One Health MAGAZINE

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Solutions to Global One Health Challenges

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netherlands centre for one health

One world, one health

Microbes are our smallest enemies and yet they pose the biggest threat to our health. As microbes recognise no borders it makes sense for us to work together in the fight against infectious diseases. The establishment of the Netherlands Centre for One Health – a world first – demonstrates that we can consolidate our strengths in human health, in animal health, and in the environment. It is a major and important step!

The fight against antimicrobial resistance is a crucial theme in this cooperation. And it shows how all three domains interact. By squandering antibiotics, humanity risks undoing nearly a century of medical progress. Then operations would become too risky, transplants impossible and simple infections would kill again. Therefore the prevention of infections and the prudent use of antibiotics in both human and animal health are vitally important. But we also must join forces in the search for new antibiotics or alternatives. This requires new business models and a sharing of responsibilities between governments and industry. The Netherlands is small and densely populated. Seventeen million people live together with 120 million domesticated animals and lots of wildlife. We know from experience that human and animal health are interconnected, for example when it comes to zoonoses.

Only a One Health approach will ensure the sustainability of our healthcare sector, our agricultural sector and the environment. These are lessons we want to share with the rest of the world. I hope that the Netherlands Centre for One Health will bring us more knowledge and cooperation in the complex field of bacteria, viruses and zoonoses as well as the means to combat them. Then we can look forward to a healthy future, beyond borders.

Edith Schippers
Minister of Health, Welfare and Sports
The Netherlands

Universiteit Utrecht

UMC Utrecht

Preface

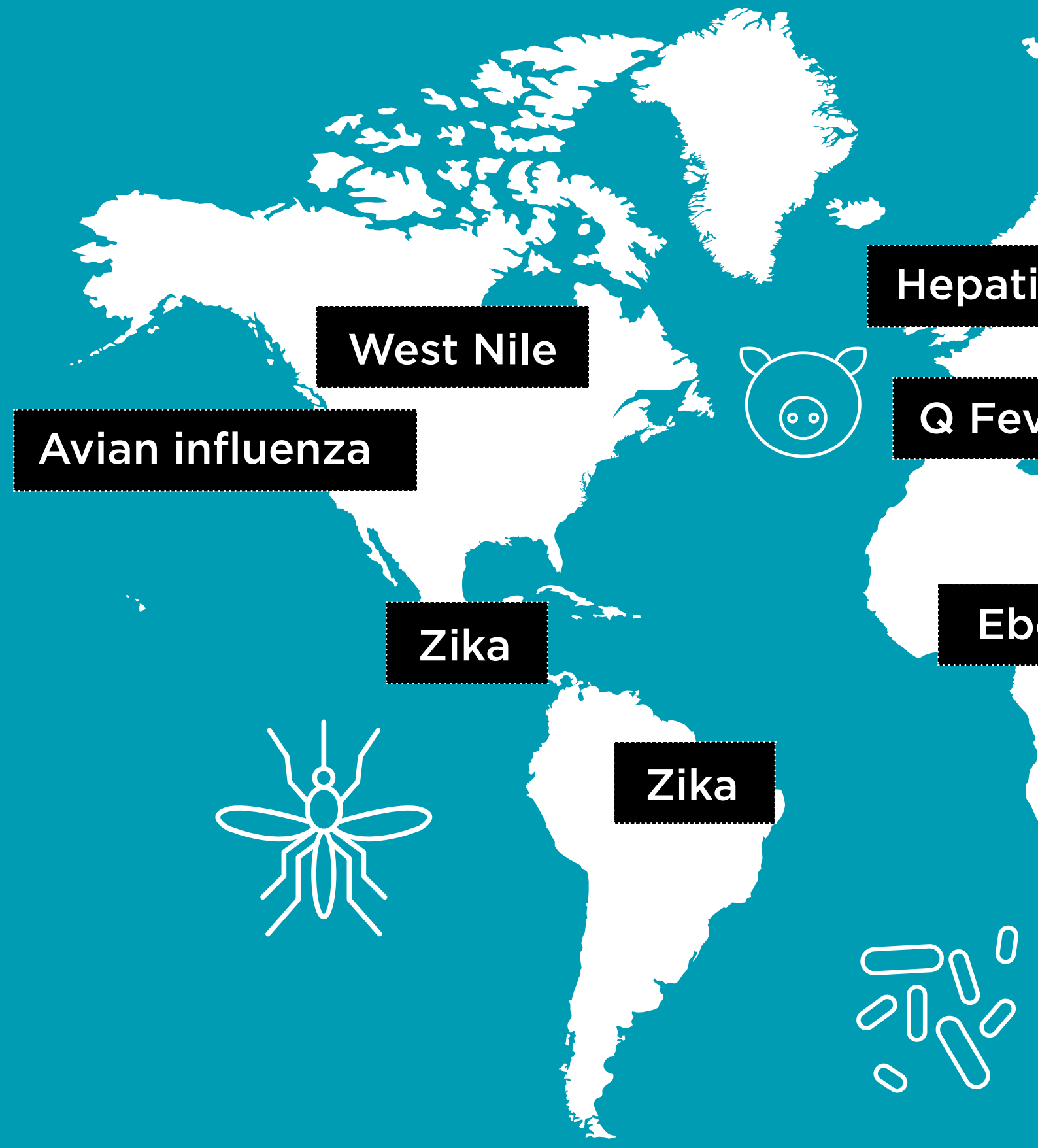
Health is increasingly recognised as a key element of sustainable economic growth, global security, and effective governance. In policy terms, health has moved from the realm of "low politics" to that of "high politics". Expenditure for international assistance in relation to health issues grew from 6 billion US dollars in the 1990s to over 30 billion US dollars by 2010. Internationally it is recognised that health issues require renewed global cooperation.

International trade and travel are growing and infectious diseases and contaminated products are quickly and easily transported. This has led to several global outbreaks in the past few decades. The recent H1N1 pandemic and Ebola outbreaks have illustrated just how vulnerable our modern societies are. They also highlighted that health issues can – if ever – no longer be examined from just a medical point of view. Avian influenza, for instance, is a typical zoonosis that spreads through the interaction of humans, domestic animals and wild fowl. It is related to animal production management systems, ecological aspects of migrating birds, trade regulations, veterinary control systems, and human healthcare.

So the challenges we are facing require a more holistic approach that integrates the different disciplines involved in human, animal and environmental health into a One Health approach. The Netherlands is home to several renowned academic centres in various relevant fields for a One Health approach.
Pooling this expertise in the Netherlands Centre for One Health will enable us to come up with better and more resilient solutions for contemporary global health challenges like antimicrobial resistance, the outbreak and spread of infectious diseases, safe food chains, and a healthy environment.
Working together in this new centre will position Dutch researchers as reliable and prominent partners in the international field and it will allow us to make a significant contribution to resolving global health threats.

Prof. dr. Louise O. Fresco
President of the Executive Board
Wageningen UR
The Netherlands

Emerging infectious diseases

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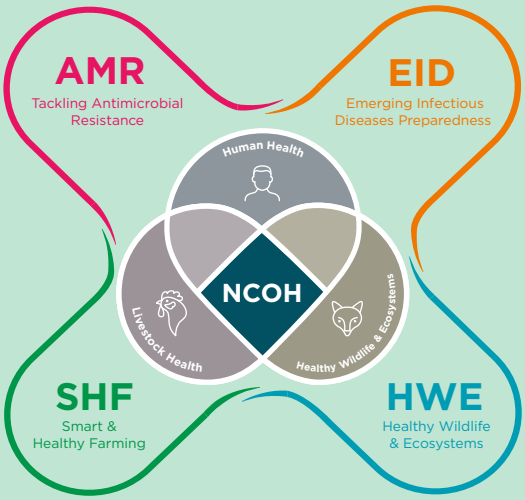
One Health – The Dutch approach

One Health stands for the combined approach to advance the health of people, animals and the environment. An approach that is vitally important for solving several key societal issues. And an approach that we in the Netherlands, a relatively small and densely populated country with 17 million people and 120 million animals, cannot ignore.



Global impact

To find an answer to One Health challenges and to develop solutions that can be deployed throughout the world, Utrecht University, Wageningen University & Research Centre, University Medical Center Utrecht, Erasmus University Medical Center Rotterdam, and Academic Medical Centre Amsterdam have joined forces in the Netherlands Centre for One Health and are consolidating their knowledge and expertise in the area of One Health.

Research themes

The NCOH aims for an integrated One Health approach. The four strategic research themes of the NCOH are complimentary and interactive. They focus on studying the interactions and connections between human, veterinary, wildlife, and environmental health in pursuit of durable solutions to grand societal challenges requiring a One Health approach.

Solutions to Global One Health Challenges

Partners

Universiteit Utrecht · UMC Utrecht · Wageningen UR · Erasmus MC · amc

Associates

RIVM
Maastricht UMC+
Leiden University
Radboud University Medical Center
Hubrecht Institute for Developmental Biology & Stem Cell Research, KNAW
CBS-KNAW, Fungal Biodiversity Centre
Immunovalley

“I’m pleased that **research and researchers are in the lead.**”

The concept of ‘One Health’ has been around for a long time but the Q fever outbreak of 2007 to 2010 ensured the breakthrough.

‘About five years ago I became involved in One Health when I was Dean of the Faculty of Veterinary Medicine at Utrecht University. Veterinary and human medicine were still separate worlds back then. That was apparent during the outbreak of avian influenza but even more so in 2009 during the peak of the Q fever outbreak. Roel Coutinho was director of the Netherlands Institute for Public Health and the Environment (RIVM), and I said, “Roel, we need to bring together initiatives in the fields of veterinary and human health.” After that I approached University Medical Center Utrecht (UMCU). We already had good contacts with the Central Veterinary Institute, part of Wageningen UR, we visited the government ministries, gave lectures… that is how it all started.’

‘Of course it is good that a small country like the Netherlands can assume a leading role in this. And as there is only one Dutch faculty of veterinary medicine, it was obvious that we would take the initiative. At an international level, One Health also started from the veterinary field, and human medicine saw the benefit of this approach mainly as a result of Q fever. In March 2015 we organised the One Health conference in Amsterdam, which attracted 1000 participants from 80 countries. When I was there, I knew something was really going to happen! And when the Dutch Minister of Health, Welfare and Sport, Edith Schippers, then said that she wanted to focus on the theme One Health and antimicrobial resistance during the Dutch presidency of the EU then I knew things would happen even faster still.’

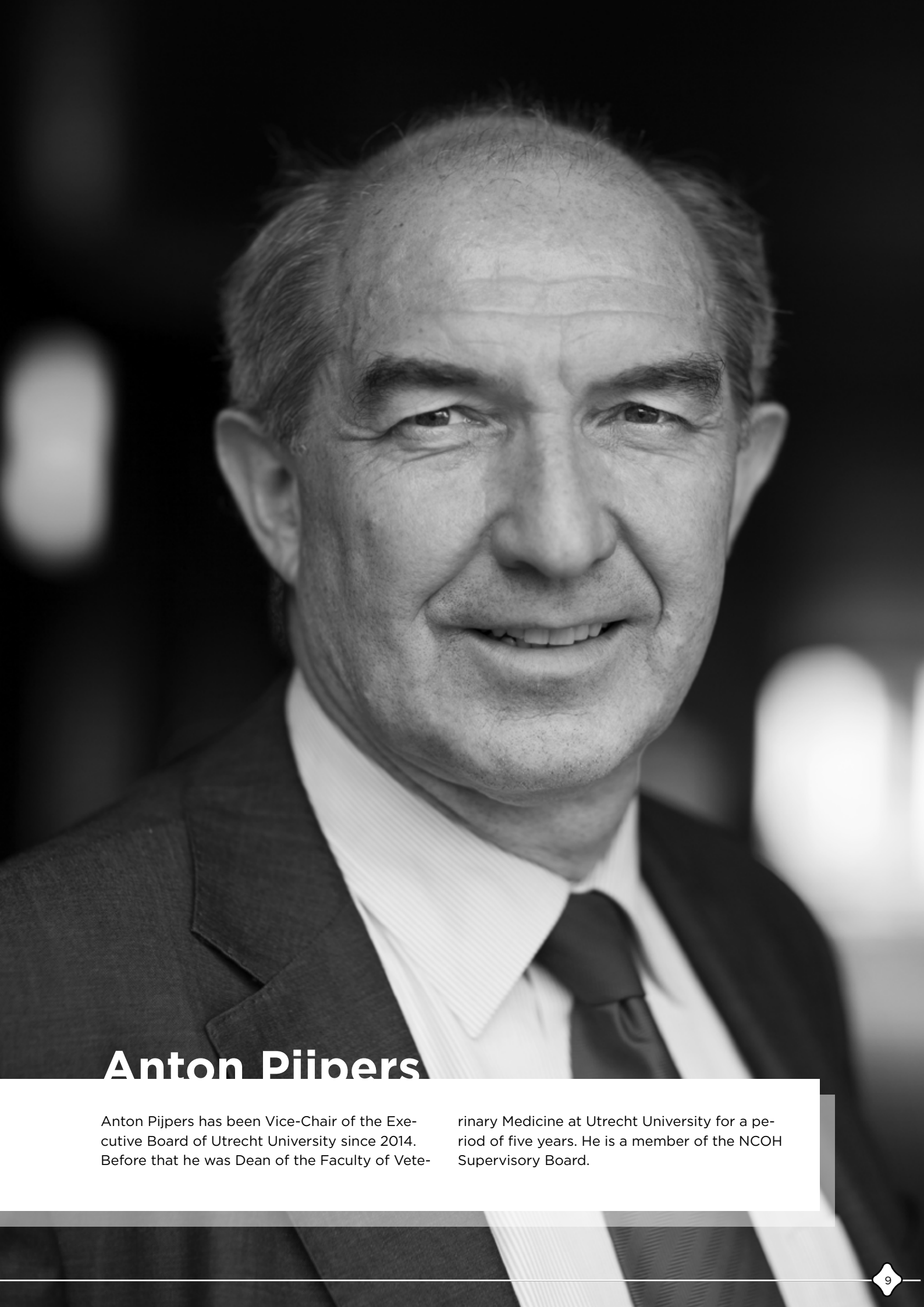
‘A lot is happening in the United States. The University of California in Davis is very active and so is Texas A&M. But look… here in Utrecht we have good contacts with South Africa, and what you see there – and that really motivates me – is that it is not a veterinary problem but a genuine human problem. Children play in pools of water that cows drink from. The risk of transmittable pathogens is a continuous and real problem.’

‘And then here we have the problem that diseases which are commonplace there could soon emerge here. For example Rift Valley fever. And don’t forget that Q fever came from Southern Europe!’ ‘The Netherlands Centre for One Health will be successful. It is already a success if we can ensure that the participating partners jointly obtain grants from Brussels.’

‘Several years ago I saw the competition in Brussels between different parties from the Netherlands and I thought to myself: what a shame, that’s a real waste! This year and in 2017 there will be calls specifically aimed at One Health projects. With our level of excellence and our organised collaboration we can definitely acquire a considerable portion of that funding. The competition is fierce but we can assume a leading role. And yes, new projects inspire. You need to place flags on the horizon and offer researchers a perspective. That stimulates people!’

‘All of the researchers saw the value of this initiative. That was not a problem. Everybody thought: we can really do something unique here. And what is really important: we have done this based on the research needs and not from the perspective of governance. If I as a director would say, “we’re going to do this and we’re going to organise it like that,” then the researchers will respond, “well, good luck with it!” Then you know it won’t succeed. In the case of the NCOH, the directors of the universities and university hospitals form a board at a distance. The researchers will organise everything. The four themes have four ‘ambassadors’ who are renowned researchers.’

‘Marion Koopmans from the Erasmus MC will lead emerging infections. The human aspects of antimicrobial resistance are mainly a task for Marc Bonten at UMCU, and the Faculty of Veterinary Medicine at Utrecht University and the Central Veterinary Institute will focus on the veterinary aspects of antimicrobial resistance. Andrea Gröne of the Faculty of Veterinary Medicine in Utrecht will lead Wildlife and Annemarie Rebel of Wageningen UR Healthy Farming. They will study the calls for proposals associated with their themes and then ask: who is going to collaborate with us? Everybody will retain ownership of their knowledge and unique value and everybody will involve the international partners required for a successful grant application.’



Anton Pijpers

Anton Pijpers has been Vice-Chair of the Executive Board of Utrecht University since 2014. Before that he was Dean of the Faculty of Veterinary Medicine at Utrecht University for a period of five years. He is a member of the NCOH Supervisory Board.

I wish first to extend congratulations for the launching of The Netherlands Centre for One Health (NCOH). Many of the most important human health, animal and agricultural challenges facing the world today – including emerging infections and ensuring safe and nutritious food - reflect the fact that the world is highly interconnected. This is evident both in nature as well as through increasingly globalized, intersectoral activities. In this context, adopting a one health perspective as the basis for establishing balanced and sustainable long-term directions and solutions follows naturally.
The key issues now are how to move from discussion of concepts to intersectoral dialog and engagement to establishing the synergies and engagement needed for effective action.

WHO, and its sister agencies FAO and OIE, have repeatedly acted upon this approach in jointly tackling issues such as rabies, animal influenza and antimicrobial resistance and will continue to do so with each other and with partners like the Netherlands Centre for One Health.

dr. Keiji Fukuda MD, MPH
Assistant Director General
Special Representative of the Director General on Antimicrobial Resistance
World Health Organization, Geneva, Switzerland

The launch of the NCOH is an important milestone. With a strong focus on excellent science and valorization the NCOH will help create critical mass for new public private partnerships in the field of One Health.
I strongly support the formation of these PPP[1]s. Because they drive innovation and create integrated solutions that safeguard both human and animal health, promote food security and a healthy environment.

dr. Bertholt Leeftink
Director-General Enterprise and Innovation
Ministry of Economic Affairs
The Netherlands

The demand for high-quality protein, such as dairy and meat, will double in the coming decades. Available land and resources will not and so productivity must be increased. Improved animal health control can make a major contribution to increased productivity, especially where human health is at stake. A One-Health approach will therefore make a key contribution to future solutions. Promoting the active role of the NCOH will also strengthen the leading position of Dutch livestock production.

dr. Aalt Dijkhuizen
President Dutch Top Sector Agri & Food
The Netherlands

“The problems related to the interaction between humans and animals are complex.”

His biggest concern is the increasing antibiotic resistance in bacteria. The One Health approach, says Marc Bonten, can help to tackle this problem efficiently.

‘We have defined six solution sets to approach the growth of antibiotic resistance: two of these clearly have a One Health component. First of all the development of vaccines that can be used in addition to, or instead of, antibiotics. That is happening in human and veterinary medicine and researchers in both fields can learn a lot from each other. One Health also plays a very strong role in research into the dynamics of how resistance develops. The genes that are responsible for this can spread in many different ways. We want to know how that happens.’

‘What else could NCOH contribute to? I’ll give an example. In the case of emerging diseases, but also during the spread of resistant bacteria, the interaction between animals, livestock and people plays an important role. But the more you delve into this, the more complex that interaction proves to be. There are no simple explanations and conclusions. We see ESBL bacteria in chicken breasts and we see ESBL in patients. And you would think that the one leads to the other. That bacteria have been transmitted from chicken to people. But now we know that this conclusion is false. So what is going on then? That is a scientific question that fits within the NCOH.’

‘Another example. In November last year all hell broke loose after The Lancet wrote that in China, E. coli had been isolated in which a gene causing resistance to the antibiotic colistin had been found. That is used a lot in pig farming against intestinal infections. The effectiveness of colistin for the treatment of infections in people is highly questionable, so it has scarcely been used for many years. However, with the emergence of pathogens that are resistant to standard antibiotics, colistin is being used more often as a drug of last resort. We could therefore lose that option. After that discovery in China many researchers, including some in the Netherlands, delved into genetic databases.’

‘They discovered that the gene concerned had already been in bacterial genomes for a long time and so the resistance it causes is very limited. Therefore within a month we could establish that this news was a hoax. Nevertheless by that time a lot of damage had already been caused worldwide. There ought to be a standard that requires a nuanced publication of such findings in scientific research. And a surveillance system that quickly detects such “new” resistances.’

‘The interaction between humans and animals is a complex problem. This is illustrated by the fact that although antibiotic use in livestock farming in the Netherlands has now decreased by 70%, we have not seen a decrease in the number of patient infections with resistant bacteria. However, you need to see the problem from a global perspective. In other parts of the world an awful lot of antibiotics are still being used in people and animals. And the protein demand of the world population is set to grow enormously, which means people and animals will live in increasing proximity to each other. The biggest threats come from Asia, where antimicrobial resistance is a big problem. And we should not be under the illusion that we can intervene there. They really will have to solve this problem themselves. We can, however, give them knowledge.’

‘ZonMw will launch a new research programme into resistance. Together with the NCOH partners, my ambition is to submit several strong research proposals concerning the dynamics of resistance exchange, and stewardship. We need to consolidate both our expertise and our funding. That will create added value and allow a unique collaboration to arise.’

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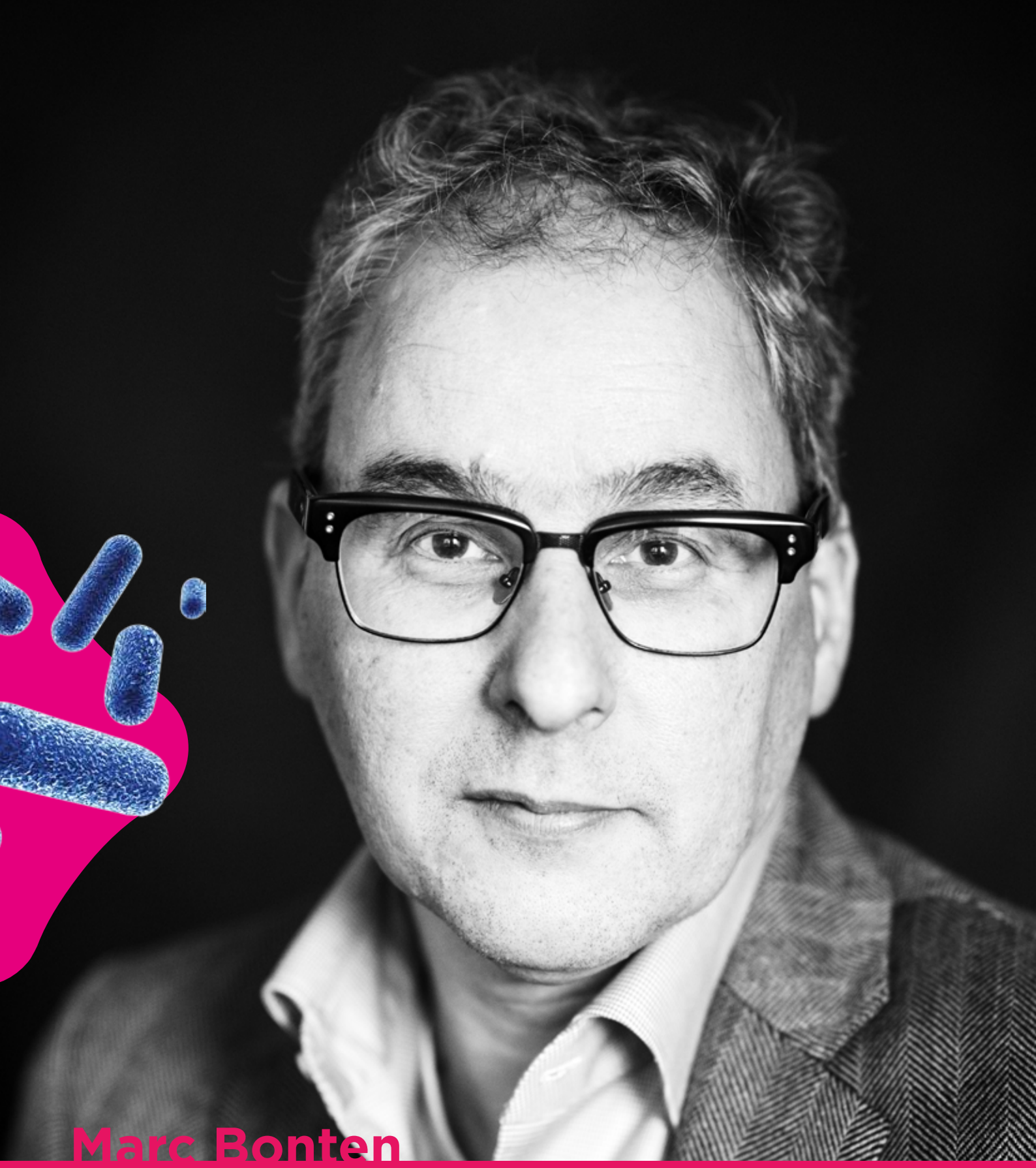


Marc Bonten

Marc Bonten gained his doctorate from Maastricht University in 1994. He completed his training as an internist-infectiologist at University Medical Center Utrecht where he was appointed in 2003 as Professor of Molecular Epidemiology of Infectious Diseases. Since then he has led the Infectious Diseases Epidemiology programme at the Julius Centre for Health Sciences and in Primary Healthcare Medicine. Since 2008 he has been physician-microbiologist and head of the Department of Medical Microbiology at Utrecht University Medical Centre.

Annemarie Rebel

Annemarie Rebel gained her doctorate from Erasmus University Rotterdam for the human medicine subject ‘Recurrence rate of bladder cancer’. She subsequently did research at the Johns Hopkins University in Baltimore into a protein that is correlated with the metastasis of prostate cancer. Following a switch to Infection Biology within the Central Veterinary Institute, part of Wageningen UR, she is now responsible for research into the interaction between animals and the environment, such as nutrition, pathogens and stress. She is head of the Animal Health and Welfare Department within Wageningen Livestock Research.

“Livestock health is vitally important for **preventing disease outbreaks**.”

My theme Smart and Healthy Farming is about keeping the entire animal healthy. Why does one animal become sick and another not? In my research I’ve always wanted to build bridges between different areas of expertise in order to consolidate knowledge. As subjects, the veterinary and human themes appear to lie in separate domains. However, we can learn a lot from each other and there are extremely complex issues that we really do need to tackle from a multidisciplinary perspective. Only then will we be in a position to jointly make major advances.’

‘Although the research in my theme seems to be focused more on practical issues, the underlying research questions are very fundamental. The apparent focus on practical issues is because some of the questions come from the commercial sector and society and they can readily implement the research outcomes.’

‘Of course we already work closely together. As soon as an infectious disease outbreak occurs the human and veterinary experts know exactly where to find each other. This collaboration became well organised after the Q fever outbreak. Back then, ‘joint’ PhD researchers were working within different organisations. Now it is time to think ahead. Take, for example, the particulate matter issue. Particulate matter also comes from livestock farms and it contains toxins that originate from bacteria in faeces. Several large studies have been started to determine whether people who live near livestock farms have an increased disease burden and what the underlying mechanisms of this are. Based on these studies it will become clear which conditions livestock farms will have to satisfy to reduce this increased disease burden.’

‘Studies have therefore been started into how the sheds can be adapted to keep animals, employees, and neighbouring residents healthy. We need to tackle the adaptation at the source; we need to see the entire picture. We want to know where the problems of public health lie and which adaptations are necessary so that the entire chain benefit from this. We will search for innovations in which not just human health but also animal health is positively influenced so that the disease burden, and with that antibiotic use, can decrease.’

‘Our challenge is to make livestock more resilient so that the impact of diseases is limited. An outbreak always starts with a few animals becoming infected. Pathogens can simply be fatal and then little can be done. But often they are not fatal and a healthy animal with a good natural immunity can deal with that. Therefore part of the set of solutions for Healthy Farming is the realisation of a detection toolkit, which is not aimed at a pathogen but at biomarkers. Biomarkers provide an indication of the animal’s health. Obvious examples are temperature, heart rate, and physical activity but biomarkers can also be measured in the blood, such as proteins or micro-RNAs. This is because animals often respond to very low levels of pathogens.’

‘The reason why an animal is not feeling ‘fit’ does not have to be an emerging disease. It could be a farm-related illness for which antibiotics will be used. If such an early diagnostic test reveals that an animal is no longer healthy then a timely action plan can be made, which could lead to reduced antibiotic use. This approach would require data from biomarkers being combined with other data such as images, genetic characteristics and immunological characteristics. These enormous quantities of data would require new analysis methods and would have to be “translated” in such a way that the livestock farmer, the animal, and neighbouring residents benefit from this information.’

‘It is good that all of the initiatives are being consolidated within the NCOH. As experts from different disciplines collaborate within the research, we are in a position to offer new ideas and solutions and jointly make far greater advances. The NCOH could therefore develop into an organisation of international repute.’

ncoh
smart
and healthy
farming

In an increasingly polluted and globalised world, we must adopt sustainable global strategies to maximise the outcome of the efforts promoting the health and well-being of humans, animals and the environment. In other words we need to develop a “sharing economy” for a healthier planet.
This is the One Health Vision, and the scope of the NCOH.
A healthier planet is what we owe our children.

Prof. dr. Ilaria Capua

DVM, PhD.
Member of the Italian Parliament
Italy

During the late 19th and early 20th centuries research and development in public-private partnerships (before the term was even coined) combined with ‘organised’ serendipity led to the global tackling of many infectious diseases. This fuelled the welfare and economic prosperity of many societies. New challenges have since arisen and these demand shared solutions on a global scale. The Dutch Top Sector Life Sciences and Health is therefore proud that a new generation of pioneers from among its members have stood up and launched the Netherlands Centre for One Health.

With this initiative, the Dutch, in collaboration with fellow institutes and experts from throughout the world, will provide the means to take the next steps in human and animal health. Congratulations NCOH!

Prof. dr. Nico van Meeteren

Executive Director, Health~Holland
(Top Sector Life Sciences and Health), The Hague
CAPHRI, UM/MUMC+, Maastricht
The Netherlands

Developments in recent years to improve the health of human, animal and plant populations within their ecosystems have undeniably shown that intensive cooperation between human and veterinary research is not only beneficial but also necessary. The integrated and multidisciplinary approach from the One Health ideology is the opportunity to realise Global One Health solutions.

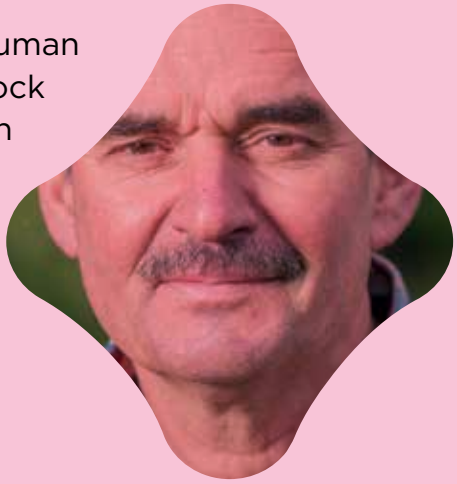
Prof. dr. Ludo Hellebrekers

Director Central Veterinary Institute (CVI)
Wageningen UR
The Netherlands

In a densely populated country like the Netherlands where people and animals live in close proximity to each other, a good relationship between veterinary physicians and researchers and their colleagues in human medicine is indispensable.

Without the joint knowledge about diseases that can be transmitted from animals to humans and vice versa, the healthy coexistence of people and animals will once again be subject to discussion. And nobody will benefit from that.

Jointly developing knowledge at the crossroads of human and veterinary medicine is vital for sustainable livestock farming. The establishment of the NCOH can make an important contribution to that in the future.



dr. Toon van Hoof

Member of the Board Southern Agriculture and Horticulture Organization (ZLTO)
The Netherlands

“Toxoplasmosis is another subject that we could tackle within the NCOH.”

Wildlife, people and livestock live in close proximity in the Netherlands and this is why Andrea Gröne is keen for scientists working in these areas to collaborate: it is important to understand how, for example, changes in the landscape can affect people and animals living in it.

‘People often say: wildlife, we don’t have that in the Netherlands do we? But think of hares, rabbits, deer... all these animals can carry diseases that can be transmitted directly to people or to people via domesticated animals.’

‘Take tularaemia (rabbit fever) for example. It is a bacterial disease, which was last reported in the Netherlands in 1953. But in 2013, in collaboration with the Central Veterinary Institute, part of Wageningen UR, we discovered that the disease had reappeared. This disease can be transmitted to humans, and whilst it is treatable, if it is not recognized or treated properly then it can be fatal. In the spring of 2015 there was an outbreak in Friesland and the disease was found in eleven dead hares. In Scandinavia they have found indications that surface water plays a role in its spread. There is a lot of water in Friesland, as well as water recreation, so it was important to look into exactly what was going on.’

‘When it comes to the spread of diseases from wildlife to livestock then swine fever is particularly important. The last outbreak of this in the Netherlands was in the 1990s. In Germany the virus, has been found in wild boar and it can be transmitted to pigs if they come into contact with wild boars. Wild boar in the Netherlands are tested regularly and so far the virus has not been found. However, the wild boar population is growing. Several years ago the African swine fever virus was found in Eastern Europe. The outbreaks are quite some distance apart and it seems reasonable to assume that the virus is being spread via vehicle tyres. In that respect the Russian trade boycott is very useful; now far fewer lorries are travelling between Russia and the EU.’

‘What I would like to know is: if something happens in the landscape then how will that affect wildlife and the spread of pathogens? Therefore I want to work more closely with ecologists particularly researchers with people from Wageningen University. They understand how changes in the landscape can affect the various wildlife populations. One area requiring further research is the spread of tularaemia, but I would like to do research into benign diseases as well. These could, for example, be used as a model to see how pathogens behave in animals and how they spread from these animals to other species.’

‘Toxoplasmosis is another subject that we could tackle within the NCOH. This parasite is dangerous for pregnant women and there are indications that toxoplasmosis could be responsible for certain brain diseases. Human pick up the parasite via contact with the faeces of infected pet cats, in water or on food or through cysts in meat that has not been properly cooked. The Netherlands recently experienced an outbreak of toxoplasmosis among squirrels, and it is thought that they picked it up from their surroundings. The role played by domestic cats in this is not clear yet.’

‘Yes, the NCOH can definitely become something unique. We know all too well the risks we face with regard to animal and human health. The Netherlands has experienced several large outbreaks in the past and these have made it clear just how vulnerable we are. The Netherlands is a small and dynamic country that is densely populated with people and livestock. However, the country’s small size also has an advantage. The lines between researchers are short and if something happens the response times can be incredibly fast. If something is happening in the Netherlands you can quickly get hold of the right person.’

ncoh
healthy
wildlife and
ecosystems

Andrea Gröne

Andrea Gröne studied veterinary medicine at the University of Giessen and subsequently worked at the Ohio State University and the universities of Berne and Hanover. Since 2005 she has been Professor of Pathology at Utrecht University.

Marion Koopmans

Marion Koopmans studied Veterinary Medicine in Utrecht. She then worked for the University of Utrecht, the Centers for Disease Control in Atlanta, USA and the Netherlands National Institute for Public Health and the Environment. She is now the head of Viroscience department at the Erasmus MC. Her research focuses on gaining insight into the development, spread, control and prevention virus infections in the animal-human interface.

“Outbreaks may seem unpredictable but there are always patterns.”

Marion Koopmans wants to shake off the ‘rookie football’ feel currently associated with research into emerging infections. We need to be prepared for future outbreaks and get ahead of the curve, by being proactive as opposed to reactive.

‘Over the past century we’ve seen mortality rates from infectious disease gradually decline on a global level. We are getting healthier and we are living longer. However, this trend has slowed since the emergence of the HIV epidemic, which heralded the changing pattern of infectious diseases due to global changes over the past decades. Other examples are avian flu, SARS, MERS, Q fever, … and most recently Ebola. Looking at the global scale, not a year goes by without an emerging disease outbreak of some kind.’

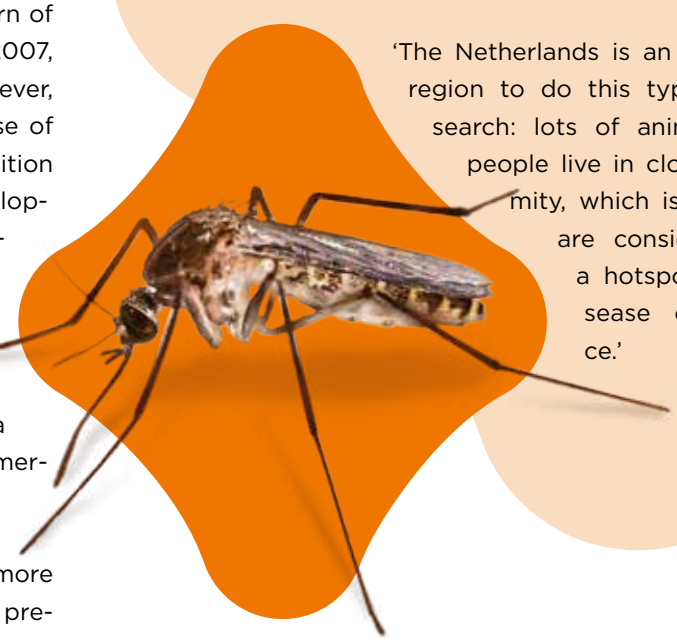
‘Currently, a lot of our attention is focussed on Zika, a viral infection transmitted by mosquitoes. We’ve been aware of Zika for years. The viral infection was known as a cause of fever, some joint pain and rash, and not considered very serious. As a consequence, not much research has been done, despite a changing pattern of spread with the outbreaks in South East Asia since 2007, and in South America in 2014. Most recently, however, new reports from Brazil suggest a 20-fold increase of the number of newborns with microcephaly, a condition in which the baby’s skull is too small and the development of the brain is impaired. The current suspicion is that this condition is related to exposure to Zika during pregnancy. With this new fact, there is a cry for information on disease causing mechanisms, diagnostics, treatments, etc.. This is the pattern that I describe as “rookie football”: a research response that is triggered after diseases emerge, us running after the ball.’

‘These examples show that we need more forward-looking and planning of emerging disease preparedness research, play more strategically. Most new infectious diseases come from the animal world, including wildlife and livestock, and are called zoonotic diseases. We need to gain knowledge about the complex ecosystem that connects humans, animals and the pathogens that they carry, what drives disease outbreaks, and what we can do to prevent or control them.’

‘Outbreaks may seem unpredictable but there are certain patterns that should raise flags. For instance, looking at zoonotic pathogens, a warning signal is the occurrence of numerous local outbreaks, even if they die down by themselves or by basic control activities. A second warning sign is when such infections start to spread among humans. We have seen small outbreaks of Ebola for decades in small remote villages. The only difference with the recent huge outbreak was that now the virus reached urban areas and hospitals, where controlling spread was much more difficult. Warning signs are also seen for avian flu, MERS, Rift Valley Fever and the Nipah virus, all viruses causing rare but severe disease with occasional outbreaks. So we should learn from Ebola and start to tackle these problems now!’

‘I would like to create a joint research program which focuses on such global challenges, by studying how viruses and bacteria pass from animal to animal and to humans. Is it via manure, via food or via a number of different routes? What factors determine if an infection can spread from animals to humans? How are these transmission patterns and pathways influenced by interventions, for instance the way animals are housed and handled?’

‘The Netherlands is an excellent region to do this type of research: lots of animals and people live in close proximity, which is why we are considered as a hotspot for disease emergence.’



ncoh
emerging
infectious diseases
preparedness

David Heymann

David Heymann is currently professor of Infectious Disease Epidemiology at the London School of Hygiene and Tropical Medicine, head of the Centre on Global Health Security at Chatham House, in London, and chairman of Public Health England, UK.

“You could call **the Netherlands** a Hot Spot.”

David Heymann came into contact with the One Health Movement early in his career and he is pleased that the Netherlands is now taking the lead. ‘This is a unique initiative.’

‘It is not clear where and when the idea of One Health arose. I think it developed gradually. It appears that at the start of the 20th century Italian physicians were already aware that veterinary and human physicians should work together. Only when the world faced a growing number of emerging infections, therefore since the 1970s, has the subject really become an issue. Then the medical and veterinary communities realised that collaboration was needed. And in the 1990s the WHO picked up on the idea when it started to work more closely with the Food and Agriculture Organization (FAO) and the World Organisation for Animal Health (OIE).’

The veterinary community is therefore leading the way in this area?

‘Yes definitely. Outbreaks like SARS and Ebola should, as far as I am concerned, push medical science in the direction of One Health. However, in all honesty the veterinary community realised earlier and more clearly that collaboration was needed. It has always aimed to realise a joint estimate of the risks. It took a long time before the medical community also saw the need for that.’

How did you come into contact with One Health?

‘I came into contact with One Health early in my career. In 1976 I investigated an Ebola outbreak in Zaire. After that I remained in Africa for 13 years where I worked for the CDC and did research, for example, into the reservoirs of the Ebola virus and into the MPX virus [the ‘monkeypox virus’ that causes symptoms in humans that look like pox and is prevalent in primates and rodents]. After that I was seconded to the WHO, who asked me in 1996 to set up an emergent infections programme. From that moment onwards I was really aware of the One Health Movement.’

‘In 2002 I coordinated the global response to the outbreak of SARS for WHO. The incredibly good collaboration back then between epidemiologists, virologists and physicians gave me a sense of optimism. The rapid tackling and effective containment of SARS proved for many that in the area of detection and response, One Health could make real advances. But the effective approach needed seems to be lacking in the recent outbreak of MERS.

I hope that over the next few years the WHO will focus even more on One Health.’ An important concept is ‘hotspots’, areas that must be monitored because that is where the emerging diseases could come from. At the same time much remains unclear.’

‘There are many parts of the world where emerging infectious diseases are more likely to occur. But keeping a close eye on such hotspots is just one of several options. A case in point was everybody focusing on South Asia to detect a new influenza virus, whereas eventually that virus emerged in Mexico and the United States. Hotspots are therefore just one element, and attention for those may not be at the expense of global detection systems. The concept is also sensitive. It was with good reason that when a new virus emerged in China, we decided on 15 March 2003 to give it a neutral name straightaway: severe acute respiratory syndrome, SARS. This was to stop the press from calling it ‘Chinese flu’ as that would have led to the stigmatisation of an entire population.’

According to many Dutch researchers the Netherlands is also such a hotspot.

‘You could refer to the Netherlands as a hotspot, but actually from a certain perspective each country is a hotspot. The Netherlands has an incredibly advanced and clean livestock sector, but at the same time, just like other countries, it has had its fair share of outbreaks. I am thinking about avian influenza in chickens and Q fever. However, this initiative is of global importance. The Netherlands has a strong reputation with respect to global advances in the area of medicine and I think that many countries pay close attention to what happens in the Netherlands. I have read several proposals from the NCOH, and I think this is a unique initiative that will serve as an example for many other countries.’

Recent outbreaks of (emerging) zoonoses in The Netherlands, especially the Q-fever epidemic, as well as the growing concern about antimicrobial resistance have emphazised the need for a One Health approach. An example of this approach is the implementation of an integrated human-veterinary zoonoses risk analysis structure for effective signalling and control of zoonoses. This approach also requires a reinforcement of collaborative research at the interface of the human and animal health domains. The establishment of the Netherlands Centre for One Health will further strengthen this cross-sectoral collaboration, which should lead to new knowledge and approaches to control animal and human health problems.

dr. Arjen van de Giessen
RIVM

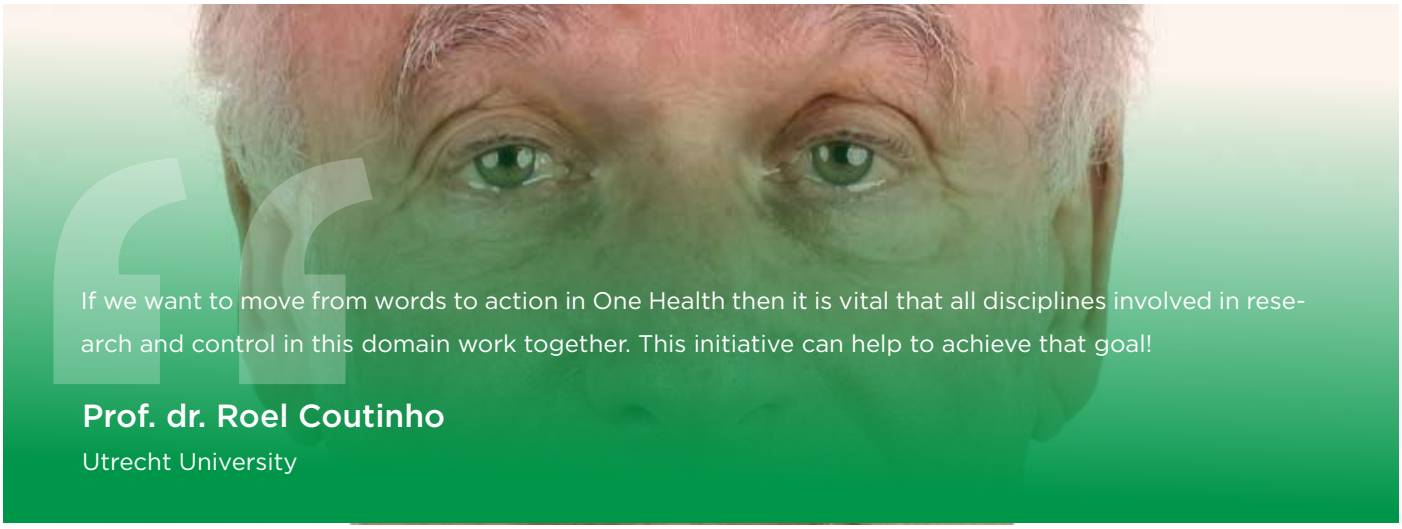
The One Health approach that NCOH stands for is absolutely vital for effectively and efficiently guaranteeing the health of humans, animals and the environment. This approach is not only important for the further development of national and international One Health policies, but also for ensuring the most efficient spending of research funds.
Therefore I welcome the establishment of the NCOH. I hope that the NCOH will not limit itself to the research institutions based in Utrecht, Wageningen and Rotterdam, but that every Dutch research institute working on One Health issues will join the NCOH. Then the NCOH will become an example for other countries to follow.

dr. Christianne Bruschke, DVM, PhD
Chief Veterinary Officer
Directorate Agro of the Ministry of Economic Affairs, The Netherlands

What great news! And very many congratulations! Laboratories in The Netherlands have long played a major international role in identifying, isolating and researching many novel zoonotic viruses and in responding to disease outbreaks caused by zoonotic pathogens. I am absolutely delighted by the news that The Netherlands Centre of One Health is now being established.

This is a natural and welcome progression of the role that the contributing institutions are already playing individually in support of One Health, and a reflection of their widely recognised expertise in infectious disease identification and ecology, and of their high standards of veterinary and human medicine. it is well-established that the wildlife-livestock- human-ecosystem interfaces are fundamental to the development of the One Health concept, a recognition that the health of humans, animals, and ecosystems are interconnected, and that to better understand and respond to zoonotic diseases, food safety, food security, and antimicrobial resistance, requires coordinated, collaborative, multidisciplinary and cross-sectoral approaches.

Prof. John Mackenzie
Research Associate and Professor of Tropical Infectious Diseases, Curtin University;
Associate Fellow, Centre for Global Health Security, Chatham House, London;
Honorary Professor, School of Chemistry and Molecular Biosciences, University of Queensland; Honorary Senior Principal Fellow, Burnet Institute, Melbourne

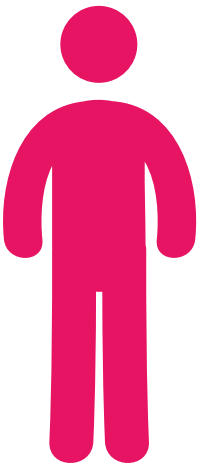


If we want to move from words to action in One Health then it is vital that all disciplines involved in research and control in this domain work together. This initiative can help to achieve that goal!

Prof. dr. Roel Coutinho
Utrecht University

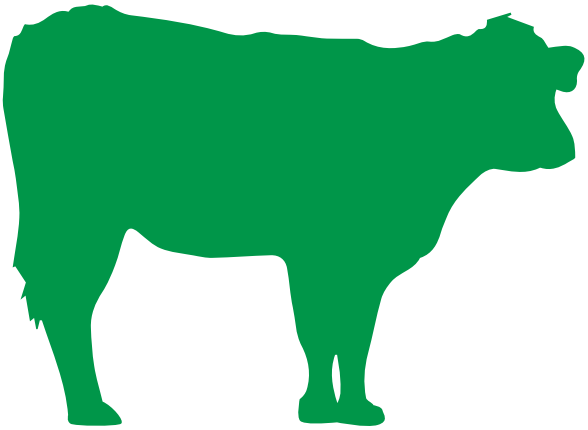
The Netherlands

17 mln



120 mln

- 12 million pigs
- 97 million chickens
- 1,5 million dairy cows
- 1 million veal calves
- 1 million fur animals
- 6 million pets
- 130.000 horses
- A large wildlife population



Awareness

- 9x more (kept animals) then people per 2km2 in the Netherlands
- 50% companion animals join owner in bed

70%

of our infection diseases we share with animals

Contact

The Netherlands Centre for One Health (NCOH) brings together five leading academic institutes, together with other leading parties. This will create an open innovation network which can respond to One Health challenges.

The NCOH carries out multidisciplinary and multisectoral research and develops knowledge in the areas of bioscience, medicine, veterinary medicine, animal science and environmental science. The NCOH is building bridges between academic and research institutes, the government and NGOs, and is open to cooperation with industrial partners.

In the NCOH, researchers from the Utrecht University, Wageningen UR, University Medical Center Utrecht, Erasmus MC in Rotterdam and the Academic Medical Center in Amsterdam work together under the motto: 'Solutions to Global One Health Challenges'.

Interested in partnering with the Netherlands Centre for One Health?

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netherlands centre for one health

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