Sino - Dutch health cooperation

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National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

CDC
CHINESE CENTER FOR DISEASE CONTROL AND PREVENTION

Sino - Dutch health cooperation

In accordance with the Agreement and Action Plan between the Ministry of Health of the People's Republic of China and the Ministry of Health, Welfare and Sport in the Netherlands

(Progress Report 2005 – 2011)

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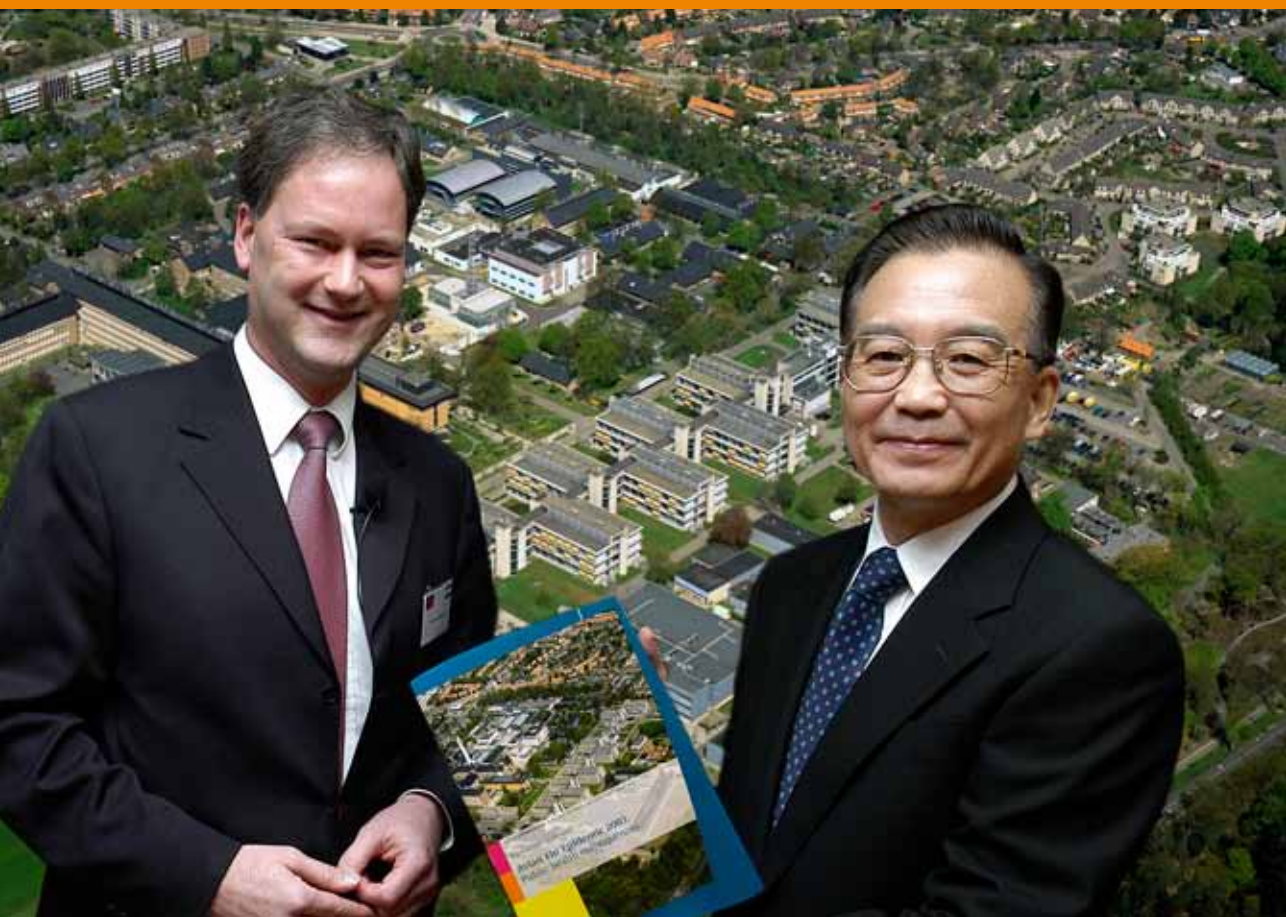
Preface

Throughout history, the People's Republic of China and the Netherlands have had an excellent relation. The MoU, signed in 2005, boasted the mutual collaboration in the public health domain substantially. We have great respect for the approach that the RIVM and CCDC experts followed to exchange their knowledge and expertise. Although the Netherlands and China differ substantially in size, geography and culture, the bilateral collaboration has improved the knowledge and expertise in several fields of the health domain. The projects on infectious diseases, health information, food safety and nutrition, funded by the MoU have definitely contributed to improved scientific understanding and methodologies.
We strongly believe that this will ultimately result in healthier citizens in both countries.
Of course we have to mention that these projects couldn't have been performed without the financing of the respective Ministries of Health and we are very grateful for their support.
We hope that the collaboration can be continued because we expect that both countries, the Netherlands and the People's Republic of China, will also benefit in the future from this initiative. We are convinced that global problems require global solutions.

Prof. dr. A.N. van der Zande
Director general
RIVM

WANG Yu, M.D.,Ph.D.
Director general
China CDC

Mr. Marc Sprenger (Director-general RIVM 2003-2010) and Mr. Wen Jiabao (Prime Minister of the People's Republic of China)



General introduction

Public health has been an area of joint concern for the Netherlands and China over the last decade. Diseases do not stop at borders. During the past decade China has been faced with emerging global health risks such as SARS, avian influenza and the pandemic flu. Also new health threats such as tuberculosis and anti microbial resistance are of concern and necessitate cooperation in the field of public health. Food safety is an interesting subject to address because of the large amounts of import and export of food commodities between the Netherlands and China. Knowledge in the field of nutrition is also useful because of similar problems.

Prime Minister Wen Jiabao of the People's Republic of China visited the Netherlands in December 2004 on the occasion of the EU Presidency of the Netherlands. During this visit he requested the former Minister of Health, Welfare and Sport, Hans Hoogervorst, to organize a meeting with experts of the Ministry of Health, Welfare and Sport and the National Institute for Public Health and the Environment (RIVM) to learn how to combat the spread of infectious diseases and a possible global pandemic of human influenza through the exchange of knowledge on the prevention and monitoring of such outbreaks, particularly in the field of risk assessment.

RIVM was invited by the Dutch Minister to describe the role and expertise of RIVM in public health and environmental issues. In the Netherlands it is the task of RIVM to promote the health of the citizens and to protect the environment by providing policy support to the government.

As the health threats in the Netherlands and China are very similar, it was agreed between the Chinese and Dutch leaders that knowledge exchange can help to address these threats more efficiently in both countries.

As a follow up, the former Minister Hans Hoogervorst visited China in Spring 2005 with a delegation from the Ministry of Health, Welfare and Sport and the RIVM. Both parties acknowledged that people in both countries would benefit greatly from the application of this knowledge. On that occasion a bilateral Memorandum of Understanding was signed by both the Minister of Health of the People's Republic of China and the Minister of Health, Welfare and Sport in the Netherlands.

From this time on China CDC and RIVM became executing partners in several projects focusing on reducing health risks and threats in both countries.

Mr. Marc Sprenger (Director-general RIVM 2003-2010) and Mr. CHEN Zhu (Minister of Health of the People's Republic of China)

Memorandum of Understanding

The Memorandum of Understanding (MoU) and the respective Plans of Action provide a framework for the bilateral cooperation between the China CDC and the RIVM:
'In view of the wish to jointly invest in global health, and the wish to cooperate in the battle against global public health risks and threats, helping each other and sharing experience, which will benefit the people of two countries and the development of medical science, have resolved to sign the agreement in the health care and public health with special reference to prevention and control of infectious diseases'.

The main areas of mutual action were summarized as follows:
'Both parties will exchange information and views on policies, management, organisation, infrastructure, research, methods and services in the field of public health and health care and both parties shall encourage direct contacts and exchanges of knowledge and expertise between relevant departments of both Ministries, related institutions and other relevant partners in the field of public health and health care'.
In accordance with the areas laid down in the MoU, special attention was initially given to:

- Infectious diseases
- Innovation in pharmaceuticals related to public health
- Primary health care
- Food safety
- Non communicable diseases

In January 2008 the Chinese Minister of Health, Mr CHEN Zhu, visited the Netherlands. At the Ministry of Health, Welfare and Sport two topics of the Health Care Reform in the Netherlands and China were discussed as well as the topic of prevention, disease management and primary health care.
Minister CHEN Zhu visited the RIVM and was informed about the progress of the Dutch activities of the cooperation in the fields of infectious diseases, nutrition, and food safety.
In 2010 the Vice-Minister of Health in China, Mr. YIN Li, visited the RIVM. The aim of his visit was to become acquainted with each other and to monitor the progress of the projects. Additionally, this was a good moment to further sharpen the formulations of the cooperation items.

This visit resulted in the input for a new action plan. That action plan has since been developed and was agreed upon by both parties at the Director general level of both Ministries during the meeting of the Director general Public Health of the Netherlands, Mr. Paul Huijts, with Director general for International Affairs, Dr. Ren Minghui in Beijing in June 2011.
Some fields of cooperation are new while others will be continued. The following fields for cooperation were agreed upon:

- Infectious diseases (TB, Influenza and laboratory surveillance system)
- Antimicrobial resistance and operational research
- Overweight, obesity and diet-related chronic diseases
- Health systems: in particular performance and system indicators
- Nutrition and health
- Food safety
- Rehabilitation medicine

Partners

The following two institutions related to the Ministries of Health were involved in the realization of the Memorandum of Understanding (Mou) and were requested to develop projects in accordance with the MoU:

- Chinese Center for Disease Control and Prevention of the People's Republic of China (China CDC)
- National Institute for Public Health and the Environment (RIVM)

The involvement of other partners steadily increased as the project activities progressed. The main institutions involved are mentioned below:

- Guangdong CDC
- Heilongjiang Provincial Tuberculosis Control Center
- Tuberculosis Reference Laboratory in Shandong Chest Hospital/TB Center
- Tuberculosis Laboratory in Zhanjiang, Guangdong Province
- Department of Pharmacology (Beijing University)
- Beijing CDC
- Military CDC
- Stichting Werkgroep Antibiotica Beleid (SWAB) (Foundation Working Group Antibiotic Policy)
- China National Health Research Development Center (Beijing)

Project results

The cooperation between Chinese and Dutch experts has benefited both parties through the sharing of knowledge and experiences. The Dutch experiences have supported Chinese experts to develop skills and methods, and it has greatly improved their various systems, such as surveillance of infectious diseases, diagnosis and treatment of tuberculosis, anti-microbial surveillance, risk assessment of food safety and chemicals, interventions on nutrition, health indicators. At the same time Chinese experiences are of great value to the Dutch experts with respect to knowledge exchange in the field of new infectious diseases, food safety of products that will be imported into the European/Dutch market and because of the larger population sizes.
Moreover, knowledge exchange and joint workshops on tuberculosis, influenza, anti-microbial resistance have improved our ability to tackle these health threats. Besides it helps the Netherlands (RIVM) to be better prepared to combat the spread of these diseases should they reach our borders, and also contributes in preventing these diseases from becoming a health threat to the Dutch public and the world at large. Data provided by countries with a large population is statistically sounder than data provided by countries with a small population. For example, models and interventions developed by RIVM experts could be tested and fine tuned and thus reduce uncertainty. In general, it can be said that the cooperation has been beneficial to both institutions involved.

The following section describes the activities carried out in each area. The benefits of the projects for both China and the Netherlands, resulting from cooperation in the different areas, are highlighted in the boxes.

Infectious diseases: virology

Based on the experiences with SARS and highly pathogenic avian influenza, China has developed the CDC system, and built high-tech advanced facilities for surveillance across China. The implementation of such surveillance, however, requires investment in human capital.
RIVM was able to provide support to Guangdong CDC (GDCDC) because of its vast experience in laboratory-based surveillance and support. Diseases at the human-animal interface were a second reason for cooperation, as both countries are considered to be hot spots for zoonotic disease emergence. The last five year period was successful, and especially GDCDC in particular benefited.

The virology project consisted of four sub projects:

a. *Influenza surveillance and antiviral resistance testing*
Influenza is one of the important respiratory infections, causing illness with the most severe impact in young children and the elderly. On rare occasions, new influenza viruses are introduced into the human population from the animal world, especially through poultry and pigs. Influenza is controlled through vaccination, but production of vaccines for new pandemic strains takes several months. Therefore, pandemic preparedness plans rely on the targeted use of antiviral drugs in the early stages of a pandemic. The choice of available drugs is limited, and it is therefore crucial to monitor whether the strains that circulate are sensitive to such treatment. As part of the collaboration, protocols for antiviral resistance testing in the surveillance context were exchanged in 2008 and 2009, staff members were exchanged for training visits, and antiviral resistance testing was established as part of routine surveillance in Guangdong (GD).

b. *Food-borne viruses*
GD-CDC is developing a system for surveillance of food- and waterborne viral disease outbreaks modelled upon the EU-wide system that was developed by RIVM. Expanding this network is important, because the food market is becoming increasingly globalized. Protocols and staff were exchanged in 2008 and 2009, to study how data can be compared between countries. Collaboration on zoonotic infectious diseases and food safety is of major importance both now and in the future.

c.. *Enterovirus surveillance for global eradication of polio viruses*
GD-CDC is charged with the systematic analysis of enterovirus isolates to document the absence of polioviruses in the GD-province. RIVM is one of the specialized polio virus reference laboratories in WHO's global eradication network. Large epidemics of enterovirus type 71 with various symptoms (hand-foot and mouth disease, neurological disease, severe respiratory disease, conjunctivitis) have been detected in South East Asia in recent years. A collaborative research project was developed to compare the viruses circulating in China with those circulating in Europe to address the question of whether these outbreaks constitute a health risk to European citizens. For this, protocols and data were exchanged, and a training workshop was organized in December 2010. A joint publication was drafted in 2011. Continuing research on enteroviruses, surveillance on poliovirus mutation and recombination will lead to more knowledge and experience for the benefit of both countries.

d. Development of laboratory support for studies at the human-animal interface

GD-CDC was appointed as WHO collaborating center for surveillance, research and training of emerging infectious disease. The strengthening of infectious disease surveillance and emergency response involve different sectors, such as health, agriculture, forestry and border port authorities. RIVM staff were invited to give lectures in two meetings. A survey of laboratory capacity was launched, and joint study visits were carried out in 2008 and 2010 to discuss collaboration between the agricultural sector and the public health sector.

Moreover, GD-CDC expressed an interest in novel technology developed by RIVM, which measures antibodies to zoonotic viruses in people working with animals. GD-CDC staff were trained to work with this technology, and a test kit was provided in late 2011. Studies are ongoing to screen blood samples collected during surveys in China, in order to evaluate the usefulness of this approach.

GD-CDC has launched a pilot surveillance system in collaboration with 3 city CDCs. A meeting was held in 2010 to discuss possible ways forward, and it was concluded that - based on preliminary findings - more emphasis should be placed on common food-borne bacteria.
The GD-CDC developed a training program for technicians from city CDCs, in which RIVM staff participated as trainers. The surveillance is now fully operational.

Benefits of this cooperation for RIVM:

- Insight into the development and functioning of laboratory infectious diseases surveillance in Guangdong. This was very relevant because South-China is a potential source of new infectious diseases, including the influenza virus.
- Validation of methodologies for fast detection of new infectious diseases.
- Insight into the potential risks of outbreaks, for instance of hand-foot and mouth disease, for the Netherlands and/or Europe.

Expected results of future cooperation:

- To continue developing laboratory methods for surveillance of zoonotic diseases.
- Joint cooperation to expand our knowledge on arboviruses. This is important knowledge for the Netherlands because of the enlargement of the Kingdom of the Netherlands with the Caribbean islands: Bonaire, S\t Eustatius and Saba.

RIVM Virology laboratory

Tuberculosis

Tuberculosis (TB) remains one of the most deadly infectious diseases in the world. Despite huge efforts of the WHO in the past decades one third of the human population is still latently infected, and the incidence of TB is decreasing very slowly, by less than 1% per year. The TB control is particularly threatened by the emergence of multi-drug resistant tuberculosis (MDR-TB) and extensive drug resistant tuberculosis (XDR-TB). MDR- and XDR-TB occurs mainly in areas with poor TB control programs. The quality of diagnosis and treatment of TB in China is still at a low level, and the rate of resistance (and the absolute number of resistant cases) is among the highest in the world. More than 5% of the TB cases in China are reported as MDR-TB. Therefore, there is a great need for training in the diagnosis and treatment of TB, especially regarding MDR- and XDR-TB.
A large part of the problem of MDR- and XDR-TB can be attributed to the Beijing genotype strains of *Mycobacterium tuberculosis*. In order to understand the current dynamics in the worldwide TB epidemic it is important to investigate the role of the evolutionary change in Beijing bacteria in relation to the development of resistance. China has the highest density of Beijing strains worldwide. Therefore, molecular epidemiological and phylogenetic analysis of the Beijing strains in China is of paramount importance to TB control world wide.

TB experts at the Dutch National Tuberculosis Reference Laboratory and Chinese TB experts have discussed the possibility of upgrading the diagnosis and treatment of TB in China in the near future. During the period 2009-2011, new tools for the diagnostics of TB, with a focus on molecular methods, were introduced and demonstrated at the Heilongjiang Provincial Tuberculosis Control Center, the Tuberculosis Reference Laboratory in Shandong Chest Hospital/TB Center and the Tuberculosis laboratory in Zhanjiang (Guangdong Province), including:

- fluorescence microscopy operated by Light Emitting Diodes (LEDs)
- molecular identification and molecular detection of INH and rifampicin resistance. In addition, several presentations were held on modern tools in the diagnosis of tuberculosis.
- quality assurance and biosafety in the tuberculosis laboratory
- treatment of MDR- and XDR-TB

The Heilongjiang, Shandong and Guangdong Provinces were selected for workshops because of

- the high prevalence of multi-drug resistant TB;
- the motivation of the staff of these institutes to improve this situation;
- the possibilities to perform molecular epidemiological research on the role of the Beijing genotype in the TB epidemic in China.

The participants of the workshop are mostly laboratory technicians at central and provincial level. Furthermore, China CDC selects staff to attend training at the RIVM for one month each year. Both parties have expressed that a long-term commitment would be extremely worthwhile. Both would like to expand the scope and depth of their cooperation, and in 2012 initial steps were taken to extend the cooperation from the TB laboratory to the TB clinic.

Practical training in molecular diagnostics of TB at the Tuberculosis Institute in Harbin

Multidrug resistant tuberculosis is a growing problem worldwide, and a major concern of TB professionals. In this project, Dutch and Chinese experts work together to exchange their knowledge about TB. This project will therefore result in better diagnosis and treatment of TB in China, and in a better understanding of the Beijing genotype.

Benefits of this cooperation for RIVM:

- scientific collaboration with China (China CDC) on the major genotype of Mycobacterium tuberculosis behind the worldwide resistance problem; the Beijing lineage; to determine its evolutionary development and association with patients' characteristics and epidemiological parameters;
- insight into the state-of-the-art of TB control in the country with the highest burden of TB and the possibility to directly contribute to capacity building;
- comparison of Beijing strains from China to the ones circulating in Europe and causing most of the transmissions of multidrug resistant TB.

Expected results of future cooperation:

- access to study sites in China for new drugs and new therapies to treat tuberculosis;
- contribution to improved TB control in China in general;
- determination of the origin of Beijing strains in comparison to its current evolution.

Prof. dr. Dick van Soolingen and Prof. Xie Yanguang, director of the Heilongjiang Provincial Tuberculosis Control Center

Antibiotic resistance

Resistance of opportunistic pathogens and their acquisition through health care services (health care-associated infections, HAIs) constitute a large burden on the Chinese Health Care System. In many large hospitals the rate of methicillin-resistant *Staphylococcus aureus* (MRSA) among bloodstream infections is high. Livestock MRSA also exists in China and was found to colonise large proportions of pigs in six different provinces.
RIVM has longstanding experience with the setting up of large-scale surveillance networks in antimicrobial resistance (AMR); RIVM was the founding institution of the European Antimicrobial Resistance Surveillance System (EARSS).
In close cooperation with the Department of Pharmacology of Beijing University, training sessions (2008) were organised for the application of specific software tools to accommodate the digital communication of routine AMR data from diagnostic microbiological laboratories in hospitals. This enhanced the management of data of a large surveillance initiative consisting of numerous hospital laboratories throughout China.

Beijing University Hospital (selling of medicines such as antibiotics)

In October 2010 Chinese technical experts from the Civil CDC and Military CDC were trained at RIVM in molecular sequence-based typing and a range of communication platforms (including Type-Ned and MLVA.net).
Project work has been underway since 2009 to foster the understanding of the occurrence, transmission and risk factors of high risk clones of hospital, community and livestock associated *Staphylococcus aureus* among inhabitants and patients of urban centres in China. A selection of isolates commonly associated with farm animals in Europe is currently being investigated by deep DNA sequencing in order to define the common origins of internationally spreading bacteria.

Workshops on capacity building in DNA sequence-based (molecular epidemiological) typing are expected to continue on an annual basis.
Importantly, secondments of young researchers to the RIVM and Dutch academic centres is expected to result in successful project work with mutual scientific and public health benefit.
Reciprocal visits by delegations from the Ministry of Health, such as the Expert Committee of Rational Drug Use and the SWAB will have a bearing on the development of guidelines towards a more efficient use of antibiotics in hospitals and the community.

The activities in this project have led to an improved network in China for AMR surveillance. At this moment some 280 hospitals use the software to report antibiotic resistance data within the remit of the Ministry of Health National Antibiotic Resistance Network (MOHNARIN).
Chinese technical experts from the Civil CDC and Military CDC were trained at RIVM in molecular sequence-based typing.

Benefits of this cooperation for RIVM:

- antimicrobial resistance (AMR) is an increasing global problem. Awareness of this problem among policy makers in China's Ministry of Health is of crucial interest for the future of antimicrobial effectiveness. The cooperation between China CDC and RIVM has strengthened the international position of RIVM as a leading institute in AMR surveillance and molecular epidemiology.

Expected results of future cooperation:

- setting up a molecular platform at China CDC which will be modelled on the RIVM template. This will enhance RIVM´s ability to exchange information and knowledge on the spread of antibiotic resistant clones with particular public health importance;
- guideline development on prudent antibiotic use in China will also be based upon experiences gathered by RIVM and SWAB.

Training room: Xaio Yonghong (fourth person from left) and Prof. dr. Hajo Grundmann (in the middle)

Food safety

In China contamination of food products may occur (*e.g.* arsenic in seaweed or bacterial contamination of meat) which may pose a risk to Chinese consumers or could lead to problems in international trade.

In 2007 a China CDC delegation of 6 people under the leadership of Vice-Director Wang Zhutian which included Wu Yongning (Research Fellow), Wanglin (Associate Research Fellow), Liu Xiumei, Li Fengqin and Xu Haibin (all Research Fellows) visited RIVM to learn more about RIVM's *in vitro* digestion model. *In vitro* digestion models enable simulation of the release (bioaccessibility) of a contaminant from a matrix (*e.g.* food) during transit in the gastrointestinal tract, with a three-step procedure simulating the digestion process in mouth, stomach and intestine successively. The China experts were specifically interested in:

- arsenic contaminated rice and seaweed, because in certain areas high natural concentrations are observed in rice and seaweed which may lead to adverse health effects;
- aflatoxin B1 (a mycotoxin) contamination of maize and grain, because in wet years mycotoxin contamination is a problem in China and can lead to difficulties in (inter)national trade and health risks.

Workshop at RIVM, 2009

In 2009 delegations from RIVM and China CDC visited each other's institutes. The RIVM expert delegation included: Rolaf van Leeuwen, Bas Bokkers, Wim Mennes (three toxicologists), Esther Brandon (pharmacokineticist), Arie Havelaar, Jurgen Chardon, Kirsten Mooijman (three microbiologists). The Chinese expert delegation (from the Ministry of Health supervision, Department of Public Health in China CDC, CDC in 10 provinces and the National Institute for Nutrition and Food Safety) included more than 60 leaders or professionals engaged in microorganism and chemical harmful factors, risk assessment. The two parties exchanged their knowledge during workshops and training sessions in Beijing concerning:

- benefit-risk and cost-benefit;
- chemical regulatory frameworks;
- community reference laboratory tasks;
- dose response modeling;
- quantitative risk assessment;
- intake assessment.

During the workshop, the implementation and experimental set-up of the RIVM *in vitro* digestion model for food were taught. Also the calculation of bioaccessibility and bioavailability was further explained. Support in choosing the most appropriate food samples for studying the bioaccessibility of arsenic in rice and seaweed and aflatoxin B1 in maize was provided by RIVM. Both China CDC and RIVM agreed to run *in vitro* digestions with arsenic contaminated rice and seaweed for assessment of the human health risk for the intake of these products. In consultation with the Netherlands Food and Consumer Product Safety Authority (responsible for the food safety in the Netherlands), it was decided to investigate rice and seaweed naturally contaminated with arsenic available on the Dutch market (to be performed in 2012). The maximum bioavailability and concentration information will be used for the intake assessment of arsenic for high rice consumers in the EU. The results of the RIVM digestion experiment will be compared with the China CDC results and the intake and risk assessment and possible implications for China will be discussed with the China CDC.

Transfer of knowledge on food safety, and more specifically the RIVM in vitro digestion model, was attained. The importance of the cooperation is beneficial to the protection of human health in both China and the EU. Furthermore, to enhance the safety of food and non-food products to be imported into the European (NL) market, but also for the food safety in China.

Benefits of this cooperation for RIVM:

- information on food safety issues in China is obtained which may also be relevant for the Netherlands either due to international trading or a specific food pattern in the Dutch Chinese population;
- international implementation of the in vitro digestion model developed by the RIVM;
- a more refined risk assessment for the EU/Dutch high rice consuming population by taking the bioavailability of different arsenic forms into account.

Expected results of future cooperation:

- validation of the RIVM in vitro digestion model for arsenic from food (bioaccessibility versus human internal exposure determined in urine);
- comparison of the arsenic intake in the Dutch Chinese population and the Chinese.

Participants to the Sino-Dutch Workshop on Food Safety Risk Assessment Beijing, 24-28 August 2009

Nutrition and Health

Counterpart for the cooperation on nutrition and health is the National Institute of Nutrition and Food Safety (NINFS), which is part of China CDC. At the kick-off meeting in November 2006 in Beijing agreement was achieved on a preliminary list of areas of cooperation on nutrition and health.
After a 4-day workshop in April 2007 at RIVM with experts from NINFS and a few working visits of NINFS experts on further elaboration of potential areas of cooperation, a large-scale Workshop on Nutrition and Health was organised in Beijing in January 2008. The NINFS experts involved were: Vice-Director Zhai Fengying and Research Fellows Yang Xiaoguang, Yang Yuexin, and Li Fengqin; Vice-Director Ma Guansheng and PhD Fellow Li Yanping.
Eighty people, mainly nutritional staff from provincial CDCs and professionals from NINFS, and eleven RIVM-experts (delegation leader Joop van Raaij) participated the Beijing workshop in 2008.

This 2008 workshop resulted in an assessment of the complementary value of each other's [NINFS and RIVM] approaches, methodologies, knowledge and expertise with respect to the potential fields of cooperation:

- dietary guidelines/nutrition policy;
- food composition table;
- nutrition and health claims;
- food consumption;
- food fortification;
- overweight and obesity;
- nutritional and physical activity interventions;
- non-communicable diseases;
- health loss/gain;
- risk benefit analysis.

Based upon a list of priorities, NINFS and RIVM made a planning of various activities, including training of staff and exchange of knowledge and experience. Unfortunately, in 2008 and 2009 for a number of reasons (i.e. earthquake, Olympic Games, food safety issues, lack of financial sources) our Chinese counterpart could not be given optimal attention on the intended cooperation issues.

Workshop in Beijing, 2008

In May 2010 two RIVM-experts (Wanda Bemelmans and Joop van Raaij) visited NINFS, and cooperation was revitalized by starting working together on two nutritional (and physical activity) interventions performed in China:

- the effectiveness and cost-effectiveness of nutritional education, nutrients supplementation, and the combination of nutritional education and nutrients supplementation in children under 2 years old in poor rural China (executed by the Department of Public Nutrition);
- the costs and cost-effectiveness of a school-based comprehensive intervention study on childhood obesity in China (executed by the Department of Student Nutrition).

In 2011 two Chinese experts (associate researcher Yu Dongmei and Assistant Research Fellow Meng Liping) stayed at RIVM for a three month period to work together with RIVM staff on analyses of the data of the two interventions, data interpretation and writing two articles (RIVM-staff as co-authors).

Europe but also, and in particular in China* appropriate nutritional and lifestyle interventions are urgently needed. Implementation of appropriate interventions and adequate nutrient profiling systems are crucial. Adequate food intake and nutritional status monitoring is required to assess effectiveness and health impact of interventions

* China National Plan for NCD Prevention and Treatment (2012-2015)" issued by the Ministry of Health and 14 other ministries and state administrations on May 8, 2012.

Benefits of this cooperation for RIVM consist of:

- monitoring methodologies on quantity and quality of daily diets has substantially strengthened RIVM expertise on food consumption surveys and food composition tables;
- methodologies on analysing and interpreting the enormous data sets on indicators of overweight and nutritional status have substantially strengthened RIVM expertise on dealing with large data sets and database;
- the type of information available and needed to quantify the health impact of various nutritional interventions has strengthened RIVM expertise on health impact assessment;
- how nutritional and lifestyle interventions are performed in Chinese settings have substantially strengthened RIVM expertise on effectiveness studies of interventions.

Expected results of future cooperation:

- improved RIVM models on assessing habitual intakes from food consumption survey data;
- adaptation of current nutrient profiling models (e.g. for comparison food logo's) to deal with a complex food system (as in China);
- adaptation of RIVM models to assess the health impact of various salt reduction strategies;
- improvement of cost inventory procedures and modelling techniques for assessing cost-effectiveness of nutrition and lifestyle interventions.

Health reporting and health system performance monitoring in China

During a visit to RIVM the Vice-Minister of the Ministry of Health Yin Li, expressed his interest in the Dutch experience with health system performance measurement.
As this project only started in mid 2011, it is still in a very early phase. RIVM has invested in monitoring instruments for health and health care for years. In this respect the Netherlands is an international leader in this field of expertise. The project aims to develop indicators that are relevant for China. The indicators to be used for monitoring will be the basis for a special Chinese monitoring instrument.

In June 2011, a seminar on health system performance assessment framework was hosted by the China National Health Research Development Center (CNHRDC) in Beijing. During this seminar representatives of RIVM, the Dutch MoH and representatives of the CNHRDC and the Chinese MoH exchanged ideas about monitoring health and health care performance. During the same week, RIVM researchers had meetings with researchers from CNHRDC and China CDC.

China is confronted by large public health problems and has asked the Dutch experts to support them through capacity building in the field of health system reporting.
The project offers a unique challenge for Dutch experts to cooperate with the Chinese counterparts and CNHRDC , because of the Chinese societal context in which the RIVM monitoring instruments can be applied.

Benefits of this cooperation for RIVM:

- the project has supported RIVM by improving the conceptual approach towards health system performance assessment;
- exchanging knowledge with Chinese counterparts was inspiring and helps to make our methods more widely applicable in other health contexts.

Expected results of future cooperation:

- the result of the project is a set of indicators for health and health care performance. Making a start with the development of a monitoring report may be the next step;
- the aim of the next workshop (Beijing) will be to disseminate the project results to policy makers and experts of relevant institutes resulting in absorption of these outcomes into locally relevant implementation processes.

Tobacco and health

A global tobacco testing laboratory network is crucial to improve tobacco control. Combining testing and research at the global level is a new approach to match the tobacco industry's expert product testing capabilities.

No such tobacco testing laboratory existed at China CDC before 2007. In 2007 in Beijing a meeting took place in which RIVM experts and CDC experts exchanged knowledge in developing methods for tobacco analysis and for the purpose of tobacco control.
This meeting supported CDC in establishing a 'tobacco control' laboratory. Moreover CDC became a partner of the TobLabNet. This network has been established for the study of tobacco products at the international level. It is also intended to initiate discussions on the guidelines needed for contents and emissions testing as described in Article 9 of the WHO Framework Convention on Tobacco Control (WHO FCTC). These guidelines include:

- the development of laboratory methods
- standards
- expertise
- capacity on tobacco products testing and research.

Since 2008 CDC has been a very active partner within the TobLabNet. It played an important role, especially during the negotiations concerning the WHO FCTC articles 9 and 10.
After establishing a tobacco laboratory in 2008, China CDC has since developed a second structural laboratory in this field.

Two concrete results can be mentioned:

- a tobacco laboratory was established at China CDC
- China CDC became a partner in TobLabNet

Future cooperation

In the first seven years of the cooperation between China and the Netherlands on public health, the initial focus has been on jointly recognized global public health threats. Viruses, anti-microbial resistant pathogens and multi-drug resistant TB are health threats which don't respect borders and remain of mutual concern for both countries and the rest of the world. Secondly, focus has been placed on safety issues related to the high proportion of Chinese products imported into the Netherlands and Europe in general. Thirdly, a shift has taken place with respect to the growing attention China is paying towards reforming the health system and the rise of NCDs, such as obesity.
A recent development has been the expansion of cooperation with other parties and stakeholders. The cooperation is no longer limited to the institutions of RIVM and CDC, but now also includes other institutions such as the China National Health Research Development Center for health system performance assessment, as well as direct cooperation with the relevant policy departments of the ministries, with respect to AMR and rehabilitation medicine.

Most of the above-mentioned projects are on-going activities, and all parties involved appreciate the cooperation. Many of these cooperation projects require long-term commitments to deepen understanding and improve outcomes.
The continuation of this cooperation is of mutual interest to the parties involved, as well as in the interest of both the Chinese and Dutch Ministries of Health. A well functioning reporting system to monitor the progress achieved is of great importance. Improvement of the reporting system by integrating it in the projects would be of mutual interest and will support the possibilities for all stakeholders to follow the progress of the projects.

It is of major importance for both China and the Netherlands to stay engaged in their efforts to tackle global health risks, and while doing so benefit from each others experiences and knowledge. Therefore, a well-focused public health cooperation remains of utmost importance.

The trustful atmosphere that has been created is a solid basis for continuing the fruitful cooperation for years to come and will contribute to a reduction in global health threats.
Exchanging knowledge that can be applied in models and interventions is of great value to both countries, today and in the near future.

‘Good cooperation contributes to good health’

Disclaimer:
The parts of this publication which concern projects carried out with other institutions than China CDC are not under the responsibility of China CDC.


SANYO

中荷双方现有的相互信任的氛围是在未来开展有效合作的坚固基础，并能推动减少全球卫生威胁。
无论是在今天，还是在不久的将来，应用于模型和干预措施的知识交流对中荷两国都具有极为重要的意义。

“加强合作，促进健康”

声明：

本报告中所涉及的由中国疾病预防控制中心以外的中方单位执行的项目，与中国疾病预防控制中心无关。

未来合作展望

中荷公共卫生合作的第一个七年，合作重点最初放在两国共同认可的全球公共卫生威胁上。病毒、抗生素耐药病原体及 MDR-TB 这些健康威胁因素不仅没有局限于国家边境内，更受到了中荷两国及其他国家的共同关注。此后，荷兰及欧洲从中国进口的重比例商品的安全问题成为另一个合作重点。最后，随着医疗卫生体制改革及肥胖等慢性病的兴起，中国政府工作重点的转移，中荷合作重点也有了转移。
近年来，中荷卫生合作进展的体现是合作成员和利益攸关方的增加，双方合作不再局限于单纯 RIVM 和中国疾控中心的合作。中国国家卫生研究发展中心加入到合作框架中，进行卫生系统绩效评价合作研究。同时，在抗生素耐药（AMR）和康复医学领域，RIVM 与相关部委政策制定部门开展了直接的合作。

上述多数项目仍在进行中，并且所有的合作方都很重视相关合作。许多项目要求长期的合作承诺，以加深彼此了解并改善合作成果。
合作的持续开展有利于中荷卫生部及相关合作机构。建立一个运转良好的报告系统来监测项目进展极为重要。将报告系统整合到项目中改良报告系统，有利于中荷双方的合作，并能帮助所有利益攸关方跟进项目的进展。

中荷两国致力于全球健康风险的处置极为重要，同时通过该行为可以使双方在经验和知识上彼此获益。因此，一个重点突出的公共卫生合作仍是重中之重。

烟草与健康

建立一个全球烟草检测实验室网络对加强烟草控制工作至关重要。在全球水平将检测和研究结合起来，是足以与烟草业专家的产品检测能力相媲美的新方法。

在 2007 年前，中国疾控中心没有一个此类烟草检测实验室。2007 年，RIVM 和中国疾控中心专家在北京召开了会议，就开发烟草分析方法及控烟方法相关知识进行了交流。本次会议帮助中国疾控中心建立了一个“控烟”实验室，并促使中国疾控中心成为世界卫生组织控烟实验室网络（TobLabNet）的一员。TobLabNet 网络建立的目的是为在国际水平开展烟草制品研究，同时发起讨论共同制定《世界卫生组织烟草控制框架公约》（WHO FTCT）第 9 条所述烟草制品成分和释放物检测相关指南。相关指南包括：

- 实验室方法的开发；
- 标准；
- 专业知识；
- 烟草制品检测和研究的能力。

自 2008 年起中国疾控中心成为 TobLabNet 网络内非常活跃的成员机构。在 WHO FTCT 第 9 条和第 10 条相关磋商会上，中国疾控中心发挥了重要作用。自 2008 年建立烟草实验室后，中国疾控中心在该领域建立了第二个结构实验室。

共有两项具体成果可以提及：

- 中国疾控中心建立了一个烟草实验室；
- 中国疾控中心成为 TobLabNet 网络的成员机构。

中国卫生报告和卫生系统绩效监测

中国卫生部尹力副部长访问 RIVM 期间，对荷兰在卫生系统绩效测量方面的经验表达了兴趣。
鉴于该项目于 2011 年中才开始启动，项目现仍处于早期阶段。RIVM 多年来在卫生和医疗卫生监测工具给予了大量的投入，故而在该专业领域荷兰可以说是国际社会的个中翘楚。该项目目标是开发适于中国的相关监测指标，并以此为基础建立中国专门的监测工具。

2011 年 6 月，中国国家卫生研究发展中心在北京举行了卫生系统绩效评价框架研讨会。会上，荷兰卫生部、中国卫生部、RIVM 及中国国家卫生研究发展中心的参会代表就卫生和医疗卫生绩效监测交换了意见。在会议同一周，RIVM 专家与中国国家卫生研究发展中心和中国疾控中心的专家进行了会谈。

中国面临着巨大的公共卫生问题。中方请求荷兰专家支持其进行卫生系统报告相关能力建设。
鉴于中国有着不同的社会背景，在中国应用 RIVM 监测工具给与中方合作的荷兰专家提出了特别的挑战。

RIVM 的收获：

- 该项目帮助 RIVM 改善了 RIVM 卫生系统绩效评价的理论方法；
- RIVM 与中方合作机构进行知识交流，启发并帮助 RIVM 改良其方法并使其在其他卫生背景下具有更广泛的适用性。

预期未来合作成果：

- 预期通过项目能开发出一套卫生和医疗卫生绩效指标。计划下一步开始制定监测报告；
- 计划在北京召开第二届研讨会，向政策制定者和相关机构专家分享项目成果，使项目成果应用到地方相关实施过程中。

2010 年 5 月，RIVM 两位专家（Wanda Bemelmans 和 Joop van Raaij）访问营养食品所，双方开始在中国就两个营养（和体育运动）干预项目进行合作，借机也恢复启动了两机构间的合作。两个项目具体情况如下：

- “中国贫困地区2岁以下婴幼儿营养干预研究”项目（由营养食品所公共卫生营养室执行）：营养教育、营养素补充剂及营养教育和营养素补充剂结合使用的效益及成本—效益分析；
- “以膳食为基础的儿童肥胖防控机制研究”项目（由营养食品所学生营养室执行）：基于校园的中国儿童肥胖综合干预研究的成本及成本—效益分析。

2011 年两位食品安全所专家（于冬梅副研究员和孟丽苹助理研究员）赴 RIVM 访问并进行为期 3 个月的合作研究，并与 RIVM 工作人员共同分析上述两个干预项目数据，进行数据解读并共同撰写了两篇文章（RIVM 专家作为合作作者）。

欧洲国家迫切地需要合宜的营养和生活方式的干预。而在中国*，相关干预更是紧迫。合宜的干预及充足的营养素度量体系的实施至为关键。评估干预措施的有效性及健康影响力，就要求进行充分的食物摄入和营养状况监测。

*2012 年 5 月 8 日，卫生部和其他 14 个部委联合颁布中国国家慢性病预防和治疗规划（2012-2015 年）。

RIVM 的收获：

- 每日饮食质量和数量监测方法大大提升了 RIVM 在食物消费调查和食物成分表的专业能力；
- 超重指标和营养状况相关数据集的分析和解译方法极大提高了 RIVM 处理大数据集合数据库的专业能力；
- 已有及需要用于量化多种营养干预措施健康影响力的信息类型提升了 RIVM 对健康影响力评估的专业能力；
- 在中国实施营养和生活方式干预项目极大增强了 RIVM 对干预效益研究的专业能力。

预期未来合作成果：

- 通过食物消费调查数据，改善 RIVM 习惯性摄入评价模型；
- 采用现有营养素度量法（如，比较食品标识营养素度量法）来处理复杂的食品体系（如中国的食品体系）；
- 采用 RIVM 模型来评价多个减盐策略的不同健康影响力；
- 改善评价营养和生活方式干预措施的成本清单分析步骤和造型技术。

营养与健康

与 RIVM 进行营养和健康相关合作的机构是中国疾控中心营养和食品安全所（营养食品所）。2006 年 11 月在京举行的中荷合作启动会议上，确定了营养和健康相关合作的初步领域。
2007 年 4 月，营养食品所专家赴 RIVM 进行了为期 4 天的访问，并召开合作项目交流研讨会。随后，营养食品所专家又陆续访问 RIVM，进一步讨论未来合作领域。访问 RIVM 的营养食品所专家包括：马冠生副所长、翟凤英副所长、杨晓光研究员、杨月欣研究员、李凤琴研究员和李艳平博士。2008 年，中荷双方在北京联合举办营养和健康研讨大会。来自营养食品所、省级疾控中心营养专家及由 Joop van Raaij 博士率领的 11 位 RIVM 专家团共 80 人参会。

2008 年的研讨会评估了营养食品所和 RIVM 两个机构在潜在合作领域相关的方法、知识和专业能力等方面具有的互补价值。评估的主要领域包括：

- 饮食指南/营养政策；
- 食品成分表；
- 营养和健康声明；
- 食品消费；
- 食品强化；
- 超重和肥胖；
- 营养和体育活动干预措施；
- 慢性非传染性疾病；
- 健康损失/改善；
- 风险收益分析。

根据合作重点，营养食品所和 RIVM 制定了人员培训及知识和经验交流等一系列活动规划。鉴于各种原因（如地震、奥运会、食品安全问题、缺乏资金支持等），2008、2009 年两年间合作项目未能如期开展。

照片：2008 年在北京召开的营养与健康研讨会

预期合作成果：

- 验证评估含砷食品的RIVM体外消化模型（生物可给性对比尿液检测法确定人体暴露）；
- 比较荷兰籍华人群体和中国人砷摄入情况。

照片：2009 年 8 月 24-28 日中荷食品安全风险评估研讨会参会代表

2009 年 RIVM 和中国疾控中心代表团互访对方机构。RIVM 专家代表团包括 Rolaf van Leeuwen，Bas Bokkers, Wim Mennes (3个毒理学家), Esther Brandon (药物动理学家), Arie Havelaar, Jurgen Chardon, Kirsten Mooijman (3 个微生物学家)。中国专家代表团（来自卫生部、中国疾控中心公共卫生管理处、中国疾控中心营养食品所、10 个省疾控中心）共 60 位领导和专家，参与了微生物和化学有害物质
风险评估。中荷双方在研讨会及在京的培训会上交流了以下议题：

- 收益—风险和成本—收益；
- 化学物质管理规范框架；
- 社区参比实验室任务；
- 剂量反应模型；
- 定量风险评估；
- 摄入量评估。

在研讨会上，RIVM 专家介绍了食品体外消化模型的实施步骤及实验装置，同时还进一步介绍了生物可给性和生物利用度的计算方法。RIVM 协助中方专家选择最合适的食品样本来研究大米和海藻中砷的生物可给性及玉米中黄曲霉素 B1 的生物可给性。中国疾控中心和 RIVM 一致同意进行砷污染的大米和海藻体外消化实验，评估摄入污染食品的人健康风险。通过与荷兰食品和消费品安全部（负责荷兰食品安全机构）磋商，决定调查荷兰现有遭受自然砷污染的大米和海藻情况（项目计划于 2012 年实施）。最大生物可给性和浓度相关信息将会用于评估欧盟大米高消费人群中的砷摄入量。RIVM 体外消化实验结果将与中国疾控中心结果进行比较，并讨论相关摄入、风险评估及对中国造成的可能影响。

转让了食品安全知识，特别是 RIVM 体外消化模型知识。该合作有利于保护中国和欧盟公众的健康，提高欧洲（荷兰）进口食品和非食物商品市场的安全性，同时也改善了中国的食品安全。

RIVM 的收获：

- 考虑到国际贸易及荷兰籍华人群体消费某些特殊食品的情况，RIVM 取得了中国公布的食品安全相关信息，有助于荷兰相关食品安全的工作；
- RIVM 开发的体外消化模型得到了国际性实施；
- 通过计算不同形式砷的生物可给性，对欧盟/荷兰大米高消费人群进行了更为精确的风险评估。

食品安全

在中国可能出现的食品污染问题（如海藻含砷或肉类被细菌污染）将对中国消费者带来威胁，甚至可能导致国际贸易问题。

2007 年，由中国疾控中心营养与食品安全所（以下简称“营养食品所”）王竹天副所长为团长，吴永宁研究员、王林副研究员、刘秀梅研究员、李凤琴研究员和徐海滨研究员组成的 6 人访问团访问 RIVM 并学习了体外消化模型。体外消化模型模拟了介质（如食物）中的污染物在胃肠道短暂停留期间的释放过程（生物可给性），包括在口腔、胃和肠道依次消化的三个步骤。中方专家对以下几点尤感兴趣：

- 砷污染的大米和海藻。因为在部分地区，砷的自然浓度较高，被水稻和海藻吸收后可能造成不良健康反应；
- 玉米和谷物黄曲霉素 B1（一种霉菌霉素）污染。因为在气候潮湿的年份里，中国霉菌霉素污染历来是个问题，并可能带来国内或国际贸易和健康的风险。

照片：2009 年在 RIVM 召开的研讨会

照片：Xiao Yonghong（左数第四人）和 Hajo Grundmann 教授（中间）在培训室

2010 年 10 月，中国军事医学科学院疾控中心和北京市疾控中心技术专家在RIVM接受分子序列分型和一系列沟通平台（包括 Type-Ned 和 MLVA.net）的培训。
自 2009 年起，双方已开展合作，加强了解在医院、社区和家畜等高风险区中国城市中心区居民及患者中金黄色葡萄球菌的发现、传播和风险因素等相关情况。现已对欧洲农场动物相关的分离株进行筛选研究，通过对 DNA 深度测序来确定国际上传播的细菌的同源性。

中荷双方均希望能继续每年召开 DNA 测序（分子流行病学）分型的能力建设研讨会。重要的是，期待将年轻科研人员借调到 RIVM 和荷兰学术中心工作这一行动能促成利于科研和公共卫生领域的项目。
卫生部代表团间开展了互访活动并推动项目的开展，如合理用药专家委员会及 SWAB 拟共同制定一个针对医院和社区更有效使用抗生素的指南。

该项目活动帮助改善了中国 AMR 监测网络。在卫生部国家抗生素耐药网络（MOHNARIN）内现已有约 280 家医院使用软件来报告抗生素耐药数据。
中国军事医学科学院疾控中心和北京市疾控中心的中国技术专家在 RIVM 接受了分子测序分型培训。

RIVM 的收获：

- AMR 已逐渐成为全球性问题。中国卫生部的政策制定者对未来抗生素的有效性极为关注。中国疾控中心与 RIVM 的合作巩固了 RIVM 作为国际 AMR 监测和分子流行病学带头机构的地位。

预期未来合作成果：

- 参照 RIVM 模式在中国疾控中心建立一个分子平台，以提高 RIVM 就具有公共卫生特殊意义且与抗生素耐药细胞系传播相关的信息和知识进行交流的能力；
- 根据 RIVM 和 SWAB 的经验，制定中国抗生素使用指南。

抗生素耐药

机会性致病菌耐药及通过医疗卫生服务获得的机会性致病菌感染（医疗卫生相关感染，HAIs）给中国的医疗卫生系统带来了极大的负担。在很多大医院，耐甲氧西林金黄色葡萄球菌（MRSA）的血液感染率很高。在中国还存在家畜 MRSA 感染，并已在中国六个不同省份发现大量猪被感染。

RIVM 具有长期建立抗生素耐药（以下简称“AMR”）大范围监测网络的经验，是欧洲抗生素耐药监测系统（EARSS）的建立机构。

RIVM 与北京大学药学院进行了密切合作，并就应用医院诊断性微生物实验室常规 AMR 数据处理数字沟通软件工具（2008 年）组织了培训课程，加强了对中国各地医院实验室大量监测数据的管理。

照片：北大医院（出售抗生素等药物）

照片：Dick van Soolingen 教授和黑龙江结核病防治所所长谢艳光教授

照片：在黑龙江结核病防治所举行结核病分子诊断技术培训

耐多药结核病在全球日益严重，并成为结核病专家主要关注焦点。在该项目中，中荷专家互相交流结核病知识。因此，该项目将帮助提高中国结核病诊疗水平，并更好地了解北京菌株情况。

RIVM 的收获：

- 就全球结核病耐药问题，RIVM 与中国疾控中心进行结核分枝杆菌主要基因分型合作科学研究，确定其进化性变化及其与患者特征性和流行病学参数的关联；
- 进一步认识结核病负担最重的国家结核病防控现状，并了解如何直接帮助进行能力建设的可能性；
- 将在中国流行的北京菌株与在欧洲流行并造成大量 MDR-TB 传播的北京菌株进行比较。

预期未来合作成果：

- 在中国开展结核病治疗新药和新疗法试点研究；
- 帮助中国提高结核病防控总体水平；
- 通过比较北京菌株的现有变异株，确定其起源。

结核病

结核病仍是当今世界最致命的传染病之一。尽管 WHO 在过去几十年投入了巨大努力，世界上仍有三分之一的人口是结核病潜伏感染者，而且结核病发病率降低缓慢，平均每年降低率低于 1%。随着耐多药结核病（以下简称 “MDR-TB”）和广泛耐药结核病（以下简称 “XDR-TB”）。MDR-TB 和 XDR-TB 主要出现在结核病防控项目薄弱的地区。中国结核病诊断和治疗的质量仍在较低水平，结核病耐药性发生率（及耐药患者的绝对数量）也列于世界首位。5% 以上的中国结核病患者是 MDR-TB 患者。因此，中国极其需要就结核病，特别是 MDR-TB 和 XDR-TB 的诊断和治疗进行培训。
MDR-TB 和 XDR-TB 的病原主要是北京基因分型株系的结核分枝杆菌。为更好了解全球结核病流行动态，明确北京菌株的演变与耐药性的关系尤为重要。中国北京菌株的密度是全球最高的。因此，全球结核病防控的首要任务是对中国北京菌株进行分子流行病学和系统发育分析研究。

荷兰国家结核病参比实验室结核病专家和中国结核病专家讨论了在不久的将来提高中国结核病诊疗水平的可能性。2009—2011年间，黑龙江结核病防治所、山东胸科医院/山东结核病中心结核病参比实验室及广东省湛江结核病实验室引进结核病诊断新工具并进行示范
工作。这些新诊断工具主要是分子方法工具，包括：

- 发光二极管（LEDs）荧光显微法；
- 异烟肼和利福平耐药分子鉴定和分子检测。此外，还举行了几个结核病现代诊断工具相关讲座；
- 结核病实验室质量控制和生物安全；
- MDR-TB 和 XDR-TB 治疗。

选择在黑龙江、山东和广东省进行研讨会的原因包括：

- 三省都具有 MDR-TB 高患病率；
- 三个相关机构员工具有改善现状的积极性；
- 三地具有开展中国结核病流行北京菌株分子流行病学研究的可能性。

参会人员主要是中央或省级实验室技术专家。此外，中国疾控中心每年选派专家赴 RIVM 进行为期一个月的培训。中荷双方均表示长期合作极有价值，同时希望扩大合作的范围和深度，并在 2012 年开始尝试将合作从实验室拓展到临床。

四、建立人类—动物相交点相关研究的实验室支持体系

广东疾控中心被任命为 WHO 新发传染病监测、研究和培训合作中心。

加强传染病监测和应急工作需要多部门的合作，如卫生、农业、林业及边境口岸主管部门的合作。RIVM 专家受邀参加了两个多部门合作会议并在会上进行了报告。另外，双方还联合开展了实验室能力调查，并在 2008 年和 2010 年进行合作研究互访，讨论农业部门和公共卫生部门的合作问题。

此外，RIVM 开发新技术可用来测量动物相关工作人员中人畜共患病病毒含量，广东疾控中心对该技术饶有兴趣。因此，RIVM 培训广东疾控中心工作人员使用该工具，并在 2011 年末提供了检测工具包。为评估该技术的有效性，在中国调查采集的血样标本的筛查研究仍在进行中。

广东疾控中心和三个市疾控中心合作建立了试点监测体系。2010 年召开一个会议讨论未来合作潜在的途径。会议认为，基于初步发现，合作重点应该放在共同食源性细菌监测上。

广东疾控中心为市疾控中心技术人员设立了监测培训项目，并邀请 RIVM 专家作为培训老师。该监测现已充分运转。

RIVM 的收获：

- 深入了解广东传染病实验室监测体系的开发和运转。鉴于华南地区是流感等新发传染病的潜在源头，了解监测体系具有重要意义。
- 验证新发传染病快速监测方法。
- 深入认识荷兰和（或）欧洲暴发手足口病等潜在风险。

预期未来合作成果：

- 继续开发人畜共患病监测实验室方法。
- 共同拓展虫媒病毒相关知识。鉴于荷兰王国领土的扩大，三个加勒比海岛波奈（或译波内赫，Bonaire）、沙巴（或译萨巴岛，Saba）与圣佑达修斯（或译圣尤斯特歇斯，St Eustatius）的纳入荷兰领地，相关知识对荷方特别重要。

照片：RIVM 病毒学实验室

传染病：病毒学

SARS 和致病性禽流感后，中国建立了疾病预防控制中心体系，并在全国范围内建立了先进的高技术监测设施。然而，要实施此类监测，必须要求有大量人力资本的投入。RIVM 对基于实验室的监测和支持工作具有丰富的经验，因此 RIVM 为广东疾控中心提供相关技术支持。另外，由于两国都是人兽共患疾病高发地带，人类—动物相交点是促成合作的另一个动因。过去五年的合作是成功的，其中广东疾控中心尤为受益。

病毒学项目主要由四个子项目组成：

一、流感监测和抗病毒药耐药监测

流感是重要呼吸系统感染疾病之一，对幼童和老年人造成最为严重的影响和危害。在极罕见的情况下，新型流感病毒通过动物，特别是通过家禽和猪传播到人群中。现在，我们可以通过接种疫苗控制流感，但制造新型大流行性毒株疫苗需要花费几个月的时间。因此，防范大流行计划主要基于在大流行早期有目标性地使用抗病毒药物。鉴于现有的药物有限，传播中的毒株对已有治疗的敏感性监测特别重要。作为合作的一部分，2008 年和 2009 年双方交流了流感监测中抗病毒药耐药检测方案。而双方工作人员的培训互访及抗病毒药耐药检测也已成为广东流感监测常规工作的一部分。

二、食源性病毒

以 RIVM 开发的欧盟监测系统为模型，广东疾控中心建立了食源性和水源性病毒病暴发监测体系。随着食品市场的全球化进程，监测网络的拓展显得尤为重要。为进行两国相关数据比较研究，2008 年和 2009 年双方进行了相关方案和人员的交流。无论是现在还是将来，人畜共患病领域的都是重点合作内容。

三、肠病毒监测——为推进全球消灭脊髓灰质炎（以下简称“脊灰”）病毒进程

广东疾控中心的职责之一是负责对广东省肠病毒分离株进行系统分析，证明广东省处于无脊灰病毒状态。在世界卫生组织（以下简称 “WHO”）全球消灭脊灰网络中，RIVM 拥有一个 WHO 脊灰病毒参比实验室。近年来，在东南亚地区已陆续出现肠病毒 EV71 造成的大流行，致使多种疾病和症状的发生（手足口病、神经性疾病、严重呼吸道疾病、结膜炎等）。中荷肠病毒监测项目中的一项工作是对在中国和欧洲国家流行的病毒进行比较，并判断相关暴发是否会给欧洲公众带来健康风险。双方就此进行了工作方案和数据的交流，并在 2010 年 12 月开展了一个培训研讨会。2011 年双方联合撰写文章进行发表。在肠病毒研究以及脊灰病毒变异和重组监测项目的持续合作将会促进中荷双方更多的知识和经验交流，造福两国人民。

项目成果

通过知识和经验的分享，中荷双方专家均获益匪浅。荷兰的经验帮助中方专家习得相关技能和方法，并改善中国的各种系统，如传染病监测、结核病诊断和治疗、抗菌素监测、食品安全和化学物质风险评估、营养干预及健康指标等。另外，由于中国人口数量巨大，中国新发传染病、出口欧洲/荷兰的食品安全等相关知识对荷兰专家来说是极为宝贵的。
知识交流以及联合举办的结核、流感、抗菌素耐药相关研讨会提高了中荷双方处理相关健康威胁的能力，同时还帮助荷兰（RIVM）在疾病抵达边境前更充分地做好准备来抗击疾病的传播，防止相关疾病成为荷兰甚至全世界的健康威胁。人口基数大的国家所提供的数据要比人口基数小的国家所提供的数据在统计学上更有可靠性。因此，可在中国对 RIVM 专家开发的模型和干预措施进行检验并调整以降低其不确定性。总之，可以说，中荷公共卫生合作有利于双方所有参与机构。

以下部分将介绍在各领域所开展的活动。各领域合作项目成果，将在表格里展示出来。

合作伙伴

为实现谅解备忘录，中国疾控中心及 RIVM，作为中荷卫生部直属机构直接参与了谅解备忘录的执行，并按要求开展项目。

随着项目稳步的开展和推进，更多的机构加入到合作框架中。主要有：

- 中国疾控中心；
- 广东省疾病预防控制中心（以下简称“广东疾控中心”）；
- 黑龙江结核病防治所
- 山东胸科医院/山东结核病中心结核病参比实验室
- 北京大学药学院
- 北京市疾病预防控制中心
- 中国军事医学科学院疾病预防控制中心
- 荷兰抗生素政策工作组基金会（SWAB）
- 中国国家卫生研究发展中心

谅解备忘录

谅解备忘录（MoU）和各项目执行计划是中国疾控中心和 RIVM 双边合作的框架：
“鉴于双方共同致力于全球卫生，合作抗击全球公共卫生风险和威胁的愿望，通过互助和经验共享使两国人民受益并促进两国医学的发展，因此决定特别就传染病预防控制相关卫生保健和公共卫生领域签署协议。”

双方合作的主要领域总结如下：
“双方将在公共卫生和医疗卫生领域针对政策、管理、组织、基础设施、研究、方法和服务等方面进行信息和观点交流，同时双方鼓励中荷卫生部相关部门、公共卫生和医疗卫生领域相关机构及其他相关方之间直接的沟通及知识和专业的交流。”

根据谅解备忘录中所述领域，合作重点首先是：
- 传染病
- 公共卫生相关药物创新
- 初级卫生保健
- 食品安全
- 慢性非传染性疾病

2008 年 1 月，中国卫生部陈竺部长访问荷兰。在荷兰卫生部，双方讨论了疾病预防、疾病管理和初级卫生保健相关工作，以及中荷医疗卫生改革情况。此外，陈竺部长还访问 RIVM，了解了中荷传染病、营养和食品安全相关领域合作中荷方的工作进展。
2010 年，中国卫生部尹力副部长访问 RIVM。尹部长此行目的是促进合作双方相互了解，同时监督合作项目的进展，并进一步明确合作重点。

2011 年 6 月，中国卫生部国际司任明辉司长在北京会见荷兰卫生部公共卫生司 Paul Huijts 先生。会上，两位司长一致认可新的执行计划。
在新执行计划中，除了延续部分旧有的合作领域，又增加了一些新的合作内容。双方同意开展合作的领域如下：
- 传染病：结核、流感及实验室监测系统
- 抗菌素耐药和应用性研究
- 超重、肥胖和与饮食相关的慢性疾病研究
- 卫生系统：特别是绩效与系统指标
- 营养与健康
- 食品安全
- 康复医学

图片：中国卫生部陈竺部长和RIVM前主任（2003-2010 年）尹部长的访问孕育了一个新的执行计划。

概况

在过去的十年里，公共卫生已经成为中荷两国共同关注的领域。疾病流行不再局限于一国国境之内。十年间，中国面临着各种新兴全球性健康风险因素的威胁，如非典型性肺炎（SARS）、禽流感和大流行性流感。同时，如结核病、抗菌素耐药性等新型健康威胁日益被关注，使得公共卫生领域合作迫在眉睫。鉴于中荷两国食品进出口数量巨大，食品安全问题的解决亦是合作的重点，同时营养相关知识也切实可用。

2004 年 12 月，时值荷兰接任欧盟轮值主席国，温家宝总理访问荷兰。期间，温总理请荷兰卫生、福利和体育部（以下简称“荷兰卫生部”）前部长 Hans Hoogervorst 先生为其安排与荷兰卫生部及荷兰国家公共卫生和环境研究院（以下简称“RIVM”）相关专家的会面，交流疾病暴发相关预防和监测工作，重点交流风险评估相关知识，学习抗击传染病传播和潜在全球人流感大流行相关技术和策略。

应荷兰卫生部长之邀，RIVM 介绍了其在公共卫生和环境领域的主要职能和业务专长。RIVM 的职责是为荷兰政府提供政策支持，改善国民健康，保护环境。

鉴于中荷面临的健康威胁极其相似，中荷两国领导人一致认为知识交流有益于更有效地解决两国所面临的共同威胁。

2005 年春，Hans Hoogervorst 部长率荷兰卫生部和 RIVM 代表团访华。中荷双方一致认为疾病暴发相关预防和监测知识将大大造福于两国人民。此次访问期间，中荷两国卫生部长签署了双边合作谅解备忘录。

自此之后，中国疾病预防控制中心（以下简称“中国疾控中心”）和 RIVM 成为合作伙伴，共同执行降低中荷两国健康风险和威胁相关项目。

图片：温家宝总理和 RIVM 前主任（2003-2010年）Marc Sprenger 先生

序言

有史以来，中国和荷兰两国一直保持着良好的双边关系。2005 年，两国政府签署的卫生合作谅解备忘录更是将公共卫生作为双方的重点合作领域之一。我们要向中国疾病预防控制中心和荷兰国家公共卫生与环境研究院的专家们在备忘录框架下进行的技术交流致以崇高的敬意。尽管中荷两国在国土面积、地理环境和文化传统方面存在差异，彼此的合作却对双方多个卫生领域的发展起到了很大的推动作用。在合作谅解备忘录框架下开展的传染病、卫生信息、营养与食品安全等项目切实促进了公共卫生领域的认知和方法学的发展。我们坚信这些成果终将转化为促进两国人民健康的动力。

不得不提到的是，如果没有两国卫生部的资金支持，这些项目是不可能开展和实施的。我们对两国的卫生部表示衷心的感谢。

我们希望这种双赢的合作能够持续下去。我们深信，全球性的问题，需要全球性的解决方案。

王宇博士
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中荷卫生合作进展报告
（2005–2011年）

根据中华人民共和国卫生部与荷兰王国卫生、
福利和体育部签署的卫生合作协议和执行计划撰写。

2012年8月

中荷卫生合作进展报告

中荷卫生合作进展报告（2005-2011年）

2005-2011年

National Institute for Public Health and the Environment
Ministry of Health, Welfare and Sport

CDC
CHINESE CENTER FOR DISEASE CONTROL AND PREVENTION