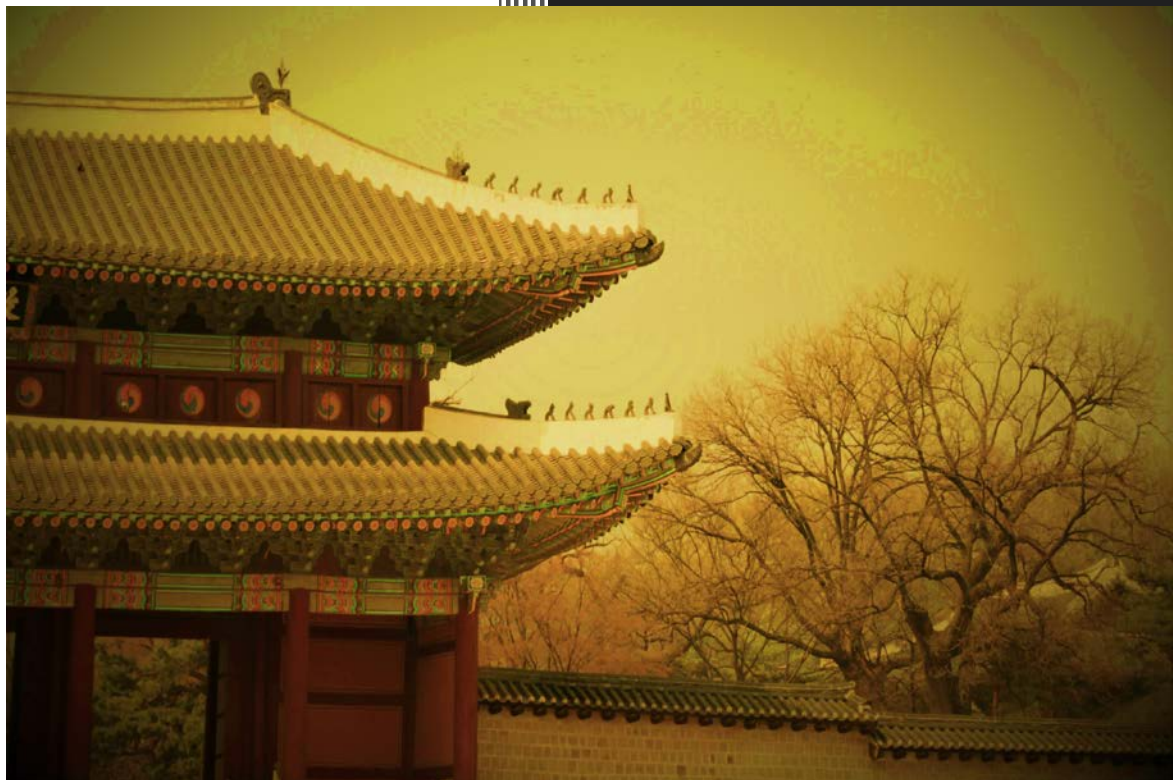# EIOS
EPIDEMIC INTELLIGENCE FROM OPEN SOURCES

2019 EIOS GLOBAL TECHNICAL MEETING

12-14 November 2019
Seoul, Republic of Korea

2019 EIOS GTM
Table of Contents

Welcome

Dear colleagues and friends,

Welcome to our second EIOS (Epidemic Intelligence from Open Sources) Global Technical Meeting – we are thrilled that you have joined us and pleased to have this meeting co-hosted by the Korea Centers for Disease Control and Prevention and the WHO Regional Office for the Western Pacific.

As the core team responsible for directing, managing and leading the EIOS initiative, we have a vision for authoritative early warning for evidence-based action to improve global health, prevent illness and save lives. But for this vision to become a reality, we need a joint sense of purpose across disciplines and sectors bringing together diverse and complementary skills. This diversity enables richer perspectives, allowing us to dream up novel ideas and resolve complex problems through coordinated efforts. What will make this vision a reality is if we come together as one community, pooling our resources, learning from each other's successes and failures and collaboratively building on our strengths, experiences and expertise to detect health threats as early as possible and reduce or prevent their impact.

Last year saw us hold our first ever EIOS Global Technical Meeting, just over one year after our team was born. While last year's meeting focused more on the technological aspects of the EIOS system, we want this year's meeting, as well as those of subsequent years, to reflect one of our central principles: collaboration. EIOS is not an information technology system or series of systems and algorithms, but rather a community; a global network of people working together to achieve the vision. As such, you are not a "user" or "consumer" of EIOS, but a collaborator and participant with us in the initiative. And so, it is our sincere hope that these meetings will be opportunities for community-building, for strengthening existing connections and making new ones, for coming together to learn from one another and to explore collaborative efforts to drive this vision, strengthening our resolve to continually evolve and improve public health intelligence to reduce suffering and save lives.

Having recently completed our first training of trainers and with strong collaboration established with each of the WHO regional offices and the country offices of members states in our first expansion phase, we have already begun building a community of communities and an enabling system of systems. EIOS is not merely an idea anymore, or a recommendation in the literature. It's a reality being made possible by colleagues present at this meeting and colleagues around the globe from multiple sectors, none of whom are merely consumers but all of whom are contributors and participants. Thank you for being a part of this public health intelligence movement and we look forward with much anticipation to working with you.

The EIOS Core Team
World Health Organization
November 2019

The EIOS Initiative

At the heart of early detection is surveillance, with its iterative cycles of detection, verification, assessment and communication feeding the public health intelligence (PHI) cycle. Public health organizations around the world actively detect, investigate, monitor, and respond to hundreds of events annually. The earlier such events are detected – whether they are intentionally created or naturally occurring – the more likely it is that an appropriate and timely response will limit the impact and protect health, security and livelihoods.

The wealth of information available through the Internet and the associated exponential growth of publicly available ("open source") information provide unprecedented opportunities for detection, information-sharing and processing. On the other hand, these have also dramatically increased "noise", including – but not limited to – irrelevant data, useless data, duplicate data, archived or out-of-date data, unsubstantiated data (rumours), and sarcastic comments. Nonetheless, amid the noise are valid and reliable "signals", and there is a growing body of peer-reviewed literature documenting the usefulness of such event-based surveillance for PHI. This value is directly related to the ability to systematically sift through the noise to identify, verify, assess, analyse, interpret and communicate relevant information for appropriate, timely and effective action.
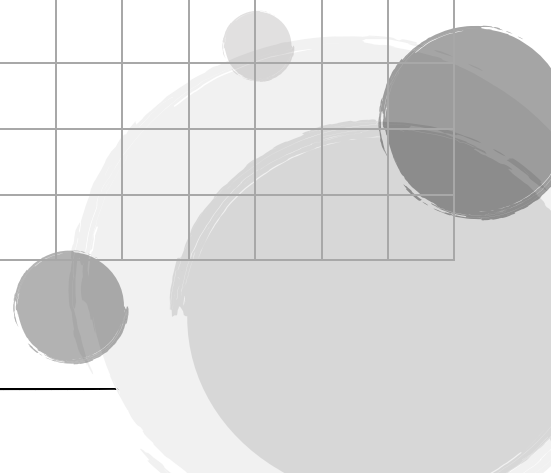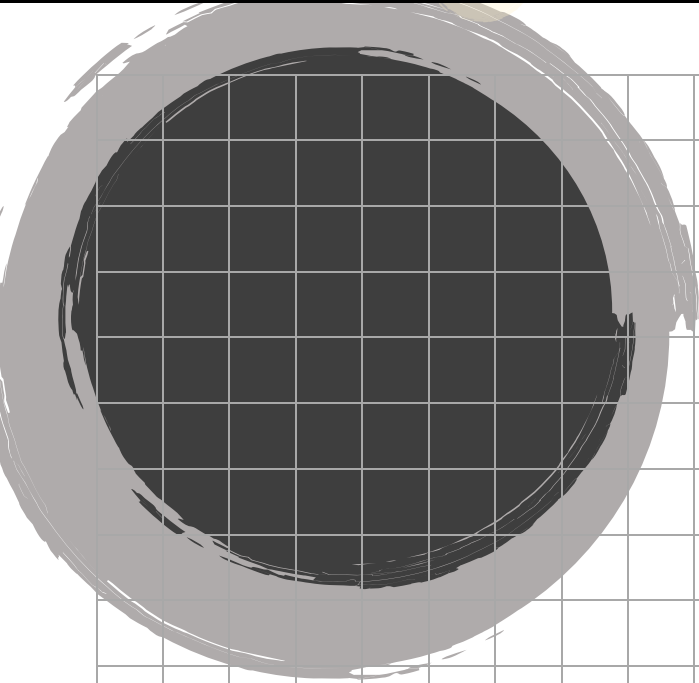
The Epidemic Intelligence from Open Sources (EIOS) Initiative is a unique collaboration between WHO and various stakeholders that brings together new and existing initiatives, networks and systems to create a unified all-hazards, One Health approach to early detection, verification and assessment of public health risks and threats using open source information.

The EIOS initiative builds on the Early Alerting and Reporting (EAR) project of the Global Health Security Initiative (GHSI), draws on experience from the Hazard Detection and Risk Assessment System (HDRAS) – both of which were developed by the Joint Research Centre (JRC) of the European Commission (EC) – and is a response to the need for an initiative that brings together PHI efforts. EIOS is such an initiative, aimed at consolidating efforts and platforms to build a strong PHI community supported by robust, harmonized and standardized Epidemic Intelligence systems and frameworks across organizations and jurisdictions.

In October 2017, WHO was given leadership of the EIOS initiative by the GHSI and is now driving the growth of the public health intelligence community through the expansion of a network of experts and the development and implementation of an evolving state-of-the-art suite of tools. It is also establishing standards, providing training and evaluating the system on an ongoing basis. The initiative is being led by the EIOS Core Team in WHO's Health Emergencies Programme at WHO headquarters in Geneva.

TUESDAY
12 NOVEMBER 2019
08:00 – late

	08:00	Registration
	09:00	Welcome
	10:00	Networking Coffee
Panel	10:30	Public Health Intelligence in Practice: A Global Perspective
	12:00	Lunch
Presentations	13:00	A Sampling of Systems
Panel	14:30	The EIOS Experience I
	15:30	Networking Coffee
Panel	16:00	The EIOS Experience II
	17:00	Wrap-Up Day 1

	18:00	Welcome Reception

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PUBLIC HEALTH INTELLIGENCE IN PRACTICE: A GLOBAL PERSPECTIVE

Public health intelligence (PHI) describes the process of moving from data through knowledge synthesis to action with the specific aim of early detection for effective response.

In this interactive session, we'll hear about the experience of a variety of countries that have an active public health intelligence function, including Member States looking to implement EIOS in the coming year. Understanding how future EIOS stakeholders implement PHI and event-based surveillance activities will provide the starting point for the EIOS community as a whole to identify challenges and opportunities for integrating EIOS into existing systems and filling vital gaps in capacity.

The audience is encouraged to engage in the conversation, sharing their own experiences with public health intelligence, including tools used, success stories and lessons learned.

Tuesday
12 November 2019

10:30 – 12:00

PANEL CHAIR

Philippe Barboza
Detection, Verification & Risk Assessment
World Health Organization

PANEL

Wei Xin Khong
Ministry of Health Singapore

Amanda Walsh
Public Health England

Rabia Lahlaouti
Ministry of Health Morocco

Issa Makumbi
Ministry of Health Uganda

Fatma Mohamed
Ministry of Health and Population Egypt

PUBLIC HEALTH INTELLIGENCE IN PRACTICE - PANEL

WEI XIN KHONG

Public Health Officer, Public Health Intelligence Branch
Epidemiology and Disease Control Division, Ministry of Health Singapore

AMANDA WALSH (MANDY)

Senior Scientist, Emerging Infections and Zoonoses
Public Health England

Epidemic Intelligence: Looking for the Needle in the Haystack?
The presentation will portray Public Health England's epidemic intelligence activities including their rationale, approach and processes for signal detection and verification, interpretation, risk assessment and communication, and will address challenges, requirements and lessons learned to date.

RABIA LAHLAOUTI

Epidemiologist, Epidemiological Surveillance Service
Directorate of Epidemiology and Disease Control, Ministry of Health Morocco

Morocco: Rapid detection and early warning during the influenza season 2018-2019
During the influenza season 2018-2019, Morocco experienced a public health emergency linked to the death of a pregnant woman following an A / H1N1 confirmed SARI. The high media coverage and rumors surrounding this case created panic in the population and prompted the set-up of a new early warning system across the country. This presentation will give an overview of this process and how it led to an enhancement of ILI and SARI surveillance and higher responsiveness, as well as to exhaustive surveillance of all cases with severe acute respiratory infections hospitalized in intensive care units, which was implemented in all public and private hospitals.

ISSA MAKUMBI

Director, Public Health Emergency Operations Centre
Ministry of Health Uganda

Event-based surveillance practices in Uganda

FATMA MOHAMED

Coordinator, Event-Based Surveillance
Epidemiology and Surveillance Department, Ministry of Health and Population Egypt

Egypt: Experience in Implementing Event Based Surveillance
The presentation will go through a general view of the National Surveillance System focusing on Event Based Surveillance. It will present the pillars of EBS, phases of implementation, development of the electronic reporting platform and finally, present future plans.

A SAMPLING OF SYSTEMS

Within a year of CERN making World Wide Web technology public, ideas for systems that would capitalize on this new wealth of information for public health intelligence began to pop up. This ushered in a new era for event-based surveillance, allowing us to tap into huge amounts of varied information quickly and build systems that would help collect and filter the information to facilitate the manual detection of unusual events.

In this interactive panel session, we will hear from a sampling of the pioneers of these systems, learn about their developments to date, their plans moving forward, and how we can work together as one community to capitalize on different system strengths and find solutions for the gaps.

Tuesday
12 November 2019

13:00 – 14:30

PRESENTERS

Larry Madoff
ProMed / International Society for Infectious Diseases

Florence Tanguay
Public Health Agency of Canada

Kara Sewalk
Boston Children´s Hospital

Csaba Kovacs
National Association of Radio Distress-Signalling and Infocommunications (RSOE)

A SAMPLING OF SYSTEMS - PRESENTERS

LARRY MADOFF

Editor
ProMed / International Society for Infectious Diseases

ProMED and the early detection of emerging disease outbreaks: the first 25 years

FLORENCE TANGUAY

Senior Epidemiologist Center for Emergency Preparedness and Response
Public Health Agency Canada

Global Public Health Intelligence Network (GPHIN)
The Global Public Health Intelligence Network (GPHIN) supports Canada, EIOS and other countries with event-based surveillance for early detection, assessment and reporting of emerging public health threats worldwide. GPHIN consists of a team of highly educated, multilingual analysts utilizing a web-based application to scan, filter and assess open-source information from around the world in nine languages. The future for the GPHIN platform involves lessening time spent scanning and filtering and more time providing analysis to planners and decision-makers. The GPHIN tool was recently updated with cutting-edge technology features including machine learning and natural language processing.

KARA SEWALK

Project Manager, Computational Epidemiology Lab/HealthMap
Boston Children´s Hospital

HealthMap: Infectious Disease Surveillance using Online Data; Ongoing and Future Initiatives

CSABA KOVACS

CEO
National Association of Radio Distress-Signalling and Infocommunications (RSOE)

How can an NGO support the information collection and sharing?
The RSOE's Emergency and Disaster Information Service (RSOE-EDIS) has started informing the world 15 years ago. For more than a decade, it has been collecting and sharing extremely large amounts of information about natural and human made disasters and catastrophes based on open source information, using the advantages of the Internet. The service is now 15 years old and needs to be renewed with new services and technologies. RSOE´s goal is to keep on providing timely and accurate information to people and organisations like WHO and started a number of new developments towards this objective.

THE EIOS EXPERIENCE

While Phase 1 of EIOS expansion has only just begun, several stakeholders have been piloting the system, helping to provide initial feedback for system improvements. From global intentional threats to regional routine intelligence, animal health to mass gatherings, we'll hear from some of these pioneers, learning about the different ways in which user groups have worked within the EIOS system to create and implement processes and protocols to meet the unique needs of their communities.

The audience is encouraged to actively engage with the panel, expanding on the opportunities made possible through the EIOS community and system.

Tuesday
12 November 2019

14:30 – 17:00

PANEL CHAIR

Ray Arthur
Centers for Disease Control and Prevention (CDC)

PANEL

Flavia Ricardo
National Institute of Health – Istituto Superiore di Sanità (ISS), Italy

Jay Varma
Africa Centers for Disease Control and Prevention

Christina Rojo
Food and Agriculture Organization of the United Nations (FAO)

Paolo Tizzani
World Organisation for Animal Health (OIE)

Tomoe Shimada
National Institute of Infectious Diseases Japan (NIID)

Lauren McDonald & Silviu Ciobanu
World Health Organization Regional Office for Europe

THE EIOS EXPERIENCE - PANEL

FLAVIA RICARDO

Researcher Infectious Diseases Department
National Institute of Health – Istituto Superiore di Sanità (ISS), Italy

Italy: Working within the EIOS system - from international collaboration to national opportunities
Italy has started exploring domestic implementation of event-based surveillance and has participated in the GHSAG Early Alerting and Reporting (EAR) project as evaluator and analyst since 2009. This area benefits from a long-standing collaboration between the Ministry of Health and the National Institute of Health - Istituto Superiore di Sanità (ISS). The transition to the EIOS system was successfully performed by Italy within GHSAG EAR and has been fruitful and beneficial allowing collaborative teamwork in this specific diffuse model of event-based surveillance implementation. The possibility of discussing opportunities for EIOS use also at national level would be very welcome.

JAY VARMA

Senior Advisor
Africa Centers for Disease Control and Prevention

The Implementation of EIOS at Africa CDC
Africa CDC has begun using EIOS for continent-wide event-based surveillance. This presentation will review the progress and challenges of implementing this system at Africa CDC.

CHRISTINA ROJO

Veterinary Epidemiologist Animal Production and Health Division
Food and Agriculture Organization of the United Nations (FAO)

FAO: Using the EIOS system to monitor and track animal and zoonotic diseases
The animal health disease intelligence team at FAO regularly monitors and tracks animal diseases information. FAO uses the EIOS system for internet-based surveillance by monitoring articles captured in ten different boards. Presently, the FAO community has 17 users all located at headquarters and one team for the seven members of the animal disease intelligence team. The EIOS tool has facilitated capturing relevant news and the preparation of updates and alerts (e.g. the weekly Animal Health Threats Update, Rift Valley Fever alerts) and weekly news called Global Health News on Animal and Public Health for wide dissemination within FAO.

THE EIOS EXPERIENCE – PANEL (CONTINUED)

PAOLO TIZZANI

Veterinary Epidemiologist World Animal Health Information and Analysis Department
OIE - World Organisation for Animal Health (OIE)

OIE: Using EIOS in active search and its impact on disease notification at global level
The OIE is the only international organisation with a global legal framework that allows to request, collect, and release global animal health information. Since 2002, the OIE has been operating its own system of active search for non-official information related to animal health. Information found through this activity is compared with the data collected in the OIE World Animal Health Information System and, where necessary, verification is sought from the Member Country concerned. With the creation of EIOS, the OIE significantly improved this activity. The impact of EIOS on OIE activity and on disease notification will be presented and discussed.

TOMOE SHIMADA

Senior Researcher, Infectious Disease Surveillance Center
National Institute of Infectious Diseases Japan (NIID)

Japan: Application of EIOS to mass gathering events

LAUREN MCDONALD

Consultant, Health Emergency Information and Risk Assessment
World Health Organization Regional Office for Europe

SILVIU CIOBANU

Technical Officer, Health Emergency Information and Risk Assessment
World Health Organization Regional Office for Europe

EIOS use in the WHO European Region: Past and Future
Until recently, EIOS was used in the European Region for mass gathering events only. No significant signal or event was missed during the FIFA 2018 World Football Championship in the Russian Federation as cross-checked against other event-based surveillance approaches employed in parallel.

A systematic and collaborative approach is underway to explore the use of EIOS for routine signal detection, whereby regional experts collaborated to devise surveillance system parameters and search strategies. Initial results demonstrate the acceptability of EIOS in the daily work of the epidemic intelligence team. Early phase testing will help refine methods for SOP development.

WELCOME RECEPTION

- SEOUL FOOD -
6pm- Gloria Hall, 7th floor

As local and regional hosts of the 2019 EIOS Global Technical Meeting, Korea Centers for Disease Control and Prevention (KCDC) and the WHO Regional Office for the Western Pacific (WPRO) are pleased to invite all participants to a welcome dinner on Tuesday evening, 12 November 2019.

The evening will be opened by Dr. Eun-Kyeong Jeong, Director, KCDC, with Dr. Jin Gwack from KCDC and Leila Bell, Technical Officer at WPRO, providing a glimpse into public health surveillance in Korea and the wider region.

Participants will have the opportunity to sample a range of local delicacies and thus get properly acquainted with the richness of Korean cuisine – renowned around the world for its savoury and bold flavours*.

Enjoy the evening and take the opportunity to meet fellow members of the ever growing EIOS Community in a relaxed atmosphere, concluding the first day and recharging for the remaining meeting days in Seoul.

많이 드세요!

Tuesday
12 November 2019

18:00 →

Graciously hosted by Korea CDC

KCDC
Korea Centers for Disease
Control & Prevention

* *Part*icipants with food allergies are kindly asked to make these known to the service personnel.

많이 드세요 **(maany deuseyo) means** "Enjoy your meal"

WEDNESDAY
13 NOVEMBER 2019
07:30 – 17:30

Optional	07:30	Wake-Up Run
	09:00	Welcome Day 2
Panel	09:10	Social Media: Hope or Hype?
	11:00	Coffee Break
Presentations	11:15	Research I: AI4IA
	12:30	Lunch
Presentations	13:30	The EIOS System: What's Cooking?
Presentations	14:30	Research II: Disease Modeling
	15:20	Coffee Break
Panel	15:45	Assessing and Managing Events
	17:15	Wrap-Up Day 2

Optional	17:30	Explore Seoul!
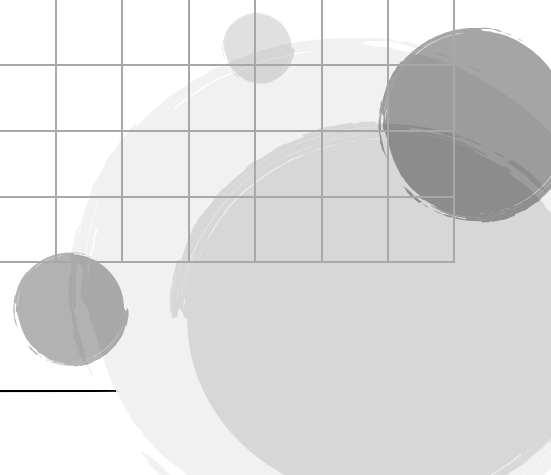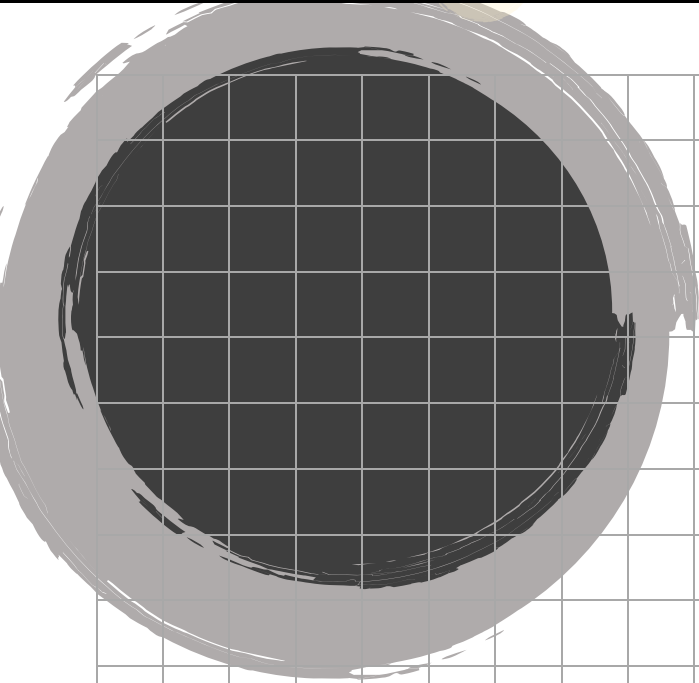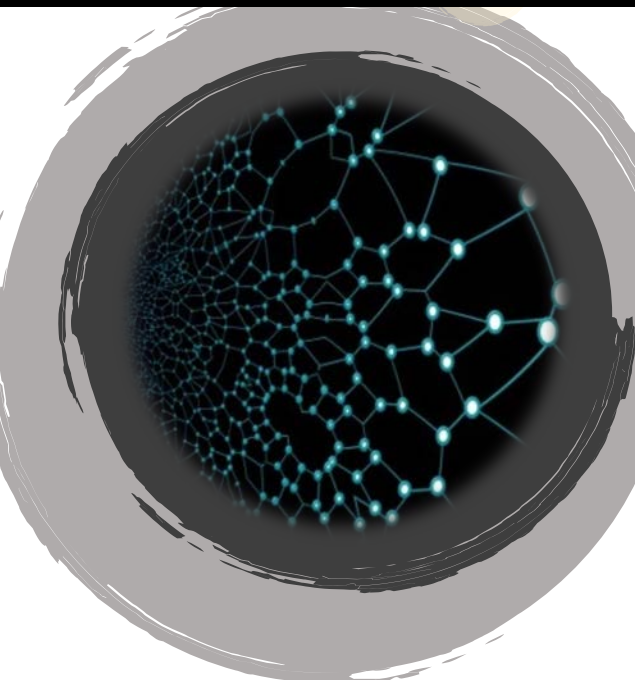
SOCIAL MEDIA: HOPE OR HYPE?

Social media has revolutionized modern day communication with significant potential for public health intelligence. Studies demonstrate the promising capacity of social media to improve surveillance through early event detection. Identifying different social media platforms, understanding how people communicate through them and understanding how public health stakeholders can ethically integrate them within the context of early warning is therefore a necessary exercise, but one fraught with challenges.

This interactive panel will discuss different strategies and experiences in using social media for public health intelligence. The audience is encouraged to share their own experiences as well and suggest how social media can add more value to the EIOS community.

Wednesday
13 November 2019

09:10 – 11:00
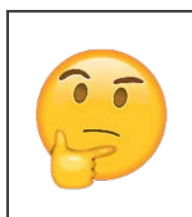
PANEL CHAIR

Jens Linge
Joint Research Centre of the European Commission

PANEL

Mahmoud Sadek
World Health Organization Regional Office for the Eastern Mediterranean (EMRO)

Thomas Mollet
European Centre for Disease Prevention and Control (ECDC)

Jaemar Miller
UN Global Pulse

Muntari Hassan
Nigeria Centre for Disease Control (NCDC)

SOCIAL MEDIA – PANEL

MAHMOUD SADEK

Technical Officer, Health Emergency Information and Risk Assessment
World Health Organization Regional Office for the Eastern Mediterranean (EMRO)

EMRO: Using Social Media Monitoring for signal detection in the DVA process
The presentation will describe the WHO Regional Office for the Eastern Mediterranean´s (EMRO) experience in social media scanning for signal/event detection and follow up. It will highlight detection, verification and assessment activities at EMRO and the need for using social media to improve the early detection function. Moreover, it will describe the used methodology for social media scanning and its results. Finally, lessons learned and proposed next steps will be shared.

THOMAS MOLLET

Leader of Epidemic Intelligence group
European Center for Disease Prevention and Control

Social media trend analysis for early detection
ECDC is implementing a new method for early detection based on social media metadata trend analysis. This includes the analysis of volume of social media posts by topic and time but also the analysis of queries in google and Wikipedia. A pilot project has been initiated in 2019 and this approach will complement the classical event-based surveillance in the fields of early detection, rumours detection as well as sentiment analysis and anti-vax debate monitoring.

JAEMAR MILLER

Data and Security Engineer
UN Global Pulse

**Using Social Media for Public Health Intelligence**
This presentation will showcase various projects conducted by UN Global Pulse and various partners agencies around social media analysis, primarily around health topics, including "Social Media Monitoring of Discrimination and HIV Testing", which was conducted in 2015 following the Brazil World Cup and the "Proteja o gol" campaign for safe sex along with HIV/AIDS testing and awareness; "Nowcasting Food Prices with Twitter in Indonesia," which showcases modeling of data to track food commodity prices; "Hazegazer," which displays Air Quality Index data with social media data around haze from possible wildfires in South East Asia region; "Qatalog," an internal tool that is being developed to allow analysis from various data sources using machine learning such as topic modeling, term association, vector model training along with visualization graphs and maps to highlight each use case., and, lastly, "Radio Mining" to showcase insights from automatic speech recognition from public broadcast radio in indigenous languages.

MUNTARI HASSAN

Assistant Director and Head of Event Based Surveillance Unit
Nigeria Center for Disease Control (NCDC)

Nigeria: Using Tataafo for social media and web mining in event-based surveillance
This presentation will highlight Nigeria CDC´s experience with using the Connect Center and systematic horizon scanning (Tataafo) for detection, verification, assessment, analysis and communication. We will hear about current gaps, success stories as well as the way forward.
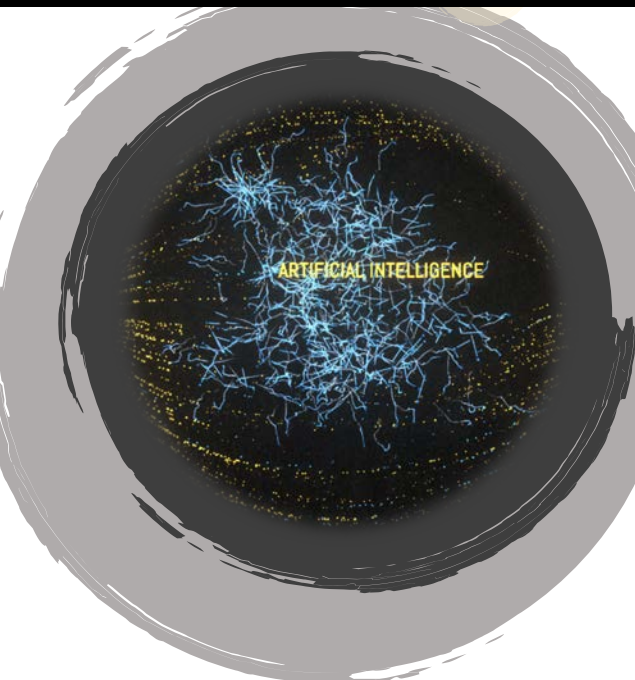
RESEARCH I: AI4IA

The huge volume of information available to us through open sources is an incredibly rich and useful resource, but making sense of it all, knowing what to focus on and linking concepts together across it all is overwhelming. Sifting through it and synthesizing it to extract relevant information and data points – or entities – is humanly impossible, but with the help of the right computing power and algorithms, the impossible becomes possible. Not to replace us, but to augment us.

This is the topic of this Artificial Intelligence for Intelligence Augmentation session.

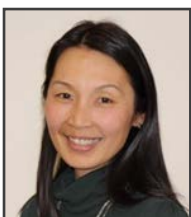Join us in this first of two applied research-based sessions as we explore how machine learning can be used to augment public health intelligence and make the otherwise impossible possible.

Wednesday
13 November 2019

11:15 – 12:30

PRESENTERS

Nigel Collier
University of Cambridge

Victoria Ng
Public Health Agency of Canada

Panos Constantopoulos
Athens University of Economics and Business

RESEARCH 1 – PRESENTERS

NIGEL COLLIER

Lecturer in Computational Linguistics
University of Cambridge, UK

What's missing in geographic parsing?
This talk will report on research with Milan Gritta and Taher Pilehvar that outlines current capabilities and challenges in Natural Language Processing for automated place name understanding ('geo-parsing'). The ability to geo-locate events in textual reports represents a valuable source of information in many real-world applications such as emergency responses. However, geo-parsing is still widely regarded as a challenge because of domain language diversity, place name ambiguity, metonymic language and limited leveraging of context. Geo-parsing task, its challenges, evaluation metrics and a comparison of current methods will briefly be introduced.

VICTORIA NG

Senior Scientific Evaluator, Public Health Risk Sciences Division
Public Health Agency Canada (PHAC)

Developing information extraction algorithms for open-source data from event-based surveillance systems
The Internet-based Surveillance Informing Global Health Threats (InSIGHT) project led by PHAC will integrate advanced analytics into event-based surveillance systems. To achieve this, the extraction of key information from open-source data is necessary to convert unstructured data into structured data for epidemiological risk modelling and assessment. Using Zika virus as a pilot candidate disease, we are developing algorithms to extract information about infection events, including the time of events and the number of infected individuals associated with each event. This presentation will focus on the current developments of these algorithms and an early evaluation of the algorithms against human performance.

PANOS CONSTANTOPOULOS

Professor, Department of Informatics
Athens University of Economics and Business

From Publications to Knowledge Graphs
This talk will address the potential for knowledge access and integration offered by ontology-driven semantic graph indexing. More effective knowledge access becomes possible when data- and process- oriented approaches are combined, especially in view of the increasing ability to use automatic knowledge extraction and indexing techniques. In particular, it will review the Scholarly Ontology, specifically designed to represent different aspects of scientific work processes, and how this can be used to drive the extraction from publications with natural language processing methods and subsequent linking of information about 'who' does 'what', 'why' and 'how'. Tests to date yield promising results.

THE EIOS SYSTEM: WHAT'S COOKING?

The continuous enhancement and integration of innovative technologies into the EIOS system is a core component of the EIOS initiative. Since the last EIOS Global Technical Meeting in December 2018, exciting new collaborations have been established with multiple partners to explore new technologies and concepts for the enhancement of the EIOS system.

The main aim of this session is for some of the collaborators to present ongoing work in the evolution of the EIOS system.

Participants are encouraged to provide comments and feedback on the developments and propose future EIOS system enhancements and ideas.

Wednesday
13 November 2019

13:30 – 14:30

PRESENTERS

Benjamin Huynh
Stanford University

Stéphane Ghozzi
Robert Koch Institut (RKI)

Scott Lee
Centers for Disease Control and Prevention (CDC)

Emilie Peron
World Health Organization

THE EIOS SYSTEM – PRESENTERS

BENJAMIN HUYNH

PhD Candidate, Biomedical Informatics
Stanford University

Analyzing radio data for epidemic surveillance using speech recognition and natural language processing
Public radio remains a predominant form of media and communication in many parts of the world, representing an unused area for epidemic surveillance. Monitoring of rural areas based on their radio communications could improve epidemic surveillance, but the sheer volume of data is too large to parse manually. However, modern machine learning techniques present the opportunity to conduct epidemic surveillance using raw unstructured data from public radio. We present a data analysis pipeline that transcribes radio data using automatic speech recognition and analyzes the text using machine learning. We discuss preliminary and proposed work based on radio data from Uganda.

STÉPHANE GHOZZI

Research assistant in data science, Department of Infectious-Disease Epidemiology
Robert Koch Institut (RKI)

Towards Anomaly Detection in EIOS: Natural language Processing and Supervised Learning Can Help Detect Signals
In the context of the research presented, "anomaly detection" is defined as applying algorithms trained to predict which EIOS articles would be identified as "signals" by experts at WHO. The texts of the articles are vectorized following both a bag-of-words and a word-embeddings approach. Overall 78 combinations of data preparation and classification algorithms are evaluated using a series of scores. Despite a very low precision, focusing on high recall, the multilayer perceptron, applied to the bag-of-words without up sampling or standardization, reaches a specificity of 0.84 for a recall of 0.91, among other good performances, which indicates that it could already be useful in sorting articles.

SCOTT LEE

Statistician, Center for Surveillance, Epidemiology, and Laboratory Services
Centers for Disease Control and Prevention (CDC), USA

EMILIE PERON

Epidemiologist/ Evaluation Coordinator,
Detection Verification and Risk Assessment (DVA), World Health Organization

Using human expertise and text classification algorithms to identify of the noise in the Epidemic Intelligence from Open Sources (EIOS) system
In 2019, the EIOS team in collaboration with six organizations conducted an evaluation of the proportion of media reports incorrectly included in the surveillance system, known colloquially as "noise reports". In this presentation, we provide some background on the noise evaluation that has been carried out and how we explore the use of text classification algorithms for identifying these reports. We try several machine learning models, from traditional models like the random forest with *n*-gram features, to newer models like Google's Bidirectional Encoder Representations from Transformers (BERT), and show that good identification is indeed possible. After discussing the results of the analysis, we propose several ways similar models may be included in the EIOS processing chain to identify the noise and improve the performance of the system.
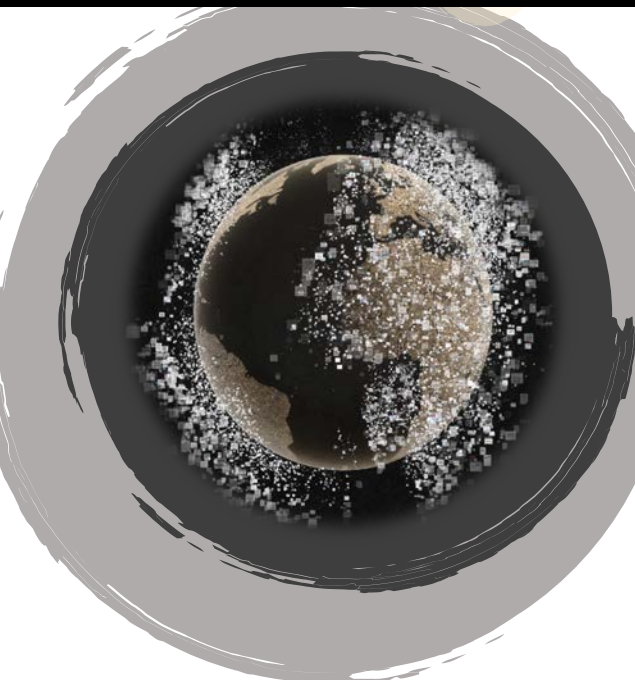
RESEARCH II: DISEASE MODELING

This is the second of the two applied research-based sessions and focuses on how extracted information can be used to better understand disease spread. Much has been and continues to be published on disease modeling, ranging from the use of animal and human movement to predict disease importation and exportation to the most cost-efficient number of persons needed to be vaccinated to achieve herd immunity. Modeling can help assess current risk, forecast spread and future risk and inform public health practice and response activities…but how confident are we in media signals and the models that are developed?

This session will highlight two ongoing projects: comparing influenza signals in online media to signals from laboratory reporting across different regions and developing epidemiological models and indicators for assessing infectious disease risks.

Wednesday
13 November 2019

14:30 – 15:20

PRESENTERS

David Buckeridge
McGill University

Erin Reese
Public Health Agency of Canada

RESEARCH II – PRESENTERS

DAVID BUCKERIDGE

Professor, School of Population and Global Health
McGill University, Canada

Infectious disease patterns in global online media data: detection, reasoning, and evaluation

Advances in natural language processing are identifying more information from online media with greater accuracy. This increase in the amount and quality of information extracted creates new opportunities to support experts in reasoning about the relevance of infectious disease patterns. We will present plans for research in this area, including development of methods to link related media reports, to assess potential sources of media bias, and to incorporate extracted information into existing disease risk surfaces. We will also present initial results from ongoing research to evaluate the agreement of information extracted from online media with information from other surveillance systems.

ERIN REESE

Senior Biostatistician Epidemiologist
Public Health Agency of Canada

Analytical tools providing epidemiological insight for event-based surveillance

One focus of the InSIGHT project is developing disease modelling tools to couple with event-based surveillance (EBS) systems to enhance epidemiological interpretation of detected events. EBS is challenged to provide early warning about emerging threats given noise in data and often little information about emerging threats. Therefore, we are developing disease modelling tools that require few input data to provide epidemiological context about detected events. We will report our progress using air traffic data to predict the number of travel-acquired cases and preview our ideas for developing tools using social media data, and automated prioritisation scoring of multiple detected threats.

ASSESSING & MANAGING EVENTS

Once a public health crisis has been detected…then what? Effective event management processes are critical to follow the event, assess it on a continual basis, determine the most effective time and way to respond, then "rinse and repeat"! By ensuring that events are documented and shared early, actions are better informed and appropriate, based on well-founded risk assessments and international best practices.

In this session, the panel will share some of the current systems being developed for assessing and managing events, allowing us to discuss similarities and differences, strengths and gaps, and explore ways to harmonize and connect systems if and where appropriate. Audience participation through feedback, questions, experiences and requirements is highly encouraged.

Wednesday
13 November 2019

15:45 – 17:15

PANEL CHAIR

Pierre Nabeth
World Health Organization Regional Office for the Eastern Mediterranean (EMRO)

PANEL

Uday Divi
Department of Agriculture, Government of Australia
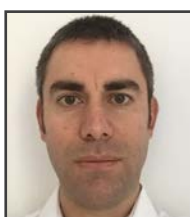
Jordi Borrell Pique
European Centre for Disease Control and Prevention (ECDC)

Gérard Krause
Helmholtz Centre for Infection Research

Ayman Badr
World Health Organization

James Elston
Public Health England

ASSESSING AND MANAGING EVENTS – PANEL

UDAY DIVI

Assistant Director, Biosecurity Integrated Information Systems and Analytics
Department of Agriculture, Government of Australia

Intel-Based Triggers and Change in Biosecurity Risk

The Australian Department of Agriculture relies on information from a variety of sources including the International Biosecurity Intelligence System (IBIS) to identify biosecurity risk events. The amount of Intel and other information can be overwhelming and looking for the proverbial needle in the haystack is time consuming and difficult. There is a strong desire to automate the monitoring and searching of the biosecurity needles as much as possible to 'trigger' some form of action. The presentation will focus on current efforts in the department to develop an integrated data-driven workflow for real-time assessment of 'Change in Biosecurity Risk' and its management.

JORDI BORRELL PIQUE

Scientific Officer Epidemic Intelligence, Epidemic Intelligence and Response
European Centre for Disease Control and Prevention (ECDC)

Event and Threat Management System (ETMS)

The European Centre for Disease Prevention and Control is currently developing a new event and threat management system that will be launched in the coming months. The ETMS has been design in order to assure an effective and smooth collaboration among the European Commission, EU agencies, national public health institutes, ministries of health and the scientific community. This will allow to share in real time relevant information to let an integrated and quick response from all stakeholders involved on the detection, assessment and communication of threats of infectious diseases in the European Union and the European Economic Area.

GÉRARD KRAUSE

Chair and scientific lead of SORMAS
Helmholtz Centre for Infection Research

How SORMAS can validate signals of EIOS and process subsequent response measures

SORMAS is an open source mobile digital Surveillance Outbreak Response Management and Analysis System, that integrates event and indicator-based surveillance with process management of outbreak investigation and response. It contains process models for unknown emerging and 10 defined epidemic prone diseases and customized use interfaces for 12 different users (local health provider, laboratory, international operation center). SORMAS complements EIOS by offering a comprehensive system for epidemiological validation of these signals and executing the public health response to it. The system is currently being rolled out in Ghana and Nigeria and already covers a population of over 75 million people.

ASSESSING AND MANAGING EVENTS – PANEL (CONTINUED)

AYMAN BADR

IT Programme Manager, Information Management and Technology
World Health Organization

The WHO Emergency Management and Response System (EMRS)
The WHO Health Emergencies programme (WHE) has identified opportunities to improve its management of information during the lifecycle of a public health event. The project, called Emergency Management and Response System (EMRS) aims at upgrading and integrating WHE's current systems to create a seamless, rapid and actionable information flow across all actors throughout the full emergency management cycle. To allow the system to evolve, be adapted and distributed outside of WHO, the system will use a modular architecture and to respond appropriately to the needs around usability and flexibility, the project bet on an agile approach focused on continuous learning.

JAMES ELSTON

Consultant Epidemiologist, National Infection Service
Public Health England

SITAware- a public health event management system for Nigeria
SITAware is the public health event management system of Nigeria Centre for Disease Control (NCDC). It is a web-based, simple, user friendly, lightweight solution, developed at low cost to record and share information on events in real time. The system is a product of a programme of partnership working between NCDC and Public Health England (PHE).

THURSDAY
14 NOVEMBER 2019
07:30 – 17:00

Optional	07:30	Wake-Up Yoga
	09:00	Welcome Day 3
Panel	09:15	EIOS Expansion
	10:45	Networking Coffee
Presentations	11:15	Building PHI Capacity
	12:30	Lunch
Brainstorming	13:30	$100,000 Challenge
	14:15	Woking Coffee Break
Panel	14:45	$100,000 Challenge
	16:15	Closing Remarks
	17:00	Meeting Adjourned
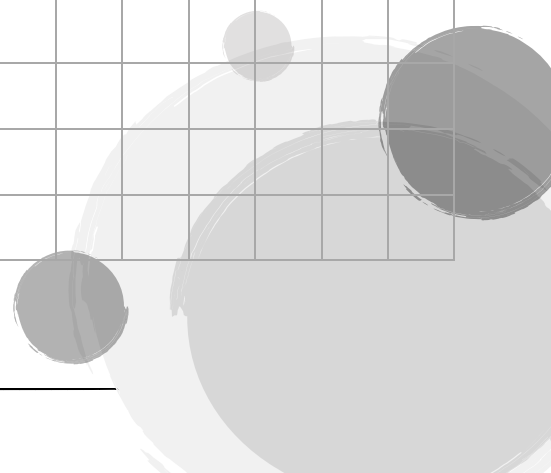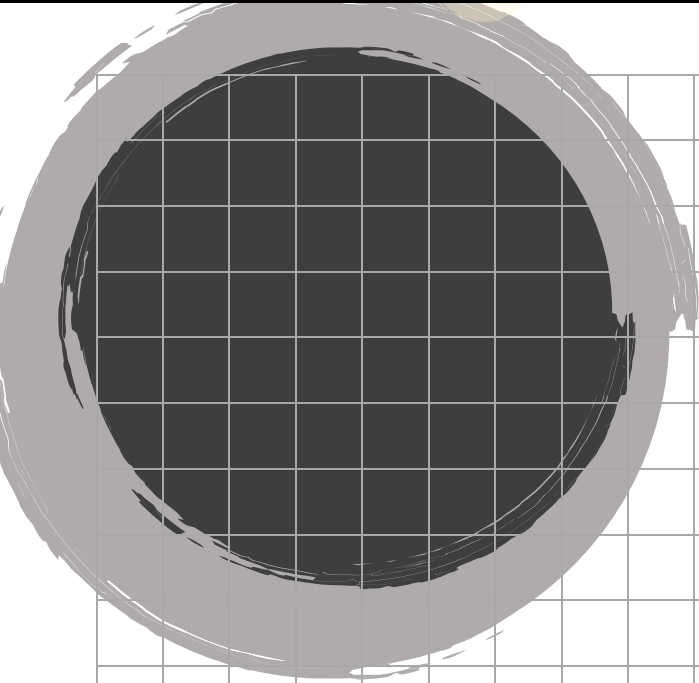
EIOS EXPANSION

This session will highlight stakeholder engagement in the EIOS expansion process at the global, regional, and national levels. For those involved in the current expansion phase, we'll learn what their training experiences have been so far, the challenges faced, and strategies used to engage, train, and support implementation of the system. As we look to transition into Phase 2 of expansion mid to late next year, we invite regions, countries, and other stakeholders preparing to implement EIOS in 2020 to share their plans, identify areas for support, and initiate a community-wide discussion to explore challenges and opportunities for the next expansion phases.

PANEL CHAIR

Blanche Greene-Cramer
World Health Organization

PANEL

Africa
Theresa Min-Hyung Lee - *World Health Organization Regional Office for Africa*
Geoffrey Namara - *World Health Organization – Nigeria*

Americas
Krista Swanson – *Pan-American Health Organization*
Thiago Rocha – *Pan-American Health Organization Brazil*

Eastern Mediterranean
Omar Abouelata
World Health Organization – Egypt

Europe
Artan Simaku - *Institute of Public Health Albania*

South-East Asia
Tika Sedai - *World Health Organization Regional Office for South-East Asia*

Western Pacific
Jia Lee - *Korea Centers for Disease Control and Prevention*
Leila Bell - *World Health Organization Regional Office for the Western Pacific*

Thursday
14 November 2019

09:15 – 10:45

BUILDING PHI CAPACITY

Training and capacity building are essential components of strengthening surveillance systems and improving global preparedness to more effectively and efficiently detect, assess, communicate, and act on potential public health emergencies.

In this session, we'll hear from stakeholders involved in developing comprehensive surveillance and training frameworks to learn how the broader PHI capacity building frameworks are being developed and how event-based surveillance is being integrated

Thursday
14 November 2019

11:15 – 12:30

PRESENTERS

Karl Schenkel
World Health Organization

Christie Hercik
Centers for Disease Control and Prevention (CDC)

Angela Hilmers
Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET)

BUILDING PHI CAPACITY – PRESENTERS

KARL SCHENKEL

Epidemiologist, Health Operations Monitoring & Data Collection
Health Emergency Information and Risk Assessment
World Health Organization

Building surveillance and early warning and response capacities: the WHE surveillance strategy
Surveillance is a cross-cutting Public Health activity with multiple stakeholders at country level, partner organizations and across WHO. Surveillance activities include (amongst others) indicator-based reporting through vertical disease programs or mandatory notifiable disease legislation, but also early warning and response (EWAR) activities integrating EBS and IBS in peacetime and during emergencies. The landscape of surveillance activities and -stakeholders is highly fragmented. The WHO Health Emergencies Programme (WHE) has been tasked to develop a surveillance strategy to propose harmonized and timelier information sharing across Headquarters, regional and country level. The findings of an exhaustive surveillance landscaping analysis and proposed solutions and investment cases will be presented.

CHRISTIE HERCIK

Epidemiologist, Global Disease Detection Operations Center
US Centers for Disease Control and Prevention, USA

Strengthening event-based surveillance in the African region
The US CDC Global Disease Detection Operations Center (GDDOC) is collaborating with a few partner countries across the African region to enhance internet-based event-based surveillance (EBS) for the purposes of early detection and response to health threats. Through technical assessment of alert and response operations (ARO), and hands-on training and linking of EBS to existing surveillance frameworks, GDDOC is committed to strengthening epidemic intelligence among WHO Member States. Proposed activities will better align target countries with the International Health Regulations (IHR; 2005) core capacity requirements, and the Joint External Evaluation (JEE) surveillance assessment criteria (D.2.1).

ANGELA HILMERS

Senior Associate Director for Science
Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET)

Modernizing FETPs to enhance global preparedness and response: The role of TEPHI Connect and the TEPHINET Learning Program
In this presentation TEPHINET will discuss initiatives to enhance global preparedness and response through the establishment of global learning technical guidelines to modernize the FETP curricula and opportunities of continuous education for FETP alumni

$100,000 CHALLENGE

What would you do to improve event-based surveillance if you were handed $100,000? Improve translation of existing tools, enhance system detection speed by improving algorithms, provide integrated EBS training at national level?

During this interactive session, participants will work in small teams to brainstorm, refine, and pitch a proposal on what they would do to improve the event-based surveillance environment and have the opportunity to gather feedback and insights from a panel of donors. This activity session is also an opportunity to network and begin building collaborative relationships to potentially bring these ideas to life.

Note: This is NOT a funding opportunity!

Thursday
14 November 2019
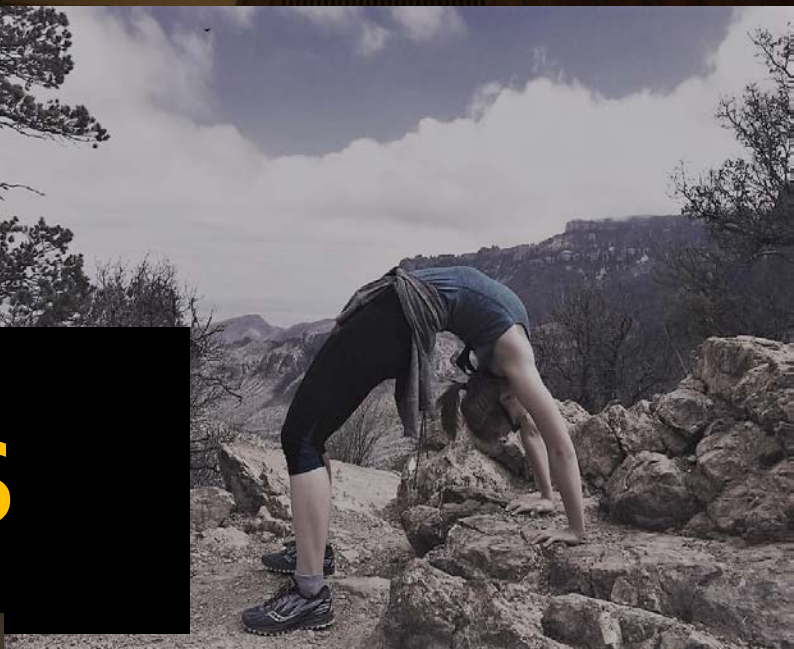
13:30 – 16:15

PANEL CHAIR

Philip AbdelMalik
World Health Organization

PANEL

Mark Smolinski
Ending Pandemics

Celine Gurry
Coalition for Epidemic Preparedness Innovations (CEPI)

ACTIVITIES

WELCOME RECEPTION
TUESDAY 12 NOVEMBER 2019
18:00

Don't forget to join us for our Welcome Reception and Dinner to hear about public health surveillance activities in the Republic of Korea and the Western Pacific Region and end the first day with some delicious "Seoul food". Good company, good food…EIOS…what more can one ask for?!

WAKE-UP RUN
WEDNESDAY 13 NOVEMBER 2019
07:30

It's time to get those pulses racing with a fun morning wake up run!! Open to runners of all levels. We meet in the hotel reception at 7:30 and run for approximately 30-45 minutes. Remember to pack your running shoes and warm winter running clothes. Route is still to be confirmed but we promise to have you all back in time to enjoy a hearty breakfast!!

WAKE-UP YOGA
THURSDAY 14 NOVEMBER 2019
07:30

A 45-minute flowing yoga session to help energize you for the day ahead. All experience levels from first timers to experienced yogis welcome. Wear something easy to move in and bring a beach towel or mat if you like to have something between you and the floor.

EXPLORING SEOUL

Seoul is a city that never sleeps! There will be plenty of activities to do after each meeting day is over, though we know you'll all want to just stick around and continue chatting. Still, we encourage you to explore the rich culture and hospitality of Seoul with each other, thereby continuing to build and strengthen the community that is EIOS. Here are some suggestions to get you going…

Subway: Gyeongbokgung (Line 3)
Hours: 9 AM – 6 PM

This is the main royal palace of the Joseon dynasty, the former name of Korea. Built in 1395, it is the largest of the Five Grand Palaces built by the dynasty. You can easily rent a Korean traditional costume (Hanbok) near the entrance of the palace and stroll through the palace just like the royals back in the time used to do!

경복궁
GYEONGBOK PALACE

광장시장
GWANGJANG MARKET

Subway: Jongno 5-ga (Line 1)
Hours: 8 AM – 11 PM

This the most famous food market for both the locals and visitors in Seoul. Try the mung bean cake (Bindaeteok), Gimbop, and all kinds of street food. If you feel brave, Korean raw beef tartar (Yukhoe) is one of the most famous menu items in the market. Don't forget to add Makgeoli (traditional rice wine with milky texture) to your dishes.

서울 타워
SEOUL N-TOWER

Subway: Myeongdong (Line 4)
Hours 10 AM – 11 PM

If you'd like a sneak peek of this sleepless city from above, take a cable car to Seoul N-Tower. It's a famous dating spot for young couples in Korea, so be prepared to be surrounded by love.

Subway: Anguk (Line3)

Looking for cute souvenirs to bring back home (or take with you wherever you choose)? Insadong is a street full of little souvenirs, traditional arts and crafts and endless options for Korean restaurants. It is an easy 10-minute walk from Gyeongbok palace.

인사동
INSADONG

북촌 한옥 마을
Bukchon Hanok Village

Subway: Anguk (Line 3)

On the east side of Gyeongbok palace, this village is full of traditional Korean houses (Hanok) and is the perfect spot for your Instagram post! You can easily search for a map of a walking tour on the Internet or get lost in this beautiful part of Seoul.

동대문 디자인 플라자
Dongdaemoon Design Plaza (DDP)

Subway: Dongdaemun History & Culture Park (Lines 2,4,5)

The Dongdaemun Design Plaza, also called the DDP, is a major urban development landmark in Seoul, designed by Zaha Hadid and Samoo, with a distinctively neofuturistic design characterized by the "powerful, curving forms of elongated structures".

동대문 쇼핑 센터
Dongdaemoon Shopping Complex

Subway: Dongdaemun (Line 1,4)

Korea is famous for its K-pop influenced street fashion, cosmetic products and stylish and affordable clothes. Dongdaemun has multiple shopping centres that are open 24/7 and is *THE* place to go for shopaholics. Be ready with water bottles and snacks and don't be shy to negotiate.

홍대
Hongdae

Subway: Hongik Univ. (Line 2)

Hongdae is the epitome of Korean nightlife scenes. You will find everything from Korean barbeque restaurants with people drinking Soju (traditional Korean alcohol in green bottles) to street musicians and dancers. It is also a nice area for shopping.

강남
Gangnam

Subway: Gangnam (Line 2)

YES!! THIS IS THE GANGNAM FROM GANGNAM STYLE. This commercial centre with some of the highest traffic in Seoul is also full of restaurants, karaoke bars (Noraebang) and shops. It gets very vibrant after 7-8 pm with Seoulites enjoying their meals and drinks after work

Subway: Itaewon (Line 6)

If you are in the mood for staying up late and partying, Itaewon will never disappoint you. Just follow the crowds and you will end up in bars/clubs full of youth enjoying the music.

이태원
Itaewon

USEFUL NUMBERS

Fire, Emergency and Ambulance	119
Police	112
Medical Emergency: Medical information centre specifically aimed at foreigners in Seoul	1339
National Intelligence Service	111
Tourism and Translation Service	1330
Coast Guard	122
International Emergency Rescue	02-790-7561

USEFUL KOREAN PHRASES

Most Koreans in Seoul can speak English and they will be willing to help you. Dining out can be quite challenging if you have any food restrictions because Korean dishes tend to mix a lot of ingredients all at once. But don't worry! Here are some useful phrases to help you! (Don't torture yourself trying to pronounce. Just show these phrases to people.)

I don't speak Korean. Do you speak English?
저는 한국말을 못합니다. 혹시 영어를 할 줄 아세요?

I am lost. Can you help me?
길을 잃어버렸습니다. 도와주시겠습니까?
(this one may have limited use if the response is only in Korean but pointing might work!)

Where is the toilette?
화장실이 어디입니까?

Can you make the dish less spicy?
음식을 조금 덜 맵게 만들어주실 수 있나요?

I have a food restriction and cannot eat any dish containing these ingredients.
죄송합니다만 저는 아래의 재료가 들어간 음식을 먹을 수 없습니다.

Dairy 유제품	Eggs 달걀	Fish 생선	Crustacean Shellfish 조개 및 갑각류
Tree nuts 견과류	Peanuts 땅콩	Wheat 밀가루	Soybeans 콩
Sesame 깨	Gelatin 젤라틴	Alcohol 알콜	Pork 돼지고기
Fruits 과일	Beef 소고기	Bee-related product 벌꿀, 로얄젤리	Animal Fat 동물성 기름
Any meat or poultry 닭고기 포함 육류 일체			

Biographies

In alphabetical order by first name

Amanda Walsh (Mandy)
Senior Scientist Emerging Infections and Zoonoses
Public Health England

Email: Amanda.walsh@phe.gov.uk

Mandy trained initially as a microbiologist and worked in the UK National Health Service for 15 years before spending 10 years in tropical medicine research programmes in Thailand, Vietnam and Malawi. She then moved into public health, and for the last 17 years has worked in Public Health England's National Infection Service, primarily on emerging infections, risk assessment, zoonoses and epidemic intelligence. She is also a founder member of the UK's Human Animal Infections and Risk Surveillance (HAIRS) group.

Angela Hilmers
Senior Associate Director for Science
TEPHINET

Email: ahilmers@tephinet.org

Angela Hilmers, M.D., M.P.H, M.Sc. is currently a Senior Associate Director for Science at Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET). Prior to joining TEPHINET, she served as an international subject matter resource expert and epidemiologist for the implementation of Field Epidemiology Training Program (FETP) – Frontline in West Africa, The Americas and Caribbean Regions. Alongside her role at TEPHINET, Dr. Hilmers actively supports a number of global health activities. She is a member of the technical group developing technical guidelines for the global implementation of Veterinary Field Epidemiology Training Programs; the Training Advisory Committee at the Caribbean Public Health Agency (CARPHA) to support workforce capacity building in the Caribbean Region, the Africa CDC Workforce Development Task Force, among others. Dr. Hilmers has been involved in a number of research activities in the area significant experience in scientific planning of quantitative and qualitative research studies related to communicable and non-communicable diseases. Dr. Hilmers holds degrees in Human Medicine, University of Minas Gerais; Tropical Medicine, Baylor College of Medicine National School of Tropical Medicine; Public Health, Johns Hopkins Bloomberg School of Public Health; and Nutrition, Texas Woman's University.

Artan Simaku
Epidemiologist, Senior Analyst Disease Surveillance
Institute of Public Health Albania

Email: artan.simaku@gmail.com

Dr Artan Simaku is a Senior Analyst for disease surveillance at the Public Health Institute of Albania. He is a medical epidemiologist, holds a Master's Degree in Public Health and is a PhD candidate at Tirana Medical University, Albania. Dr. Simaku is the data manager for nationwide syndromic surveillance, has a strong interest in event-based surveillance and participated in several training workshops.

Ayman Badr
IT Programme Manager, Information Management and Technology
World Health Organization

Email: abadr@who.int

Mr Ayman Badr is an IT Programme Manager for the World Health Organization. He holds a Master's in Business Administration and several international project management certifications. He heads the implementation of the IT programme for the Health Emergencies division of WHO, working closely with innovators such as the EIOS team. He is driven by turning the seemingly impossible into the possible through solid project management and digital innovation.

Benjamin Huynh
PhD Candidate, Biomedical Informatics
Stanford University

Email: benhuynh@stanford.edu

Benjamin Huynh is a PhD candidate in Biomedical Informatics at Stanford University and a United Nations Global Pulse Data Fellow. He received a degree in Statistics from the University of Chicago and previously worked as a biostatistician. His research interests lie at the intersection of public health, machine learning, and humanitarian aid.

Blanche Greene-Cramer
Epidemiologist, Detection, Verification and Risk Assessment Unit
Health Emergency Information and Risk Assessment
World Health Organization

Email: greenecramerb@who.int

Blanche Greene-Cramer is an Epidemiologist with the Health Emergency Information & Risk Assessment department at the World Health Organization HQ in Geneva, Switzerland. Prior to joining WHO in 2019, Greene-Cramer was an Epidemic Intelligence Service Officer and Emergency Public Health Epidemiologist with the Emergency Response and Recovery Branch in the Division of Global Health Protection at the US Centers for Disease Control and Prevention in Atlanta, GA. Her work has focused on strengthening research in complex humanitarian and emergency settings including evaluating maternal and perinatal deaths documentation and assessing the burden of noncommunicable diseases and mental illness and barriers to care among conflict affected populations. Greene-Cramer currently focuses on developing training and capacity building materials for an event-based surveillance system to improve early detection of potential events of international public health concern. A graduate of Brown University, Blanche also holds a DrPH in Behavioral Science and Health Promotion from University of Texas School of Public Health and a MPH in Global Health from Emory University's Rollins School of Public Health.

Celine Gurry
Scientific Officer, Vaccine Science
Coalition for Epidemic Preparedness Innovations (CEPI)

Email: celine.gurry@cepi.net

Ms Celine Gurry is a Scientific Officer in the department of Vaccine Science of the Coalition for Epidemic Preparedness Innovations (CEPI). CEPI's mission is to stimulate and accelerate the development of vaccines against emerging infectious diseases and enable access to these vaccines for people during outbreaks. Ms Gurry has a Masters in Infection and Immunity from UCL and additional postgraduate degrees and training in Epidemiology and Infectious Diseases from the London School of Hygiene and Tropical Medicine, and in Vaccinology from the University of Oxford. Ms Gurry has been working on outbreak preparedness, alert and response to emerging infectious diseases since 2013 in global and regional coordination roles. She has participated the response to major outbreaks of high impact pathogens including MERS-CoV, Ebola, Zika, Cholera, Rift Valley Fever and Lassa Fever. She has furthermore worked as a front-line responder to three major Ebola outbreaks between 2014-2019. Ms Gurry is passionate about building systems and projects that put excellence in science, ethics and operations at the service of vulnerable populations affected by outbreaks. Ms Gurry's current focus is epidemiological studies and biological standards and assays for vaccine development against pathogens in CEPI's portfolio, and response to Disease X.

Christie Hercik
Epidemiologist, Global Disease Detection Operations Center
US Centers for Disease Control and Prevention, USA

Email: ocg5@cdc.gov

Dr. Christine Hercik is an epidemiologist in the Global Disease Detection Operations Center (GDDOC) at the US Centers for Disease Control and Prevention, where she supports the systematic collection and analysis of international health event information for the early detection of health threats. Her current work is focused on providing technical assistance to strengthen event-based surveillance (EBS) and alert and response operations (ARO) in partner countries across the African region. Dr. Hercik holds a PhD in Global Infectious Disease from the Department of Microbiology and Immunology at Georgetown University.

Cristina Rojo Gimeno
Veterinary Epidemiologist Animal Production and Health Division
Food and Agriculture Organization of the United Nations (FAO)

Email: cristina.rojo@fao.org

Dr Cristina Rojo Gimeno is a veterinary epidemiologist at the headquarters of the Food and Agriculture Organization in Rome. She is a Spanish-trained veterinarian who holds a PhD in Veterinary Sciences from Ghent University in Belgium and a Masters degree in Epidemiology from Utrecht University in the Netherlands. Cristina has previously worked in several animal health, One health related research projects including the socio-economic aspects of antimicrobial use and presented their results internationally. She has a strong interest in early warning and risk assessment as well as in veterinary epidemiology capacity development. In her current position she carries out animal disease intelligence activities at FAO and works on a global project to strengthen veterinary service capacities in applied epidemiology.

Csaba Kovacs
CEO
National Association of Radio Distress-Signalling and
Infocommunications (RSOE)

Email: csaba.kovacs@rsoe.hu

Csaba Kovács is the CEO of the National Association of Radio Distress-Signalling and Infocommunications (RSOE). He is an economist and studied at the College of Szolnok, Hungary. Csaba has been working for the RSOE in several positions since 1989. Previously, he has been responsible for projects dealing with inland navigation, particularly RIS (River Information Services) developments, and was responsible for the EDIS (Emergency and Disaster Information Service). Now he is the CEO of the Association and besides running the RSOE, he is focusing on the renewal and extension of the EDIS. He is also a member of the permanent Working Group 125 of PIANC.

David Buckeridge
Professor, School of Population and Global Health
McGill University, Canada

Email: david.buckeridge@mcgill.ca

David Buckeridge is a Professor in the School of Population and Global Health at McGill University in Montreal where he holds the Canadian Institutes of Health Research (CIHR) Applied Public Health Chair in eHealth Interventions. He also directs the Research Data Warehouse at the McGill University Health Center and is a medical informatics consultant to the Quebec Institute for Excellence in Health and Social Services. As a clinician-scientist in public health surveillance, his research and practice focus on the informatics of public health surveillance and disease control. At McGill, Dr Buckeridge directs the Surveillance Lab, which is an interdisciplinary group of over twenty students and staff with a mission to develop, implement, and evaluate novel computational methods for public health surveillance. He has a M.D. from Queen's University, a M.Sc. in Epidemiology from the University of Toronto, a Ph.D. in Biomedical informatics from Stanford University, and is a Fellow of the Royal College of Physicians and Surgeons of Canada.

Emilie Peron
Epidemiologist/EIOS Evaluation Coordinator, Detection Verification and Risk Assessment (DVA)
World Health Organization

Email: perone@who.int

Dr Emilie Peron is an epidemiologist in the Epidemic Intelligence from Open Sources (EIOS) Core team at WHO. She holds a doctorate in Pharmacy and Master Degree in Modeling in epidemiology from the University of Nantes, France. In 2016, she graduated from the European Programme for Intervention Epidemiology Training (EPIET) during which she was located at the Robert Koch Institute, Berlin, Germany. Emilie participated in diverse outbreak responses and investigations, including Ebola in Guinea, Yellow Fever and Ebola in the Democratic Republic of the Congo, and Zika virus in Cambodia. Her focus now is on the evaluation of the EIOS system.

Erin Rees
Senior Biostatistician Epidemiologist
Public Health Agency of Canada

Email: erin.rees@canada.ca

Erin Rees is a Senior Biostatistician Epidemiologist in the National Microbiology Laboratory at the Public Health Agency of Canada. Her background includes a Masters in Geographical Information Science (University of Edinburgh, UK) and a PhD in Watershed Ecosystems (Trent University, Canada) focusing on wildlife disease ecology. Dr. Rees' research focuses on understanding how spatial and temporal processes influence the occurrence and spread of infectious diseases in wildlife, aquatic and human populations. Research outcomes are applied to the design of effective surveillance and disease control strategies, as have been contributed for the Ontario Ministry of Natural Resources and Forestry, Ministère des Forêts de la Faune et des Parcs du Québec, United States Department of Agriculture, SalmonChile Farmer's Association and the World Organization for Animal Health (OIE) regarding safe trade of aquaculture products. Dr. Rees co-leads the Internet-based Surveillance Informing Global Health Threats (InSIGHT) project. The goal of InSIGHT is to develop and refine machine learning techniques and other analytical tools to exploit information from news media, social media and other internet and surveillance sources for more informative warning of emerging disease threats detected by event-based surveillance.

Fatma Osman
Coordinator of Event-Based Surveillance
Department of Epidemiology and Surveillance
Ministry of Health and Population, Egypt

Email: msmfatma1976@gmail.com

Dr Fatma Osman is a senior staff at the Department of Epidemiology and Surveillance, MoHP, Egypt. She has been working as the Coordinator of Event-based Surveillance since 2012. She is a focal point of the National Committe for IHR. She is FETP graduate and FETP Mentor. She is a fellow of Egyptian Epidemiology Association. She participated as a technical partner with Africa CDC in developing and reviewing a final version of Framework for Event-based Surveillance, 2018. She has a strong interest in Event Based Surveillance and currently, she is responsible for piloting the Epidemic Intelligence from Open Sources (EIOS) platform in Egypt.

Flavia Riccardo
Researcher Infectious Diseases Department
National Institute of Health – Istituto Superiore di Sanità (ISS), Italy

Email: flavia.riccardo@iss.it

Flavia Riccardo is an MD, PhD and an infectious disease specialist. She has experience in working with international organizations, including the Red Cross, the UN and NGOs, both in conflict and non-conflict settings in West Africa, South Asia and the Middle East. Currently, she works as a researcher in the Department of Infectious Diseases of the Italian National Institute of Health in Rome (Istituto Superiore di Sanità - ISS). Among her interests are the implementation of the International Health Regulations, with a particular focus on communicable diseases, infectious disease surveillance, epidemic intelligence and operational research.

Florence Tanguay
Senior Epidemiologist
Centre for Emergency Preparedness and Response
Public Health Agency Canada

Email: florence.tanguay@canada.ca

Florence is a Senior Epidemiologist working in the Center for Emergency Preparedness and Response at the Public Health Agency of Canada. She currently supports the Global Public Health Intelligence Network (GPHIN) in order to provide situational awareness and risk assessment on issues of public health importance domestically and globally. She completed her undergraduate studies in microbiology and immunology at McGill University followed by a Master of Public Health at the Université de Montréal. She is a graduate of the Canadian Field Epidemiology Program. Florence has over 13 years of experience in communicable disease surveillance and outbreak response.

Geoffrey Namara
Health Information Management and Risk Assessment Lead
World Health Organization Nigeria

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Geoffrey Namara, a statistical epidemiologist by training, leads the WHO Nigeria health information management and risk assessment team within the country health emergencies programme. He has been involved in the implementation of EIOS in Nigeria, initially by WHO and eventual training and roll out for use the government's public health institute, the Nigeria CDC. Geoffrey holds an MSc Epidemiology from the London School of Hygiene & Tropical Medicine(LSHTM) in London, UK. Geoffrey's career has mainly been in medical research data management & statistics, monitoring and evaluation of public health programmes across several African countries and strengthening disease surveillance systems.

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Gérard Krause is a medical doctor and epidemiologist, chair for infectious disease epidemiology and former state epidemiologist of Germany. For many years he has conducted and coordinated outbreak investigations in the United States, Germany and various African Countries. He was also in charge of implementing and running a novel national digital Surveillance System in Germany. Dr. Krause served as advisor for WHO in the design and evaluation of Annex 2 of the International Health Regulations and for polio elimination in Africa, as well as for the European Centre for Disease Control (ECDC) in building the European Union Surveillance System. He is the initiator and scientific lead of SORMAS, the open source, mobile digital Surveillance, Outbreak Response Management and Analysis System (www.sormas.org) that integrates outbreak detection through indicator and event-based surveillance with outbreak response process management. SORMAS currently runs in 300 districts of Nigeria covering a population of 75 million people.

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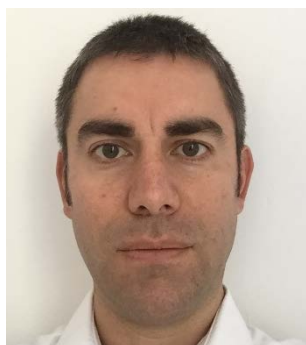
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Dr James Elston is a Consultant Epidemiologist working for the National Infection Service of Public Health England. He leads the surveillance strengthening component of the PHE and UK Department of Health and Social Care IHR strengthening programme in Nigeria, working closely with the Nigeria Centre for Disease Control. James is by background a specialist infectious disease physician, dual trained in public health, a graduate of the UK Field Epidemiology Training Programme, and is a Fellow of both the Royal College of Physicians and the Faculty of Public Health, UK. James has broad experience in international health including working in public health crises such as the West African Ebola outbreak, and fulfilling a range of roles including representing State and NGO sectors.

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Jay K. Varma, MD is the Senior Advisor at Africa CDC. He develops strategy and supports implementation of programs in surveillance, emergency preparedness and response, information systems, laboratory systems, and workforce development. After graduating magna cum laude with highest honors from Harvard, Dr. Varma completed medical school, internal medicine residency, and chief residency at the University of California, San Diego School of Medicine. In 2001, he joined CDC's Epidemic Intelligence Service, working on foodborne diseases. From 2003 - 2008, he served in Bangkok, Thailand, directing CDC's TB programs and research in Southeast Asia. From 2008 - 2011, he served in Beijing, China, directing CDC's International Emerging Infections Program which assisted the Chinese government on infectious diseases. From 2011-2017, Dr. Varma served as the Deputy Commissioner for Disease Control at the New York City Department of Health and Mental Hygiene. Dr. Varma directed the public health laboratory and all infectious disease control programs for New York City, including HIV, tuberculosis, sexually transmitted infections, immunizations, and general communicable diseases. His Division was one of the largest in the Department, employing more than 1100 staff, managing >$350 million, and operating 17 clinical facilities. Dr. Varma has authored 126 scientific manuscripts, six essays, and one book.

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Ms. Jia Lee is an Epidemic Intelligence Officer at Korea Centers for Disease Control and Prevention. She is a nurse holding a Master's Degree in Nursing from Emory University in USA. She has worked for KCDC since 2014 and completed her FETP course last December. During her training, she participated in various epidemiological investigations. She has strong interest in event-based surveillance and risk assessment and she is continuously working on the advancement of EBS and RA systems in Korea.

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Dr. Jin Gwack is the Director for Division of Emerging Infectious Disease Response at Korea Centers for Disease Control and Prevention(KCDC). He is a medical doctor trained at Seoul National University. As an epidemiologist, he participated in various epidemiological investigations nationally and internationally including his time with Health Emergency Information and Risk Assessment(HIM) of WHO/WPRO from Mar. 2017 to Aug. 2019. He has a strong interest in Evidence-based Surveillance and Epidemiological investigation and currently focuses on emerging infectious disease response.

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Jordi Borrell Pique is a scientific officer working in the epidemic intelligence and response section at the European Centre for Disease Prevention and Control in Stockholm, Sweden. He is a public health expert with a specialization in health economics by the University of Gothenburg, Sweden. His professional trajectory in the preparedness and response fields includes working experience in Equatorial Guinea and with the Public Health Agency of Barcelona province before his current position at ECDC. He has a strong interest in the areas of epidemic intelligence and early detection activities. He is also an analyst from the GHSI community and a current user of the EIOS platform.

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Kara Sewalk, MPH is a project manager in the Computational Epidemiology Lab at Boston Children's Hospital. She has a background in epidemiological research focused on infectious disease outbreaks, and currently manages several digital health platforms across the lab's portfolio. Kara supports strategic planning and partnerships with the group, and acts as a liaison between the development team and project stakeholders. She has experience managing grant-funded research, as well as large-scale federal contracts.

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Karl is a team lead in WHO´s Health Emergencies Programme (WHE) Health Operations Monitoring & Data Collection team in Geneva. His tasks are related to health information management in emergencies, including the development of a surveillance strategy for the WHO emergencies programme, developing user guidance for Early Warning and Response, and supporting the development of tools for outbreak investigations and for Early Warning and Response. The WHO emergencies programme operates mainly in emergency prone countries, with a focus on the African Region. Trained as a medical doctor, and after clinical specialization as a GP he conducted a master studies on International Health with a focus on communicable diseases epidemiology and disease control. He worked as a research fellow in communicable diseases epidemiology at the Robert Koch Institute (RKI), Berlin, Germany, including a 2-year applied field epidemiology training programme and joined WHO in 2016.

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Ms. Krista Swanson is a Technical Officer for Epidemic Alert and Response within the PAHO Health Emergencies Department of the Pan American Health Organization/World Health Organization (PAHO/WHO). She holds a Bachelor of Biological Sciences from Virginia Tech and a Master of Public Health in International Health and Development from Tulane University. Ms. Swanson has experience in infectious disease epidemiology, disease surveillance, and outbreak response.

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Lauren brings more than 10 years of experience in applied epidemiology and public health, with a focus on surveillance and response, emergency preparedness, public health planning and research. In Canada she was based in Vancouver, British Columbia with the BC Centre for Disease Control where she provided public health expertise in syndromic surveillance mass gatherings and led national and international working groups in vaccine safety signal detection and cross-border emergencies. She has also worked with other UN agencies and international NGOs in epidemiological research and capacity building in Austria, Nigeria and Vietnam.

Lawrence Madoff (Larry)
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Dr. Larry Madoff is an infectious disease physician specializing in the epidemiology of emerging pathogens, bacterial pathogenesis, and international health. He is Professor of Medicine at the University of Massachusetts Medical School and Lecturer on Medicine at Harvard Medical School. Dr. Madoff serves as Medical Director of the Bureau of Infectious Disease and Laboratory Sciences for the Massachusetts Department of Public Health.

Dr. Madoff has directed the International Society for Infectious Diseases' Program for Monitoring Emerging Diseases (ProMED), since 2002 and serves as Editor of ProMED. He is a member of the American Society for Microbiology, Massachusetts Medical Society, past President of the U.S. Lancefield Streptococcal Research Society, a Fellow of the Infectious Diseases Society of America and a Fellow of the American College of Physicians. A graduate of Yale College and Tufts Medical School, he performed his Internal Medicine Residency at New York Hospital-Cornell Medical Center and his Infectious Disease Fellowship at the Harvard Medical School-Longwood program.

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Leila Bell is a technical officer with the WHO Health Emergencies Programme at the Regional Office for the Western Pacific based in Manila, Philippines. She works with the Health Emergency Information and Risk Assessment team. Primary responsibilities are around surveillance, risk assessment and response to emerging infectious disease outbreaks and public health emergencies. She is an epidemiologist with particular interest in vaccine preventable diseases including polio.

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Dr. Mahmoud Sadek is a medical epidemiologist at WHO/EMRO, Health Emergency Information and Risk assessment (HIM) unit. Before joining WHO he was working at the Central Department of Epidemiology and Surveillance, MOH Egypt as IHR NFP. One of his main tasks was to support the enhancement of the national Event Based Surveillance with focus on media scanning and hotline modules. He graduated from FETP program Egypt in 2017 and his research projects were accepted and presented in 2 international conference (EMPHNET annual scientific conference 2016 and MediPIET annual scientific conference 2017). He is FETP scientific mentor since graduation from the program in 2017 till now. Mahmoud Sadek was part of the emergency deployed team to Bangladesh to respond to the Diphtheria outbreak among the Rohinga refugees.

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Mark Smolinski brings 25 years of experience in applying innovative solutions to improve disease prevention, response, and control across the globe. Since 2009, Mark has served as the Chief Medical Officer and Director of Global Health at the Skoll Global Threats Fund (SGTF), where he developed the Ending Pandemics in Our Lifetime Initiative in 2012. His work at SGTF created a solid foundation for his work as President of Ending Pandemics, which branched out as an independent entity on January 1, 2018. Prior to SGTF, Mark was part of the startup team at Google.org, Vice President for Biological Programs at the Nuclear Threat Initiative, and Study Director at the U.S. National Academy of Medicine. Mark has also served as the sixth Luther Terry Fellow in Washington, D.C., in the Office of the U.S. Surgeon General and as an Epidemic Intelligence Officer with the U.S. Centers for Disease Control and Prevention. Mark has a strong interest in bringing innovations in disease surveillance to countries as public-private partnerships.

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Dr Muntari Hassan, a Medical Doctor, is presently an Assistant Director and head of the Event Based Surveillance Unit of the Nigeria Centre for Disease Control (NCDC) supervising activities of connect center and systematic horizon scanning (Tataafo). He has extensive experience in the areas of strategic planning, policy development, health economics, project design, implementation and management. Prior to working with NCDC, he was the Executive Secretary of Katsina State Agency for the Control of AIDS. Dr.Hassan has more than ten years' experience in the areas of HIV/AIDS, working with the public and private sectors as well as several national and international agencies, incl. the World Bank, PEPFAR, Global Fund, IHVN, UNICEF, and Helen Keller International. As Director of Public Health in Katsina State Ministry of Health, he coordinated all public health interventions and managed programmes for neglected tropical diseases such as trachoma, schistosomiasis, soil transmitted helminths and lymphatic filariasis. He also supervised state tuberculosis and leprosy control programmes as well as regulating and issuing licenses to private health facilities. Dr. Hassan has been involved in epidemic control as a member of the Epidemic Preparedness and Response Committee and was the Chairman of the Health Research and Ethics Committee and in Katsina State.

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Dr Nigel Collier is a Lecturer in Computational Linguistics at the University of Cambridge where he co-leads the Language Technology Lab. He currently holds fellowships from the Alan Turing Institute and the Engineering and Physical Sciences Research Council. Previously he was a Marie Curie Research Fellow at the European Bioinformatics Institute and an Associate Professor at the National Institute of Informatics in Japan. The current focus of Nigel's research is on machine learning for Natural Language Understanding with a particular interest in health applications. Health data includes many types of large-scale unstructured sources including informal patient self-reports in the social media, news reports, electronic patient records and the scientific literature. Currently he is investigating machine learning techniques for integrating information between free texts and ontologies.

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Panos Constantopoulos is a professor at the Department of Informatics, Director of the MSc Programme in Digital Methods for the Humanities, and former Dean of the School of Information Sciences and Technology at Athens University of Economics and Business. He is also affiliated with the Information Management Systems Institute of the "Athena" Research Centre, where he founded and heads the Digital Curation Unit. He has previously been Professor and Chairman of the Department of Computer Science at University of Crete, and Head of the Information Systems Laboratory and the Centre for Cultural Informatics at the Institute of Computer Science, FORTH. His scientific interests include knowledge representation and conceptual modelling, ontology engineering, semantic information access, process mining, knowledge management and decision support systems, cultural informatics, digital libraries, digital curation and preservation. He currently is the scientific coordinator of "APOLLONIS-Greek Infrastructure for Digital Arts, Humanities and Language Research and Innovation," which joins the Greek components of CLARIN and DARIAH.

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Paolo Tizzani currently works as veterinary epidemiologist at the World Animal Health Information and Analysis Department – WAHIAD at the World Organisation for Animal Health (OIE). Dr. Tizzani is in charge of the Epidemic Intelligence activities and is currently involved in the process of renovation of the new WAHIS platform for the notification and sharing of Animal Health Information from OIE Member Countries. Paolo does research in Veterinary Medicine, Geoinformatics (GIS) and Geostatistics. His most recent publications are '*Global dynamics of highly pathogenic avian influenza outbreaks in poultry between 2005 and 2016 - Focus on distance and rate of spread*' and *'Characterization and evolution of countries affected by bovine brucellosis (1996 - 2014)´*.

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Philip AbdelMalik is an epidemiologist and public health informatician with a deep curiosity for exploring and promoting strategic cross-disciplinary creative technological solutions to facilitate public health practice. He currently leads and manages the Epidemic Intelligence Development and Innovation team in the World Health Organization's Health Emergencies Programme.

Although much of his work has focused on the early detection, assessment and communication of health threats, Philip's ability to conceive of and convey concepts bridging applied epidemiology and technology have led to multiple roles, including clinical research; spatial epidemiology; management of the Canadian Field Epidemiology Program; technical leadership and management of the Global Public Health Intelligence Network; active contributions to peer-reviewed literature as author, reviewer and handling editor for multiple journals; numerous academic lectures and training workshops; and continued engagement with and facilitation of international conferences. Philip's work has almost always been in the context of emergency preparedness and response activities…. including trying to raise two young adorable children with his lovely wife from down under.

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Philippe Barboza is a senior epidemiologist and the manager of the unit in charge of the global Detection, Verification and Risk Assessment of acute public health events in the Health Emergencies Programme (WHE) of the World Health Organization (WHO), headquartered in Geneva. His unit also leads and manages the development of innovative tools dedicated to the enhancement of epidemic intelligence and timely information sharing. Philippe has over 15 years in conception, development and implementation of epidemic intelligence and event-based surveillance systems at national and international levels and over 15 years' experience in infectious disease surveillance and control in resource-limited countries. He obtained his MPH from The University of Liverpool, UK and his Ph.D. in epidemiology and sciences of biomedical information from Paris University, France.

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Dr Pierre Nabeth graduated as a Medical Doctor from the University of Paris, France, with a specialization in biostatistics and epidemiology. He started his professional life in hospital settings and in general practice, then worked for medical NGOs in Liberia, Guinea, and Malawi, as coordinator and head of mission. He worked as a researcher at Epicentre, as a technical adviser in the Ministry of Health, Nouakchott, Mauritania, and as Head of the Epidemiology Unit, in the Pasteur Institute in Dakar, Senegal. His focus was on viral haemorrhagic fevers, nutrition, drug resistance, health information systems, and epidemiological surveillance. He coordinated several surveillance projects as well as International training courses in Epidemiology.

In 2006, he joined WHO. In Headquarters, he was leading a team strengthening national surveillance systems. He developed guidance on EWAR and EBS, which is used as a reference document by many Ministries of Health and WHO partners. Since 2017, he is leading the HIM Unit of the WHO Health Emergencies Programme in EMRO. In addition to the detection, verification and risk assessment of signals and events that affect the region, the unit is coordinating the development of a regional surveillance strategy and is supporting national EBS which includes media scanning through the EIOS initiative, community-based surveillance, and collection of information from different sectors.

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Dr. Lahlaouti holds a doctorate in dental medicine from the University Mohamed V / Morocco and a master's degree in public health (epidemiology option) from the University of Montreal / Canada. Dr Lahlaouti is an epidemiologist at the Epidemiological Surveillance Service / Directorate of Epidemiology and Disease Control at the Ministry of Health in Morocco. She is a permanent member of the health security committee at the Epidemiology Department and participated in the setting up of the national operational emergency center of public health. Dr. Lahlaouti is further the focal point for Health Surveillance at the Ministry of Health under the Health Regulations and for event-based surveillance. She is a member of the Health Safety Action Plan Development Committee and the External Evaluation of WHO in the framework of the International Health Regulations, focal point for the development of surveillance procedures focused on early warning and event-based surveillance with animal health officials and a trainer of Rapid Intervention Teams in Morocco. Dr. Lahlouati is supervising the training of Regional and Provincial Field Epidemiological Surveillance Teams (Frontline), training regional and provincial teams as mentors in epidemiological surveillance of AFP and eruptive fevers, and a member of the Technical Committee of the National Non-communicable Disease Risk Factors Survey (STEPWISE).

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Dr. Arthur currently leads the Global Disease Detection Operations Center (GDDOC) in the CDC Center for Global Health in Atlanta, GA. The GDDOC that Dr. Arthur established at CDC in 2006 is modeled on the alert and response operations developed at WHO headquarters where Dr. Arthur was assigned by CDC (1997-2003). He actively participated in WHO's epidemic intelligence and response activities and coordinated field operations during viral hemorrhagic fever outbreaks. The GDDOC systematically collects and analyzes international event information for early detection, assesses the health risk and facilitates appropriate and rapid interventions. While at WHO, he was directly involved in establishing the Global Outbreak Alert and Response Network (GOARN). Dr Arthur and the GDDOC have key roles in the GHSI Early Alerting and Reporting project and the Epidemic Intelligence from Open Sources (EIOS) collaboration. He received his PhD in virology at the Johns Hopkins University School of Public Health.

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Silviu Ciobanu is a technical officer with the World Health Organization (WHO) Emergency Program (WHE) in the Regional Office for Europe. He has been working in the Health Emergency Information and Risk Assessment team for almost two years, performing the IHR Regional Contact Point duties on a rotation basis with other team members. He is also the EIOS regional focal point for the European Region responsible for EIOS expansion efforts in the Region. Key tasks include event-based surveillance, running NFP capacity building workshops and thematic simulation exercises, and contributing to various reports and guidelines. Before joining the WHE, Silviu has been working as a communicable diseases officer for about 13 years in the WHO Country Office in the Republic of Moldova, with primary focus on HIV, TB, viral hepatitis, immunizations, and IHR. He has more than five years of experience of running projects in frozen conflict areas, including through joint UN partnerships. He is a medical doctor by background with subsequent specialization in neurology and holds a Master of Public Health from the University of California at Los Angeles, USA.

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Stéphane Ghozzi graduated from the Ecole normale superieure (ENS) in Paris with an M.Sc. in theoretical physics and a specialization in particle physics. He did his Ph.D. in theoretical and experimental biology (gene-expression dynamics) at ENS and later joined the Institute for Theoretical Physics in Cologne, on modeling the fitness effects of mutations in bacteria and influenza. Since 2016, Stéphane is a data scientist in the Signale team of the Robert Koch Institute in Berlin and develops machine-learning methods, automated processes and interactive visualizations for infectious-disease epidemiology, especially outbreak detection. He was seconded to the World Health Organization in Geneva for six months in 2019, where he developed methods and tools for event-based surveillance and the investigation of outbreaks of unknown origin.

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Theresa Min-Hyung Lee is a Technical Officer for data collection, management and analysis in the Health Emergencies Programme at the WHO Regional Office for Africa. She is part of the Health Emergency Information & Risk Assessment (HIM) team and supporting the EIOS Initiative Expansion Strategy in the African region. She is Canadian of Korean descent and completing her Doctorate in Health Services Research and Health Informatics Research at the University of Toronto. She has worked in event-based surveillance in the regional office with the Detection, Verification and Risk Assessment (DVA) team.

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Psychologist, Ph.D., and Masters in Health Policy assessment from the Federal University of Minas Gerais. Thiago has experience in the technical coordination of more than 25 projects on a national basis for the evaluation of public policies in health. He has additional training in spatial analysis - GIS development and analysis of databases with PASW (SPSS), Data envelopment analysis (DEA), predictive modeling, R, multivariate data analysis, focus group methodology, and Business Process Modeling Notation. It has developed several projects for Pan American Health Organization, Ministry of Health, various state secretariats, private foundations. He has experience in public administration and performance evaluation, acting on the themes as: evaluation of public policies, development of performance assessment methodologies, data mining, GIS, performance management, process mapping, organizational restructuring, structuring systems information technology in health care, mobile health (mHealth), Business Intelligence, BIG DATA and data science applied to health management.

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Dr Thomas Mollet is a senior expert in Epidemic Intelligence at ECDC. He is a medical doctor and expert in geopolitics and geostrategy. He worked several years for Doctors Without Borders/MSF in Africa as well as for the private sector in the field of preparedness and response. He has a strong interest in Epidemic Intelligence and has dedicated 10 years of his career to this topic.

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Dr Tomoe Shimada is a medical doctor and started her career as a medical epidemiologist in 2007 after obtaining her Master of Public Health degree. She joined the Infectious Disease Surveillance Center of the National Institute of Infectious Diseases, Japan in 2008 and engages in field epidemiology and infectious disease intelligence activities including outbreak investigation. She and her colleagues employed the EIOS system as pilot users during the G20 Osaka Summit in June 2019 and the 2019 Rugby World Cup from September to November.

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Dr Uday Divi is a senior intelligence analyst and acting Assistant Director for the Intelligence and Research unit of the Biosecurity Integrated Information Systems and Analytics program in the Department of Agriculture, Australia. Uday holds a doctorate from Western University, Canada in molecular biology and bioinformatics analysis of gene expression patterns. He has previously worked as lead investigator in several research projects to understand complex biological interactions and presented at international meetings. He played an active role in the development and application of open-source intelligence gathering (OSINT) tools for biosecurity risk management. His current focus is on utilization of OSINT information combined with advanced analytics for development of risk management protocols.

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Dr. Victoria Ng is an epidemiologist and quantitative modeller for the Public Health Risk Sciences Division, National Microbiology Laboratory, Public Health Agency of Canada. She holds a Doctorate in epidemiology from the Australian National University, Australia and she completed her Postdoctoral Fellowship at the Department of Population Medicine, University of Guelph, Canada. Victoria has an interest in quantitative risk assessment, disease prioritisation, infectious disease epidemiology and statistical/mathematical modelling of infectious diseases. She is a co-Principal Investigator for a Canadian funded research project - Internet-based Surveillance Informing Global Health Threats (InSIGHT) - the goal being to incorporate advanced data analytics, including artificial intelligence techniques and epidemiological modelling, into event-based surveillance systems.
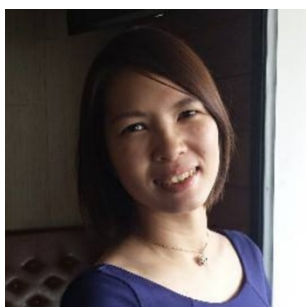
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Acknowledgements

Many individuals contributed to the planning, development and implementation of the 2019 EIOS Global Technical Meeting and to list them all would be an impossible task. The EIOS Core Team is extremely grateful for their support and dedication and would also like to acknowledge and thank all presenters, panelists and chairs. Special thanks also go to all participants – without you, we would have had a relatively empty meeting!

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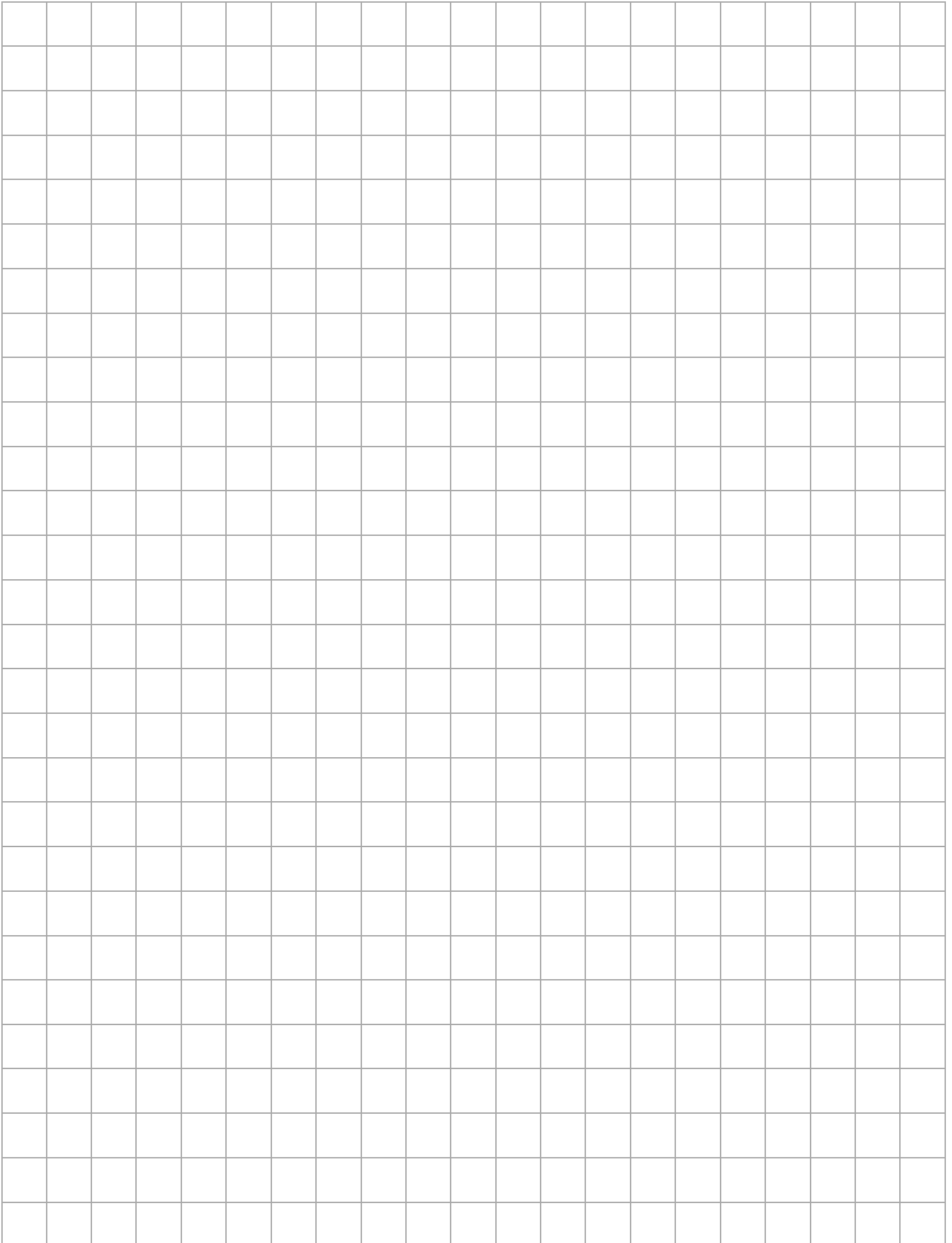
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Consultant*
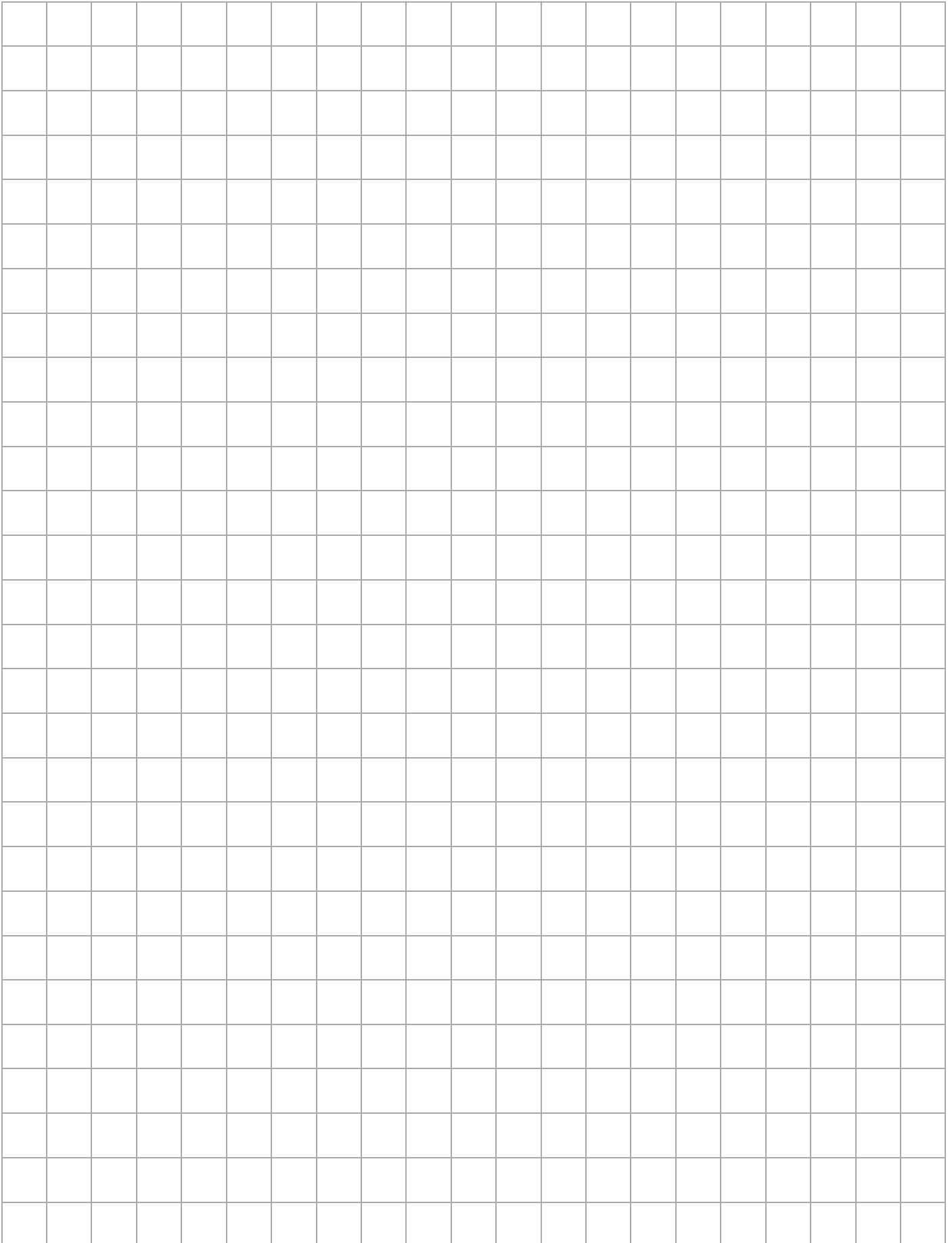
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United Kingdom: Public Health England (Amanda Walsh)
United States: Centers for Disease Control and Prevention (Ray Arthur)
World Health Organization (Philippe Barboza)**

Chaired by: World Health Organization (Oliver Morgan)

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EIOS
EPIDEMIC INTELLIGENCE FROM OPEN SOURCES

2019 EIOS Global Technical Meeting
12-14 November | Seoul, Republic of Korea

TUESDAY 12 NOVEMBER 2019

Time	Event
08:00	Registration 08:00
09:00	Welcome 09:00
10:00	Networking Coffee Break
10:30	Public Health Intelligence In Practice 10:30
12:00	Lunch 12:00
13:00	A Sampling of Systems 13:00
14:30	The EIOS Experience I 14:30
15:00	Networking Coffee Break
16:00	The EIOS Experience II 16:00
17:00	Wrap-up
18:00	Welcome Reception

WEDNESDAY 13 NOVEMBER 2019

Time	Event
07:30	Wake-up Run 07:30
	Welcome
09:10	Social Media: Hope or Hype? 09:10
	Coffee Break
11:15	Research I: AI4IA 11:15
12:30	Lunch 12:30
13:30	The EIOS System: What's Cooking? 13:30
14:30	Research II: Disease Modeling 14:30
	Coffee Break
15:45	Assessing and Managing Events 15:45
	Wrap-Up
	Explore Seoul

THURSDAY 14 NOVEMBER 2019

Time	Event
07:30	Wake-up Yoga 07:30
	Welcome
09:15	EIOS Expansion 09:15
	Networking Coffee
11:15	Building PHI Capacity 11:15
12:30	Lunch 12:30
13:30	$100,000 Challenge 13:30
	Working Coffee Break
14:45	$100,000 Challenge 14:45
16:15	Closing Remarks 16:15
	Meeting Adjourned

PANEL
PRESENTATIONS