened as a part of the additional programme of the summit of Health Ministers of countries of Central and Eastern Europe (CEEC) and China entitled Health Ministers Meeting 2015. This initiative was established at the Governmental level. The Memorandum of Understanding (MoU) signed between UHHK and partners of CEEC aims to establish the centre and take other steps together in the area of TCM.
Relevance	The creation of the Czech-Chinese Centre for TCM Research and the cooperation in this area was made by advanced collaboration between the Czech Republic and PRC in healthcare. Instead of substituting Western medicine with TCM methods, the main goal is to take advantage of both sides to improve care and ensure maximum rise in the patients' quality of life. In particular, the centre aims to:

	<ul style="list-style-type: none"> • Assess the potential of TCM; • Develop TCM treatments and care; • Monitor TCM therapy effects in neurology.
Link	http://czechchina.com/hmm/?p=8585

Table 11 - Health cooperation agreement between the National Health and Family Planning Commission of China and the Czech Republic authorities

Name of agreement	Health cooperation agreement between the National Health and Family Planning Commission of China and the Czech Republic authorities
Year of implementation	2013
Objectives	Under the Belt Road for International Cooperation the National Health and Family Planning Commission of China and Czech Republic authorities signed a health cooperation agreement.
Relevance	<p>The main purpose of this agreement is to invest more in peoples' livelihood and deepen people-to-people exchange. The cooperation should mainly focus on:</p> <ul style="list-style-type: none"> • Health supervision; • Health and TCM application; • Medical and Healthcare services; • Health policy.
Link	http://www.chinadaily.com.cn/china/2017-05/16/content_29359377.htm

China and Denmark

Table 12 - MoU on bilateral cooperation in S&T between Danish Ministry of Science, Innovation and Higher Education (SIHE) and the Ministry of Science and Technology of the People's Republic of China (MOST)

Name of agreement	MoU on bilateral cooperation in S&T between Danish Ministry of Science, Innovation and Higher Education (SIHE) and the Ministry of Science and Technology of the People's Republic of China (MoST)
Year of implementation	2007
Objectives	The principal objective of the MoU is to facilitate broad opportunities for scientific and technological cooperation between the two countries, thereby promoting areas of research of mutual benefit.
Relevance	<p>Priority will be given to collaboration that can advance progress in science and technology, notably within research areas of mutual strategic interest such as</p> <ul style="list-style-type: none"> • Biotechnology and Biomedicine, including TCM; • Nano-science and technology; • Health and TCM application.
Link	https://ufm.dk/forskning-og-innovation/internationalt-samarbejde/globale-samarbejder/bilaterale-samarbejder/mou-kina-dk.pdf

Table 13 - Sino-Danish Centre for Education and Research in cooperation of the Danish Ministry of Science, Technology & Innovation and Danish Universities with the University of Chinese Academy of Sciences

Name of agreement	Sino-Danish Centre for Education and Research in cooperation of the Danish Ministry of Science, Technology & Innovation and Danish Universities with the University of Chinese Academy of Sciences
Year of implementation	2008
Objectives	In 2008, the Danish Ministry of Science, Technology and Innovation published its Knowledge - based Strategy for Collaboration between Denmark and China in the fields of Research, Education and Knowledge. The objective was the creation of a Sino-Danish University Centre in China. The university centre serves as a platform for research collaboration within areas of high relevance to future development of both Chinese and Danish society. The collaboration research between Denmark and China aims to combine Chinese and Danish scientific strongholds within neuroscience and cognition.
Relevance	Major research themes are: Water and Environment, Sustainable Energy, Nano Science, Life Sciences, Social Sciences and Food and Health. In the areas of life science, it is relevant to highlight the following subthemes: <ul style="list-style-type: none"> • Neuroscience and Cognition (scanning technologies, image processing and mathematical modelling, the use of neuroimaging techniques); • Omics (genomics, proteomics, glycomics, lipidomics and metabolomics).
Link	http://sdc.university/

China and Estonia

Table 14 - MoU on Health and Medical Cooperation between China and Estonia

Name of agreement	MoU on Health and Medical Cooperation between China and Estonia
Year of implementation	2015
Objectives	The Chinese vice Minister met with the Estonian Minister of Health and Labour Mr. Rannar Vasilyev and signed a MOU in the field of health and medical sciences between the Estonian Ministry of Social Affairs and China's National Health and Family Planning Commission. The memorandum, which is the first document signed between the two countries' health ministries, will create a framework for cooperation in various areas related to healthcare and medicine.
Relevance	<ul style="list-style-type: none"> • Health system reform; • Education on health; • Management of pharmaceutical resources; • Information exchange, using the CEEC-China 16+1 cooperation on health fields to promote national health cooperation.
Link	https://www.fmprc.gov.cn/ce/ceee/eng/zagx/qtlyhz/t1281685.htm

China and Finland

Table 15 - Implementation Plan for Cooperation in Health for the period from 2015 to 2018 between National Health and Family Planning Commission, China and Ministry of Social Affairs and Health, Finland

Name of agreement	Implementation Plan for Cooperation in Health for the period from 2015 to 2018 between National Health and Family Planning Commission, China and Ministry of Social Affairs and Health, Finland
Year of implementation	2014
Objectives	The Implementation Plan aims to enhance cooperation and promote exchanges in all sectors of health.
Relevance	Through updating the implementation plan for cooperation in the field of health, there are various joint programmes/institutes such as: <ul style="list-style-type: none"> • Fudan Nordic Centre at Fudan University (various universities from Finland participating) • Sino-Finland Life Sciences Centre at Wuhan University (various Chinese institutes and universities, particularly Wuhan University, and University of Helsinki)
Link	https://um.fi/documents/35732/0/Joint+Action+Plan+2019-2023+%283%29.pdf/bd639013-a815-12d2-ae44-4bc50ded7a97

Table 16 - MoU on establishing a Sino-Finnish Medical AI Research Centre in Chengdu

Name of agreement	MoU on establishing a Sino-Finnish Medical AI Research Centre in Chengdu
Year of implementation	2018
Objectives	The medical research centre was built together by the Sichuan Provincial People's Hospital, Eksote Hospital from Finland, and Avaintec, aiming to develop artificial intelligence and machine learning technology for improving diagnosis, treatment, and prevention of diseases.
Relevance	The goal is to implement comprehensive and cross-platform solutions in the medical and healthcare sector. Through the cooperation, the delegation had a comprehensive understanding of utilising artificial intelligence and data science to promote clinical services, promote universal social security reform, and improve hospital management level, in particular for: <ul style="list-style-type: none"> • Diagnosis, treatment, and prevention of diseases.
Link	http://news.cision.com/avaintec/r/chinese-finnish-cooperation-kicks-off-research-into-medical-ai,c2433355



China and France

Table 17 - MoU between the national Health and Family Planning Commission of China and the French Ministry of Mutual Assistance and health in the field of health

Name of agreement	MoU between the national Health and Family Planning Commission of China and the French Ministry of Mutual Assistance and health in the field of health
Year of implementation	2018
Objectives	The objective is to maintain the cooperation in the field of health, especially in • <ul style="list-style-type: none"> • Prevention and control of infectious diseases; • Health of the elderly; • Hospital management; • Other aspects of extensive and pragmatic cooperation.
Relevance	The Chinese side gives great importance to the work of maternal and child health, disease prevention and control, health and safety. Therefore, it is expected that experience is shared with the French side in these areas, promoting pragmatic cooperation and enhancing the health and well-being.
Link	https://cn.ambafrance.org/accord-cadre-de-cooperation-Communique-du-ministere-des

Table 18 - Laboratoire Christophe Mérieux

Name of agreement	Laboratoire Christophe Mérieux
Year of implementation	2011
Objectives	This is a bilateral agreement between the French Ministry of Higher Education and Research (MESR) and the Chinese Ministry of Science and Technology (MOST) in order to strengthen research and innovation cooperation on, Life Sciences (emerging infectious diseases), New Chemistry and Technology, New Energies, Advanced Materials, Information and Communication Technologies and Smart Cities, Sustainable Development, Biodiversity, Management of Water.
Relevance	The laboratory Christophe Mérieux (CML) participates permanently in the development of technologies allowing: <ul style="list-style-type: none"> • the detection of new emerging respiratory viruses • the development of new concepts and tools to predict, diagnose and treat the main respiratory diseases of viral origin. <p>The laboratory is thus involved in the fight against infectious diseases in China.</p>
Link	http://www.ambafrance-cn.org/IMG/pdf/sst_medecine.pdf

China and Germany

Table 19 - Inter-ministerial framework of action for German-Chinese cooperation regarding health (2014 + 2016)

Name of agreement	Inter-ministerial framework of action for German-Chinese cooperation regarding health (2014 + 2016)
Year of implementation	2014
Objectives	At the 3rd intergovernmental consultations on 10th October 2014 in Berlin, the inter-ministerial framework of action for German-Chinese cooperation regarding health was signed by Federal Minister of Health and Minister of the NHFPC. This bilateral plan of action was revised and extended at the 4th intergovernmental consultations on 13th June 2016. The plan builds the health strategy for closer cooperation between China and Germany regarding health.
Relevance	The following main topics of interest and increased cooperation were identified in the plan of action (taken from both the 2014 and 2016 plan of action): <ul style="list-style-type: none"> • Infectious diseases and hygiene • Oncology • Hospital management, quality assurance, hospital financing • TCM • Emergency services and emergency care • Promotion and development of the health industry • Innovation in health care
Link	https://www.bundesgesundheitsministerium.de/fileadmin/Dateien/4_Presse_mitteilungen/2016/2016_2/160613-27_PM_Dt-chin_Regierungskonsultationen.pdf

Table 20 - China Strategy 2015–2020 - Strategic Framework for Cooperation with China in Research, Science and Education

Name of agreement	China Strategy 2015–2020 - Strategic Framework for Cooperation with China in Research, Science and Education
Year of implementation	2015
Objectives	The BMBF (federal ministry for German research, science and education cooperation) drafted its China Strategy to exploit the opportunities that arise from cooperation with China, setting out a systematic approach to tackling the challenges and risks involved. One of the topics covered in the BMBF China Strategy is “Promoting the life sciences” with one of the subtopics being “Health care industry”.
Relevance	For the health care industry, it was agreed as part of a prioritisation process that the Sino-German Life Science Platform will be used to focus activities on biomaterials for therapeutic purposes and diagnostics. The measure of implementing a pilot project is to promote industry-led collaboration projects on biomaterials using the ‘2+2 model’. A joint database is created to promote life sciences institutions and stakeholders from German and Chinese industry and research.

Link	https://www.bmbf.de/upload_filestore/pub/China_Strategy_Longversion.pdf
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China and Greece

Table 21- China-Greece Science and Technology Innovation Cooperation Action plan in 2018

Name of agreement	China-Greece Science and Technology Innovation Cooperation Action plan in 2018
Year of implementation	2018
Objectives	On May 18 th , 2018, the 12 th Meeting of the China-Greece Joint Commission on Science and Technology was held in Athens. The goals are to continue to strengthen basic research, promote industrial technology system innovation, and increase openness and cooperation in building innovation capacity.
Relevance	The two sides agreed to deepen their cooperation in science and innovation in the fields of: <ul style="list-style-type: none"> • Environment and sustainable development; • Energy; • Agricultural food; • Cultural heritage protection; • Electronic information; • New materials; • Life sciences.
Link	http://www.most.gov.cn/eng/pressroom/201806/t20180608_139935.htm

Table 22 - Greek-Chinese cooperation agreement on traditional medicine

Name of agreement	Greek-Chinese cooperation agreement on traditional medicine
Year of implementation	2019
Objectives	In line with the Memorandum of Understanding on Cooperation in the Belt and Road Initiative that Greece and China signed in August 2018, the Shanghai University of Traditional Chinese Medicine (SHUTCM) and University of West Attica at Aegaleo agreed on the creation of a centre to offer programmes based on TCM, which focuses on health promotion.
Relevance	It forms part of the Greek-Chinese financial and cultural cooperation in the Belt and Road Initiative and is seen becoming a model for similar centres in every country along the Silk Road. So far, SHUTCM has three traditional Chinese medicine centres in Europe, this is the first Taiji health centre abroad and it will serve as a springboard for the development of many similar ones in Europe and in every country along the Silk Road, promoting Chinese tradition and culture.
Link	http://www.ekathimerini.com/232660/article/ekathimerini/business/greek-chinese-cooperation-deal-expands-to-traditional-medicine

China and Hungary

Table 23 - Hungary – China Research and Innovation Cooperation

Name of agreement	Hungary – China Research and Innovation Cooperation
Year of implementation	2014
Objectives	The Hungarian Academy of Science and the Chinese Academy of Sciences signed an agreement on establishment of joint laboratories in 2014, in order to strengthen the already existing exchange and collaboration in designated fields of common interest.
Relevance	This agreement has at its main areas of priority, information and communication technologies (ICT) and life sciences, including: <ul style="list-style-type: none"> • Healthcare and medical technologies; • Bio and nanotechnology, including the development and application of new materials; • Energy utilization, including new and renewable energies, as well as development of green technologies; • Environmental protection, as well as waste and water management; agriculture, including food processing, food safety and security, animal husbandry, fish breeding and farming technologies.
Link	http://eeas.europa.eu/archives/delegations/china/eu_china/research_innovation/estonia/hungary_en.htm

Table 24 - China CDC and Hungarian National Institute of Public Health Signed the MoU

Name of agreement	China Centre for disease control and prevention (CDC) and Hungarian National Institute of Public Health Signed the MoU
Year of implementation	2017
Objectives	The CDC and the Hungarian National Institute of Public Health signed a MoU on inter-agency cooperation in the presence of the leaders of China and Hungary, and the "China-Central and Eastern European national Network for Public Health cooperation" was announced, it aims to strengthen substantive cooperation between state-level medical management and public health institutions.
Relevance	Under the framework of 16+1 cooperation, the two institutes will establish the cooperation on: <ul style="list-style-type: none"> • Immunization management; • Emergency management; • Air pollutants and water quality monitoring; • Climate change and public health.
Link	http://www.chinacdc.cn/en/

China and Ireland

Table 25 - The MoU on Science and Innovation cooperation between Minister for Jobs Enterprise and Innovation and MOST

Name of agreement	The MoU on Science and Innovation cooperation between Minister for Jobs Enterprise and Innovation and MOST
Year of implementation	2012
Objectives	Two sides agreed on furthering bilateral cooperation in the fields of science and technology, health and agriculture (food and agribusinesses), information and communications technologies, software, financial services and other important industries.
Relevance	On 7 th of March 2013, Science and Innovation cooperation received up to € 1 million funding from Irish Government. This funding focused on a number of thematic areas of cooperation, including: <ul style="list-style-type: none"> • Agri-Food • Nanotechnology • Biomedical diagnostics & therapeutics • ICT and Health
Link	http://www.merrionstreet.ie/en/News-Room/News/minister-bruton-signs-memorandum-of-understanding-on-science-and-technology-with-chinese-government-2.43543.shortcut.html

Table 26 - International Strategic Collaboration Programme – China/Ireland (ISCP China)

Name of agreement	International Strategic Collaboration Programme – China/Ireland (ISCP China)
Year of implementation	2013
Objectives	China (ISCP China) aims to build a research capacity between Irish and Chinese universities and knowledge-intensive industries in the strategically important areas of ICT, biomedical science and nanotechnology. Biomedical science is defined as the application of the basic sciences, but the biological sciences are in particular to the study of medicine, the causes, consequences, diagnosis, and treatment of human diseases.
Relevance	With this programme new China-Ireland partnerships were developed. Those partnerships focus on strategic research areas such as immunology, cancer treatment and other fields with regard to peoples health. The China/Ireland International Strategic Collaboration Programme aims to be competitive, sustainable and saleable in international funding programmes. The programme developed under the new China–Ireland partnerships focused on research excellence in the thematic of: <ul style="list-style-type: none"> • Immunology; • Anti-cancer agent; • Population health areas.
Link	http://iscpchina.ie/

China and Italy

Table 27 - National Oncological Network: agreement with the China National Cancer Centre

Name of agreement	National Oncological Network: agreement with the China National Cancer Centre
Year of implementation	2018
Objectives	Alliance Against Cancer and the China National Cancer Centre in Beijing signed a cooperation agreement to deepen issues related to technological innovation and cancer epidemiology. The document was signed by the President of ACC, the largest Italian cancer research network and the Chinese counterpart. The decision to accelerate the collaborative relationship was hired last September, in Rome, after the meeting in the Superior Health Institute, where the headquarters of ACC.
Relevance	The cooperation on health research between Italy and China is focusing on the following: <ul style="list-style-type: none"> • Early diagnosis and prevention of cancer; • Cancer treatment and the application of biomarkers in chemical prevention; • Artificial intelligence and big data; • Immunotherapy.
Link	https://www.insalutenews.it/in-salute/ricerca-oncologica-acc-e-china-national-cancer-center-siglano-accordo-di-cooperazione/

Table 28 - Italy – China, the Call for the Collection of Joint Research Projects 2019-2021

Name of agreement	Italy – China, the Call for the Collection of Joint Research Projects 2019-2021
Year of implementation	2018
Objectives	The Ministry of Foreign Affairs and International Cooperation (MAECI) and the Ministry of Science and Technology of China (MOST) have published the announcement for the collection of highly relevant scientific projects for the renewal of the Executive Programme (EP) of scientific and technological cooperation for the years 2019-2021.
Relevance	The topics of proposal are in the following thematic areas: <ul style="list-style-type: none"> • Artificial Intelligence (Brain-inspired artificial intelligence, Intelligent City); • Technologies related to astrophysics; Innovative Biomedical Devices (medical robots, tissue engineering, new therapeutics, neurodegenerative diseases and personalized medicine); • Innovative processes for biomass conversion into energy and other added value products.
Link	https://www.innovitalia.net/opportunita/italia-cina-pubblicato-il-bando-per-la-raccolta-di-progetti-di-ricerca-congiunti-2019-2021/

China and Latvia

Table 29 - Latvia signs MoU with one of the world's largest genome sequencing companies – BGI for developing a Life Science and Technology Centre

Name of agreement	Latvia signs MoU with one of the world's largest genome sequencing companies – BGI for developing a Life Science and Technology Centre
Year of implementation	2017
Objectives	Under the 16+1 Initiative, during the summit 23 cooperation agreements were signed and among them was a MoU between one of the world's biggest genome sequencing organisations – BGI, Chinese Wuhan National Bio-industry Base construction Management Office and Ministry of Economics of the Republic of Latvia on building a Latvia-Biolake-BGI Life Science and Technology Centre. The centre will improve economic transformation and people's livelihood and serve as an innovation and cooperation platform for life science enterprises and research institutions of both countries, providing state of the art equipment, mentorship and commercialization.
Relevance	The key field for cooperation focuses on life science. With this partnership agreement one the main target is to make state-of-the-art genomics highly accessible to the global research community and clinical markets by integrating the industry's broadest array of leading technologies, including BGISEQ sequencing platform, economies of scale, and bioinformatics resources.
Link	http://www.liaa.gov.lv/en/news/latvia-signs-mou-with-one-of-the-worlds-largest-genome-sequencing-companies-bgi

China and Lithuania

Table 30 - Education Instructions Committee of World Federation of Chinese Medicine Societies was signed between the government of People's Republic of China and the government of the Republic of Lithuania

Name of agreement	Education Instructions Committee of World Federation of Chinese Medicine Societies was signed between the government of People's Republic of China and the government of the Republic of Lithuania.
Year of implementation	2013
Objectives	This agreement makes foundation for Lithuanian TCM specialist preparation and TCM integration into Lithuanian Health Care system. It is important to increase TCM popularity not only in public but those TCM methods to be recognized in academic level and integration in Lithuanian Health Care system.
Relevance	Cooperation fields are educational and scientific knowledge exchange between academia and industry on health. It was decided that TCM method knowledge and dispersion has to be connected with academic society. Deeply integrated TCM method valuation involving Lithuanian science society and local specialist preparation, will help effectively use all TCM strengths and increase doctor treatment effectiveness.
Link	http://eic.tjutcm.edu.cn/info/1059/1328.htm

China and Luxembourg

Table 31 - China – Luxembourg Traditional Chinese Medicine Centre

Name of agreement	China – Luxembourg Traditional Chinese Medicine Centre
Year of implementation	2015
Objectives	China-Luxembourg Chinese Medicine Centre was built in 2015 to promote international cooperation of TCM. The project is based on the long-term good cooperative relationship between Hunan University of Traditional Chinese Medicine and the National Institutes of Health of Luxembourg, relying on the existing advantages of the National Institutes of Health of Luxembourg in promoting Chinese medicine culture, adopting the form of combined resources of the Government, universities and pharmaceutical enterprises to go to sea, and promoting the entry of Chinese herbal, Products (pharmaceuticals and health Products) cooperative.
Relevance	The project has carried out a lot of work in the following areas: <ul style="list-style-type: none"> • Institution-building, fund construction, site construction; • Scientific research cooperation; • European pharmacopoeia standard setting for Chinese medicine; • Internationalization of TCM; • Construction of EU registration consulting and training base for Chinese medicine products, • Research on Chinese medicine cooperation strategy in China and the EU, and achieved a series of results.
Link	http://jiankang.cctv.com/2017/04/26/ARTluPoAZHUW3XSMeJxqaxNm170426.shtml

China and Malta

Table 32 - Prime Minister of Malta signed a five-year MoU together with the Chinese Prime Minister

Name of agreement	Prime Minister of Malta signed a five-year MoU together with the Chinese Prime Minister
Year of implementation	2014
Objectives	Under the 'One Belt, One Road' (OBOR) initiative, in July 2014, Prime Minister Joseph Muscat travelled to China on an official visit that was concluded by a five-year MoU together with the Chinese Prime Minister Li Keqiang, and enter the following areas: health and medical care, infrastructure, construction and real estate, tourism, financial services, bio-technology, air services and aerospace and aviation. This MoU delineated the current developments being witnessed in terms of a Cooperation Plan between the two states that set the stage for the bilateral cooperation. The main areas of cooperation that were pointed out in the MoU were infrastructure, energy, air services, financial services and R&D.
Relevance	The key fields for cooperation include health and medical care as well as biotechnology. Regarding health and medical care, the main priorities are:

	<ul style="list-style-type: none"> • Communicable diseases; • Health security; • Healthy lifestyles; • Road safety. <p>The investment in new and better roads, energy supplies, and telecommunications will promote access to health facilities and improve primary care.</p>
Link	https://www.maltachamber.org.mt/en/blogs/155

China and Netherlands

Table 33 - MoU between the Ministry of Health of the People's Republic of China and the Ministry of Health, Welfare and Sport in the Netherlands, the RIVM

Name of agreement	MoU between the Ministry of Health of the People's Republic of China and the Ministry of Health, Welfare and Sport in the Netherlands, the Dutch National Institute for Public Health and the Environment (RIVM)
Year of implementation	2016
Objectives	The aims of the health cooperation between China and the Netherlands focused on the prevention and control of new infectious diseases, health emergency response and health personnel training.
Relevance	<p>With regard to the key priorities for cooperation between China and The Netherlands, Chinese side is willing to cooperate more with the Dutch side in:</p> <ul style="list-style-type: none"> • Health policy; • Health personnel; • Medical technology- <p>On the other hand, The Netherlands is looking forward to exchanging experiences with China on:</p> <ul style="list-style-type: none"> • Health system reform; • Medical insurance; • Health information; • Rehabilitation medicine; • Technology research and development.
Link	https://www.rivm.nl/sites/default/files/2018-11/Progress%20and%20future%20of%20public%20health%20activities%20within%20MoU%27s%20China%20and%20the%20Netherlands.pdf

Table 34 - Sino-Dutch Centre for Preventive and Personalized Medicine – SD PPM

Name of agreement	Sino-Dutch Centre for Preventive and Personalized Medicine – SD PPM
Year of implementation	2010
Objectives	The Sino-Dutch Centre for Preventive and Personalized Medicine (SD PPM) bridges the different philosophies underlying Western and Chinese medicine,

	based on scientific biochemical language following a Systems Biology approach.
Relevance	The integration of Chinese and Western medicine strategies, philosophies and practices leads to innovative systems approaches in health care. The systems biology investigations of the Sino-Dutch Centre suggest that traditional Chinese methods for subtyping in the diagnosis of chronic diseases, such as diabetes and arthritis, can be of use in deciding the course of treatment for patients in modern (Western) medicine.
Link	http://www.sinodutchcentre.nl/

China and Poland

Table 35 - Confucius Institute of China Academy of Traditional Chinese Medicine and Krakow also jointly signed a cooperation agreement

Name of agreement	Confucius Institute of China Academy of Traditional Chinese Medicine and Krakow also jointly signed a cooperation agreement
Year of implementation	2017
Objectives	Under "One Belt and One Road" Initiative. The Confucius institute of China academy of TCM and Krakow Poland jointly signed a cooperation agreement, hope in the "area" under the guidance of the initiative, to further deepen in central and Eastern Europe cultural exchange and promotion of TCM, promote the medium wave in education and training of TCM and other fields.
Relevance	The key fields for cooperation focus on TCM, and to deepen in central and eastern Europe cultural exchange and promotion of TCM.
Link	http://www.cngjzj.com/eng_content.asp?id=51446

China and Portugal

Table 36 - MoU on Cooperation in Scientific and Technological Innovation between MoST and the Ministry of Education and Science of Portugal

Name of agreement	MoU on Cooperation in Scientific and Technological Innovation between MoST and the Ministry of Education and Science of Portugal
Year of implementation	2013
Objectives	Established on the MoU, an international science and technology cooperation centre "China-Portugal Joint Innovation Centre on Advanced Materials" officially settled at Zhejiang University. The calls for joint project proposals were launched in 2013 in research areas of: <ul style="list-style-type: none"> • Biomedical Materials • Nanotechnology and Nanomaterials • Sustainable Materials • Materials for Energy

Relevance	The MoU aimed to focus on the cooperation field of biomedical Materials and the establishment of China-Portugal Joint Innovation Centre on Advanced Materials. The Centre was built by four innovative research bases and transfer incubation bases for biomedical materials and devices, nanotechnology and materials, energy materials and environmental materials.
Link	http://polymer.zju.edu.cn/english/redir.php?catalog_id=50161&object_id=86783

Table 37 - Agreement signed between the Ministry of Health of Portugal and the Ministry of Health of the People's Republic of China on Health Cooperation in 2005

Name of agreement	Agreement signed between the Ministry of Health of Portugal and the Ministry of Health of the People's Republic of China on Health Cooperation in 2005
Year of implementation	2005
Objectives	Under the agreement, both sides agreed to launch the cooperation in the areas of <ul style="list-style-type: none"> • Public health; • Primary healthcare; • Emergency; • Chinese medical; • Hospital management.
Relevance	Based on the agreement, both sides were encouraged to start the cooperation on health abided by the regulation from both ministries of health.
Link	http://treaty.mfa.gov.cn/tykfiles/20180718/1531876897234.pdf

Table 38 - China-Portugal TCM Centre

Name of agreement	China-Portugal TCM Centre
Year of implementation	2017
Objectives	China-Portugal TCM Centre was jointly established by Jiangxi University of Traditional Chinese Medicine and Portugal May 16, 2017, aimed to cooperate in Chinese medicine talent training, health care, scientific research, academic exchanges, cultural exchanges, industrial development and other aspects.
Relevance	China-Portugal TCM Centre was jointly established by Jiangxi University of Traditional Chinese Medicine and Portugal May 16, 2017, aimed to cooperate in <ul style="list-style-type: none"> • Chinese medicine talent training; • Health care; • Scientific research; • Academic exchanges; • Cultural exchanges; • Industrial development;

	<ul style="list-style-type: none"> • Other aspects.
Link	http://www.iamchina.com/detail/l/3QISyhYY

China and Romania

Table 39 – Zhejiang Chinese Medical University First TCM Center Established in Romania

Name of agreement	ZCMU's First Int'l TCM Center Established in Romania
Year of implementation	2017
Objectives	Zhejiang Chinese Medical University and the Vasile Goldis Western University partnership aim to create and establish a Traditional Chinese Medicine Center in Romania.
Relevance	The goal of the agreement is not only to promote Traditional Chinese Medicine in Romania but also aims to promote the exchange of knowledge between the two institutions, as well as the mobility of students and researchers between Zhejiang Chinese Medical School and the Vasile Western University.
Link	https://iec.zcmu.edu.cn/en/info/1078/1034.htm

China and Slovenia

Table 40 - Agreement on Scientific and Technological cooperation

Name of agreement	Agreement on Scientific and Technological cooperation
Year of implementation	2014
Objectives	<p>In accordance of the Protocol of the 9th Session of the Joint Commission, Call for Proposal in the years of 2014-2015 was opened for the following areas: natural sciences and mathematics, engineering, biotechnical Sciences, medical sciences, social sciences and humanities.</p> <p>Both Parties exchange information on their key strategies and the latest plans of R&D as well as the international scientific cooperation of their respective countries. The Committee agreed that both parties should announce the next call for the period of 2020-2022 in the second half of 2019.</p>
Relevance	<p>The key fields for cooperation include biotechnical and medical sciences:</p> <ul style="list-style-type: none"> • Advanced treatment of pharmaceutical wastewaters in integrated photocatalytic process nanostructured g-C₃N₄ materials; • Study on key intelligent control technology and method of robot assistant system for cerebral palsy rehabilitation; • Research on intelligent early warning of emergency from perspective of public security; • Perceptions of caring among Slovenian and Chinese nursing students.
Link	http://www.arrs.si/sl/medn/dvostr/drzave/Kitajska/rezultati/18/inc/Kitajska-protokol-12-zasedanje-en.pdf

China and Spain

Table 41 - Beijing Municipal Administration of TCM and the Government of Catalonia signed a cooperation agreement

Name of agreement	Beijing Municipal Administration of TCM and the Government of Catalonia signed a cooperation agreement
Year of implementation	2016
Objectives	<p>The Beijing Municipal Administration of TCM and the Government of the Autonomous Region of Catalonia signed the "European Traditional Chinese Medicine Development and Promotion Centre" cooperation framework agreement. China and the West are committed to make the "European Centre for the Development of Chinese Medicine" an internationally renowned Chinese medicine centre.</p> <p>Focusing on Traditional Chinese Medical care, healthcare, education, research, cultural exchange and consultation, the Centre will become Europe's largest Traditional Chinese Medicine institution.</p>
Relevance	<p>The key field for cooperation focus on TCM:</p> <p>Use of acupuncture, herbal remedies and many other Chinese manipulative therapies.</p>
Link	http://www.chinadaily.com.cn/m/chinahealth/2016-02/05/content_23407578.htm

Table 42 - Sino-Spanish medical project to be built in Guangzhou

Name of agreement	Sino-Spanish medical project to be built in Guangzhou
Year of implementation	2017
Objectives	<p>The Hospital Clinic of Barcelona and the fifth Affiliated Hospital of Guangzhou Medical University, together with other partners, signed a framework agreement to establish the Guangzhou Barcelona International Hospital in Huangpu district, on Sept 5, the first Sino-Spanish joint medical project in China. The other partners include the administration of Huangpu district and Guangzhou Development District, Faculty of Medicine and Health Sciences of University of Barcelona, and Silver Mountain Capital.</p>
Relevance	<p>The partners will also build one or two high-end Pantheon Clinics in Huangpu. The new hospital and clinics will connect with foreign commercial insurances and serve both local residents and employees, including employees of more than 3,400 foreign-funded firms in the district. Guangzhou Medical University and Faculty of Medicine and Health Sciences of University of Barcelona will cooperate in student training and research. The Hospital Clinic of Barcelona is one of the best medical institutions in Spain in medical service.</p>
Link	http://www.chinadaily.com.cn/regional/guangdong.html



Table 43 - China-Spain Science and technology cooperation proposal for traditional medicine

Name of agreement	China-Spain Science and technology cooperation proposal for traditional medicine
Year of implementation	2018
Objectives	The Beijing Traditional Chinese Medicine administration and the Spanish Catalonia Business knowledge Department signed cooperation on the "European Centre for the Development and promotion of Chinese medicine" project to build a collection of education, medical care, scientific research, culture and industry as one of the Chinese medicine institutions in Catalonia.
Relevance	<p>The project of building the European Centre for the Development and promotion of Chinese medicine is conducive to promoting the spread and development of Chinese medicine in Europe and to serving the health and economic construction of the people.</p> <p>Both sides will jointly carry out research in the fields of:</p> <ul style="list-style-type: none"> • Basic theory of Chinese medicine; • Diagnosis and treatment technology; • Curative effect evaluation; • Major difficult diseases; • Common diseases; • Frequent diseases; • Prevention and treatment of chronic diseases; • International standards of traditional Chinese medicine.
Link	http://www.chinadaily.com.cn/m/chinahealth/2016-02/05/content_23407578.htm

China and Slovakia

Table 44 - MoU between China Academy of Chinese Medical Sciences (CACMS) and the Slovak Medical University

Name of agreement	A MOU between China Academy of Chinese Medical Sciences (CACMS) and the Slovak Medical University
Year of implementation	2016
Objectives	CACMS and Slovak Medical University had decided the starting point of cooperation made joint efforts to benefit the health of Slovakia people with Chinese medicine under the support of the governments of both countries.
Relevance	<p>It aims to promote Chinese medicine in Slovakia under the support of the governments of both countries. The cooperation between the two sides should start from the education of Chinese medicine and then expand to medical services and Chinese medicine research.</p> <ul style="list-style-type: none"> • Access to Chinese medicine.
Link	http://www.cacms.ac.cn/zykxyenglish/newsinbrief/201603/38569beadec142289c3becc4f51fe04d.shtml

China and Sweden

Table 45 - Sweden and China sign MoU on urban development

Name of agreement	Sweden and China sign MoU on urban development
Year of implementation	2017
Objectives	Cooperation will centre on urban development and smart solutions that will help to create liveable and healthy cities. The MoU also highlights energy-efficient, green and sustainable building, including wood construction, as a special field of cooperation. A joint working group will be set up to develop work plans for implementation of the MoU.
Relevance	The key fields for cooperation focus on: <ul style="list-style-type: none"> • Smart health; • Succeed in building attractive; • Build healthy and sustainable cities.
Link	https://www.government.se/press-releases/2017/06/sweden-and-china-sign-memorandum-of-understanding-on-urban-development/

Table 46 - Sino-Swedish bilateral cooperation on management of antibiotic resistance

Name of agreement	Sino-Swedish bilateral cooperation on management of antibiotic resistance
Year of implementation	2014
Objectives	The Sino-Swedish integrated multi-sectoral partnership for antibiotic resistance containment (IMPACT) was funded from 2014 to 2018 by the Swedish Research Council (VR) and National Natural Science Foundation of China (NSFC). The project brings together a wide range of expertise in Sweden and China in the area of antibiotic use and resistance.
Relevance	The research should aim at: <ul style="list-style-type: none"> • Improve basic knowledge; • Improve diagnostics and treatment or perfecting use; • Healthcare and hospital management; • Minimise emergence of antimicrobial resistance; • Environmental effects.
Link	https://www.folkhalsomyndigheten.se/the-public-health-agency-of-sweden/communicable-disease-control/antibiotics-and-antimicrobial-resistance/international-collaborations/impact--a-sino-swedish-collaboration/

China and the United Kingdom

Table 47 - The MoU on health cooperation between the National Health Service (NHS) UK and National Health and Family Planning Commission of the People's Republic of China

Name of agreement	The MoU on health cooperation between the National Health Service (NHS) UK and National Health and Family Planning Commission of the People's Republic of China
Year of implementation	2016
Objectives	The MoU has been signed between the Department of Health of the UK and the National Health and Family Planning Commission of the People's Republic of China on Health Cooperation.
Relevance	Both countries are facing the challenges of providing high quality healthcare to their people in the context of ageing populations, emerging infectious disease and the growing burden of non-communicable diseases. This relationship benefits both nations through sharing expertise and supporting joint projects. It commits both sides to holding an annual Ministerial dialogue on health, alternating between the two countries.
Link	https://www.gov.uk/government/news/uk-china-ties-flourish-at-2016-high-level-people-to-people-dialogue

Table 48 - Memorandum of Understanding on the UK-China Antimicrobial Resistance Research and Innovation Collaboration between the Department of Health of the UK and the Ministry of Science and Technology of China

Name of agreement	Memorandum of Understanding on the UK-China Antimicrobial Resistance Research and Innovation Collaboration between the Department of Health of the UK and the Ministry of Science and Technology of China
Year of implementation	2016
Objectives	The main objective of this agreement is to support joint collaborations in the translation of research into new solutions to address antimicrobial resistance.
Relevance	This could fund activities of joint research and innovation projects led by research organisations, higher education institutions, companies and enterprises within the two countries. The Chinese Government will provide matching funding to the UK Government's commitment to respectively support researchers of the two countries to carry out these projects. Collaboration under this MoU will build on existing UK-China science, research and innovation agreements.
Link	https://www.gov.uk/government/news/uk-china-ties-flourish-at-2016-high-level-people-to-people-dialogue

Table 49 - MoU on Medicine and Device Regulation between UK - Chief Executive of the Medicines and Healthcare products Regulatory Agency (MHRA) and China - China Food and Drug Administration (CFDA)

Name of agreement	MoU on Medicine and Device Regulation between UK - Chief Executive of the Medicines and Healthcare products Regulatory Agency (MHRA) and China - China Food and Drug Administration (CFDA)
Year of implementation	2014 (updated in 2018)
Objectives	The agreement pledges new areas of cooperation such as an exchange of learning from the accelerated access review (AAR) and how to effectively regulate the trading of medicines online.
Relevance	This new signing expands on a previous MoU signed in 2014 which focused on the exchange of safety information on medicines and medical devices to protect patients in the UK, China, and around the world.
Link	https://www.gov.uk/government/news/uk-and-china-sign-memorandum-of-understanding-on-medicine-and-device-regulation

3. Overview of Health Priorities in the EU and China

This section provides an overview of health priorities in the EU and China, highlighting the action plans and its research priorities on health in both regions. The EU and China have been collaborating on health research and innovation in the context of several Framework Programmes, particularly within H2020.

2.1. Methodology

This sub-section provides information regarding the methodology for identifying health research priorities and action plans in the EU and China.

To define the health research of action plans and priorities, the methodologies used in this section include desk research and literature review. The resources identified in sub-sections 3.2 and 3.3 are related to key action plans formulated by the EU and China which highlight health collaboration activities.

Within this context, the project team has identified the health priorities that are considered as some of the main programmes launched by the EU and China. The selection of the action plans is based on the relevance and impact on all levels of the involved stakeholders. Therefore, the health priorities and action plans mentioned in the following section are seen as the key scope to address the health sector from both the EU and China, aiming to facilitate the development of a healthier society as a whole.

From the EU side, it is relevant to highlight the Health 2020 programme. Health 2020 is a policy framework and strategy that requires the full and continuous engagement of WHO, Member States and a wide range of stakeholders. In this regard, Health 2020 is a guiding framework for the supporting action in health, providing systems of collaborative leadership to encourage innovative approaches to social mobilisation for equitable, sustainable and accountable health development.

Regarding the health priorities and action plans in China, the national 13th Five Year Plan has been formulated a key plan for health which is the Health China 2030, an important national medium and long-term strategic plan in the health sector.



In regard to the health cooperation at international level, the EU continuously plays the key role in accelerating progress on global health challenges engaged with WHO and other Member States. On the other hand, China has initiated significant plans on health to facilitate the cooperation with Eastern Europe and ASEAN countries through initiatives such as the Belt and Road Initiative and the 16+1 Cooperation.

2.2. Health research priorities and action plans in the EU

This sub-section provides the action plan and its research priorities for health in the EU. The key initiatives related to EU research and innovation action plan on health are described. As part of Europe 2020 strategy, promoting good health is the EU's 10-year economic-growth strategy. Specifically, health policy is important to Europe 2020's objectives for smart and inclusive growth.

2.2.1. Health 2020

Health 2020⁷ is the European health policy framework under the World Health Organisation (WHO), launched in 2012, aiming to “support action across government and society to significantly improve the health and well-being of populations, reduce health inequalities, strengthen public health and ensure people-centred health systems that are universal, equitable, sustainable and of high quality”.

Health 2020 addresses developments in Europe that affect the health status of Europe's citizens and that require new ways of thinking and acting. These areas also build on relevant WHO strategies and action plans at the regional and global levels. To fulfil the requirements from Health 2020, two strategic objectives are defined:

- Improving health for all and reducing health inequalities;
- Improving leadership and participatory governance for health.

Moreover, there are four priority areas for policy action based on the global priorities from WHO by its MS to address the special requirements and experiences of the European Region. The four priority areas of Health 2020 are the following:

- Invest in health through a life-course approach and empower citizens;
- Tackle Europe's major disease burdens of non-communicable and communicable diseases;
- Strengthen people-centred health systems and public health capacity, including preparedness and response capacity for dealing with emergencies; and
- Create supportive environments and resilient communities⁸.

Health 2020 is associated with all European Member States that engage from different starting-points and have different contexts. In Health 2020, health comes from the framework of societies and how they work, including the influences and opportunities that affect how individuals, families and communities live across the whole life-course.

To address the challenges, Health 2020 proposes good and modern governance for health, structures and practices. It is a requirement for developing a national health policy with supporting strategies and plans. Due to the complexity of health security challenges, an effective response requires transparent and timely sharing of information and data between WHO and its MS and the close collaboration of governments, international organisations, civil society, the private sector and other partners. In this

⁷ <http://www.euro.who.int/en/health-topics/health-policy/health-2020-the-european-policy-for-health-and-well-being/about-health-2020>

⁸ <http://www.europeanpublichealth.com/governance/who-europe/health-2020/>

context, WHO collaborates closely with the ECDC and the EC to enhance health security at the pan-European level.

2.2.2. European Centre for Disease Prevention and Control⁹

Established in 2005, the European Centre for Disease Prevention and Control (ECDC) is an agency of the European Union which aims to strengthen Europe's defences against infectious diseases. ECDC has partnered with national health protection bodies across Europe to strengthen and develop continent-wide disease surveillance and early warning systems. By working with experts throughout Europe, ECDC pools Europe's health knowledge to develop authoritative scientific opinions about the risks faced by current and emerging infectious diseases.

ECDC has interacted with the Member States on scientific and technical work within networks linked to Competent Bodies in the countries. In each Member State, there is a Coordinating Competent Body (CCB) with a National Coordinator (NC) responsible for institutional contacts with ECDC, as well as National Focal Points (NFPs) and Operational Contacts Points (OCP) responsible for strategic and operational collaboration on technical and scientific issues for specific diseases areas and public health functions. The various networks consist of NFPs and OCPs within the areas of ECDC work.

The health research programmes covered by ECDC are mainly related to antimicrobial resistance and healthcare-associated infections; emerging and vector-borne diseases; food and waterborne diseases and zoonoses; HIV, sexually transmitted infections and viral hepatitis; influenza and other respiratory viruses; tuberculosis; and vaccine-preventable diseases. Therefore, ECDC monitors 52 communicable diseases.

2.3. Health research priorities and action plans in China

This section provides information regarding the action plans and research priorities on health in China.

3.3.1. 13th Five Year Plan – Health Plan

Under the 13th Five Year Plan released in 2016, Chinese government has launched a healthcare system that was efficient, safe, affordable, and accessible by reducing the cost of medicine, improving rural access to healthcare, and improving medical assistance programmes¹⁰.

Under the Health Plan announced by Chinese government, the Plan aims to build a healthy China by carrying out in eight fields, including deepening medical and health care reform, improving the universal health care system, strengthening prevention and control of critical diseases and basic public health service, enhancing maternal and children healthcare service, improving medical service system, promoting the inheritance and development of TCM, carrying out nationwide fitness campaign and safeguarding food and drug safety. Through the implementation of these action, it is expected to prevent and control **tumours, mental diseases** and **chronic diseases** such as cardiovascular, brain, and vascular diseases as well as diabetes, malignant tumours, respiratory disease, and mental illness. With the reform of the healthcare system, the main actions of improving healthy China include: strengthening the prevention and control of major communicable diseases by working to lower prevalence of hepatitis B among the general population, keeping HIV prevalence low, reducing the incidence rate of tuberculosis to 58 cases per 100,000 people, basically eradicate schistosomiasis, and eliminate malaria

⁹ <https://ecdc.europa.eu/en/about-us/ecdc-partnerships-and-networks>

¹⁰ http://govt.chinadaily.com.cn/ministries/health/2017-11/16/c_111253.htm

and leprosy. On the other hand, the plan aims to provide greater free supplies of special medicines for the prevention and treatment of HIV/AIDS and other diseases, as well as improve the TCM healthcare service system by developing new service models and raising capacity for providing community-level services¹¹.

3.3.2. Healthy China 2030 Plan¹²

The Healthy China 2030 Plan was launched by the Central Committee of the Communist Party and the State Council in 2016. It is an important national medium and long-term strategic plan for the health sector. Healthy China 2030 is a complete national action plan covering the important areas of healthcare, including infant and maternal health, mental health, healthy ageing, healthy lifestyle promotion and education, control and management of non-communicable diseases, disease prevention, capacity building of healthcare services, building healthy environments (water and air quality improvement), and health services and security. The plan aims to promote healthy lifestyles, improve health services and the health industry, and build a sustainable health system to provide essential health services to every citizen by 2020 and reach the main health indicators of high-income countries by 2030.

The plan built by four core principles - health as a priority, reform and innovation, scientific development, and equity and justice - and five strategic goals. To monitor and evaluate these goals, 13 indicators in five fields were set to be achieved by 2030. The framework of the plan is shown in the Table 1 below.

Table 50 - Core indicators to be achieved by 2030

Strategic goals	Fields	Core indicators
Continuously improved population health	Health status	<ul style="list-style-type: none"> Life expectancy (year) Infant mortality (‰) Under-five mortality (‰) Maternal mortality (1/100.000) People meeting the fitness standards defined in the National Physical Fitness Standards (%)
Key health risk factors	Healthy living	<ul style="list-style-type: none"> Health literacy (%) Frequent physical exercises (100 million)
Under effective control	Health service and protection	<ul style="list-style-type: none"> Premature death rate from major chronic diseases (%) Practicing or assistant physicians per 1.000 Out-of-pocket payment as a share of total health expenditures (%)
Increased capacity for healthcare service delivery	Healthy environment	<ul style="list-style-type: none"> Percentage of days with good air quality in cities at prefecture or above level (%) Percentage of surface waters at or above level III (%)

¹¹ The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China (2016–2020), Central Compilation & Translation Press

¹² <https://www.bmj.com/content/360/bmj.k234>

Expanded healthcare industry	Healthcare industry	• Total size of healthcare industry (trillion Yuan)
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Within the Healthy China 2030 plan, the medium to long-term plan (2017-2025) on the prevention and treatment of chronic diseases was released in 2017. The goal is to help reduce people’s financial burden in medical expenses, improve the average life expectancy and boost their health. The plan highlighted the advantage of the TCM in preventing chronic diseases. The government will further promote family doctor services and involve people already suffering from chronic diseases, and establish a medical quality management and control platform to improve medical services.

2.4. Collaboration priorities on health research and innovation between the EU and China

This section outlines the main collaboration priorities on health research between the EU and China, more specifically what types of programmes have been initiated and what are the main focused on health areas for both sides.

The EU and China had built a long-term cooperation on health with establishing a strong tradition of cooperation on Health in the context of FP7 and within multilateral initiatives aimed at addressing global health challenges. Under H2020 programme, the flagship initiatives were published by the EC and the Government of China for the period 2018-2020 supported by the co-funding mechanism between the DG-RTD, EC and MoST, China.

These flagship initiatives are a common understanding between the EC, implementing H2020 (H2020) calls under its rules, and the National Natural Science Foundation of China (NSFC), implementing calls under its rules, to cooperate in specific areas of common research and innovation interest. The EC and NSFC have earmarked funding budgets to finance projects under the initiative.

In the Work Programme (WP) 2018-2020 on Health, demographic change and wellbeing, it implements several health topics in relation with developing sustainable health and care systems and growth opportunities for the health and care related industries. It aims to translate new knowledge into innovative applications and accelerate large-scale uptake and deployment in different health and care settings, making health and care systems and services more accessible, responsive and efficient in Europe and beyond. Research areas that implemented through the seven main priorities:

1. Personalised medicine;
2. Innovative health and care industry;
3. Infectious diseases and improving global health;
4. Innovative healthcare system - Integration of care;
5. Decoding the role of the environment, including climate change, for health and wellbeing;
6. Digital transformation in health and care;
7. Trusted digital solutions and cybersecurity in health and care¹³.

The current H2020 WP 2018-2020 health topics targeting the participation of China are the following:

- SC1-HCO-11-2018: Strategic collaboration in health research and innovation between the EU and China
- SC1-HCO-01-2018-2019-2020: Actions in support of the International Consortium for Personalised

¹³ http://ec.europa.eu/research/images/infographics/health/h2020_health_funding_2017-w920.jpg

- Medicine
- SC1-HCC-03-2018: Support to further development of international cooperation in digital transformation of health and care

Table 51 - Health topics targeting the participation of China

Topic description
<p>SC1-HCO-11-2018</p> <p>Compared to its size and increasing weight on the R&I international scene, China's participation and cooperation to the H2020 SC1 programmes is low. This is a lost opportunity because most of the major health challenges are global, and cooperation with China on specific strategic health challenges can contribute to provide more evidence-based solutions and to avoid duplication.</p> <p>The objective of this action is to support networking between European and Chinese policy makers, programme owners and funders, to address the following specific needs, including develop a sustainable platform between the EU and China that will facilitate a constant dialogue on addressing common health R&I challenges, identify health challenges, whose solution may benefit from closer bi-lateral and/or multi-lateral cooperation between the EU and China, facilitate and develop collaborative research initiatives between European and Chinese stakeholders.</p>
<p>SC1-HCO-01-2018-2019-2020</p> <p>The action should focus on building links with third countries by analysing the potential and advantages of collaboration in personalised medicine (PM) with those countries, studying areas of interest for Europe in PM collaboration and promoting international standards in the field. In particular the uptake of personalised approaches in health systems and healthcare should be addressed, taking into account social and cultural aspects, health economy issues and equitable healthcare.</p>
<p>SC1-HCC-03-2018</p> <p>There is an increasing global interest in cooperation on research and innovation addressing this issue with digital solutions and services. It is however necessary to identify the future areas for international cooperation which have the highest potential as well as support the identification and networking of the potential funding organisations which can promote future cooperation. In line with the strategy for EU international cooperation in research and innovation (COM (2012)497), international cooperation is encouraged, in particular with the US, Canada, Japan, South Korea and China.</p> <p>The action should develop and deliver a roadmap for international cooperation which outlines key relevant research and innovation areas in digital solutions and services for active and healthy ageing. The selection of topics and potential funding schemes should be based on a clear methodology which also takes into account the European added value and identifies relevant existing and emerging initiatives which can form the basis for such a cooperation. The action should also ensure that relevant stakeholders are engaged during the process through regional and international workshops and a set of communication and dissemination actions.</p>



2.5. International cooperation priorities on health

2.5.1. The EU's actions in global health

The EU global health policy was defined in 2010 that highlights the main challenges and sets the principles for a stronger EU vision, voice, and action on global health: leadership, universal coverage, coherence of EU policies and knowledge¹⁴.

The EU attempts to formulate a policy coherence between its internal and external policies. A comprehensive Global Health policy requires work across many sectors of government (trade, financing, development aid, migration, security, climate change, etc.). It also implies working in partnership with all interested stakeholders.

The EU also plays a significant role in the acceleration of global health challenges, in particular towards reaching the United Nations (UN) Sustainable Development Goals (SDGs). The 17 SDGs, which are in the UN's 2030 Agenda for Sustainable Development, provide a new policy framework worldwide towards ending all forms of poverty, fighting inequalities and tackling climate change, while ensuring that no one is left behind¹⁵. Thus, the EU is committed to support the implementation of the 2030 Agenda and to strive towards a sustainable future in coordination with its EU MS. In particular, the EU has made progress in some health-related areas, namely on the SDG 3 “good health and well-being”, SDG 4 “quality education” and SDG 7 “affordable and clean energy”. Regarding the SDG 3, there is strong focus on infectious diseases and non-communicable diseases – in particular, cardiovascular disease, cancer, diabetes or chronic respiratory disease.

It is also relevant to highlight the EU's actions in the European Neighbourhood Policy (ENP). The ENP has been launched in 2003 to govern the relations with 16 of the EU's closest Eastern and Southern Neighbours and formulated EU's key foreign policy towards 16 of its neighbours. ENP has formed the bilateral Action Plans with partner from European countries; including twelve ENP Action Plans are in place (Armenia, Azerbaijan, Egypt, Georgia, Israel, Jordan, Lebanon, Moldova, Morocco, Occupied Palestinian Territory, Tunisia and Ukraine).

With non-EU countries, EC cooperated on health based on bilateral agreements to promote good health for all and support high-quality public health principles, standards and legislation. These agreements set a general framework for cooperation on public health. They also provide a basis for bilateral cooperation between individual EU countries and non-EU countries.

2.5.2. China and Eastern European cooperation on health

The “16+1 Cooperation” framework has built a platform for developing relations between China and 16 countries (11 EU MS and 5 Balkan countries), enabling the two sides to regularly exchange cooperation conceptions, projects or issues to which the two sides both pay attention to realise win-win cooperation¹⁶.

The Medium-Term Agenda for Cooperation between China and Central and Eastern European Countries was released in 2015, aiming to improve 16+1 cooperation and further unleash its potential by setting out directions and priorities for 16+1 cooperation from 2015 to 2020.

¹⁴ https://ec.europa.eu/health/international_cooperation/global_health_en

¹⁵ <https://ec.europa.eu/eurostat/web/sdi/overview>

¹⁶ The Medium-Term Agenda for Cooperation between China and Central and Eastern European Countries https://www.fmprc.gov.cn/mfa_eng/zxxx_662805/t1318038.shtml

The “16+1 cooperation” developed synergies with major EU initiatives and plans and contributes to the China-EU partnerships for peace, growth, reform and civilization. The participants welcome and support the establishment of the China-EU Connectivity Platform. The “16+1 cooperation” will make full use of the opportunities offered by the Belt and Road initiative to steadily expand cooperation and in turn contribute to the initiative. The “16+1 cooperation” has been supporting health cooperation in the following:

- The China-CEEC Health Ministers' Forum is being held on a regular basis. The participants work for the establishment of a China-CEEC association on the promotion of health cooperation.
- Joint research on the healthcare system will be conducted and workshops will be organised on a regular basis. Exchanges of health professionals and workers will be expanded.
- Taking into account the healthcare system diversity, national specificities and legal framework, the Participants will encourage the establishment of a China-CEEC cooperation network for public hospitals and a China-CEEC alliance for cooperation among public health institutes.
- The participants support strengthened cooperation in traditional medicine and enhanced understanding and knowledge of TCM in the CEECs. The Chinese side is ready to carry out TCM cooperation with interested CEECs with mutual recognition of relevant legal framework and traditions.
- During the 3rd Minister Health Meeting between China and the CEECs, the topics discussed were related to global health security, prevention of multiple drug resistant tuberculosis (MDR-TB) and antimicrobial resistance (AMR), vaccination schemes, providing a platform for exchange and sharing experiences on hospital management and research, health policy developments in China and in the CEECs, and development of TCM in China and in the CEECs.

2.5.3. Major health exchange and cooperation on the Belt and Road Initiative¹⁷

The Belt and Road Initiative (B&R) aims to promote the connectivity of Asian, European and African continents and their adjacent seas, establish and strengthen partnerships among the countries along the Belt and Road, set up all-dimensional, multitiered and composite connectivity networks, and develop diversified, independent, balanced and sustainable development in these countries.

Belt and Road strengthens cooperation with neighbouring countries on epidemic information sharing, the exchange of prevention and treatment technologies and the training of medical professionals, and improve its capability to jointly address public health emergencies, providing medical assistance and emergency medical aid to relevant countries, and carry out practical cooperation in maternal and child health, disability rehabilitation, and major infectious diseases including HIV/AIDS, tuberculosis and malaria.

The National Health and Family Planning Commission recently unveiled the three-year plan for Belt and Road health exchange and cooperation (2015-2017).

The short-term goals are:

- Formulate Belt and Road health strategic study and implementation plans in 1-3 years;
- Reach broad consensus with countries on the Road and Belt, and establish health cooperation mechanism;

¹⁷ http://www.chinadaily.com.cn/regional/2015-12/18/content_23070224.htm

- Carry out health cooperation projects in the three-year construction plan (2015-2017) of the Silk Road Economic Belt and Maritime Silk Road of the 21st Century;
- Develop preliminary results from major cooperation fields.

Regarding the medium-term goals:

- Establish health cooperation networks among neighbouring countries and those on the Road and Belt, and stabilise cooperation mechanism;
- Improve policy support and coordination, and initiate new strategic projects on infectious disease prevention and treatment;
- Increase China's voice and influence in multilateral health governance at regional or global level.

Long-term goal:

- Develop effective results in all major projects in 5-10 years, and develop new projects to benefit countries on the Road and Belt;
- Increase China's role in multilateral health governance at regional or global levels, and develop an all-round cooperation model among Belt and Road countries.

The cooperation fields include the following aspects:

- Infectious disease prevention and control;
- Capacity development and talent cultivation;
- Health rapid response and emergency aid;
- Traditional medicine;
- Health development aid;
- Health development.

4. Synergies between the priorities of EU-China and global WHO-G7

3.1. Identification of global WHO-G7 priorities

This section provides the overview of the global WHO Group of Seven (G7) health priorities. The G7 is an informal grouping of seven of the world's advanced economies consisting of Canada, France, the United States, the United Kingdom, Germany, Japan and Italy.

3.1.1. Canada

Canada has been actively engaged in promoting health in the Americas since 1971, when it officially joined the Pan American Health Organisation/World Health Organisation (PAHO/WHO). Over the years, Canada has placed great importance on technical cooperation with Latin America and the Caribbean, based on the principles of equity and Pan-Americanism¹⁸.

PAHO's Canada BWP for 2018-2019 guides the technical cooperation between PAHO and Canada for this biennium. This work plan includes the following priority areas of intervention:

- Non-communicable diseases (NCDs);
- Mental Wellness and Suicide Prevention;
- Violence against women;
- Strengthening regional regulatory capacity.

¹⁸ <https://www.paho.org/can/index.php?lang=en>

3.1.2. France¹⁹

Santé Publique France was created from the merge of 3 health agencies in 2016 and meets the need for a leading centre of public health expertise in France. With expertise in epidemiology, prevention and working with the general public, the new national public health Agency is involved in a wide range of activities – from serving as a knowledge base to involvement in actual operations.

The missions of Santé Publique France:

- Epidemiological observation and monitoring of the health of the population;
- Monitoring health risks threatening populations;
- Promoting health and reducing health risks;
- Developing prevention and education initiatives for health;
- Preparing and developing solutions to counter threats, alerts and health emergencies;
- Launching the health alert system.

Operating at the heart of a vast network of partners and working alongside organisations in the field, the Agency develops independent scientific expertise.

3.1.3. Germany²⁰

The Robert Koch Institute (RKI) is one of the most important bodies for the safeguarding of public health in Germany. As leading institution of the government in the field of biomedicine, it plays a major role in the prevention and combat of infectious diseases, as well as in the analysis of long-term public health trends in the German health system.

One of the characteristics of RKI is its advisory role towards the federal government, state, local health authorities and medical specialists.

The RKI provides expert teams to help in investigations of regional epidemic outbreaks and collaborates with other authorities and experts to draw up epidemic emergency plans for extraordinary scenarios such as a worldwide influenza pandemic.

National reference centres and consultant laboratories for various bacterial and viral diseases are also located at the RKI. They serve as central contact points for the identification and of the protection against the diseases. The RKI also functions as an important interface in numerous international co-operative projects.

3.1.4. Italy²¹

The Italian National Institute of Health (Istituto Superiore di Sanità, ISS) is the main Italian research institute in the biomedical and public health field. It is the technical and scientific body of the Italian National Health Service (Servizio Sanitario Nazionale, SSN).

Promotion and protection of public health are pursued through activities carried out especially in the areas related to the following types of diseases: neurological, psychiatric, oncological, haematological, genetic, infectious, cardiovascular, endocrine-metabolic, immune-mediated and ageing-related.

¹⁹ Santé Publique France

https://www.santepubliquefrance.fr/content/download/1230/11631/version/3/file/plaquette_institutionnelle_sante_publicue_france_anglais.pdf

²⁰ https://www.rki.de/EN/Content/Institute/Profile/profile_node_en.html

²¹ <https://www.alleanzacontroilcancro.it/en/istituto/istituto-istituto-superiore-sanita/>

The Institute develops tools and strategies aimed at ensuring food safety, fighting zoonoses and promoting the adoption of healthy diets. It assesses the environmental risks for human health and carries out environmental monitoring, biomonitoring and surveillance.

3.1.5. Japan²²

Japan's National Institute of Public Health (NIPH) was established on April 1st, 2002, integrating The Institute of Public Health, National Institute of Health Services Management and a part of the Department of Oral Science in National Institute of Infectious Disease.

The development of public health, healthcare, and welfare systems capable of responding to the low birth rate and rapidly aging population is an urgent issue in Japan. In addition, there are strong calls for the construction of a society that ensures lifelong health and safety.

In order to promote administrative health, labour, and welfare policies in Japan relating to public health, healthcare, and welfare, the NIPH implements training for local government employees, etc. and related surveys and research.

The NIPH engages in various other activities as well, including making policy proposals to the Ministry of Health, Labour and Welfare and providing scientific evidence for the promotion of policies; the supply of health-related information to local governments and the public. Through these activities, the NIPH contributes to the improvement of public health in Japan. In this regard, the NIPH implements cross-sectional research in the cooperation with researchers. Some key areas of research at NIPH are the following:

- Promotion of lifelong health building;
- Improvement of the quality and patient safety in healthcare services with patient-centeredness;
- Promotion of community-based integrated care;
- Promotion of economic assessment of public health projects;
- Improvement of the living environment;
- Promotion of health crisis management.

3.1.6. United States²³

Pan American Health Organisation (PAHO) is the specialised international health agency for the Americas, major catalyst for ensuring that all the peoples of the Americas enjoy optimal health and contribute to the well-being of their families and communities. PAHO is committed to ensuring that all people have access to the health care they need, when they need it, with quality and without fear of falling into poverty. Through its work, PAHO promotes and supports the right of everyone to good health. The cooperation between PAHO and the United States of America goes back to the founding of the Organisation.

PAHO plans and implements Biennial Work Plans (BWP), which are in alignment within the framework of the PAHO Strategic Plan and Programme and Budget. The USA actively participated in the development of PAHO Strategic Plan 2014-2019 "Championing Health: Sustainable Development and Equity" and to the PAHO Programme and Budget for the 2017-2018 biennium. PAHO's USA BWP for

²² https://www.niph.go.jp/wp-content/uploads/pamphlet_en.pdf

²³ https://www.paho.org/us/index.php?option=com_content&view=article&id=142:about-paho-usa-cooperation&Itemid=315&lang=en

2018-2019 guides the technical cooperation between PAHO and USA for this biennium. This work plan includes the following priority areas of intervention:

- Physical inactivity (Non-Communicable Diseases - NCDs);
- Healthy ageing;
- Ethnicity and health.

3.1.7. United Kingdom²⁴

Public Health England (PHE) was established to protect and improve the public's health and wellbeing and reduce health inequalities. PHE has provided the services through world-class science, advocacy, partnerships, knowledge and intelligence, and the delivery of specialist public health services

The objective of Public Health England is to protect the country from threats to health, including outbreaks of infectious diseases and environmental hazards, in the UK and abroad, to improve the public's health and wellbeing, improve population health through sustainable health and care services and build capacity and capability of the public health system.

PHE plays a key role in implementing the plan of public health, including infectious diseases, environmental hazards, health improvement and health system strengthening, recognising that rates of non-communicable diseases are increasing.

Global Public Health activity will be focused on those countries prioritised by the government as most are in need of assistance, at the same time as continuing with wider contribution to ensuring global health security, including global antimicrobial resistance efforts.

PHE is also building a strong partnership and creating opportunities for shared learning and co-development with countries such as India and China.

3.2. Comparison between the main priorities of EU-China and the global WHO-G7 priorities

3.2.1. EU-China health programmes and priorities

The EU and China have initiated their health programmes to address various topics in health. In China, the National Science and Technology Major Project (NMP)²⁵, the National Natural Science Foundation of China (NSFC)²⁶, the National Key R&D Programmes and the Chinese Academy of Medical Sciences (CAMS) Programmes²⁷ are the key government agencies that have launched health-related programmes. These specific programmes have been designed to enhance cooperation with the EU through exchange in the field of health, especially regarding cooperation in the field of infectious and rare diseases. In this regard, Chinese health programmes are aiming the synergies with the main health research areas and priorities in the EU.

In the EU, the EC has formulated health-related programmes under several framework programmes. Within this context, it is relevant to highlight the work programmes under the H2020 for "Health, Demographic Change and Well-being" Societal Challenge, which aims to support research and innovation in order to improve peoples' health, providing conditions for ageing healthier and creating a

²⁴ <https://www.gov.uk/government/organisations/public-health-england>

²⁵ <http://www.nmp.gov.cn/>

²⁶ http://www.nsf.gov.cn/english/site_1/pdf/NationalNaturalScienceFundGuidetoPrograms2018.pdf

²⁷ <http://english.cams.cn/index.html>

proper environment for the existence of sustainable healthcare system that allows growth opportunities for healthcare industries.

This section describes a set of main EU and China research and innovation programmes, taking into account their main health priorities.

National Natural Science Foundation of China (NSFC)

The National Natural Science Foundation of China (NSFC) was established on February 14, 1986. It is an institution directly under the jurisdiction of the State Council, tasked with the administration of the National Natural Science Fund from the Central Government²⁸.

NSFC has set up a General Programme to support the basic research under the Department of Health science. The objective of the funding for General Programme in the Department is to support basic research on issues concerned with disease prevention, disease control and disease treatment in China. For the purpose of improving the scientific research in medical science, this programme mainly supports basic research (including clinical-related basic research) in the following areas: the structural, functional, developmental, genetic and immune abnormalities of human body, the occurrence, development, outcome, diagnosis, treatment and prevention of diseases.

In total 10 divisions are set up in the Department of Health, including

1. Respiratory system, circulatory system, blood system;
2. Digestive system, urinary system, endocrine system/metabolism and nutrition support;
3. Neurological and psychiatric diseases, gerontology;
4. Reproductive system/ perinatology/neonatology, medical immunology;
5. Medical imaging and biomedical engineering, special medicine, forensic sciences;
6. Medical pathogenic microorganisms and infection, orthopaedics and sports medicine, emergency and intensive care;
7. Oncology;
8. Skin and appendages, preventive medicine;
9. Medical and pharmacology material;
10. Chinese medicine, Herbal Medicine.

The department also highlights research on rare diseases based on existing accumulated research work and other weak research areas in an effort to keep the balance and coordinative development of various disciplines.

National Science and Technology Major Project (NMP)

According to national medium-and long-term science and technology development planning (2006-2020), approved by the State Council, NMP has identified 16 major projects that are the most important priorities of the development of science and technology in China in 2020.

Major Project for Significant New Drugs Development was launched in 2008 by the National Health Commission and the Military Commission logistics and Support Department led the implementation of the Organisation. To ensure the successful implementation of two key scientific projects on the “Significant New Drugs Development” and “Prevention and treatment of major infectious diseases such as AIDS and viral hepatitis B”, the NHC has published a number of regulations to formulate the work of major S&T of the National Health Commission. The regulations of NHC are mainly related to formulating

²⁸ <http://www.nsf.gov.cn/nsfc/cen/xmzn/2019xmzn/01/08yx/index.html>

national health policies, coordinating and advancing the medical and healthcare reform, establishing a national basic medicine system, supervising and administrating public health, medicare and health emergencies, as well as family planning services.

The Major Project for “Significant New Drugs Development” aims to address the 10 major diseases including malignant neoplasms, cardiovascular and cerebrovascular diseases, neurodegenerative diseases, diabetes mellitus, mental diseases, autoimmune diseases, drug-resistant pathogenic bacteria infection, tuberculosis, viral infectious diseases and other common and frequent illnesses.

The project focuses on the drug development for children and rare diseases to address the major scientific and technological problems in the process of new drug R&D and industrialisation.

There have been a number of key technologies implemented, especially on the creation of restricting new drugs, producing a number of innovative achievements with significant clinical value and clinically needed chemicals, TCM and biological drugs, as well as the implementation of an innovation system on national drug²⁹.

Apart from the project for “Significant New Drugs Development”, Major project for “Prevention and Treatment of Major Infectious Diseases” such as AIDS and viral hepatitis is also considered the one of the main priorities under the NMP³⁰. To comprehensively improve the level of prevention, diagnosis, treatment and control of major infectious diseases in China, the programme aims to prevent and control of infectious diseases by creating a preventive and control system for research and development of infectious disease diagnosis, prevention and protection products on AIDS, viral hepatitis B and other major infectious diseases.

According to the National Health Commission (NHC), the Collaboration Network on Rare Diseases will be the main focus. China will establish a national collaborative network of hospitals for rare disease diagnosis and treatment to promote the early detection and effective treatment of such diseases. 324 hospitals have been selected for their capacity in treating patients with rare diseases. The network will facilitate the timely transfer of difficult and complicated cases between hospitals and the allocation of quality medical resources for them. Meanwhile, hospitals in the network are advised to further train medical workers on rare disease knowledge and clinical skills, focusing on improving their abilities to identify, diagnose and treat such cases.

National Key R&D Programmes³¹

National Key R&D Programmes support R&D in areas of social welfare and people’s livelihood, such as agriculture, energy and resources, environment, and health, focusing especially on strategic, fundamental and prospective major scientific issues, key generic technologies as well as international S&T cooperation regarding core industrial competitiveness, indigenous innovation capabilities, and national security.

To compare with the EU’s actions on the health priorities, Health 2020 policy framework proposed the four priority areas for policy action based on the global priorities set for WHO by its Member States. One of the priorities is to tackle Europe’s major disease burdens of non-communicable and communicable diseases. The EU has also put much effort to initiate the health programmes through the

²⁹ http://www.nmp.gov.cn/tztg/201902/t20190218_6181.htm

³⁰ http://www.nmp.gov.cn/tztg/201902/t20190218_6180.htm

³¹ <http://chinainnovationfunding.eu/national-key-rd-programmes/>

FP7 and H2020 which have provided around 135 million EUR worth of funding for 45 global health-related research projects.

These multi-disciplinary projects addressed important topics influencing global health, including health literacy, disease prevention and treatment, health system and workforce strengthening, and governance and management capacity-building. Through these research actions, the EC reinforces the impact of its actions by involving all relevant stakeholders, and by providing data and evidence-based recommendations to policy makers.

Chinese Academy of Medical Sciences (CAMS) Programmes³²

Chinese Academy of Medical Sciences (CAMS) is the only state-level academic centre for medical sciences in China and multidiscipline medical research institution, which was founded in 1956. Furthermore, the Peking Union Medical College (PUMC), founded in 1917, is the first key medical school to offer eight-year curriculum on clinical medicine and undergraduate courses on nursing in China. CAMS and PUMC produce and provide world-class medical research and education, having the responsibility of advising the Chinese government on pivotal healthcare and medical education reforms. CAMS and PUMC share the same administration and faculty.

CAMS and PUMC have been leading modern medicine in China for over a century. There are 19 institutes (and five sub-institutes), six hospitals, seven schools and five CAMS branches among CAMS and PUMC. In terms of key labs (areas), it is relevant to highlight the following: cardiovascular disease, molecular oncology (cancer), molecular biology, bioactive substance and function of natural medicines and experimental haematology.

CAMS has been strongly involved in international cooperation, including being part of the Global Alliance for Chronic Disease as an associated member, providing funding for health research. In 2016, Lancet-CAMS Health Summit was held in Beijing, bringing together top scientists specialised in medical research at home and abroad. Nearly 500 scientists from seven countries and regions attended this health-focused summit. During the summit, the participants held in-depth discussions on health of women and children, migration, urbanisation and health, clinical medicine, medical education, infections, public health and aging.

FP7 - Health research programme³³

The objective of the health research programme under the 7th Framework Programme (FP7) was to improve the health of European citizens, and increase and strengthen the competitiveness and innovative capacity of European health-related industries and businesses. In addition, global health issues were also addressed such as emerging epidemics. Although FP7 is no longer active (replaced by H2020), it is relevant to understand the main topics of focus within the health area. Within this context, the health research programme under FP7 was focused on:

- Research on the **brain and related diseases**, human development and ageing;
- Translational research in infectious diseases (**HIV/AIDS, malaria, tuberculosis, avian influenza**);
- Translational research in major diseases: **cancer, cardiovascular disease, diabetes/obesity**, rare diseases, other chronic diseases including rheumatoid diseases, arthritis and **muscoskeletal diseases**.

³² <http://english.cams.cn/index.html>

³³ <https://cordis.europa.eu/programme/rcn/852/en>

HIV/AIDS research programme³⁴

During the FP7 (FP7-2007-2013), over 175 million EUR were invested by the EU, of which 135 million EUR to support 28 collaborative research and innovation projects to fight HIV/AIDS. These projects tackled basic understanding of the disease, product development, and clinical management.

This investment resulted in the development of several new drugs or vaccine candidates in pre or early clinical development, the creation of a large network with data from over 350.000 HIV positive individuals and the completion of studies for new drugs formulations for paediatric use and the generation of in-vitro and in-vivo models to study HIV latency and persistence. Many more results have been generated by FP7-funded projects, as well as different scientific publications and patents filed.

HIV/AIDS research has been continuously supported under H2020. In the first years of the programme, a total EC contribution of 129 million EUR has been committed. Most of the funds come from the Societal Challenge 1: Health, Demographic Change and Wellbeing, including 45 million EUR on two large platforms for the development of a preventive or therapeutic vaccine, as well as a 10 million EUR loan from the InnovFin instrument to develop a high-throughput HIV viral load test and 61 million EUR of EC contribution to the EDCTP2 grants.

New European Joint Programme on Rare Diseases³⁵

The EC has established a 100 million EUR budget allocated to rare disease research of which 55 million EUR will come from EU's research and innovation programme H2020. The new European Joint Programme on Rare Diseases (EJP RD), launched on the 1st of January 2019, aims to assure that those new treatments and diagnostic tools will reach those who need them the most. The EJP RD will involve all European Reference Networks. Through them, the programme links with expert centres providing highly specialised care in more than 300 hospitals across Europe ensuring that rare diseases patients receive the highly specialised health care they need.

Support for the functioning of the Global Research Collaboration for Infectious Disease Preparedness (GloPID-R)³⁶

One of the biggest concerns of the EU regarding health is the increasing chance of a potential epidemic. Given the fact that nowadays people move and trade as never before, pathogens and infectious diseases, including those that are resistant to antimicrobial agents, can spread further and faster. In order to tackle this international threat, the EU must coordinate with international infectious disease research funders. To prevent this to happen or to have a quick and effective reaction GloPID-R was established in 2013 as a response to a request for coordination by the Heads of International Research Organisations. This programme promotes discussions on improved data-sharing during outbreaks like Ebola, yellow fever and Zika creating links between clinical trial networks, and the inclusion of social science into research responses to public health emergencies.

³⁴ <https://ec.europa.eu/research/health/index.cfm?pg=area&areaname=aid>

³⁵ https://ec.europa.eu/info/news/commission-establishes-eu100-million-partnership-boost-research-rare-diseases-2018-dec-06_en

³⁶ <https://cordis.europa.eu/programme/rcn/704213/en>

3.2.2. G7 health programme and priorities

During the G7 Health Ministers' Communiqué took place in Milan on November 5th - 6th, 2017, it was guided by the G7 Taormina Leaders' Communiqué to address the global challenges. G7 reaffirmed the added value in providing political attention and technical resources to advance global health security on the basis of a "One Health" approach³⁷.

Guided by the "One Health" approach, G7 will continue to address antimicrobial resistance (AMR). Actions taken to address AMR make health systems stronger and more resilient by developing tools and structures to identify problems early, by minimising the spread of infections, by prolonging the effectiveness of medications, and by promoting the production of new drugs, diagnostic and therapeutic and preventive alternatives that might otherwise go undeveloped.

G7 has emphasised the importance of strengthening health systems through each country's path towards Universal Health Coverage (UHC). The international conference of UHC was held in Tokyo in 2015, focused on building resilient and sustainable health systems. The G7 leaders commit to leveraging lessons from the Ebola crisis, lead the strengthening of response to public health emergencies by the international community, to further promote UHC, which is a key to address the broader health issues faced by the international community, and to strongly commit to the health-related SDGs as the first G7 Summit Meeting after the adoption of SDGs³⁸.

In addition to the analysis on the main health programmes and priorities identified under the G7, it is relevant to briefly describe the main aspects agreed under the G20 meeting in 2018.

G20 health programmes and priorities

This sub-section provides inputs on the G20 health agenda which are considered as main priorities among G20 countries (including China) and reflecting the main objective of 19 countries and the EU. Thus, the project team provides an analysis on the main health priorities identified and discussed in during the most recent G20 meeting, instead of analysing the priorities of each country individually.

Within this context, it is relevant to mention the G20 meeting that took place in Argentina on October 4th, 2018, where four major health priorities were defined: antimicrobial resistance (AMR); malnutrition – childhood overweight and obesity; health systems strengthening; and health systems responsiveness to disasters, catastrophes and pandemics. The main lines of actions to achieve improvements on those areas are as follows: increase the level of awareness and instill responsibility, moderation and caution on all users, going from healthcare providers to general public, farmers and food producers; the implementation of policies to promote the use of the right drug in dose and in the proper time; improve infection prevention and reducing transmission and spreading; the development of new drugs that are safer, more effective and more affordable and at the same time ensure the maintenance of the global supply of the existing drugs; and reinforce and acknowledge the role that small and medium-sized enterprises (SMEs) play in the product development³⁹.

In accordance with the G7 and G20 commitments and the agenda for Sustainable Development and the SDGs set by 2030, G7 countries are working together to reduce global inequalities, to protect and improve the health of all individuals throughout their life course through inclusive health services, to

³⁷ G7 Milan Health Ministers' Communiqué 5-6 November, 2017

http://www.g7italy.it/sites/default/files/documents/FINAL_G7_Health_Communicu%C3%A8_Milan_2017_0.pdf

³⁸

https://www.uhc2030.org/fileadmin/uploads/ihp/Documents/About_IHP_/mgt_arrangemts_docs/UHC_Alliance/Consultation_Day_one_presentations/Rev_MOFA_Presentation_June222016_UHC2030_.pdf

³⁹ <http://www.g20.utoronto.ca/2018/2018-10-04-health.html>

tackle non-communicable diseases (NCDs), to sustain their commitments to eradicate polio through support to the Global Polio Eradication Initiative, and to end the epidemics of HIV/AIDS, malaria and tuberculosis by 2030 through the support to the Joint UN Programme on HIV/AIDS (UNAIDS), the Global Fund to Fight AIDS, Tuberculosis and Malaria, and UNITAID, to support key global initiatives such as Gavi the Vaccine Alliance, and to invest in research and innovation important to global health.

3.2.3. Comparison between the priorities in EU-China and G7

The EU and China have launched the key programmes for health sector. Table 52 below shows the health priorities of EU-China compared to G7.

Table 52 - Health priorities among the EU, China and G7

	Programmes	Priorities
EU	FP7	<ul style="list-style-type: none"> • Infectious diseases (HIV/AIDS, malaria, tuberculosis, SARS, avian influenza); • Major diseases (cancer, cardiovascular disease, diabetes/obesity, rare diseases, other chronic diseases).
	H2020	<ul style="list-style-type: none"> • Personalised medicine; • Innovative health and care industry; • Infectious diseases and improving global health; • Innovative health and care systems - Integration of care; • Decoding the role of the environment, including climate change, for health and wellbeing; • Antimicrobial Resistance; • Rare Diseases (molecular genetics, metabolic diseases, neurology, neuromuscular and musculoskeletal disorders, cardiovascular, haematological disorders, cancer, infectious diseases, nephrology, urology, mental health, ophthalmology and dermatology).
China	National Natural Science Foundation of China	<ol style="list-style-type: none"> 1. Respiratory system, circulatory system, blood system (cardiovascular); 2. Digestive system, urinary system, endocrine system/metabolism and nutrition support; 3. Neurological and psychiatric diseases, gerontology; 4. Reproductive system/perinatology/neonatology, medical immunology; 5. Medical imaging and biomedical engineering, special medicine, forensic sciences; 6. Medical pathogenic microorganisms and infection, orthopaedics and sports medicine, emergency and intensive care; 7. Oncology; 8. Skin and appendages, preventive medicine; 9. Herbal medicine and pharmacology; 10. Chinese medicine, Chinese herbal medicine.

	Programmes	Priorities
	National Science and Technology Major Project	<ul style="list-style-type: none"> • Significant New Drugs Development for major disease (malignant neoplasms, cardiovascular and cerebrovascular diseases, neurodegenerative diseases, diabetes mellitus, mental diseases, autoimmune diseases, drug-resistant pathogenic bacteria infection, tuberculosis, viral infectious diseases); • Prevention and treatment of major infectious diseases.
G7	G7 priorities	<ul style="list-style-type: none"> • Non-communicable diseases (cancers, cardiovascular and lung disease, and diabetes); • Infectious diseases: HIV/AIDS, malaria and tuberculosis; • Antimicrobial resistance (AMR).

As presented in the table above, both China and the EU have been focusing on the area of infectious and rare diseases. In China, the health priorities are focused on major disease and infectious diseases (HIV/AIDS and viral hepatitis B), and rare disease under the programmes of NSFC and NMP. China will implement a comprehensive strategy for the effective prevention and control of chronic diseases such as cardiovascular, brain, and vascular diseases as well as diabetes, malignant tumours, respiratory disease, and mental illness. Moreover, China will also strengthen the prevention and control of major infectious diseases by working to lower prevalence of hepatitis B among the general population, keep HIV prevalence low, reduce the incidence rate of tuberculosis to 58 cases per 100.000 people, basically eradicate schistosomiasis, and eliminate malaria and leprosy⁴⁰. More importantly, it is urgent to provide greater free supplies of special medicines for the prevention and treatment of HIV/AIDS and other diseases.

At the EU level, the public health research leads the way in providing evidence for the best population health and health systems practices. It will make use of various types of data, collaborate across different sectors and countries, and emphasise long-term impact.

Rare disease is one of the main areas for health research. The major funding opportunities for rare diseases research are available in the H2020 Work Programme 2018-2020 for health, demographic change and wellbeing. The investment of 1,4 billion Euros has been made from FP7 and H2020 to more than 200 research and innovation projects in the area of rare diseases⁴¹.

The other health priorities are related with **HIV/AIDS**, which has invested 129 million EUR in the first years of the Programme. With its investment in research and innovation for **HIV/AIDS**, the EC is increasing the chances for the community to provide solutions to the challenges – including the **development of a preventive or therapeutic vaccine** and a **high-throughput HIV viral load test**⁴².

The EU and China have been cooperating in the areas of rare diseases through the International Rare Diseases Research Consortium (IRDiRC) and of chronic diseases in the framework of the Global Alliance for Chronic Diseases (GACD⁴³) since FP7. Founded in 2011, IRDiRC is a consortium that brings together public and private sector funders of research, patient advocacy groups and scientific researchers. The objective of IRDiRC is to enable all people living with a rare disease to receive an accurate diagnosis,

⁴⁰ <http://en.ndrc.gov.cn/newsrelease/201612/P020161207645765233498.pdf>

⁴¹ Commission activities in the area of Rare diseases, <https://ec.europa.eu/research/health/index.cfm?pg=area&areaname=rare>

⁴² <https://ec.europa.eu/research/health/index.cfm?pg=area&areaname=aids>

⁴³ <https://www.gacd.org/>

care, available therapy and to invest in rare diseases research to achieve two main objectives: 200 new therapies for rare diseases and the means to diagnose most rare diseases by 2020.

Regarding the GACD, this consortium provides funding on joint programmes related to life-style and chronic diseases (**cardiovascular diseases, diabetes, certain cancers, lung diseases and mental health**). Its main objective is to reduce the burden of chronic NCDs in low and middle-income countries by building evidence to inform national and international NCD policies and contribute to the achievement of the Sustainable Development Goals. Thus, GACD fulfils its goal by investing in impactful NCD research; building implementation science capacity and capability related to NCDs; facilitating cooperation and partnership to support GACD investment.

It is relevant to highlight that CAMS is a member of GACD and is dedicated to promoting international cooperation on health research and encouraging scientific exchange and joint training of young scientists and graduate students.

Within this context, the two tables below present the agencies that are part / members of IRDiRC and GACD.

Table 53 - Agencies of IRDiRC

	Europe	China
Agencies	<ul style="list-style-type: none"> Academy of Finland Agence Nationale de la Recherche Chiesi Famaceutici S.p.A Children’s New Hospitals Management group European Commission European Organisation for Research and Treatment on Cancer EURORDIS- Rare Diseases Europe E-Rare Consortium Federal Ministry of Education and Research French Foundation for Rare Diseases French Muscular Dystrophy Association Istituto Superiore di Sanità Loulou Foundation Lysogene National Institute for Health Research National Institute for Health Carlos III Roche Shire Telethon Foundation The Netherlands Organisation for Health Research and Development 	<ul style="list-style-type: none"> BGI Group Chinese Rare Disease Research Consortium Chinese Organisation for Rare Disorders WuXi AppTec Co, Ltd

Table 54 - Agencies of GACD

	Europe	China
Agencies	<ul style="list-style-type: none"> Medical Council UK (MRC) DG Research & Innovation (EC) 	<ul style="list-style-type: none"> Chinese Academy of Medical Sciences (CAMS)

From the perspective of G7, an overview of the main policy issues and some of the policy actions of G7 health authorities were put in place to improve population health. NCD is the one of key fields that has been emphasised in the G7 health programme. To address this challenge, G7 is aware that climate and environmental-related factors can aggravate existing health risks and create new threats, which is needed to take into account.

G7 is strengthening the existing commitments on AMR and to maintain global action to tackle AMR as a major current and future health threat. The research is required to interpret the incidence, prevalence and geographical pattern of AMR and Antimicrobial Use (AMU) to a better understand the links between AMR and the risks to human, animal and environmental health.

It is also relevant to highlight that the Joint UN Programme on **HIV/AIDS** (UNAIDS) set the goal within the 2016 United Nations Political Declaration on Ending AIDS target is to **reduce new HIV infections** to fewer than 500.000 by 2020, from more than 1,8 million in 2016.

In summary, there are several similarities between the EU, China and G7 regarding public health, including health literacy, disease prevention and treatment, health system and workforce strengthening, and governance and management capacity-building. The health priorities in general cover wide ranges of diseases and have addressed numerous health research fields with the funding supports from the national level.

5. Comparative analysis of European and Chinese healthcare funding mechanisms

5.1 European funding mechanism

This sub-section provides the overview of European funding mechanisms, especially focusing on the EU Research and Innovation Framework Programme such as EU Health Programme, H2020 and Horizon Europe. Within these programmes, health is one of the key research fields, which has been implemented in several Work Programmes. The Health Programme 2014-2020 has been initiated to help EU countries in responding to economic and demographic challenges facing their health systems and enable citizens to stay healthy for longer.

EU Health Programme⁴⁴

The EU Health Programme is a funding programme created to implement the EU health strategy, aiming to support cooperation among EU countries and underpin and develop EU health activities. The Third Health Programme (2014-2020) is the legal basis for the current Health Programme with a budget of 449.4 million EUR. Throughout 23 priority areas, the Health Programme serves four specific objectives:

- Promote health, prevent disease and foster healthy lifestyles through “health in all policies”;
- Protect EU citizens from serious cross-border health threats;
- Contribute to innovative, efficient and sustainable health systems;
- To ease access to high quality, safe healthcare for EU citizens.

The Programme is implemented by means of annual work programmes agreed with countries on a number of annually defined priority actions and the criteria for funding actions under the programme. On this basis, the Consumers Health Agriculture and Food Executive Agency (Chafea) organises calls for

⁴⁴ https://ec.europa.eu/health/funding/programme_en

proposals for projects and operating grants, as well as calls for joint action and tenders. Direct grants are signed with international organisations involved the health sector. All EU countries and entities registered are also eligible to participate in the calls for proposals. Participation is open to a wide range of organisations including public authorities, public sector bodies, in particular research and health institutions, universities and higher education establishments and NGOs. For the application of the health programme, the relevant information is available on the Chafea website⁴⁵.

Horizon 2020⁴⁶

H2020 is the EU's biggest programme regarding research and innovation, this programme started in 2014 and it is ongoing until 2020 with nearly 80 billion EUR of funding. Through the calls launched under H2020, the EU expects more breakthroughs and findings in different thematic areas. H2020 has been designed to deliver results that make a difference in peoples' lives. Built on three pillars – Excellent Science, Industrial Leadership and Societal Challenges – it funds all types of activities, from frontier science to demonstration projects and close-to-market innovations. H2020 brings all EU-level funding for Research and Innovation under one roof, providing a single set of simplified rules and radically slashes red tape. The overarching goal is a more coherent and simpler programme that is easier to participate, especially for academia, research organisations and SMEs and businesses, from both European and non- European countries.

H2020 is open to everyone. Under H2020 there is only one set of simplified rules and procedures to follow. This means that participants can focus on what is really important: research, innovation and results. H2020 is open to the participation of researchers from across the world.

Researchers of any nationality, any career stage (PhD applicants, post-docs, confirmed researchers, Principal Investigators, etc.), and in any research area can apply.

In order to better address challenges, research and innovation (R&I) under H2020, there is an investment system to improve health for all. It aims to keep older people active and independent for longer and supports the development of new, safer and more effective interventions. R&I under H2020 also contributes to the sustainability of health and care systems. H2020 has invested more than 10 billion EUR in health R&I funding within 15 funding channels to meet specific health R&I needs. It is relevant to highlight the five areas that are covered⁴⁷:

- Collaborative research: support multidisciplinary and cross-sector research on health and care for generating and translating new knowledge into applications and benefits for society.
- Innovative health and care industry: translate innovation into practical health and care applications benefiting citizens, healthcare systems and businesses
- Working with member states and international partners: foster European and global coordination in health and disease research
- Blue sky research: reinforce and extend the excellence of EU's science base (including life science and health-related research)
- Infrastructure: support facilities, resources and services used by the science community to conduct research and foster innovation (including in health area)

Thus, the health priorities are highlighted in collaborative research for health, demographic change and wellbeing, including personalised medicine, innovative health and care industry, infectious diseases and

⁴⁵ http://ec.europa.eu/chafea/index_en.htm

⁴⁶ <https://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020>

⁴⁷ <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/health-demographic-change-and-wellbeing>

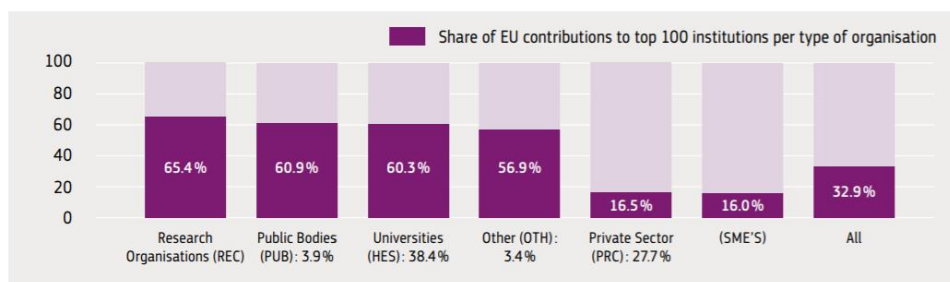
improving global health - integration of care, decoding the role of the environment, including climate change, health and wellbeing, digital transformation in health and care, trusted big data solutions for cybersecurity for health and care.

Evaluation of H2020

This section provides an evaluation of H2020 in terms of R&I investment and funding allocation to different types of organisations. It describes the progress of H2020 towards its objectives that may advice on the design of future EU research programmes, in particular the next programme Horizon Europe.

The evaluation report presents an interim evaluation of H2020. The interim evaluation concluded that the EU spends limited investment on R&I (the 3% R&D expenditure target has not been met but H2020 only represents a small proportion of the total public R&D spending in the EU) and the innovation gap with key competitor still exists, even though performance is improving⁴⁸. The benefits of H2020 are numerous. When comparing to a reference scenario in which H2020 would not have been implemented, the results or a macro-economic modelling analysis are that every Euro spent under H2020 will bring an estimated benefit in terms of GDP increase of between 6 to 8.5 EUR by 2030. In particular, regarding health, according to the interim evaluation, the health societal challenge is one of the most attractive programmes considering the number of proposals submitted.

Applying this formula to the total H2020 direct budget of 69.3 billion EUR between 2014 and 2020, the expected benefit is in the range or 400 to 600 billion EUR over the period between 2014 to 2030. The macro-economic model further estimates that the internal rate of return of H2020 will be 30% by 2030⁴⁹.



Source: Corda, Signed Grants cut-off date by 1/1/2017

Figure 1 - Share of funding to the top 100 most-receiving organisations, per type of organisation⁵⁰

As indicated in Figure 1, there are 100 institutions receiving most of the funding with 32.9% of the total budget. Combine research organisations and higher or secondary education institutions, this proportion of funding is particularly strong. The 100 research organisations getting the most funding received two-thirds (66.2%) of the funds, while higher or secondary education institutions in the top 100 received 60.5%. The proportion is less pronounced for the 10.367 private companies that have participated in H2020, where the top 100 received 17.7% of the funding.

⁴⁸ <https://publications.europa.eu/en/publication-detail/-/publication/f86a92b9-d8c9-11e8-afb3-01aa75ed71a1/>

⁴⁹ <https://publications.europa.eu/en/publication-detail/-/publication/fad8c173-7e42-11e7-b5c6-01aa75ed71a1/language-en/format-PDF/source-77918455>

⁵⁰ <https://publications.europa.eu/en/publication-detail/-/publication/fad8c173-7e42-11e7-b5c6-01aa75ed71a1/language-en/format-PDF/source-77918455>

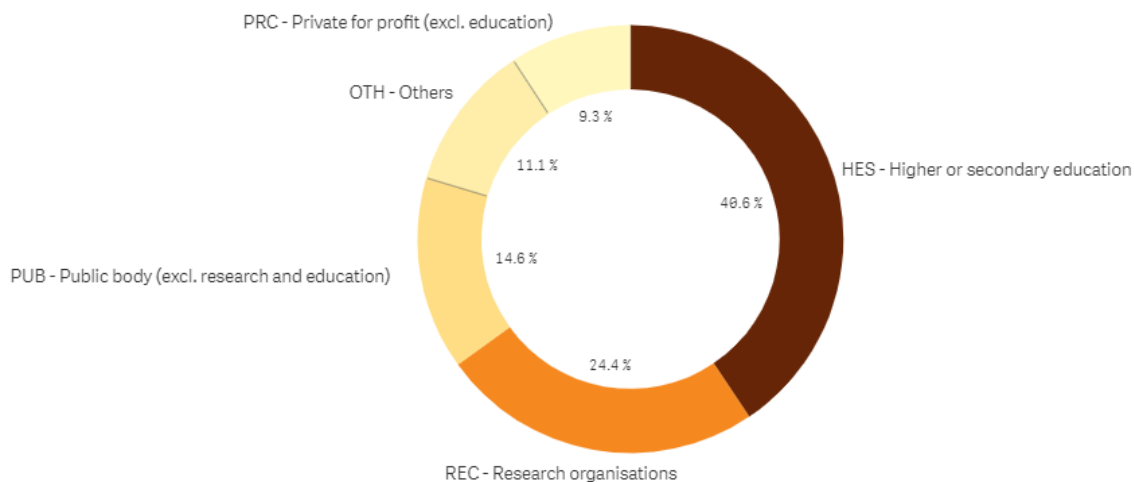


Figure 2 - Share of EU contribution per type of organisation in China⁵¹

As presented in the Figure 2, the share of the EU contribution of H2020 in China, the research organisations and higher or secondary education institutions received most funding, represented 65% of the total budget. Overall, in H2020 until October 2017, Chinese entities have participated 255 times to 117 signed grants of collaborative, MSCA and ERC actions, receiving 3 million EUR of direct EU contribution while 26.7 million EUR is the non-EU budget of Chinese beneficiaries.

Regarding the distribution of funding in the H2020, the average success rate of H2020 dropped to 11.6% compared to FP7, which had an overall proposal success rate of 18.4%. This indicated that only the very best proposals offering scientific excellence are indeed being selected, oversubscription could lead to dissatisfaction and leave good proposal unfunded. To solve this, in some of parts of H2020, two-stage calls were used to cope with oversubscription. In the first stage, the applicants submit a short project description for evaluation. Successful applicants are then invited to submit a full proposal in stage 2.

In regard to Chinese participation of H2020, Chinese applicants are involved 795 times in 337 eligible proposals. Out of 195 high-quality proposals, 61 were accepted, leading to a success rate of 18.1%.

Horizon Europe (2021-2027)

Horizon Europe, proposed by the Commission in June 2018 as part of the EU-long-term-budget for the years 2021-2027, is a crucial part of the implementation of "A renewed European Agenda for Research and Innovation - Europe's chance to shape its future"⁵². Horizon Europe will build on the achievements and success of the current research and innovation programme (H2020). It will continue to drive scientific excellence through the European Research Council (ERC) and the Marie Skłodowska-Curie fellowships and exchanges, and will benefit from the scientific advice, technical support and dedicated research of the Joint Research Centre (JRC), the Commission's science and knowledge service⁵³.

Horizon Europe is divided into three pillars:

- Open Science, with a budget of 25.8 billion EUR.
- Global Challenges and Industrial Competitiveness, with a budget of 52.7 billion EUR.
- Open Innovation, with a budget of 13.5 billion EUR.

⁵¹ <https://publications.europa.eu/en/publication-detail/-/publication/fad8c173-7e42-11e7-b5c6-01aa75ed71a1/language-en/format-PDF/source-77918455>

⁵² http://europa.eu/rapid/press-release_IP-19-1676_en.htm

⁵³ http://europa.eu/rapid/press-release_IP-19-1676_en.htm

In order to boost key technologies and solutions underpinning EU policies and Sustainable Development Goals, Horizon Europe identifies five overarching global challenges for action (referred to as “clusters”) that are implemented through usual calls, missions and partnerships: Health (7.7 billion EUR over seven years); Inclusive and Secure Society (2.8 billion EUR); Digital and Industry (15 billion EUR); Climate, Energy, and Mobility (15 billion EUR); and Food and Natural Resources (10 billion EUR).

The health cluster aims to build the linkages between discovery, clinical, epidemiological, environmental and socio-economic research, academia industry healthcare providers patients and expertise within the EU and beyond. To address the cluster of health, six main areas of intervention are identified:

- Health throughout the Life Course;
- Environmental and Social Health Determinants;
- Non-communicable and Rare Diseases;
- Infectious diseases;
- Tools, Technologies and Digital Solutions for Health and Care;
- Health Care Systems.

5.2 Chinese funding mechanism

The Chinese funding mechanism is formulated by the Ministry of Science and Technology (MoST) that is in charge of the implementation of strategies and policies for innovation-driven development, and of plans and policies for S&T development and the attraction of foreign talent. There are five new funding pillars among China’s national STI funding programme, namely the National Natural Science Fund, National S&T Major Projects, National Key R&D Programmes, Technology Innovation Guidance Fund and Bases and the Talents Programme. Each funding programme highlights has a health-related research component.

5.2.1 Introduction to the Chinese funding mechanism

Under the 13th Five Year Plan (FYP), the Plan highlighted the country’s priorities and the roadmap for the next years were highlighted. Building on the achievements of the 12th FYP, the government will continue to provide strong policy support on the following strategic industries: software, environmental equipment, biological medicine, communication equipment, new energy, cloud computing and robots. China has been putting more efforts in implementing proactive fiscal policies, stepping up supply-side structural reforms to power sustainable growth.

Currently, there are five new funding pillars among China’s national STI funding programme:

- National Natural Science Fund: focused on basic and applied research in natural sciences. It is administered by the National Science Foundation of China (NSFC). The NSFC has established departments of life science and health science that aim to support researches working on human physiology, biochemistry, immunology, reproduction, development, aging, stem cell and tissue engineering.
- Major S&T Projects (Mega Projects): 16 programmes that address major engineering, products and technologies strategically important for the economic and industrial development of the country. Mega Projects have two key programmes related to the health topic, including Significant New Drugs Development and Prevention and treatment of major infectious diseases.
- Key R&D Programmes (NKPs): a new category of programmes which combines previous programmes such as “863 Programmes” for R&D and “Programme 973” for basic research. With a total of 48 NKPs established, it is currently the most active pillar out of the five. The health-related

- NKP programmes are research on precision medicine, R&D of digital diagnosis and treatment equipment, research on the prevention and control of major chronic non-communicable diseases.
- Technology Innovation Guidance Fund comprises three primary funds as a result of a structural re-classification, re-organisation and merging of some previous national funds. It is a new category of funds exclusively oriented to start-ups and SMEs. The fund has been specifically addressed to health research fields in order to accelerate the development of the pharmaceutical and biotechnology industry under the 13th Five Year Plan⁵⁴.
 - Bases and Talents Programme incorporates previous programmes from NDRC (National Engineering Centres/Labs, National Enterprise Technology Centres, etc.) and MoST (State Key Laboratories, National Engineering Technology Centres, Innovation Talents Promotion Programme). The fund aims to support the setup of scientific bases and their research activities to help them foster first-class innovative talents and teams.

Within the five pillars, the first three are programmes issuing tenders and the latter two are funds. The five pillars are the result of a reorganisation made among over 100 National STI funding programmes, which significantly increased efficiency and have a more channelled focus on prioritised areas.

NSFC is one of the key national funding programmes. The NSFC's funding system is divided into 14 different programmes under three categories: research promotion; talents fostering; and research environment. One of these programmes is exclusively directed to international joint research, the remaining target China-based actors, meaning that China-based affiliates of European institutes and European scientists working in China can apply too. There are a number of health-related programmes under the Department of Life Science and Department of Health Science, aiming to support basic research on issues concerning disease prevention, disease control and disease treatment in China. To enable the rapid and healthy development of both scientific fund and medical research in China, the research institutions are expected to further strengthen the management in the process of NSFC grant applications, and to make an effort to further improve the scientific quality of applications. The most significant funding programme for European actors are:

- General Programme: it supports researchers to conduct innovative explorative research on open topics within certain areas.
- Young Scientist Fund: similar to the General Programme, but exclusively targeting young scientists.
- Key Programme: medium-sized projects supporting prospective and frontier studies.
- Major Research Plan: medium and large-sized projects of strategic value to economic and social development in national priority areas.
- International (Regional) Cooperation and Exchange Programmes: they support joint research with top researchers and institutions world-wide.

In addition, the Chinese Academy of Medical Sciences (CAMS), as previously described, is the only state-level academic centre for medical sciences in China and multidisciplinary medical research institution founded in 1956. CAMS is a member of the Global Alliance for Chronic Diseases (GACD), which is the largest public health research funding institution in the world, committed to the prevention of Non-communicable diseases (NCD) across the world and reducing the prevalence of NCDs that gravely threaten the health of the population. GACD members collectively manage over 80% of all public health research funding, aiming to foster collaboration and coordination of research programmes by agreeing on joint research priorities and funding world-class research.

⁵⁴ <http://www.biodiscover.com/news/research/664055.html>

CAMS has initiated a number of health funding projects to target health research, such as **diabetes, heart and lung disease**. The on-going programmes are listed below:

- Systematic Medical Assessment, Referral and Treatment for Diabetes care using Lay Family Health Promoters - SMART Diabetes.
- Effects of information technology-based tools on long-term self-management of diabetic and non-diabetic patients with coronary heart disease.
- Lung function of Chinese adults and the predictive value of peak flow rate to long-term incidence and prognosis of lung diseases.

More detailed information on the application for the programmes is provided in section 5.3.

5.2.2 EU-China Co-Funding Mechanisms for H2020

Regarding the Chinese participation in H2020, the Chinese Government and the EU agreed to set up a Co-Funding Mechanism on research and innovation to support joint projects between European and Chinese universities, research institutions and companies. The MoST has announced the first call for proposals under the EU-China Co-Funding Mechanisms (CFM) for Research and Innovation in 2015. The CFM will pave the way for deepened cooperation between European and Chinese research and innovation stakeholders by promoting a stronger and more balanced Chinese participation in the H2020 topics targeting cooperation with China.

The CFM is designed to support mainland-China-based research and innovation organisations participating in H2020 projects. This first call covers a variety of thematic areas including food, agriculture, biotechnology, information and communication technology, space, aviation, energy, health, transportation, water resources, energy conservation, advanced manufacturing, new materials, sustainable urbanisation, and exchanges of young scientists. In principle, all Chinese legal organisations are eligible to apply for the co-funding from CSTEC. But before submitting an application to CSTEC, the H2020 project that a Chinese organisation involved, should already be approved by the EC. In other words, a Grant Agreement of H2020 with the EC is necessary for the Chinese organisations to submit an application for the co-funding.

Taking into account the calls and opportunities focused on health within the nine priority areas of common interest eligible for co-funding, it is relevant to highlight the priority related with advanced, effective, safe and convenient health technologies, covering biopharmaceuticals, precision medicine, high-performance medical devices, prevention of major infectious diseases, antibiotic resistance, regenerative medicine, big data in medicine, medical robot, aging services technologies and Chinese medicine.

Within the co-funding mechanism, the Ministry of Finance of the People's Republic of China has announced that the central government has recently regulated a plan for funding the health system to solve issues on overlapping projects in the field of health, decentralised management, integrated fund. On the 22nd of October 2018, the Chinese Ministry of Science and Technology (MoST) published the second call for proposals for 2018 under the EU-China Co-funding Mechanism for Research and Innovation (CFM), as part of the "Key Project on Intergovernmental International Science, Technology and Innovation (STI) Cooperation/STI Cooperation with Hong Kong, Macao and Taiwan" of China's National Key R&D Programme (NKP). A key requirement of the CFM call published on March 2018 is that Chinese applicants should have submitted a joint proposal with their European partners under the EU's H2020 Work Programme 2018/2020. Chinese partners in such H2020 proposals can apply to this CFM call irrespectively of whether their H2020 proposal has been submitted for a stage 1, stage 2, or

single stage deadline, or whether the H2020 proposal is still to be evaluated. In April 2019, the MoST published its first call for proposals for year 2019 under the CFM⁵⁵.

5.3 Comparison of the EU and China regarding their funding mechanisms

The EU and China have both provided numerous national programmes with various policies, regulations, financial incentives and schemes for the development of the sector at the national level and involving international cooperation. As indicated in the Section 4.2.1, National Natural Science Fund is China’s largest fund for supporting basic research and applied research in natural sciences, particularly in the fields of physics and mathematics; chemistry; life sciences; earth sciences; engineering and materials; information sciences; and management sciences. The following tables present the current funding programmes from NSFC, which provides the guideline of the programme, eligibility, funding and duration.

Table 55 - General Programme

Outline	The General Programme is the largest receiver of NSFC budget, with 10.68 billion RMB (around 1.28 billion EUR) received in 2017 only. The programme supports researchers in conducting innovative and free-exploratory research on open topics within the priority areas indicated every year in the NSFC annual guidelines. For health-related research, NSFC has established the Department of Life Sciences and Department of Health Science that are in charge of basic research on major key diseases closely related to the national welfare, human livelihood, major emergency event of public health, and common or frequently encountered diseases.
Eligibility	<p>(1) With the experience of undertaking basic research projects or doing basic research;</p> <p>(2) Have senior professional title or PhD degree, or are recommended by two professionals with senior academic positions (titles). Postgraduate students are not eligible to apply for the General Programme, but part time graduate students may apply through their employers if agreed upon by their supervisors.</p> <p>(3) Applicants should be familiar with the current situation of relevant research in China and the world, capable of leading a research group to conduct research.</p> <p>(4) Applicants should follow the guideline to prepare proposals. The proposed research should be of significance and feature scientific merits, sound thematic basis, new ideas, identical objectives, reasonable and detailed research contents and feasible research schemes.</p> <p>(5) The number of collaborative institutions for General Programme projects should not exceed 2.</p>
What is being funded	NSFC funded 18.136 General Programme projects, with direct cost of 10.685 billion RMB in 2017. The total number of health funded projects was 7.057.
Duration	<p>The duration of General Programme projects is 4 years.</p> <p>(Only in-site post-doctoral researchers should determine the duration of the project based on the written commitment from the host institutions).</p>

⁵⁵ http://www.most.gov.cn/mostinfo/xinxifenlei/fgzc/gfxwj/gfxwj2019/201904/t20190423_146203.htm



Table 56 - Key programme

Outline	The Key Programme supports researchers to conduct in-depth, systematic and innovative research in directions with sound research basis or where new growth points of scientific disciplines might emerge, in order to promote disciplinary development and breakthroughs in important areas or scientific frontiers. For health-related research, NSFC has established Department of Health Science to address various health topics, such as chronic disease , remodelling of myocardium, immune system and digestive diseases.
Eligibility	Applicants should have the following qualifications: (1) Experience of undertaking basic research projects; (2) Senior academic position (title). Applicants should follow the guidelines to prepare proposals
What is being funded	In 2017, NSFC funded 667 projects under the Key Programme, with a total funding of 1.987 billion RMB, and the average funding for direct costs is 2.979 million RMB per project. The total number of health funding project was 213.
Duration	The funding period of a Key Programme project is 5 years.

Table 57 - Young Scientist Fund

Outline	The Young Scientists Fund supports young scientists to freely choose their research topics within the funding scope of NSFC to conduct basic research, fosters the ability of young scientists to independently undertake research projects and conduct creative research, stimulates young scientists' creative thinking and trains backup talents for basic research. For health-related research, NSFC has established Department of Health Science to address health topics on respiratory and digestive system, medical pathogenic and Chinese medicine.
Eligibility	(1) Have experience of doing basic research; (2) Have senior professional position (title) or PhD degree, or be recommended by 2 researchers with senior professional position (title) in the same research area; (3) Should be younger than 35 by Jan. 1 of the year of application
What is being funded	In 2017, a total of 17.523 Young Scientist Fund projects were funded. The direct cost was 400.27 million RMB. The total number of health funded project was 6.595.
Duration	The duration of the project is generally 3 years.

Table 58 - Major Research Plan

Outline	The Major Research Plan focuses on key basic scientific issues with strategic importance to the nation and major frontier areas and gives high priority identified on the basis of the capability and advantages in the country.
Eligibility	Applicants should meet the following eligibilities: (1) Having experience of undertaking basic research projects; (2) Bearing a senior academic position (title).

What is being funded	In 2016, a total of 502 projects were funded under 39 different Major Research Plans, for a total of 714 million RMB (around 91.3 million EUR) allocated.
Duration	The duration of the project is generally 3 years.

Table 59 - Key International (Regional) Joint Research Programme

Outline	The Key International (Regional) Joint Research Programme (hereafter referred to as Key Joint Research Programme), gives priority to research in the following areas: the priority funding areas of NSFC, areas that China urgently needs to develop, international mega projects and programs with Chinese participation, and utilising large-scale scientific facilities abroad.
Eligibility	European researchers not based in China, to cooperate with a China-based entity; China-based affiliates of European research institutes, or EU-China joint research structures to apply as Chinese party, in cooperation with researchers based abroad. Legal personality in China is in this case required.
What is being funded	In 2017, altogether 107 out of the total 609 applications under the Key International (Regional) Joint Research Programme were funded with a total funding of 255 million RMB for direct costs.
Duration	The duration of the project is generally 5 years.

Table 60 - Comparison of funding programmes of NSFC and H2020

	NSFC	Horizon 2020
Outline	It is an institution directly under the jurisdiction of the State Council, tasked with the administration of the National Natural Science Fund from the Central Government. The administrative system has been well developed and improved for the decision-making of the funding policy, the implementation of funding programs and the supervision of funding operation. The management system of project implementation and a complete set of regulations have been formulated.	H2020 is the biggest EU Research and Innovation programme ever with nearly 80 billion EUR of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.
Fields of Research	Mathematical and Physical Sciences, Chemical Sciences, Life Sciences, Earth Sciences, Engineering and Materials Sciences, Information Sciences, Management Sciences, Health Sciences.	Agriculture and forestry, Aquatic Resources, Bio-based Industries, Biotechnology, Energy, Environment & Climate Action, Food & Healthy Diet, Funding Researchers, Health, ICT Research & Innovation, Innovation, International Cooperation Key Enabling Technologies, Partnerships with Industry and Member States, Plastics, Raw Materials, Research Infrastructures,



	NSFC	Horizon 2020
		Security, SMEs, Social Sciences and Humanities, Society, Space, Transport.
Health-related research	Respiratory system, circulatory system, blood system; Digestive system, urinary system, endocrine system/metabolism and nutrition support; Neurological and psychiatric diseases, gerontology; Reproductive system/perinatology/neonatology, medical immunology ; Medical imaging and biomedical engineering, special medicine, forensic sciences; Medical pathogenic microorganisms and infection, orthopaedics and sports medicine, emergency and intensive care; Oncology ; Skin and appendages, preventive medicine; Herbal medicine and pharmacology; Chinese medicine, Chinese herbal medicine.	Personalised medicine, innovative health and care industry, infectious diseases and improving global health - integration of care, decoding the role of the environment, including climate change, health and wellbeing, digital transformation in health and care, trusted big data solutions for cybersecurity for health and care.
Eligibility	The applicant has: (1) the experience of undertaking basic research programme(s) or other basic research activity; (2) a senior academic rank (title) or a doctoral degree, or recommendation from two researchers who are in the same research field and have a senior academic rank (title). Besides, those who apply for certain categories of programs shall meet other specific requirements.	The applicant must: <ul style="list-style-type: none"> • Be an individual or organisation/institution constituted under the national law of the country where you are based • Have the financial capacity to carry out the research tasks set out in your proposal. • Be PhD applicants • Already have a PhD and beyond • Be researchers
What is being funded	In 2017, a total of 202.248 proposals were received by NSFC. A total of 81.412 proposals were related to health with total funding of 1.13 billion RMB (Approx. 14.6 million EUR).	The total funding of health programme is around 4.3 billion EUR (2014-2020).
Duration	The duration of General Programme projects is 4 years. (Only in-site post-doctoral researchers should determine the duration of the project based on the written commitment from the	<ul style="list-style-type: none"> • H2020 RIA & IA and CSA grants: Maximum duration: None — unless specified in the call • H2020 MSCA-ITN, MSCA-RISE grants: Maximum duration of the action: 48 months • H2020 MSCA-COFUND, ERC frontier research and EJP Cofund grant:

	NSFC	Horizon 2020
	host institutions).	Maximum duration of the action: 60 months • H2020 ERC PoC grants: Maximum duration: 18 months ⁵⁶

In terms of the participation of funding from H2020 and NSFC, both funding programmes are open for domestic and international applicants. General Programme, Young Scientist Fund, Key Programme and Major Research Plan are directed to mainland China-based actors. China-based affiliates of European research institutes, and European researchers working in China can apply as PIs.

Regarding the duration of the programmes, in China, the duration of a project in NSFC is normally 3-5 year depending the different level of the programmes. In H2020, applicants should justify the chosen size of consortium, budget according to their suitability to meet the goals of the proposal. As for the project durations, the duration of RIA, IA and CSA grants are not limited, and there are 60 months maximum duration for the MSCA-COFUND, ERC frontier research and EJP Cofund grants. On the other hand, the maximum duration of MSCA-ITN and MSCA-RISE are 48 months, and the grants for Proof of Concept are only 18 months⁵⁷. The funding of the H2020 programme varies according to each type of grant. In this regard, the total funding of ERC Frontier Research is around 13.1 billion EUR⁵⁸, while the MSCA in part I (Excellent Science) of H2020 has a budget of EUR 6.16 billion⁵⁹.

Regarding research topics, both the EU and China have designed topics to address the societal challenges. H2020 identified seven priority challenges where targeted investment in research and innovation can have a real impact benefitting the citizen. From NSFC, the topics are various from mathematical and Physical Sciences, Chemical Sciences, Life Sciences, Earth Sciences, Engineering and Materials Sciences, Information Sciences, Management Sciences, Health Sciences. It is relevant to point out that life and health sciences are one of the key research areas of NSFC. Within the general programme, the Department of Life Sciences funds a broad-spectrum of health-related topics including biology, agricultural sciences and basic medicine, which extends to various fields of resources, environment, ecology, population and health. The Health Science Department supports basic research on issues related with disease prevention, disease control and disease treatment in China. Within the key programme, the Department of Life Science focuses in health research on microbiology; biophysics, biochemistry and **molecular biology**; biomechanics and tissue engineering; physiology and integrative biology and cell biology. The Department of Health Sciences is specialised in **chronic disease**, remodelling of myocardium, digestive diseases.

For H2020, the health research topics are in line with the societal challenges of health, demographic change and wellbeing, including personalised medicine innovative health and care industry, infectious diseases and improving global health, innovative health and care systems - integration of care, decoding the role of the environment, including climate change, for health and wellbeing, digital transformation in health and care, trusted big data solutions for cybersecurity for health and care.

Compared with success rate of application, NSFC funded 18,136 General Programme projects, with direct cost of 10.685 billion RMB in 2017. The average funding intensity was 589.200 RMB per project.

⁵⁶ http://ec.europa.eu/research/participants/data/ref/h2020/other/gm/h2020-grant-factsheet_en.pdf

⁵⁷ http://ec.europa.eu/research/participants/data/ref/h2020/other/gm/h2020-grant-factsheet_en.pdf

⁵⁸ <https://erc.europa.eu/projects-figures/facts-and-figures>

⁵⁹ <https://www.kowi.de/en/kowi/marie-s-curie/marie-sk%C5%82odowska-curie-actions-msca.aspx>

The number of funded projects increased by 1.202 over 2016 with an increase rate of 7.1%. The success rate was 22.59%, which is basically the same as that in 2016 (22.87%). In contrast, the average success rate of H2020 dropped to 11.6 % compared to FP7, which had an overall proposal success rate of 18.4%. Apart from the funding programmes of NSFC and H2020, EU-China Co-funding Mechanism for Research and Innovation (CFM) designed for Chinese participating in H2020 has been targeting the health research areas, namely on advanced, effective, safe and convenient health technologies, covering biopharmaceuticals, precision medicine, high-performance medical devices, prevention of major infectious diseases, antibiotic resistance, regenerative medicine, big data in medicine, medical robot, aging services technologies and Chinese medicine.

6 Summary and conclusions

Under the framework conditions assessed, EU-China STI Cooperation has been constantly improving in recent years. Reciprocity in the treatment of European researchers and innovators in China is considered key for ensuring balanced and mutually beneficial EU-China R&I cooperation. Within the main priorities for improving the S&T cooperation, strengthening the cooperation on health is one of the key initiatives.

The Chinese and European project partners have worked together to map and describe a set of bilateral and multilateral agreements between the EU MS and China on the topic of health, and the results were satisfactory. China and the EU have remained aligned in their cooperation actions regarding health research. The cooperation on health in the context of FP7 within multilateral initiatives was aimed at addressing global health challenges. In H2020, the current EU work programme targeting health, demographic change and wellbeing, offers opportunities for further cooperation to create better health and healthy ageing with the need to develop sustainable health and care systems and growth opportunities for health-related industries.

The majority of the health research and innovation actions are governed by national and governmental agencies, which includes key initiatives such as Health 2020 and Health China 2030. European countries face several health challenges which include air pollution, climate change, non-communicable disease and antimicrobial resistance, among others. To address these challenges, the EU and China have identified a set of health priorities in the following fields: health implemented in all policies, strengthening of the health systems, prevention and treatment of diseases (infectious diseases and chronic non-communicable diseases), provision of R&D medicine, building a supportive social environment, development of a health wellness industry and strengthening international cooperation and communication (including TCM and Western Medicine cooperation) as well as responding to global threats. In the future, these challenges will require a joint effort from multiple levels working closely to meet with health influencing factors, including lifestyle, hereditary factors, environmental factors, and medical services, among others. Based on Health China 2030, one key strategy is to sustain healthy living by promoting health education, encouraging healthy habits in individuals and improving physical fitness for all.

Regarding the funding mechanisms in the EU and China, it is important to note that the success rate of NSFC in 2017 was almost the same as in 2016, representing 22.6% and 22.9% respectively. However, the average success rate of H2020 decreased to 11.6%. Among these, in H2020, the ERC PoC (31.8%) and MSCA-RISE (27.6%) grants have the highest success rates and the lowest success rates are found in SME-2 (5.5%). The EC explained the popularity and high demand for parts of H2020 showing that they

are providing support in the right areas and that only the very best proposals offering scientific excellence are indeed being selected. This oversubscription could cause disillusionment and dissatisfaction and leave good proposals unfunded and to be resubmitted. What is more, only 1 in 4 proposals are evaluated as being high-quality⁶⁰.

EU-China health research and innovation priorities identified

According to the analysis developed under this report, it is possible to identify a set of EU-China health research and innovation priorities:

- **Infectious diseases** (HIV/AIDS, malaria, tuberculosis, avian influenza and viral hepatitis (hepatitis B) and outbreaks of global outreach e.g. Ebola);
- **Chronic diseases** (Cancer, cardiovascular, chronic respiratory diseases, hypertension diabetes and risk factors such as smoking and obesity);
- **Rare diseases** (Molecular genetics, metabolic diseases, neurology, mental health and psychiatric diseases, immunology, neuromuscular and musculoskeletal disorders, cardiovascular, haematological disorders, and dermatology).

The EU and China have been mutually cooperating on health research and innovation in order to address global health challenges, especially focusing on infectious diseases (AIDS and viral hepatitis B) and rare diseases through the International Rare Diseases Research Consortium and on chronic diseases in the frame of the Global Alliance for Chronic Diseases. Although it is not mentioned as a priority, it is also important to highlight TCM and Chinese medical sciences practices, as these are being widely used in the EU and several joint centres have already been established in different EU countries in order to promote collaboration on functional genomics research of TCM.

It is also relevant to analyse the main health priorities in the EU and China according to the budget provided for R&I actions. The EU has invested 4.3 billion EUR in health research under the H2020 work programme. Under this work programme, one of the health priorities is to deliver personalised health and care solutions to benefit citizens who suffer from chronic, rare and communicable diseases. In China, the national programme “Significant New Drugs Development” has been launched to address 10 major diseases with a total expenditure of 20 billion RMB (approximately 2.6 billion EUR) since 2008. More specifically, the total budget of programmes for major infectious diseases (AIDS, viral hepatitis B and pulmonary tuberculosis) was about 280 million RMB (approximately 36.4 million EUR) in 2018. In the EU, the investment in HIV/AIDS research was 129 million EUR in the first years of the H2020 programme. Therefore, this indicates that both the EU and China have been putting more effort into improving health research for major and infectious diseases. In particular, there has been a common objective (more on the EU side) for developing preventive or therapeutic vaccines for HIV/AIDS, as well as the prevention, diagnosis, treatment and control of major infectious diseases, including viral hepatitis, tuberculosis and avian influenza.

Taking into account health priorities at both the EU and EU MS levels, public health is one of the main priorities for both sides. Public health plays a significant role in providing evidence needed to support the development of EU health policies throughout the MS. It is relevant to highlight that the EU and EU MS have jointly worked on preventing major disease burdens of non-communicable and communicable diseases. At the MS level, antimicrobial resistance has been recognised as an important public health

⁶⁰ https://observatori.iec.cat/wp-content/uploads/2017/08/EC_H2020_Interim_Eval2017.pdf

issue. EU countries are actively taking measures to reduce antibiotic consumption by launching public awareness campaigns, and increasing patient co-payments for some antibiotics. In addition, MS countries are also stressing the need for health system through finding innovative solutions among new medical technology, products and organisations.

Regarding China, although the prevention of non-communicable and communicable diseases and antimicrobial resistance are also priorities, there are some differences when comparing them with the EU or the EU MS. These differences are due to the fact that, on some levels (i.e. healthcare system), China (HDI = 0.752)⁶¹ is a less developed country than the majority of the EU MS (HDI = 0.899)⁶² so it is normal that aspects such as reducing infant and maternal mortality or increasing the health literacy, normally associated with less developed countries, are at the top of the Chinese priorities. On the other hand, there are some Chinese priorities that can be explained by the huge rate of growth and industrialisation observed in China during the last 30 years, for example the need for improving air and water quality.

Main recommendations

Considering the main findings of the report, a set of main recommendations for supporting health research and innovation cooperation between the EU and China are presented below:

- Reinforcing prevention and control of major and infectious diseases: Prevention is one of the key strategies to avoid diseases and to achieve a high level of mental and physical well-being effectively and efficiently. Within this context, the EC is working closely with the EU MS to focus more proactively on prevention and the social determinants of health, and is fighting infectious diseases and the growing threat of antimicrobial resistance. As stated in the report, China is also paying attention on prevention and treatment of major and chronic diseases, which is considered part of national plan of Health 2030. Thus, the reinforcement of actions that support prevention and control measures for major and infectious diseases is highly recommended.
- Strengthening management of environmental problems affecting health: Building a healthy environment is part of the main objectives for the EU and China. According to the analysis developed, a key point concerns building a comprehensive environment and health management system, setting up environment and health risk management actions. Within this context, the EU is working on stimulating innovation in the European healthcare domain and industry by exploring the application of advanced technologies, improving the health of the workforce and promoting regulatory science. It should be further improved through the creation of health information and knowledge systems. At the Chinese level, there has been an effort in building healthier environments (particularly towards water and air quality improvement) – in line with the Healthy China 2030 Plan.
- Promoting development of sustainable healthcare systems: The EU and China have both considered that one of main objectives is to build a sustainable healthcare system under the national health plan. For instance, China is building a national medical innovation system and developing national clinical research centres. This is considered as one of the main aspects for the development of R&I cooperation in health between the EU and China. In particular, it would be necessary to strengthen national systems by individual countries and promote exchange of

⁶¹ <http://hdr.undp.org/en/countries/profiles/CHN>

⁶² http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/MLT.pdf

information between regulatory authorities. This process would act as a catalyst for enhanced EU and Chinese cooperation actions.

- Cooperating on standardisation and research ethics: On April 9th 2019, the 4th High Level EU-China Innovation Cooperation Dialogue took place in Brussels, with the aim of developing a joint roadmap in order to foster and balance the cooperation in research and innovation. The meeting successfully addressed topics such as standardisation and research ethics. Both sides have expressed their interest and confirmed their intention to work closely together in the field of research ethics and for mutual benefit. This is particularly important when referring to the use of new technologies in various areas, including Artificial Intelligence and health⁶³.
- Improving health funding mechanisms in China: Improving the health funding mechanisms in China remains a key issue. The governmental agencies from China are looking to further solve this issue by establishing result-based health financing and forming a diversified health funding pattern. The key actions should be taken on deepening the health system reforms, maintaining welfare of health services and improving the access to essential healthcare services. In the EU, the health programmes are already structured to support the public health system through identifying and developing tools and mechanisms at EU level to address financial shortages of resources.

It is relevant to highlight the important contribution provided by SENET partners, in particular for supporting the identification of relevant cooperation agreements on health between the EU MS and China, and for providing insight to the recommendations and conclusions for developing health R&I cooperation between the EU and China.

⁶³ 4th High Level EU-China Innovation Cooperation Dialogue - <https://ec.europa.eu/research/iscp/index.cfm?pg=china>

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