sciensano

SCIENSANO SYMPOSIUM 'HEALTH CHALLENGES OF THE 21ST CENTURY'

Brussels, 08 december 2022

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INTRODUCTION

It is my great honour to welcome you to the first Sciensano-wide symposium. Sciensano was founded in 2018 and is the result of the merger of the Scientific Institute of Public Health and the Veterinary and Agrochemical Research Centre. By bringing together these institutes it reinforced even further its ONE HEALTH approach which has become a necessity to address the many public health challenges of the 21st century. The topics selected for this symposium are just some examples to illustrate Sciesano's commitment to this approach.

We hope this day will be an inspiration to you and will instigate further research collaborations as an important way for a health institute to make an impact on society.

Sofie De Broe

PROGRAMME

09:00	**Welcome coffee**
09:25	• Opening of the symposium by the chair Sofie De Broe
09:35	• Welcome by the general director - Christian Leonard
10:00	• Opening speeches by the responsible ministers – Frank Vandenbroucke / David Clarinval
10:15	• Exposome: Where chemistry meets biology – Roel Vermeulen
11:00	**Coffee break**

SESSION 1 Crisis preparedness / innovation

11:00	**New monitoring systems and data**
	• Never waste a good crisis, the impact of COVID-19 on infectious disease surveillance in Belgium Dieter Van Cauteren
	• Wastewater surveillance of COVID-19, and future application Raphaël Janssens
	• The collection and management of real world data for public health policy: past, present and future of the healthdata.be platform Johan Van Bussel
11:30	**Emerging disease**s
	• Preparedness for emerging vector-borne diseases: Japanese encephalitis virus interactions with indigenous mosquitoes and pigs Nick De Regge
	• Zoonotic risk of the new circulating HPAI-H5 virus Mieke Steensels
12:35	**Q&A** moderated by members of the scientific council Francoise Vanbambeke and Niko Speybroeck
12:50	**Walking LUNCH** / Demonstrations Technology @Sciensano

Session 2 One Health

14:00	• Biodiversity in the OH programme: (un)healthy nature? Steven Van Gucht / Raf Aerts
	• Combining virus genomes and epidemiological tracing to understand an unexpectedly severe outbreak of avian influenza in poultry Steven Van Bormt
	• Vaccines: major contributors to global health which improve the quality of life Koen Brusselmans
14:45	**Q&A** moderated by members of the scientific council Francoise Vanbambeke and Niko Speybroeck
15:00	**Coffee break**

SESSION 3 Food safety and Health

15:30	• Presence of PFASs in the food chain: Role of Sciensano in the recent crisis Laure Joly
	• Susceptibility of vulnerable populations to foodborne illness Koenraad Van Hoorde
	• Healthy ageing and the food environment: Current evidence and future directions Stefanie Vandevijvere
16:15	**Q&A** moderated by members of the scientific council Francoise Vanbambeke and Niko Speybroeck
16:30	Closing remarks
16:35	**Drinks and networking**

ABSTRACTS

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"NEVER LET A GOOD CRISIS TO WASTE : THE IMPACT OF COVID-19 ON INFECTIOUS DISEASE SURVEILLANCE IN BELGIUM"

DIETER VAN CAUTEREN

SCIENSANO

The past two year's experiences with the COVID-19 pandemic had a major impact on communicable disease surveillance and offered new perspectives for surveillance in the long term.

Here, we highlight the impact of these experiences on an existing, laboratory-based and a newly, hospital-based, surveillance system, implemented during the COVID-19 pandemic. The impact will be illustrated by Influenza Like Illness (ILI) and severe acute respiratory infections (SARI) as a case study. Furthermore, new initiatives on incorporating genomic surveillance and data linkage have emerged. The HERA-Incubator-WGS project aims to improve pandemic preparedness towards SARS-CoV-2 and other pathogens by the implementation of data infrastructures, which allow performing combined genomic-epidemiological surveillance of infectious diseases. Additionally, in the LINK-VACC project, the linking of surveillance, vaccination and administrative datasets allows the monitoring of COVID-19 vaccination in Belgium and highlights the potential and need of data linkage to address key public health topics.

Ultimately, we will address the post-COVID-19 challenges to build further on the COVID-19 experiences and developments in order to improve public health in Belgium, which should be obtained by (1) guaranteeing the sustainability of essential surveillance systems for pandemic preparedness and (2) further optimizing the infectious disease surveillance systems.

WASTEWATER SURVEILLANCE OF COVID-19, AND FUTURE APPLICATION

RAPHAEL JANSSEN

SCIENSANO

Wastewater-based surveillance was conducted by the national public health authority to monitor SARS-CoV-2 circulation in the Belgian population. Over 5 million inhabitants representing 45% of the Belgian population were monitored throughout 42 wastewater treatment plants for 15 months comprising three major virus waves. During the entire period, a high correlation was observed between the daily new COVID-19 cases, the daily hospital admission and the SARS-CoV-2 concentration in wastewater corrected for rain impact and covered population size. Three alerting indicators were included in the weekly epidemiological assessment: High Circulation, Fast Increase, and Increasing Trend. These indicators were computed on normalized concentrations per individual treatment plant to allow for a comparison with a reference period as well as between analyses performed by distinct laboratories. The indicators permitted us to effectively monitor the evolution of the virus waves and were considered complementary and valuable information to conventional epidemiological indicators in the weekly wastewater reports communicated to the National Risk Assessment Group. Beyond COVID-19, aastewater-based surveillance has also shown potential for other public health treats, such as poliovirus, antimicrobial resistance or illicit substances.

THE COLLECTION AND MANAGEMENT OF REAL WORLD DATA FOR PUBLIC HEALTH POLICY: PAST, PRESENT AND FUTURE OF THE HEALTH-DATA.BE PLATFORM

JOHAN VAN BUSSEL

SCIENSANO

Within the domain of healthcare there are a large number of data collections in the context of epidemiology and quality of care. These collections are characterized by a heterogeneous methodological approach, not only in terms of technology, but also with regard to content. Furthermore, the same data is often requested multiple times from the same data provider. The consequences of this diversity for the providers and collectors of this data include reduced efficiency in the registration and processing of the, real privacy risks and the scattered deployment of IT resources and people for the same tasks.

The eHealth Round Table (2012) resulted in a concrete step-by-step plan, the eHealth Action Plan 2013-2018. The inventarisation and consolidation of the registries was included in this plan as a priority (Action point 18). Sciensano was entrusted with the coordination and implementation of this action point.

Since 2015, the newly created service healthdata.be deployed an organization, processes and applications that supported the collection and management of data for more than 100 projects, covering almost all biomedical domains, and for a very diverse users group.

The SARS-CoV-2 pandemic was an extreme challenge for data collection & management systems of healthdata.be. Founded to support scientific research, and therefore setup to process only pseudonymized data, healthdata.be was requested to support the complex logistics of contact tracing. The pandemic led to an unprecedented increase in data-providing organizations and professionals: not only the already connected hospitals and labs, but also general practices, pharmacies, test centers, vaccination centers, schools and companies, provided data. And where healthdata.be usually collects data for samples, it has been scaled up due to the pandemic to the entire population, with continuously increasing data volumes with a high velocity, variety and veracity.

While the context of the SARS-CoV-2 pandemic facilitated many tasks of healthdata.be, there are still many obstacles to overcome: not only of a technical nature, but also at the regulatory and policy level, at the level of operational processes, and on data models used. Aligning all these levels is a challenging but important critical success factor for real world data science in Belgium.

Together with its partners, healthdata.be will continue to tackle these challenges in the upcoming years.

PREPAREDNESS FOR EMERGING VECTOR-BORNE DISEASES: JAPANESE ENCEPHALITIS VIRUS INTERACTIONS WITH INDIGENOUS MOSQUITOES AND PIGS

NICK DE REGGE

SCIENSANO

Vector-borne diseases (VBDs) are caused by pathogens which are spread by arthropod vectors (e.g. mosquitoes, ticks, Culicoides). Globalization, changes in land use and climate change make that certain of these diseases are currently more frequently introduced in Europe and have a higher chance to be locally transmitted. The increased prevalence and spread of several arboviruses in neighboring countries indicate that also Belgium is increasingly at risk and that investing in preparedness is of key importance.

Several scientific directions and services of Sciensano work on different aspects related to prevention, preparedness and response against several vector-borne diseases and we join forces to tackle this topic in a OneHealth approach. Here, the research on virus-vector-host interactions of Japanese encephalitis virus (JEV) with pigs and indigenous mosquitoes will be presented as an example on how we build capacity and increase our preparedness and expertise for emerging VBDs.

Japanese encephalitis virus (JEV) is a mosquito-borne zoonotic flavivirus and a major cause of human viral encephalitis that is currently endemic in many Asian countries. Its natural transmission cycle includes Culex mosquitoes as main vector and pigs and waterbirds as important amplification hosts. Its potential as a transboundary disease was evidenced this year by the emergence and large scale spread of the disease in Australia, causing public health issues and leading to important economic losses in the pig industry.

Experimental infection studies in pigs were performed and have shown that Belgian pig breeds are susceptible to a JEV infection and sustain its replication. Besides the production of reference material to implement diagnostic tests and the validation of an infection model that can be used to evaluate JEV vaccine efficacy, these studies have allowed to identify a potential mechanism by which JEV avoids the induction of a pro-inflammatory immune response in porcine brain and tonsils. This probably contributes to the persistence of JEV in tonsils and the asymptomatic outcome of a JEV infection in pigs, in contrast to what is observed upon JEV infection in mice and humans.

Furthermore, infection studies with field-collected Belgian Culex pipiens and Anopheles plumbeus mosquitoes showed that both indigenous species are competent vectors and therefore are likely to spread JEV upon an accidental introduction into our country. Additional studies showed that Anopheles plumbeus readily feeds on pigs and Culex pipiens was the most abundant

species detected on pig farms during a preliminary study, emphasizing the vector capacity of these species. Taken together, these studies on virus-vector-host interactions showed that all conditions are present in Belgium to potentially sustain JEV transmission upon an accidental introduction.

With the above as just one example of the work done on VBDs at Sciensano, our institute has the intrinsic capacity to become a center of expertise that could play a central role in coordinating this topic between different partners in Belgium. This could be important since the competent authorities are well aware of the growing threat of VBDs but the implementation of a harmonized and integrated preparedness is not straightforward. Competencies related to this topic are namely scattered, involving federal and regional authorities, and within the regions, different competent bodies for human health and environment exist.

ZOONOTIC RISK OF THE NEW CIRCULATING HPAI-H5 VIRUS

MIEKE STEENSELS

SCIENSANO

Avian Influenza is a highly contagious and economically devastating disease in poultry, with wild birds playing a major role in the disease spread.

Since 2017 Europe is experiencing the worst epizootic of all time. A highly pathogenic H5 virus circulates in large numbers in wild birds, with a recurrent introduction in poultry flocks, loss of seasonality and instauration of an endemic situation in the wild bird population.

Increased circulation leads to an increased opportunity for virus adaptation and spillover to the human population. Sciensano plays an important role in the vigilance of the zoonotic risk of circulating strains.

BIODIVERSITY IN THE OH PROGRAMME: (UN)HEALTHY NATURE?

STEVEN VAN GUCHT & RAF AERTS

SCIENSANO

People living in cities are exposed to multiple stress factors typical for the urban environment such as noise, air pollution, and urban heat. Urban green space is increasingly being promoted as 'nature-based solution' to these urban environmental stress factors and risks. But do the benefits of greening, rewetting, and rewilding our cities also come with potential health risks?

Nature can be a source of viruses and other disease agents

The COVID-19 pandemic has clearly demonstrated our vulnerability for newly emerging viruses and the disruptive economic, societal and health impact of a relatively simple animal virus. History learns that pandemics occur every 10 to 30 years. The million dollar question remains whether we can reduce the probability of emergence of new viruses and postpone the next pandemic. Although a lofty goal, it is clear that a 'One Health' approach is crucial for this. Many scientists advocate for better surveillance of viruses in animals and some even want to map the entire virome in the animals that surround us. The immense diversity and ever changing evolution of viruses would render the interpretation and predictive power of such a costly endeavor difficult. A more targeted approach could be to specifically survey virus spillovers at the human-animal interface. Some people are more exposed to animal viruses because of their occupation or daily activities. Programs that consistently monitor virus exposure and occasional spill over events in these people might therefore offer a more risk-based approach. Better surveillance and scientific data can help to guide interventions and recommendations to reduce the risk of spill-overs and eventually delay the next pandemic.

Nature can also be a source of health

Bats, birds, and rodents are reservoir and vector species of numerous viruses. Many of these animals have adapted reasonably well to urban environments and live in close proximity to humans. Should we therefore consider nature in urban environments to be a biological hazard, and indeed, a risk to human health? An emerging body of literature provides evidence that living/working/being educated in or near green space is associated with improved health, and that the main mechanisms behind these beneficial associations are improved immune functioning, enhanced physical activity, improved social cohesion, and improved restoration from environmental and psychological stress. These health benefits are driven by ecosystem services provided by green space, for instance city trees. Using Brussels as a case study, we demonstrate that the conservation and restoration of biodiversity improves 'healthy nature'.

COMBINING VIRUS GENOMES AND EPIDEMIOLOGICAL TRACING TO UNDERSTAND AN UNEXPECTEDLY SEVERE OUTBREAK OF AVIAN INFLUENZA IN POULTRY

STEVEN VAN BORM

SCIENSANO

Combining complete viral genomes, epidemiological and meteorological data, we analyze the dispersal of a recent H3N1 low pathogenic avian influenza epidemic in Belgium and test hypotheses about covariates contributing to its dispersal dynamics. The results show the power of using complete viral genomes from the majority of affected farms in reconstructing the viral spread in time and space. Most importantly, this spatially explicit genetic virus dispersal reconstruction allows us to test epidemiological hypotheses like the importance of meteorological factors or traced contact networks between farms. This powerful combination of viral genetic information and epidemiological data allows us to step beyond descriptive outbreak reconstruction and identify the major drivers of virus spread.

VACCINES: MAJOR CONTRIBUTORS TO GLOBAL HEALTH WHICH IMPROVE THE QUALITY OF LIVE

KOEN BRUSSELMANS

SCIENSANO

Vaccination has a huge impact on the reduction of infectious diseases worldwide. As vaccines are intended to prevent disease, they are administered to the broad population including newborns, children and elderly. Therefore, strict quality control is of utmost importance to guarantee the safety and efficacy of vaccines.

Each vaccine needs to be approved by the regulatory authorities before it can be marketed. A marketing authorisation file of a vaccine should contain all the details on the manufacturing process, vaccine characteristics, control testing and vaccine stability, as well as information from toxicology studies in animals and clinical data from safety and efficacy studies in humans. Only when found acceptable and sufficient by the regulatory authorities, a license is granted for a vaccine.

Importantly, vaccine manufacturers are inspected by the authorities on a regular base, to verify if vaccine production occurs in accordance with the approved marketing authorisation file and in agreement with the 'good manufacturing practices' (GMP) legislation

A vaccine batch is defined as the yield of a single production run in a fermentor that is purified and filled in vials or syringes. The manufacturer has to test each new vaccine batch according to its specifications, a fixed set of test methods for the essential quality parameters with strict acceptance criteria.

In Europe, a unique additional level of quality control exists for vaccines: they also need to be tested by an independent official medicines control laboratory (OMCL) that is part of the EDQM network. An OMCL will repeat the most important specification tests on each vaccine batch. To release a vaccine batch to the market, the test results from both the manufacturer and the OMCL must comply with the acceptance criteria of the vaccine specifications.

Due to this unique control strategy at different levels, vaccines have the most stringent quality control of all medicinal products in Europe.

PRESENCE OF PFASs IN THE FOOD CHAIN: ROLE OF SCIENSANO IN THE RECENT CRISIS

LAURE JOLY

SCIENSANO

A The recent crisis on per- and poly-fluorinated substances (PFAS) in Flanders illustrated the broad problems related to pollution caused by these persistent chemicals. Not only the environment, but also food cultivated on contaminated soils might be impacted. The high toxicity of PFAS, even at very low concentrations, features the urgent need to assess their presence in the food chain.

In May 2021, Sciensano launched a research project, FLUOREX (RF 21/6350) financed by the Federal Public Service Health, Food Chain Safety and Environment to evaluate the dietary exposure of the Belgian population to PFAS from food purchased in retail.

This research allowed to quickly develop, validate and accreditate suitable methods to support the Federal Agency for the Safety of the Food Chain (FASFC) in controlling the Belgian food chain. This was particularly challenging because of the necessity to achieve very low concentrations. During the summer of 2021, the first sampling campaign focusing on farms within a 15 km zone of the hotspot showed no need for additional measures for agricultural products placed on the market. Then, in 2021, to obtain a complete and up-to-date picture of the PFAS content in foodstuffs intended for the food chain, the FASFC sampled 117 animal products (milk, eggs and meat) and 58 plant products (fruit and vegetables) at various locations in Flanders. Sciensano's analysis showed that PFAS were detected in 12 samples from free-range farming without exceeding the actual limits of actions, and thus no additional measures for the producers were needed. A similar study is ongoing in Wallonia, and the results are expected by the end of 2022. The results show that free-range farming - which leads to intensive contact with the soil - is an essential factor for the presence of PFAS in eggs and meat.

Finally, the results of the research conducted at Sciensano will also be relevant for future policy on PFAS, both at the National and the European level.

SUSCEPTIBILITY OF VULNERABLE POPULATIONS TO FOODBORNE ILLNESS

KOENRAAD VAN HOORDE

SCIENSANO

During the month of July 2021, the eastern provinces of Belgium have been struck by a massive flood. Mostly concerned by this calamity, the province of Liège has been severely touched by the floodwaves in the Vesdre valley.

Since July 2021, the Infectious Disease Surveillance Unit of the Wallonian Region (SURVMI) has received several alerts of notifiable disease that could be related to the aftermath of this event. In our presentation, we show an overview of some of those cases mostly in the province of Liège but also in the surrounding provinces (Namur, Brabant-Wallon, Luxembourg). Those cases show a possible or confirmed link with the flooding. Additionally, we report the numbers of notifiable infectious disease reported to SURVMI during the months following July 2021 up to now.

We mostly focused on food-borne diseases, leptospirosis and legionellosis.

Our aim is to show those numbers placing in the spotlight some specific clinical cases that could be interesting form a public health point of view. Also, we discuss and present the pros and cons of our project

HEALTHY AGEING AND THE FOOD ENVIRONMENT: CURRENT EVIDENCE AND FUTURE DIRECTIONS

STEFANIE VANDEVIJVERE

SCIENSANO

As in many other countries, obesity is an epidemic in Belgium and is associated with high health care and lost productivity costs for society. Population diets are not in line with food-based dietary guidelines and about one third of daily calorie intake is from ultra-processed foods, with highest intakes observed among young children. The paradigm of personal responsibility and nutrition education to address unhealthy diets and the resulting obesity epidemic has failed because food environments are so unhealthy. Food environments are defined as the collective physical, economic, policy and socio-cultural surroundings, opportunities and conditions that influence people's food and beverage choices and nutritional status. Unhealthy food environments lead to unhealthy diets and excess energy intake which have consequences in levels of morbidity and mortality. Sciensano's research over the last years has shown that unhealthy foods are relatively more available, accessible and affordable than healthy foods in Belgium and that food environments have become more obesogenic over time. In addition, more obesogenic food environments around schools have been associated with a higher percentage of children with overweight and obesity. It is critical that governments implement preventive policies and actions to create healthy food environments. The Healthy Food Environment Policy Index implemented in 11 European countries over the period 2020-2021 highlighted that key priority policies to improve food environments include addressing unhealthy food marketing to children, fiscal policies and nutrition standards in schools. This research and monitoring pioneered by Sciensano's nutrition and health team aims to support decision makers as well as to hold them to account through monitoring the implementation of internationally recommended food environment policies. Future directions include the development of a food environments dashboard and toolkits with priority indicators for each level of jurisdiction.

BIOGRAPHIES OF SCIENSANO PRESENTERS

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DIETER VAN CAUTEREN

SCIENSANO

Dieter Van Cauteren joined the direction Epidemiology and public health of Sciensano in 2017 as coordinator of a sentinel network of general practitioners at the Health services research unit. Since September 2019 he joined the service Epidemiology of infectious diseases. During the COVID-19 crisis he contributed to setting up different data collections (GPs, laboratories, pharmacies) and its use for monitoring the epidemiological situation, reporting and contact tracing. Currently his activities mainly focus on the surveillance of bacterial foodborne infections. Before 2017 he worked for several years as epidemiologist on vectorborne, foodborne and zoonotic infections at the department of infectious diseases of Santé publique France, the French Public Health Agency. He obtained a PhD in Public health-epidemiology at the university of Paris-Saclay in 2016.

RAPHAEL JANSSEN

SCIENSANO

In 2019, **Raphael Janssens** completed a Ph.D. thesis assessing the toxicity of anti-cancer drugs in wastewater effluents. This research was conducted in the group devoted to eco-efficient processes for sustainable chemical and biochemical engineering at UCLouvain. In 2020, he started working at Sciensano, the national institute of public health in Belgium. Firstly performing exposure assessment of the Belgian population to the steviol glycosides food additive, and secondly joining the national wastewater-based epidemiology surveillance project dedicated to COVID-19.

JOHAN VAN BUSSEL

SCIENSANO

Johan van Bussel is head of the service healthdata.be of Sciensano. In 2009 he obtained his PhD at the Leuven International Doctoral School of Biomedical Sciences as a Doctor in Biomedical Sciences. That same year he joined Sciensano as senior researcher for the "European Community Health Indicator Monitoring" project.

In 2010 he became head of the Belgian Monitoring Center for Drugs and Drug Addiction (BMCDDA), the national focal point for the European Agency (EMCDDA) and familiarized with the national eHealth platform and -landscape. Later, in 2014, he started the healthdata.be project, funded by the National Institute for Sickness and Invalidity Insurance (RIZIV-INAMI). The objectives of this project are the rationalization, standardization and automation of the research data streams for public health research. Johan was also national coordinator of the Action point 18 (Patient registers) of the National eHealth plans 2013-2018, and 2019-2021, co-coordinator of the national Big Data for Public Health initiative (#dataforbetterhealth), and member of several COVID-19 related committees and working groups

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NICK DE REGGE

SCIENSANO

Nick De Regge is a bio-engineer and obtained his PhD in Veterinary Medicine in 2007 at Ghent University, Belgium. He started working at the Belgian OneHealth institute Sciensano (former CODA-CERVA) in 2010. After initial work on several enzootic viruses (pseudorabies virus, small ruminant lentiviruses), he developed an interest in vector-borne diseases and got involved in several research projects on Schmallenberg virus, Japanese encephalitis virus, West nile virus and tick-borne encephalitis virus.

In 2021, he became head of the Service of Exotic and vector-borne diseases. Besides his responsibility as coordinator of the EURL for capripox viruses and deputy-coordinator of the EURL for foot-and-mouth disease virus, he continues his work on vector-borne diseases. His teams performs research on Culicoides-borne diseases and vector-borne flaviviruses like Japanese encephalitis virus and tick-borne encephalitis virus, with emphasis on virus-vector-host interactions and vector competence of indigenous arthropod vectors. He is member of the Scientific Committee of the Belgian Food Safety Agency and is visiting professor at Ghent University.

MIEKE STEENSELS

SCIENSANO

2016 Chef du labo de reference national AI/ND pour la Belgique et le Grand Duché de Luxembourg.

2005-2016: Chef de projet CODA-CERVA, Virologie aviaire et immunologie AVIVAC, AIDAPT, vaccinatie projecten met de industrie,NDCVAC, EMERDIA-H5-I+II, Belvir, COST-IB, AviMol-RG-AI, RG-VIRNA, NRL-poissons.

2005-2009 KULeuven: PhD in Bioscience engineering.

1998-2004 KULeuven: Master in Bioscience engineering (Cell and Gen biotechnology + Animal Production).

2016 Hoofd van het AI/ND nationaal referentie laboratorium voor België en het Groot Hertogdom Luxemburg.

°2005-2016: projectleider CODA-CERVA, Aviaire virologie en immunologie: AVIVAC, AIDAPT, vaccinatie projecten met de industrie, NCDVAC, EMERDIA-H5-I+II, Belvir, COST-IB, AviMol-RG-AI, RG-VIRNA, NRL-vissen.

2005-2009: KULeuven PhD in Bioscience engineering.

1998-2004: KULeuven, Master in Bioscience engineering (Cell and Gen biotechnology + Animal Production).

STEVEN VAN GUCHT

SCIENSANO

Steven Van Gucht is head of the service of Viral Diseases at Sciensano. Since January 2020, he was closely involved in the risk assessment and management of the COVID-19 pandemic, as interfederal spokesperson of the National Crisis Centre and advisor of the government in different scientific advisory boards, including Celeval, GEMS and the recently founded Scientific Strategic Council.

Steven Van Gucht started his career at Sciensano in December 2005 as Scientific Co-worker at the National Reference Laboratory of Rabies. He was nominated as Head of the Service of Viral Diseases in 2010. Since 2014, he is also appointed as Visiting Professor at the Laboratory of Virology at the Faculty of Veterinary Medicine, Ghent University.

Before his career at Sciensano, Steven Van Gucht was a Doctoral Researcher at the Laboratory of Virology at the Faculty of Veterinary Medicine, Ghent University. He obtained a PhD in Veterinary Sciences in 2005 and a Master in Veterinary Medicine in 2000, both at Ghent University. In 2007, he obtained the FELASA Cat. C certificate in Laboratory Animal Science at Ghent University.

RAF AERTS

SCIENSANO

Raf Aerts started his career at Sciensano in 2016 as a scientist and work leader in the Health Impact Assessment team of the service Chemical and Physical Health Risks. Since 2019, he is also appointed as Associate Professor at the Division Ecology, Evolution and Biodiversity Conservation at the Biology Department of KU Leuven. Raf investigates associations between environmental exposures (biodiversity, green space, pollen, air pollution, urban heat...) and human health, and evaluates how human impacts on the environment affect these relationships.

Before his career at Sciensano, Raf Aerts held several research and teaching positions at the Divisions Forest, Nature and Landscape and Ecology, Evolution and Biodiversity Conservation of KU Leuven, and a four-year assignment as expatriate staff of the Land Resources Management and Environmental Protection Department at Mekelle University, Ethiopia.

Raf Aerts obtained a Master (1999) and a PhD (2006) in Bioscience Engineering (Land and Forest Management), both at KU Leuven. In 2015, he obtained a class A certificate of Environmental Coordinator from Prevent Academy, and in 2022 he obtained a PhD in Biomedical Sciences at Hasselt University and Maastricht Universit.

KOEN BRUSSELMANS

SCIENSANO

Koen Brusselmans received a master degree in Bioengineering Sciences from the University of Leuven in 1996. Afterwards he started a PhD in medical sciences in the Laboratory for Transgene Technology (University of Leuven), which focused on the role of hypoxia-inducible factors in angiogenesis during embryonic development and tumorigenesis.

After having obtained his PhD in 2001, he worked for 7 years as a post-doctoral fellow in the Laboratory for Experimental Medicine and Endocrinology (University of Leuven) on a research project studying the role of lipogenesis in cancer.

In 2008, he joined the group of 'Quality of Vaccines and Blood Products' at Sciensano, where he is currently working as senior quality assessor for biological medicines. He is involved in assessment of scientific advices and registration files of biological medicines (including vaccines, plasma-derived products and recombinant proteins), in collaboration with the Belgian Medicines Agency (FAMHP) and the European Medicines Agency (EMA). He also participates as expert in GMP inspections of manufacturers of biotech products and plasma-derived products.

STEVEN VAN BORM

SCIENSANO

Steven Van Borm is a molecular biologist in the Avian Virology and Immunology Unit of the Scientific Directorate Animal infectious diseases of Sciensano. He has more than 15 years of experience in the development of molecular diagnostic tests, full genome sequencing strategies, and phylogenetic analyses of priority livestock diseases. This work resulted in more than 80 scientific publications and the involvement in numerous European projects. Steven is regularly sharing this expertise with scientists from developing countries in capacity building projects from the joint FAO/IAEA division of nuclear techniques in food and agriculture

LAURE JOLY

SCIENSANO

After a Master degree in Analytical Sciences, **Laure Joly** obtained her PhD in Physical Chemistry at the University of Lyon (France) in 2009. Then, she joined the University of Liege for 2 years of postdoc where she continued to study the conformation of biomolecules in gas phase utilizing ion mobility — mass spectrometry techniques.

In 2012 Laure started at the WIV-ISP (the predecessor of Sciensano) as scientific collaborator in the Pesticides and Contaminants unit. Among other responsibilities, she ensures the management of the unit as NRL (National Reference Laboratory) for pesticides and as NRL for process and environmental contaminants (in collaboration with the University of Liege).

Her expertise is focused on food analysis of pesticide residues, process contaminants (PAHs, acrylamide), environmental contaminants (ndl-PCB, BFRs, PFASs) and more recently antibiotic residues via LCMS or GCMS techniques. In parallel, the unit expanded its research activities to analysis of these molecules in biological matrices (urine, mother milk, serum) and also via passive sampling devices.

KOENRAAD VAN HOORDE

SCIENSANO

Koenraad Van Hoorde graduated in 2004 with a degree in Biotechnology from the Faculty of Sciences of Ghent University. Subsequently, in 2009, with research on the use of lactic acid bacteria as adjunct cultures carried out at the Laboratory of Microbiology, he obtained a PhD in Biochemistry at the Faculty of Sciences of Ghent University. From 2009 to 2018 he was active as doctor-assistant at Hogeschool Gent (Department of Applied Sciences) and Ghent University (Faculty of Bioscience-engineering). During this period he conducted research on the microbiology of (fermented) foods and was able to expand his expertise in the use of molecular and mass spectrometry-based methods for the study of microbial diversity and dynamics. He was also responsible for teaching (practical and theoretical) topics such as microbiology, microbiological methods and gene technology. In the period 2017-2018, he was also a researcher at the Centre for Food Safety at the University College Dublin in Ireland within the framework of the EFSA EU Food Risk Assessment Fellowship, where he worked on the use of the latest generation of sequence analysis techniques in the context of food safety and risk assessment.

Since 2019 he is head of the service of Foodborne Pathogens. He is responsible for the Campylobacter National Reference Laboratory. He is involved in various national and international research projects. He is member of the Scientific Committee of the Federal Agency for the Safety of the Food Chain, and is a member of various scientific associations.

STEFANIE VANDEVIJVERE

SCIENSANO

Stefanie Vandevijvere is a senior public health nutrition scientist and her research focuses on nutrition policies for obesity prevention locally, nationally and globally. Her work aims to support the development and implementation of policies to effectively and equitably improve the quality of population diets. In particular she has an interest in the role of food environments in determining people's dietary habits and how to hold governments and food businesses to account for their actions to create healthy food environments to effectively reduce obesity. She is a member of the leadership team of the International Network for Food and Obesity / non-communicable diseases Research, Monitoring and Action Support (INFORMAS), which aims to monitor, benchmark and support public and private sector actions to create healthy food environments and reduce obesity and non-communicable diseases. She holds a PhD from the Université Libre de Bruxelles (2012). She has more than 200 peer reviewed publications.

BIOGRAPHIES OF THE MODERATORS OF THE Q&A SESSIONS (MEMBERS OF THE SCIENTIFIC COUNCIL OF SCIENSANO)

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NIKO SPEYBROECK

Niko Speybroeck is Professor at the Université Catholique de Louvain (UCLouvain) in Belgium, with responsibility for teaching epidemiology and medical statistics. He has an extensive international experience and before joining UCLouvain, he coordinated a team at the World Health Organization (2004 to 2007). Niko Speybroeck currently is the director of the Centre for Research on the Epidemiology of Disasters (CRED) at UCLouvain, with as a main activity, the maintenance and optimization of the international disasters database, EMDAT. Niko Speybroeck's main research interest is quantitative epidemiology, more specifically aiming to prioritize health problems, by developing and using advanced analytical tools. N. Speybroeck has been task force chair in the WHO Foodborne Disease Burden Epidemiology Reference Group that provided in 2015 the first estimates of the global burden of foodborne diseases. He has published over 300 peer reviewed scientific papers (h-index Web of Science = 50) and several MSc (51) and PhD (25) students have successfully completed their thesis under the supervision of Professor Speybroeck.

LAURENT GILLET

Laurent Gillet is Professor of Vaccinology and heads a research team within the FARAH Research Unit of the University of Liege (ULiège). After obtaining a doctorate in veterinary medicine (2001), he completed a PhD in the Immunology/Vaccinology laboratory of the ULiège (2005) under the supervision of Prof. A. Vanderplasschen thanks to an FNRS research Fellow. After a post-doctoral fellowship at the University of Cambridge (2005-2007) in the laboratory of Dr. P. Stevenson, Laurent obtained a mandate as FNRS research Associate at ULiège (2008). In 2012, he was awarded a teaching position in the Faculty of Veterinary Medicine of ULiège, where he has been Vice-Dean for Research since 2016.The main research theme of his laboratory is to decipher host-pathogen interactions from an immune point of view. In particular, his group has a strong expertise in studying the biology of gammaherpesviruses (yHVs) which are among the most prevalent viruses in animal and human populations. For example, Epstein-Barr virus (EBV) and Kaposi's Sarcoma associated Herpesvirus (KSHV) infect ~90% and up to 50% of humans worldwide respectively. These viruses were first studied because they are associated with a range of diseases from infectious mononucleosis to serious cancers such as Burkitt's lymphoma. However, alongside these important pathologies, yHVs infections remain asymptomatic in most immunocompetent individuals, highlighting the high degree of adaptation of these viruses to their hosts. Laurent Gillet's team is therefore seeking to decipher this highly regulated interaction in order to provide new insights into our understanding of the persistence and consequences of certain viral infections but also more generally on the functioning of our immune system.

GEERT LEROUX-ROELS

Geert Leroux-Roels obtained the MD degree from the Ghent University in 1976. During his medical studies and specialty training in internal medicine he conducted doctoral research in clinical pathology and immunology. After obtaining a board certification in internal medicine and a PhD degree in biomedical sciences, he carried out postdoctoral research in the Scripps Research Institute in La Jolla, California and in the Laboratory of molecular biology at the Ghent University and finalized a specialty training in clinical pathology. He was appointed professor of medicine and director of the laboratory of clinical pathology in 1989. Throughout his medical career Geert Leroux-Roels has been a researcher and Principal Investigator of numerous scientific projects. Together with his team he has studied the human immune response to HBV, HCV, HIV, influenza and Plasmodium falciparum. A major achievement has been the development of a small animal model (human liver in uPA-SCID mouse) that allowed for the in vivo study of hepatotropic pathogens like HBV, HCV, HEV and Plasmodium falciparum (malaria).

Geert Leroux-Roels has founded the Center for Vaccinology (CEVAC - Ghent University and University Hospital) and was its director for three decades until his retirement in 2017. During this period, more than 275 clinical vaccine trials have been finalized that evaluated the safety, immunogenicity of candidate vaccines against numerous viral and bacterial pathogens. Via the execution of clinical studies and laboratory investigations he contributed to the development and understanding of the mechanism of action of a new adjuvants and adjuvant systems. He authored and co-authored of over 300 peer-reviewed articles that have been cited 15,768 times with an H-index of 68. He is a member of the Royal Academy of Medicine of Belgium and of several international scientific societies and scientific advisory boards. Despite his emeritus status since October 2017, he remains active in the field of vaccinology and applied immunology as a study physician and co-investigator at CEVAC and consultant in vaccines.

FRANÇOISE VAN BAMBEKE

Françoise Van Bambeke graduated as a pharmacist in 1991 and obtained her PhD in 1995 at the Univeristé catholique de Louvain, Brussels, Belgium. She is now Research Director of the FNRS and is heading a research group at the Louvain Drug Research Institute, Université catholique de Louvain, working on antibiotic pharmacology. She is also part-time full Professor at the same University and is teaching mainly anti-infective pharmacology and pharmacotherapy to students in pharmacy and post-graduate students. She authored approx. 200 papers over the last 30 years, is member of the editorial board of different journals in the field of antibiotic pharmacology and frequent reviewer of papers in this disciplin.

KRIS VANHAECHT

KRIS VANHAECHT is president of the scientific council of Sciensano. He teaches quality policy in health care at KU Leuven and is head of research group at the 'Leuvens Instituut voor Gezondheidszorgbeleid.' His research focuses on the organisation of care processes, person-centered care, dealing with employees involved in patient safety incidents and quality implementation models. Internationally he is active as Secretary-General of the European Pathway Association, core lecturer at 'Erasmus Centrum voor Zorgbestuur' in Rotterdam, improvement advisor at the Institute for Healthcare Improvement in Boston and expert for the International Society for Quality in Healthcare. You can follow Kris on twitter via @krisvanhaecht of find more information via www.krisvanhaecht.be

ERIC COX

Eric Cox, graduated in 1983 as doctor in Veterinary Medicine at the University of Gent. He was assistant at the Laboratory of Veterinary Physiology at the University of Antwerp for 4 years. Then he returned to UGent to become assistant at the Laboratory of Veterinary Virology and the Laboratory of Veterinary Immunology. In 1991, he successfully defended his PhD on "Experimental induction of diarrhoea in newly-weaned piglets and effect of antisecretory drugs". In 1993, he became appointed as professor Immunology at the Faculty of Veterinary Medicine. His main research topic is the intestinal mucosal immune system of animals. His research group uses this knowledge to study the host-pathogen interaction at the intestinal mucosa of a number of pathogens such as F4 enterotoxigenic E. coli (ETEC), F18 shigatoxin-producing E. coli, Toxoplasma gondii and Chlamydia species in pigs, and Toxoplasma gondii, enterohemorrhagic E. coli in sheep and calves. This resulted among others in the discovery of the intestinal receptors for F4 and F18 ETEC. This knowledge is also used to develop innovative intervention strategies such as a mucosa-targeted vaccination platform or the development of receptor analogues to prevent intestinal mucosal infections. More recently, his research has been widened to food allergy and desensitization strategies in dogs. Eric Cox is author or co-author of more than 280 publications in refereed journals and 6 book chapters. He has been promotor of 46 PhD theses and has given more than 150 oral presentations on national and international conferences.

BIOGRAPHY OF ROEL VERMEULEN

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ROEL VERMEULEN

UTRECHT UNIVERSITY

Roel Vermeulen is Professor of Environmental Epidemiology and Exposome Science at Utrecht University and the director of the Institute for Risk Assessment Sciences (IRAS) at Utrecht University and the UMC Utrecht. He holds a professor position at the Julius Center, Department Public Health Healthcare Innovation and Medical Humanities (UMC Utrecht) and a Visiting Professorship at Imperial College London, UK.

His scientific research focuses on environmental risk factors for non-communicable diseases with a strong emphasis on integrating epidemiology, high quality exposure assessment, and molecular biology into multidisciplinary investigations.

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Organising committee

Sofie De Broe (Chair), Ann Ruttens, Emilie Cauchie, Joris Van Loco, Karin De Ridder, Nancy Roosens, Nick De Regge

Helping hands

Anja Mathijs, Anne Van Nerom, Bart Desmedt, Benoit Vermeire, Camille Leloup, Cassandre Dugailliez, Céline Van Hee, Charlotte Sohier, Christine Verfaillie, Daisy Tijsmans, Eric Deconinck, Hubert De Krahe, Jennifer Tshibangu Musau, Jill Alexandre, Kim Vyncke, Laura Van Poelvoorde, Ledia Jani, Marie-Alice Fraiture, Mathieu Gand, Nathalie Verhocht, Nicolas Duquenois, Saloua El Youssoufi, Sarah Moreale, Sylvie Vekemans, Veerle Van Melle, Yves Dupont, Zahra Boukhouchi

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