Event-based monitoring of emerging infectious diseases: The first 25 years of ProMED

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Epidemic Intelligence from Open Sources
2019 EIOS Global Technical Meeting 12-14 November 2019 | Seoul, Republic of Korea

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MMWR Weekly

June 5, 1981 / 30(21);1-3

Epidemiologic Notes and Reports

Pneumocystis Pneumonia --- Los Angeles

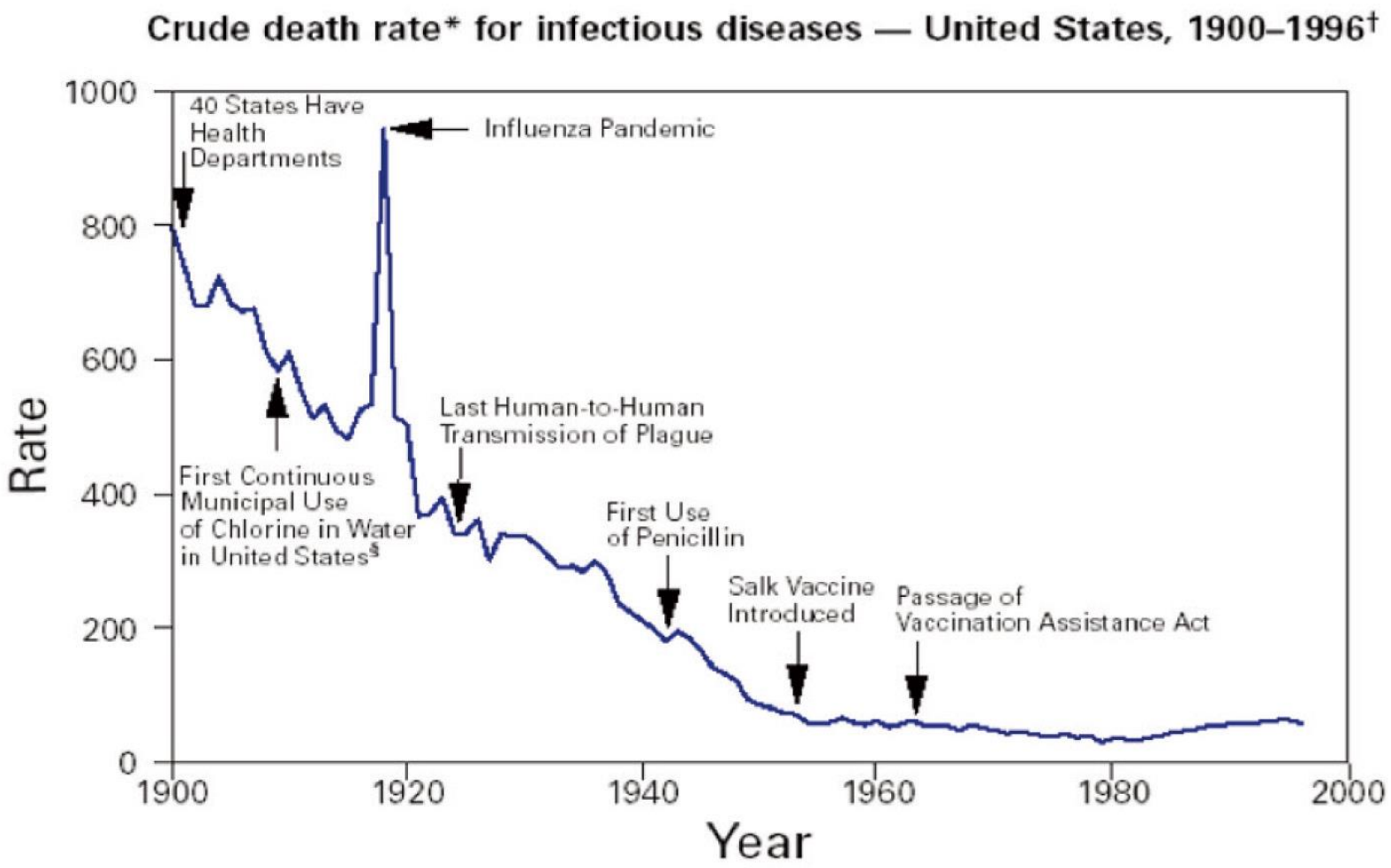
In the period October 1980-May 1981, 5 young men, all active homosexuals, were treated for biopsy-confirmed *Pneumocystis carinii* pneumonia at 3 different hospitals in Los Angeles, California. Two of the patients died. All 5 patients had laboratory-confirmed previous or current cytomegalovirus (CMV) infection and candidal mucosal infection. Case reports of these patients follow.

Patient 1: A previously healthy 33-year-old man developed *P. carinii* pneumonia and oral mucosal candidiasis in March 1981 after a 2-month history of fever associated with elevated liver enzymes, leukopenia, and CMV viruria. The serum complement-fixation CMV titer in October 1980 was 256; in may 1981 it was 32.* The patient's condition deteriorated despite courses of treatment with trimethoprim-sulfamethoxazole (TMP/SMX), pentamidine, and acyclovir. He died May 3, and postmortem examination showed residual *P. carinii* and CMV pneumonia, but no evidence of neoplasia.

Patient 2: A previously healthy 30-year-old man developed *p. carinii* pneumonia in April 1981 after a 5-month history of fever each day and of elevated liver-function tests, CMV viruria, and documented seroconversion to CMV, i.e., an acute-phase titer of 16 and a convalescent-phase titer of 28* in anticomplement immunofluorescence tests. Other features of his illness included leukopenia and mucosal candidiasis. His pneumonia responded to a course of intravenous TMP/.SMX, but, as of the latest reports, he continues to have a fever each day.

FIGURE 1. Crude death rate for infectious diseases–United States, 1900-1996

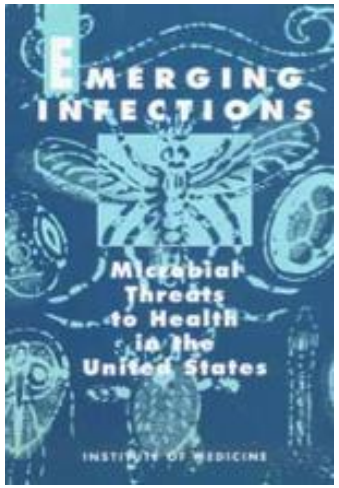
[Adapted by Rear Admiral Dr. Patrick O'Carroll, Regional Health Administrator, U.S. Public Health Service Region X]



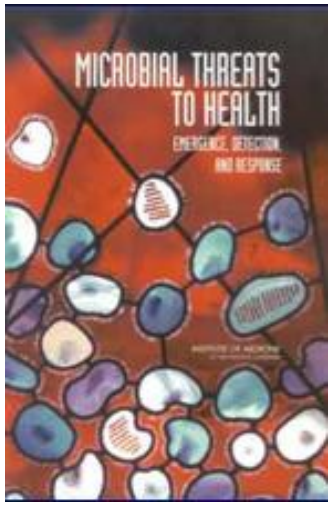
*Per 100,000 population per year.

†Adapted from Armstrong GL, Conn LA, Pinner RW. Trends in infectious disease mortality in the United States during the 20th century. JAMA 1999:281;61–6.

§American Water Works Association. Water chlorination principles and practices: AWWA manual M20. Denver, Colorado: American Water Works Association, 1973.



1992



2003

"Microbes are ranked among the most numerous and diverse of organisms on the planet; pathogenic microbes can be resilient, dangerous foes. Although it is impossible to predict their individual emergence in time and place, we can be confident that new microbial disease will emerge."

-Institute of Medicine, 1992

Could information sharing over the Internet and the use of ‘informal’ or unofficial information sources enhance the detection of emerging diseases?

ProMED founders: Stephen Morse, Jack Woodall, Barbara Hatch Rosenberg in a 1999 photo. (Source: Nature, 432:544,2004.)

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- Program for Monitoring Emerging Diseases
- The ProMED-mail electronic outbreak reporting system began in August 1994 to monitor emerging infectious diseases globally
- Moderated e-mail lists, website, social media
- Early warning system for emerging disease outbreaks
- Emphasis on rapid reporting
  - Posts are vetted by SMEs but not “peer reviewed”
  - Standard for <24 hour turnaround
  - Requests for Information (RFIs) for unconfirmed reports

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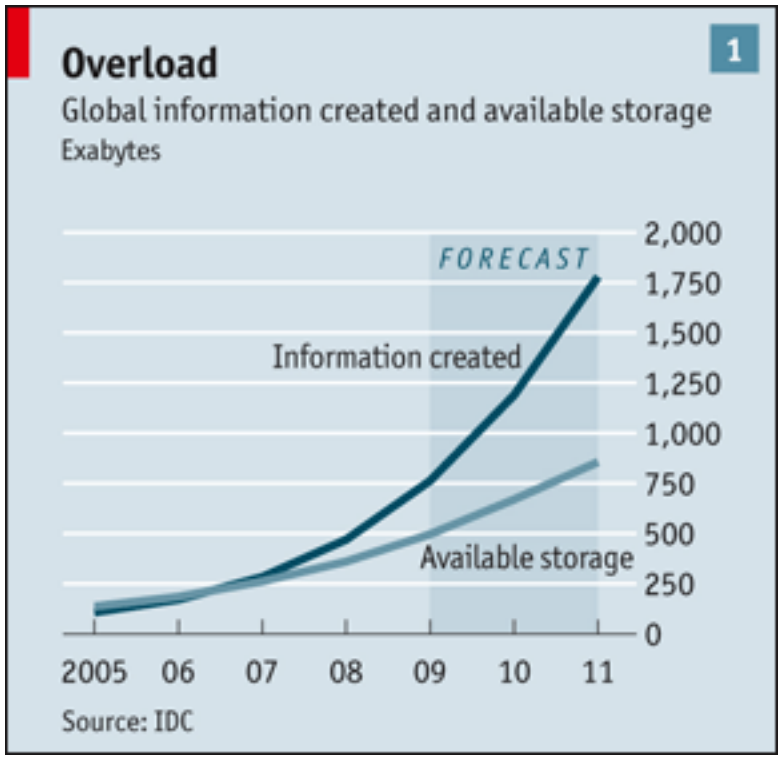
- Free subscription
- 85,000 subscribers in > 180 countries
- All reports are screened and commented upon by expert Moderators before posting
- Average of 8 reports per day
- Emphasis on “One Health”
- Regional network system



The Economist, 2012

ProMED-mail
About ProMED-mail»

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Latest Posts on ProMED-mail

16 Apr 2019 Undiag. resp. illness - Guyana (04): (BA) mine tunnel exp. histoplasmosis conf.
16 Apr 2019 Anthrax - Russia (03): (YN) anthrax ecology
16 Apr 2019 Salmonellosis, st Newport - USA: frozen raw tuna, alert, recall
16 Apr 2019 Anthrax - Kenya (07): (NK) wildlife, human suspected
16 Apr 2019 Rabies (18): Asia (Qatar ex Nepal) human, sylvatic exposure susp., comment
16 Apr 2019 Late blight, potato - Europe: emerging strains
15 Apr 2019 Newcastle disease, poultry - Mexico: (SO) OIE
15 Apr 2019 Hemorrhagic septicemia - India: (NL) water buffalo
15 Apr 2019 Impetigo - Brazil: (PR)
15 Apr 2019 Anthrax - Namibia: (KE, Bwabwata Natl Park) wildlife, human protection, 2017
15 Apr 2019 Salmonellosis, st Carrau - USA: precut melon, CDC
15 Apr 2019 Lassa fever - West Africa (22): Nigeria
15 Apr 2019 Stripe rust, wheat - India: (JK)
14 Apr 2019 Measles update (26)
14 Apr 2019 Ebola update (37): Congo DR (NK, IT) cases, WHO, vaccine

ProMED-mail alerts on HealthMap

View Full Map »

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Published Date: 2019-04-16 21:20:46
Subject: PRO/AH/EDR> Undiag. resp. illness - Guyana (04): (BA) mine tunnel exp. histoplasmosis conf.
Archive Number: 20190416.6426033

UNDIAGNOSED RESPIRATORY ILLNESS - GUYANA (04): (BARIMA-WAINI) MANGANESE MINE TUNNEL EXPOSURE, HISTOPLASMOSIS CONFIRMED

A ProMED-mail post
http://www.promedmail.org
ProMED-mail is a program of the
International Society for Infectious Diseases
http://www.isid.org

Date: Tue 16 Apr 2019
Source: Kaieteur News Online [edited]
https://www.kaieteurnewsonline.com/2019/04/16/manganese-mine-incident-mystery-illness-identified-as-histoplasmosis-infection-caused-by-fungus-found-in-droppings-of-birds-bats-and-rats-in-humid-areas/

The mystery illness, which was erroneously assumed to be H1N1 (swine flu) and as leptospirosis in 2 cases, affecting employees working in the Guyana Manganese Inc. tunnel in Matthew's Ridge, Region One, Barima-Waini has finally been determined to be histoplasmosis, an infection by a fungus found in the droppings of birds, bats and rats in humid areas. [Histoplasmosis is caused by a fungus _Histoplasma capsulatum_ that lives in soil enriched by bird or bat, not rat, droppings. - Mod.ML]

This was confirmed when the Ministry of Public Health held a press conference yesterday [15 Apr 2019] in its Mental Health Unit Boardroom to provide an update on the recent outbreak and related issues.

Samples were collected from all patients, and initially some testing was done at the National Public Health Reference Laboratory (NPHRL). Further samples were sent to the Caribbean Public Health Agency Laboratory (CARPHA) in Trinidad for confirmation.

The results initially were negative for influenza A and B inclusive of H1N1, chikungunya, Zika and dengue. All patients underwent malaria tests in Matthews Ridge, and they were also negative.

Chief Medical Officer (CMO) Dr. Shamdeo Persaud provided a detailed update.

Relating the developments sequentially, the CMO said that the 1st 4 cases were reported on 28 Mar [2019]; one died while receiving care at Pakera District Hospital in Region One. The following day, 4 more were brought in to Pakera District Hospital complaining of similar symptoms (fever, headaches, joint pains, mild shortness of breath). Subsequently, the 7 Chinese workers were transferred to the Georgetown Public Hospital Corporation (GPHC).

An additional 6 employees, including one Guyanese, were attended to at the Port Kaituma Hospital but later transferred to the GPHC. One of the 6 persons visited the hospital on his own. He was evaluated but not admitted.

Once the cases were reported, several teams visited the site from the regional level. The teams included the Regional Health Officer and the Regional Environmental Health Officer, along with some supporting medical staff.

"In the initial stage, we weren't sure what we were dealing with, but since it was a febrile illness with respiratory symptoms, we took all the necessary precautions to restrict access to both the site and the hospital where the patients were being kept. The additional staffers that were sent to the region set up a temporary facility at the community centre in Matthews Ridge where they were seeing the regular patients," the CMO recounted. "Following the transfer of the patients on 3 Apr [2019], they cleaned up the Pakera District Hospital and closed down the temporary sites. Work resumed as normal at the hospital for Maternal Child Health

Regional Programs of ProMED-mail

- ProMED-ESP, ProMED-Port: Latin America in Spanish and Portuguese
  - API
- ProMED-MBDS (Mekong Basin Disease Surveillance Collaboration)
  - MOHs of Cambodia, China, Laos, Myanmar, Thailand, Vietnam, WHO, Rockefeller
- ProMED-EAFR: English-speaking Africa
  - Regional network focused on anglophone Africa
- ProMED-FRA
  - Regional network focused on francophone Africa
- ProMED-RUS
  - Russian language reports from the countries of the independent states of the former Soviet Union
- ProMED-MENA
  - Middle East/North Africa in English with Arabic summaries
- ProMED-SoAs
  - South Asia – Subcontinent in English

Staff Locations

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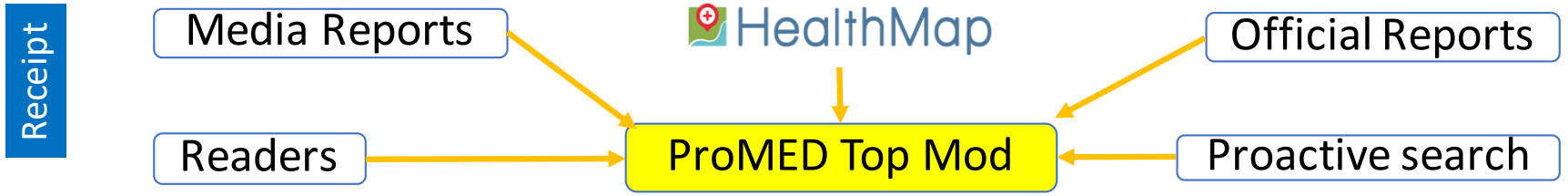
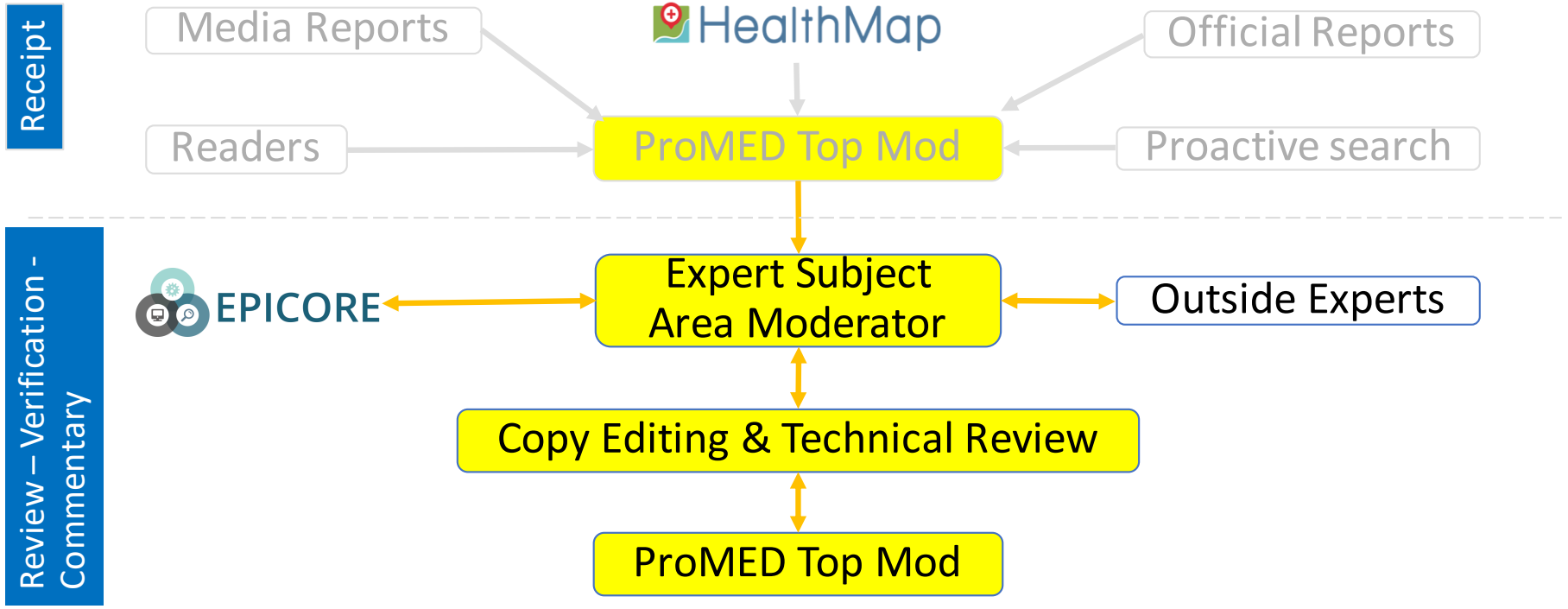
59 staff in 37 countries

ProMED information flow



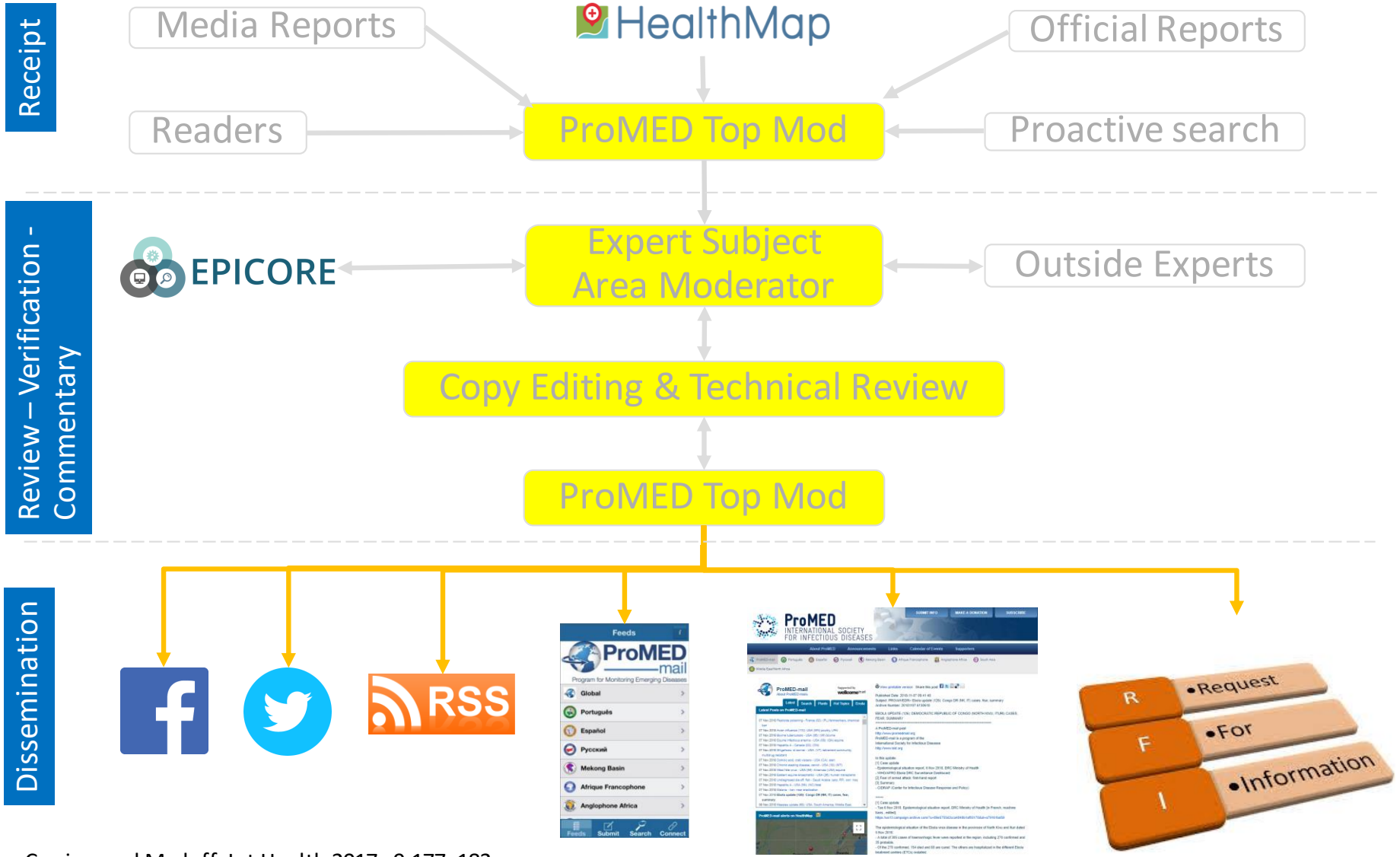
Carrion and Madoff, International Health 2017; 9:177–183

ProMED information flow



Carrion and Madoff, International Health 2017; 9:177–183

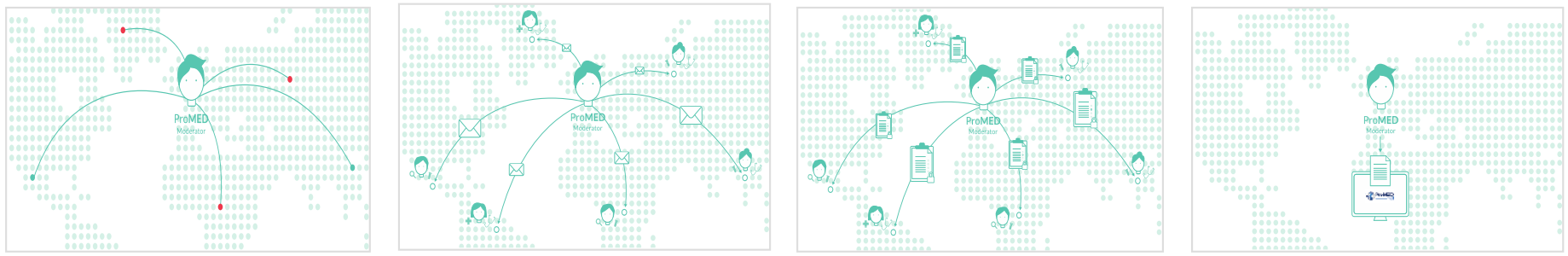
ProMED information flow



Carrion and Madoff, Int Health 2017; 9:177–183

EPICORE

A global network to verify outbreaks



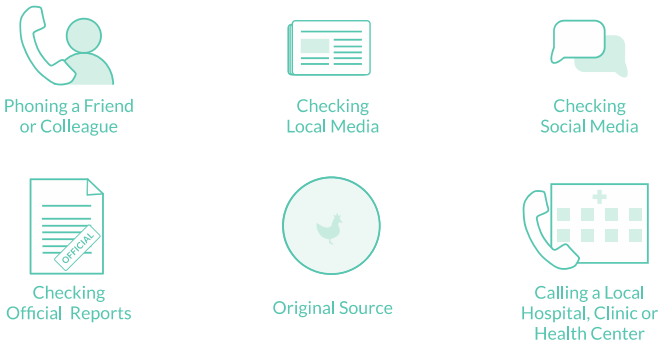
ProMED receives outbreak report from a region

ProMED sends RFI to EpiCore members in that region

Epicore member responds to RFI:

- *Correct* the information
- *Verify* outbreak information

Verified information is shared globally on ProMED



skoll global threats fund

TEPHINET
Training Programs in Epidemiology and Public Health Interventions Network

HealthMap

Time to outbreak discovery and public communication is decreasing

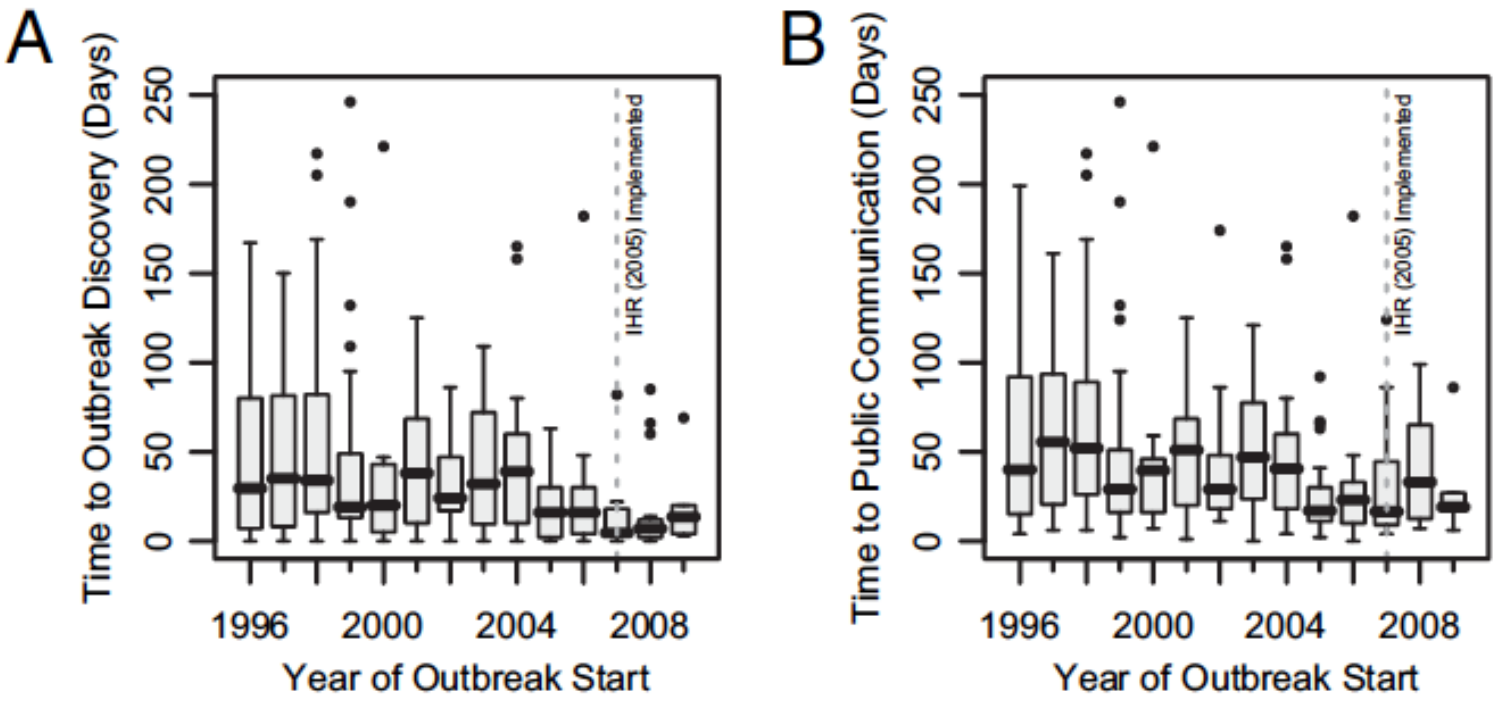
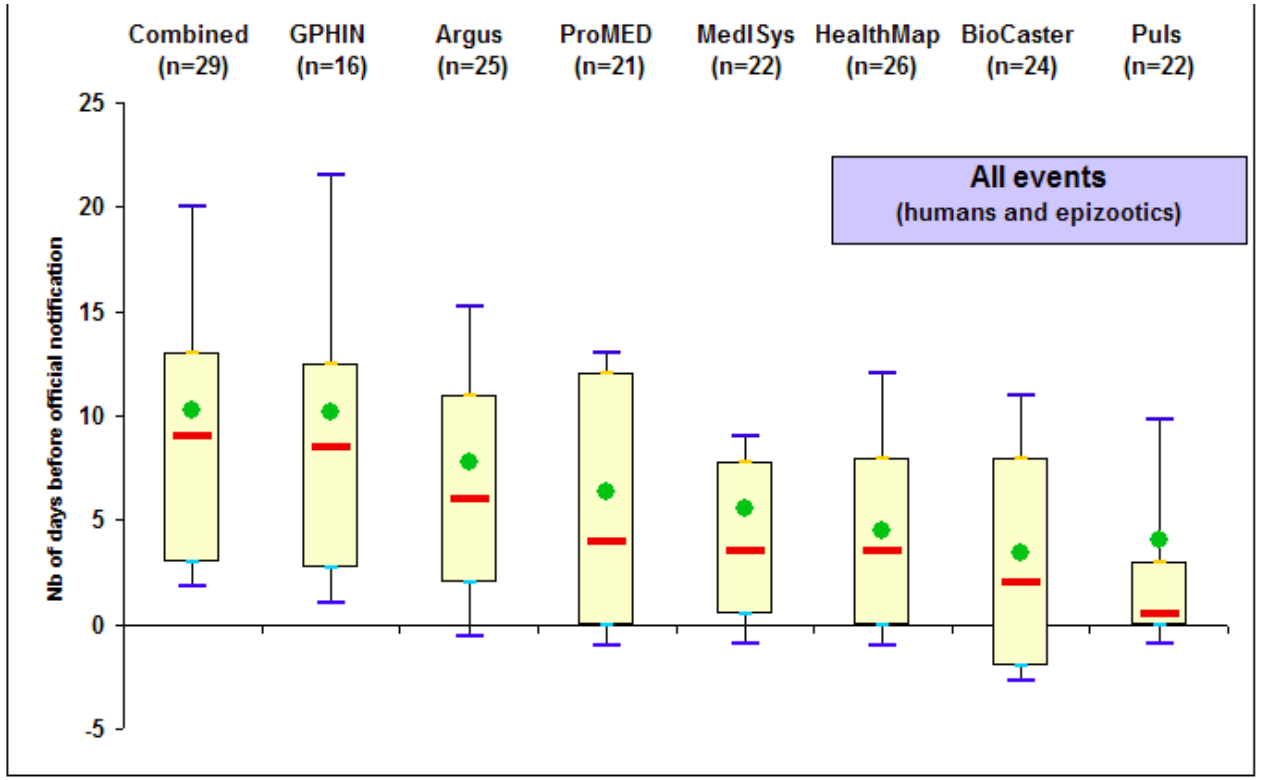


Fig. 3. Box plots of the temporal trends in the yearly median time between estimated outbreak start and (*A*) outbreak discovery and (*B*) public communication about the outbreak for selected WHO-verified outbreaks, 1996–2009. The revised International Health Regulations (IHR 2005) went into effect in 2007.

Chan et al., PNAS 2010

Synergy from multiple surveillance systems



Timeliness of the systems for A/H5N1 cases (total, human, epizootic) reported in March 2010

Barboza et al. Evaluation and potential of epidemic intelligence systems integrated in the Early Alerting and Reporting project for the detection of A/H5N1 avian Influenza epidemics. On behalf of the Early Alerting and Reporting Project of the Global Health Security Initiative. Manuscript submitted.

One Health

Considers disease without regard to species and recognizes the commonality of human and veterinary health

Published Date: 2012-09-20 15:51:26
Subject: PRO/EDR> Novel coronavirus - Saudi Arabia: human isolate
Archive Number: 20120920.1302733

NOVEL CORONAVIRUS - SAUDI ARABIA: HUMAN ISOLATE
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A ProMED-mail post
http://www.promedmail.org
ProMED-mail is a program of the
International Society for Infectious Diseases
http://www.isid.org

Date: Sat 15 Sep 2012

From: Ali Mohamed Zaki [edited]

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Novel Coronavirus – Saudi Arabia

A new human coronavirus was isolated from a patient with pneumonia by Dr Ali Mohamed Zaki at the Virology Laboratory of Dr Soliman Fakeeh Hospital Jeddah Saudi Arabia.

The virus was isolated from sputum of a male patient aged 60 years old presenting with pneumonia associated with acute renal failure. The virus grows readily on Vero cells and LLC-MK2 cells producing CPE in the form of rounding and syncetia formation.

[The clinical isolate] was initially tested for influenza virus A, influenza virus B, parainfluenza virus, enterovirus and adenovirus, with negative results. Testing with a pancoronavirus RT-PCR yielded a band at a molecular weight appropriate for a coronavirus. The virus RNA was tested also in Dr. Ron Fouchier's laboratory in the Netherlands and was confirmed to be a new member of the beta group of corononaviruses, closely related to bat coronaviruses. Further analysis is being carried out in the Netherlands.

The Virology Laboratory at the Dr Fakeeh Hospital will be happy to collaborate with others in studies of this virus.

--

Ali Mohamed Zaki
Professor of Microbiology
Dr Fakeeh hospital Jeddah Saudi Arabia

Novel Coronavirus - UK

Published Date: 2012-09-23 17:29:14
Subject: PRO/AH/EDR> Novel coronavirus - Saudi Arabia (03): UK HPA, WHO, Qatar
Archive Number: 20120923.1305982

NOVEL CORONAVIRUS - SAUDI ARABIA (03): UNITED KINGDOM HEALTH PROTECTION AGENCY, WHO, QATAR

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A ProMED-mail post
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[1] HPA press release

Date: 23 Sep 2012 Source: Health Protection Agency UK press release [edited]
http://www.hpa.org.uk/NewsCentre/NationalPressReleases/2012PressReleases/120923acuterespiratoryillnessidentified/ The Health Protection Agency (HPA) can confirm the diagnosis of one laboratory confirmed case of severe respiratory illness associated with a new type of coronavirus. The patient, who is from the Middle East and recently arrived in the UK, is receiving intensive care treatment in a London hospital.

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Novel coronavirus – Saudi Arabia

Published Date: 2012-11-04 13:11:42
Subject: PRO/AH/EDR> Novel coronavirus - Saudi Arabia (15): new case
Archive Number: 20121104.1391285
NOVEL CORONAVIRUS - SAUDI ARABIA (15): NEW CASE
****

Date: Nov 4, 2012 12:11 PM
From: Ziad Memish (Saudi Ministry of Health)

Subject: Re: A new Saudi novel coronavirus case diagnosed in KSA (Kingdom of Saudi Arabia) Attached is a report we would like for you to consider releasing in ProMED-mail: In accordance with Ministry of Health's (MoH) responsibilities for disease prevention and control, and in keeping with our practice to inform the public and the media about significant findings that result from MoH disease surveillance activities, we are announcing today [4 Nov 2012] that one of our hospitalized citizens has been confirmed to have pneumonia caused by novel Coronavirus (nCoV). This case had no epidemiological links to the 2 documented novel coronavirus cases to date.

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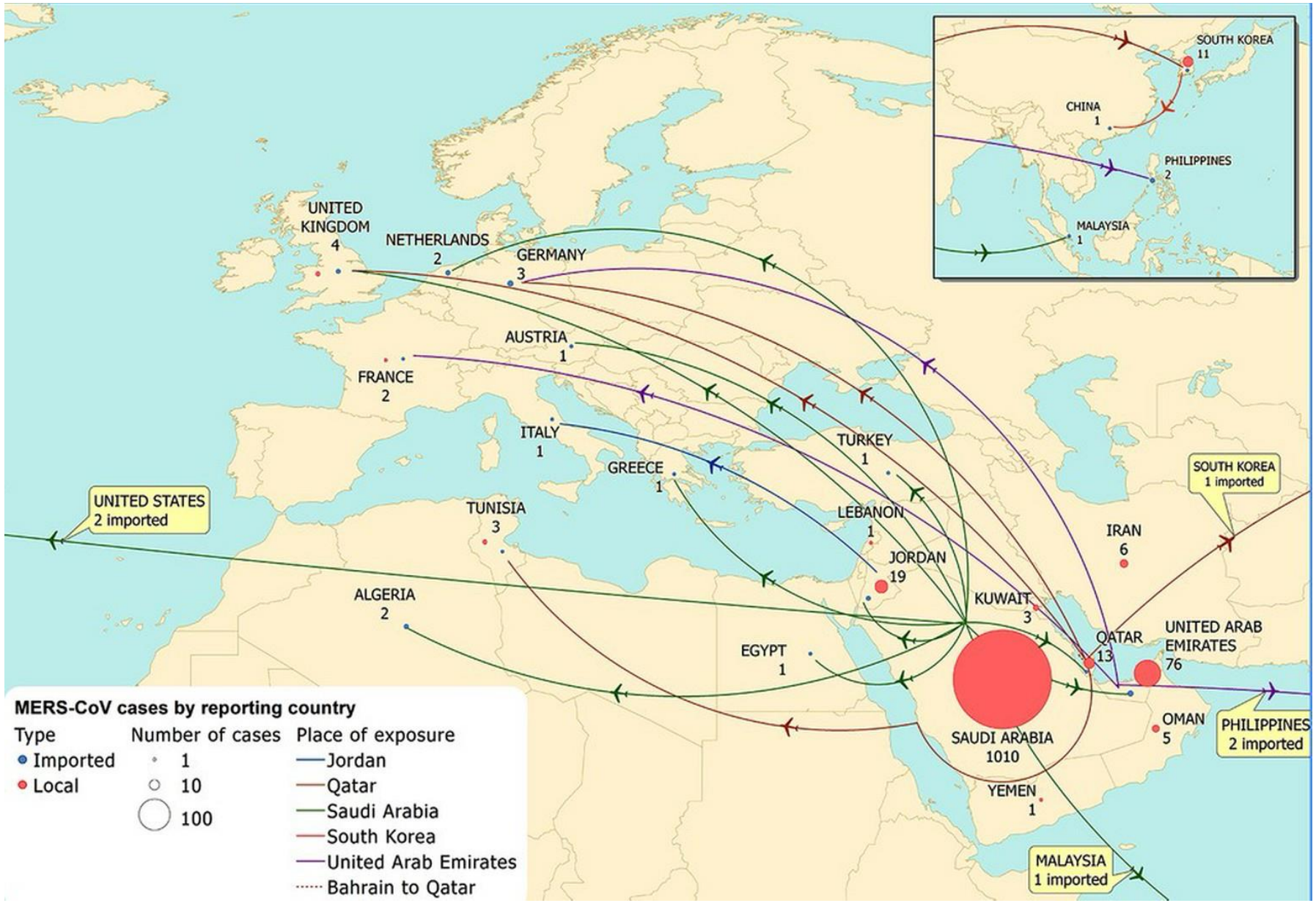

A map of the spread of MERS by the end of May 2015 © ECDC

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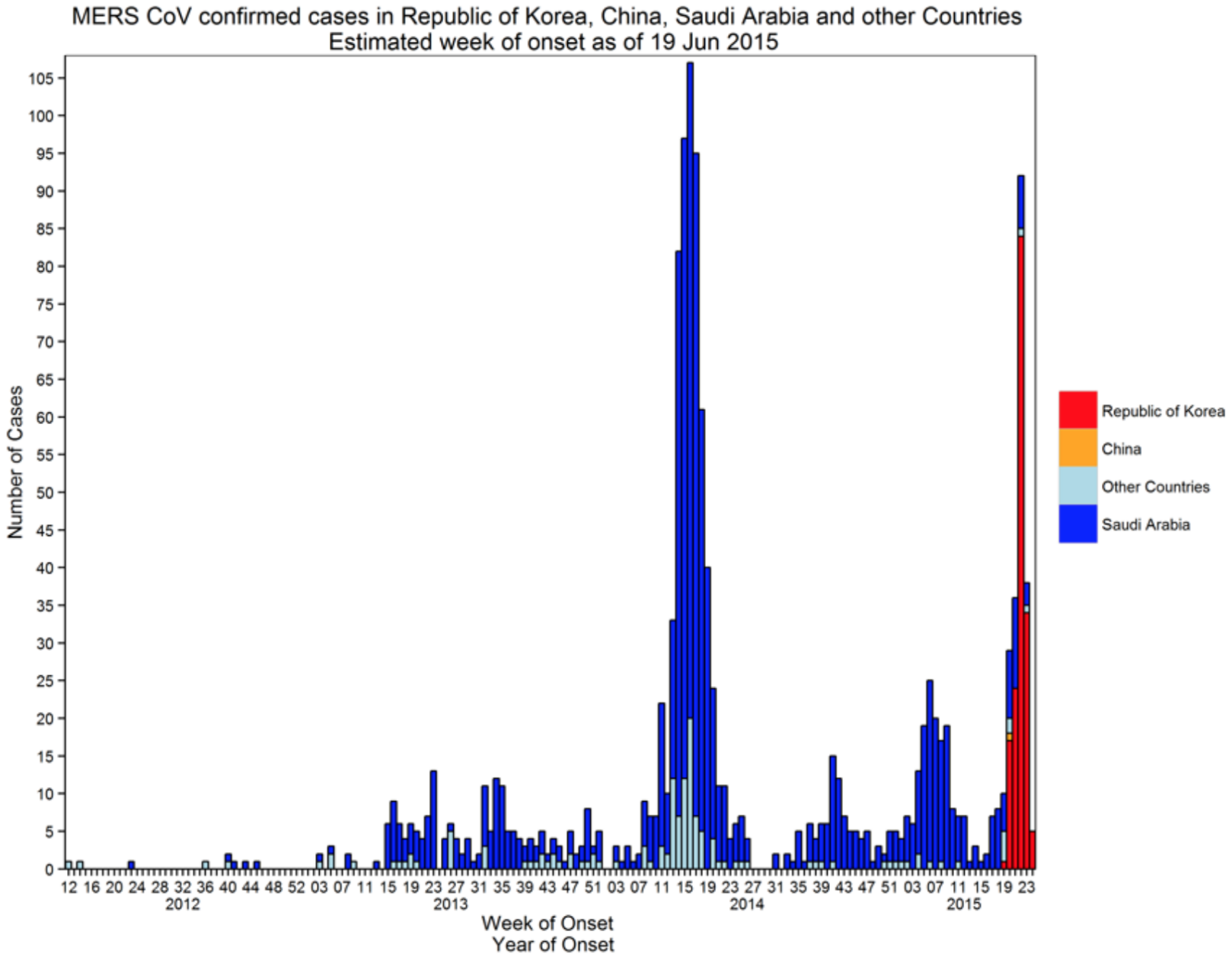
MERS – South Korea



Surveillance and outbreak report

ECDC Round Table Report and ProMed-mail most useful international information sources for the Netherlands Early Warning Committee

P Bijkerk [1], AA Monnier [1,2], EB Fanoy [1,3], K Kardamanidis [1], IH Friesema [1], MJ Knol [1]
1. National Institute for Public Health and the Environment, Bilthoven, The Netherlands
2. VU University, Amsterdam, The Netherlands
3. Public Health Service, GGD Region Utrecht, Zeist, The Netherlands

Correspondence: Paul Bijkerk (paul.bijkerk@rivm.nl)

Citation style for this article:
Bijkerk P, Monnier AA, Fanoy EB, Kardamanidis K, Friesema IH, Knol MJ. ECDC Round Table Report and ProMed-mail most useful international information sources for the Netherlands Early Warning Committee. Euro Surveill. 2017;22(14):pii=30502. DOI: http://dx.doi.org/10.2807/1560-7917.ES.2017.22.14.30502

Article submitted on 10 February 2016 / accepted on 13 June 2016 / published on 06 April 2017

SURVEILLANCE AND OUTBREAK REPORT

ECDC Round Table Report and ProMed-mail most useful international information sources for the Netherlands Early Warning Committee

P Bijkerk [1], AA Monnier [1,2], EB Fanoy [1,3], K Kardamanidis [1], IH Friesema [1], MJ Knol [1]
1. National Institute for Public Health and the Environment, Bilthoven, The Netherlands
2. VU University, Amsterdam, The Netherlands
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Article submitted on 10 February 2016 / accepted on 13 June 2016 / published on 06 April 2017

- **ECDC Round Table (RT) Report and ProMED were the most complete and timely sources, reporting 140 of 178 (79%) and 121 of 178 (68%) threats**
- **The combination of both sources reported 169 (95%) of all threats in a timely manner**
- **Adding any of the other sources resulted in minor increases in the total threats found, but considerable additional time investment per additional threat**
- **Only three potential relevant threats (2%) would have been missed by only using the ECDC RT Report and ProMed-mail**

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Summary

- Control of outbreaks depends upon rapid detection and reporting
- Over the past 25 years, event-based reporting using non-traditional data has become established as an important complement to traditional public health in the detection of new pathogens
- Transparency is a guiding principle. You can't predict who needs to know what and when
- Timeliness of outbreak detection has improved as a result of these systems

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  - HealthMap/Epidemico
  - Imperial College London
  - EcoHealth Alliance
  - NASA/Goddard Space Flight Center
  - CIRAD/European Union
  - Sandia
  - Robert Koch Institute
  - -CEPI
  - - Smithsonian National Museum of Natural History
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  - Skoll Global Threats Fund/Ending Pandemics

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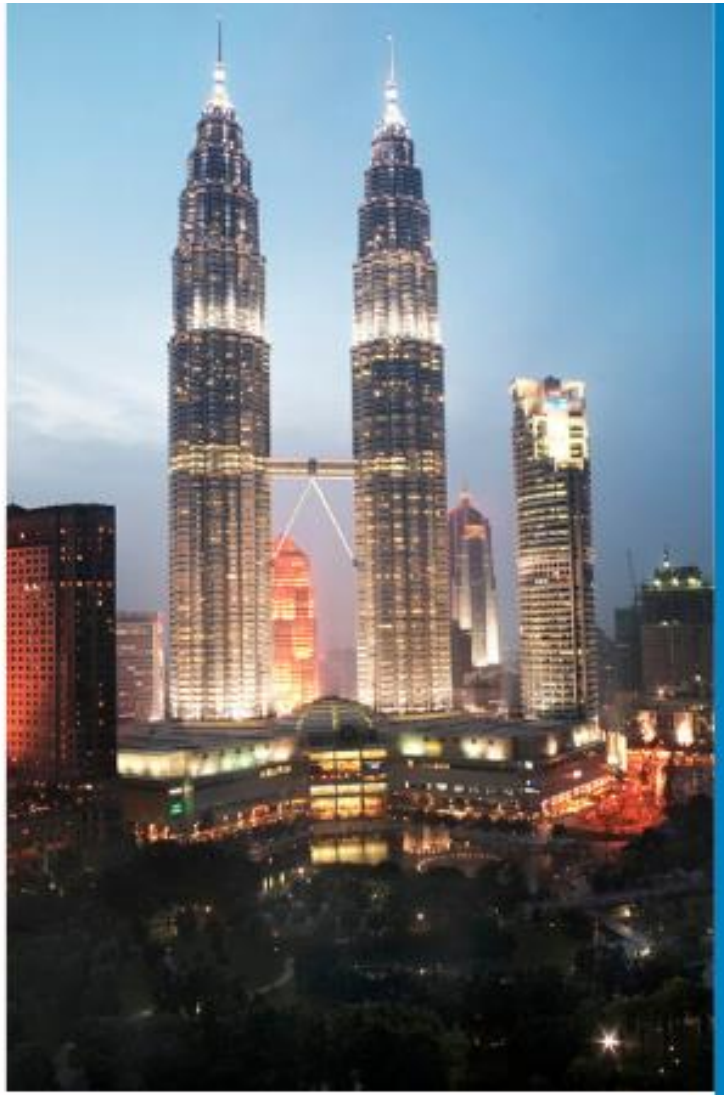

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Thank you

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