

Increase of
endemics
becoming
epidemics

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Types of Headaches

Migraine



Hypertension



Stress



Being IPAC with
recurrent emerging diseases



Objectives

- Review a few case examples of recent emerging infectious diseases
- Review potential emerging threats
- Talk about the way forward



This morning I received this e-mail and then searched your archives and found nothing that pertained to it. Does anyone know anything about this problem?

“Have you heard of an epidemic in Guangzhou? An acquaintance of mine from a teacher's chat room lives there and reports that the hospitals there have been closed and people are dying.”

Stephen O. Cunnion, M.D., on ProMED-mail, 10 February 2003

Today's Topics:

1. PRO/PL> Red blotch disease, grapevine - USA
(promed@promedmail.org)
2. PRO/AH/EDR> Undiagnosed pneumonia - China (HU),
RFI
(promed@promedmail.org)

Wuhan unexplained pneumonia has been isolated test results will be announced [as soon as available]

On the evening of [30 Dec 2019], an "urgent notice on the treatment of pneumonia of unknown cause" was issued, which was widely distributed on the Internet by the red-headed document of the Medical Administration and Medical Administration of Wuhan Municipal Health Committee.

On the morning of [31 Dec 2019], China Business News reporter called the official hotline of Wuhan Municipal Health and Health Committee 12320 and learned that the content of the document is true.

12320 hotline staff said that what type of pneumonia of unknown cause appeared in Wuhan this time remains to be determined.

According to the above documents, according to the urgent notice from the superior, some medical institutions in Wuhan have successively appeared patients with pneumonia of unknown cause. All medical institutions should strengthen the management of outpatient and emergency departments, strictly implement the first-in-patient responsibility system, and find that patients with unknown cause of pneumonia actively adjust the power to treat them on the spot, and there should be no refusal to be pushed or pushed.

The document emphasizes that medical institutions need to strengthen multidisciplinary professional forces such as respiratory, infectious diseases, and intensive medicine in a targeted manner, open green channels, make effective connections between outpatient and emergency departments, and improve emergency plans for medical treatment.

Another piece of emergency notification, entitled "City Health and Health Commission's Report on Reporting the Treatment of Unknown Cause of Pneumonia" is also true. According to this document, according to the urgent notice from the superior, the South China Seafood Market in our city has seen patients with pneumonia of unknown cause one after another.

The so-called unexplained pneumonia cases refer to the following 4 cases of pneumonia that cannot be diagnosed at the same time: fever (greater than or equal to 38C); imaging characteristics of pneumonia or acute respiratory distress syndrome; reduced or normal white blood cells in the early stages of onset The number of lymphocytes was reduced. After treatment with antibiotics for 3 to 5 days, the condition did not improve significantly.

It is understood that the 1st patient with unexplained pneumonia that appeared in Wuhan this time came from Wuhan South China Seafood Market.

12320 hotline staff said that the Wuhan CDC went to the treatment hospital to collect patient samples as soon as possible, specifically what kind of virus is still waiting for the final test results. Patients with unexplained pneumonia have done a good job of isolation and treatment, which does not prevent other patients from going to the medical institution for medical treatment. Wuhan has the best virus research institution in the country, and the virus detection results will be released to the public as soon as they are found.

What
happened?

Does this mean I get 3 wishes?

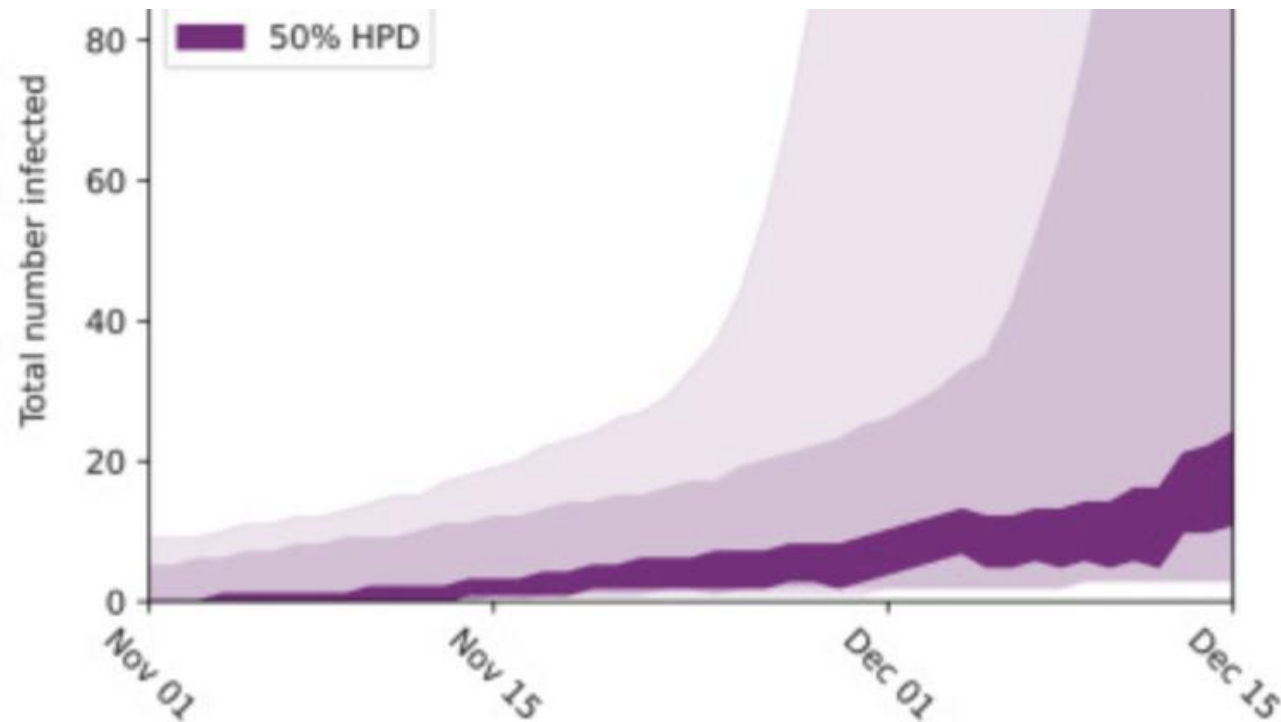


Prior ongoing transmission

Date sample (year-month)	ELISA-S	SN	COVID-19 symptoms	Risk factors and symptoms (travel, meetings, contact)
2019-11	1.17	40	No	None
2019-11	2.00	40	No	None
2019-11	1.32	160	Yes	Her partner was sick with intense cough in October 2019
2019-11	2.01	40	NA	NA
2019-11	1.16	40	No	None
2019-11	1.75	80	Yes	Travel in Spain in early November. She had daily encounters with a family member who had a respiratory illness of unknown origin between October and December. She suffered from dysosmia, and cough before the sample was taken, but could not remember the date of illness
2019-11	2.50	40	Yes	The participant and his partner were sick with a severe cough in October 2019. He had a follow-up serology at the end of July, 2020. ELISA-S=3.82; SN=10. The participant experienced another episode of cough, fever, rhinorrhea with a SARS-CoV-2 PCR positive test in the second half of September 2020
2019-12	1.53	160	No	2-month travel in Asia between October and December, 2019
2019-12	1.88	40	NA	NA
2019-12	1.83	80	Yes	Travel in Italy (Roma) end October–early November. Febrile illness at the end of October 2019
2020-01	1.71	40	Yes	Febrile illness during the third week of November 2019. Her husband and children were sick with febrile illness between November 10 and November 25, 2019
2020-01	2.83	40	No	Father was hospitalized for pneumonia in early December 2019
2020-01	1.23	40	No	General Practitioner in Paris

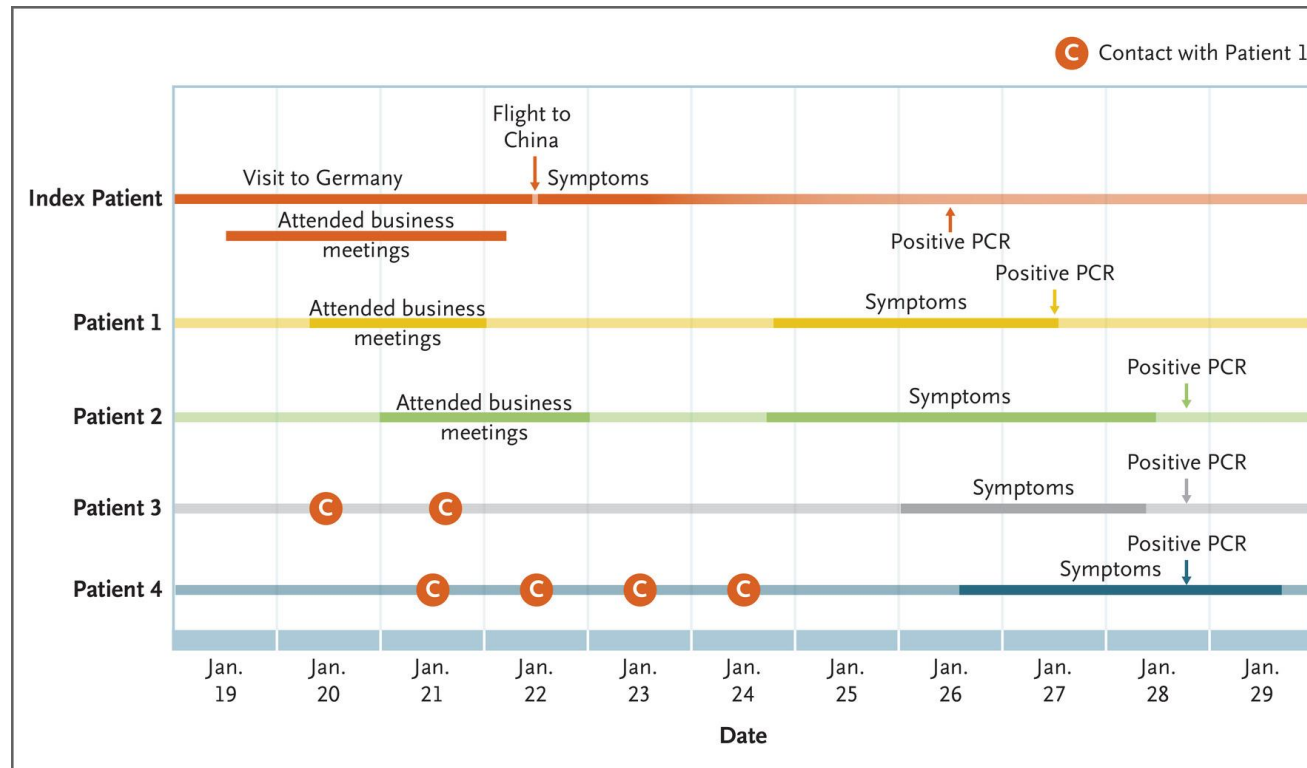
- 1.
- Carrat, F. *et al.* Evidence of early circulation of SARS-CoV-2 in France: findings from the population-based “CONSTANCES” cohort. *Eur J Epidemiol* **36**, 219–222 (2021).

Prior ongoing transmission



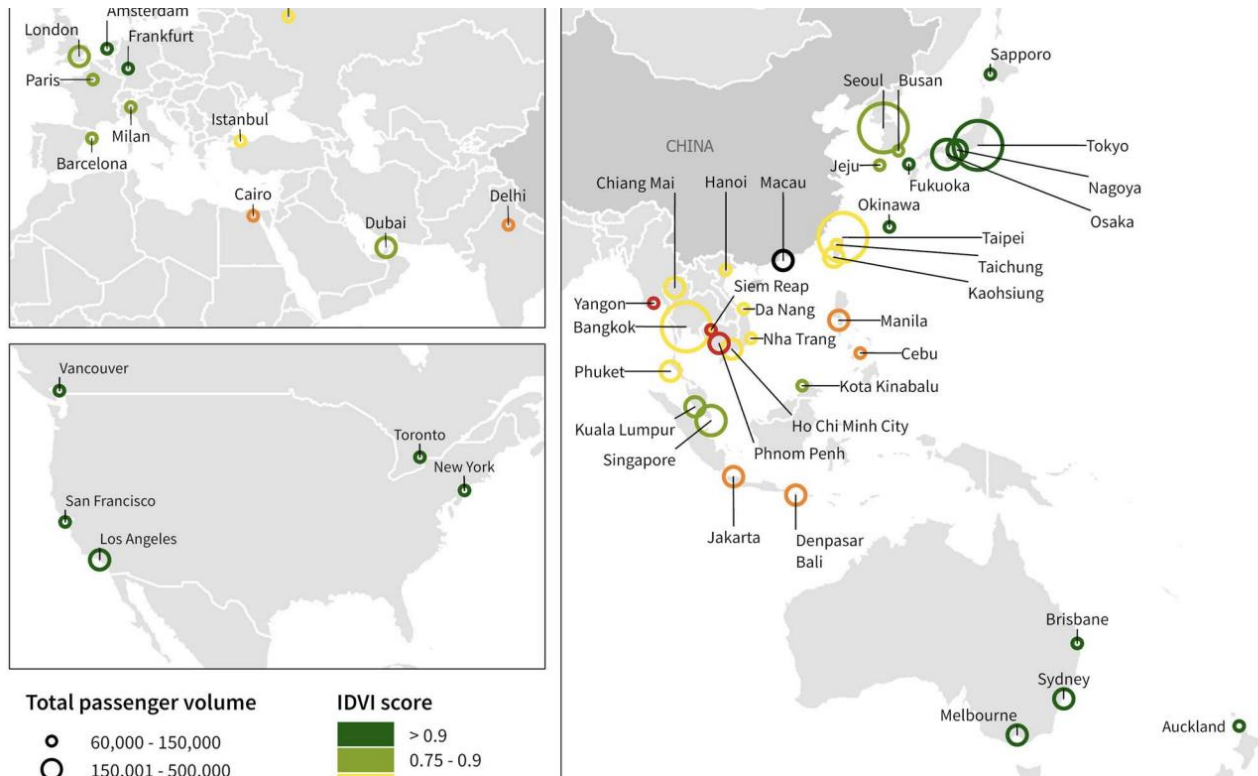
- Pekar, J., Worobey, M., Moshiri, N., Scheffler, K. & Wertheim, J. O. Timing the SARS-CoV-2 index case in Hubei province. *Science* **372**, 412–417 (2021).

Pre/Pauci/Asymptomatic spread



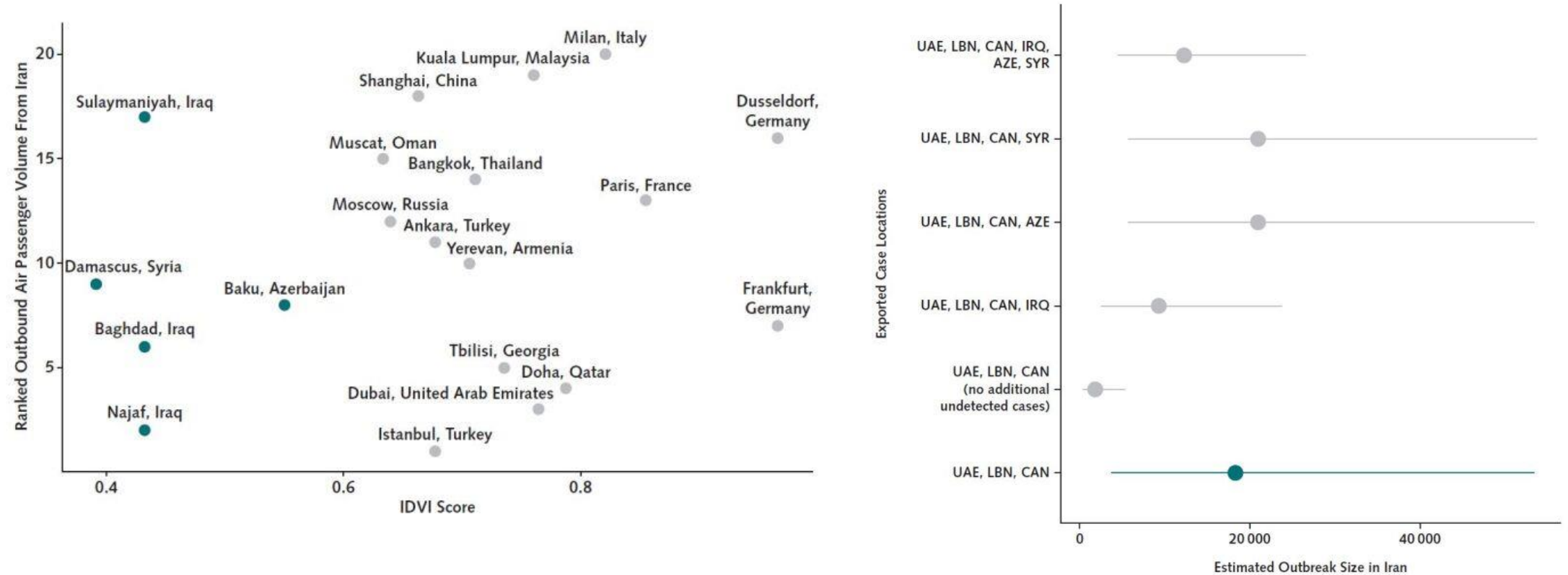
- Rothe, C. *et al.* Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany. *N Engl J Med* **382**, 970–971 (2020).

Globalization



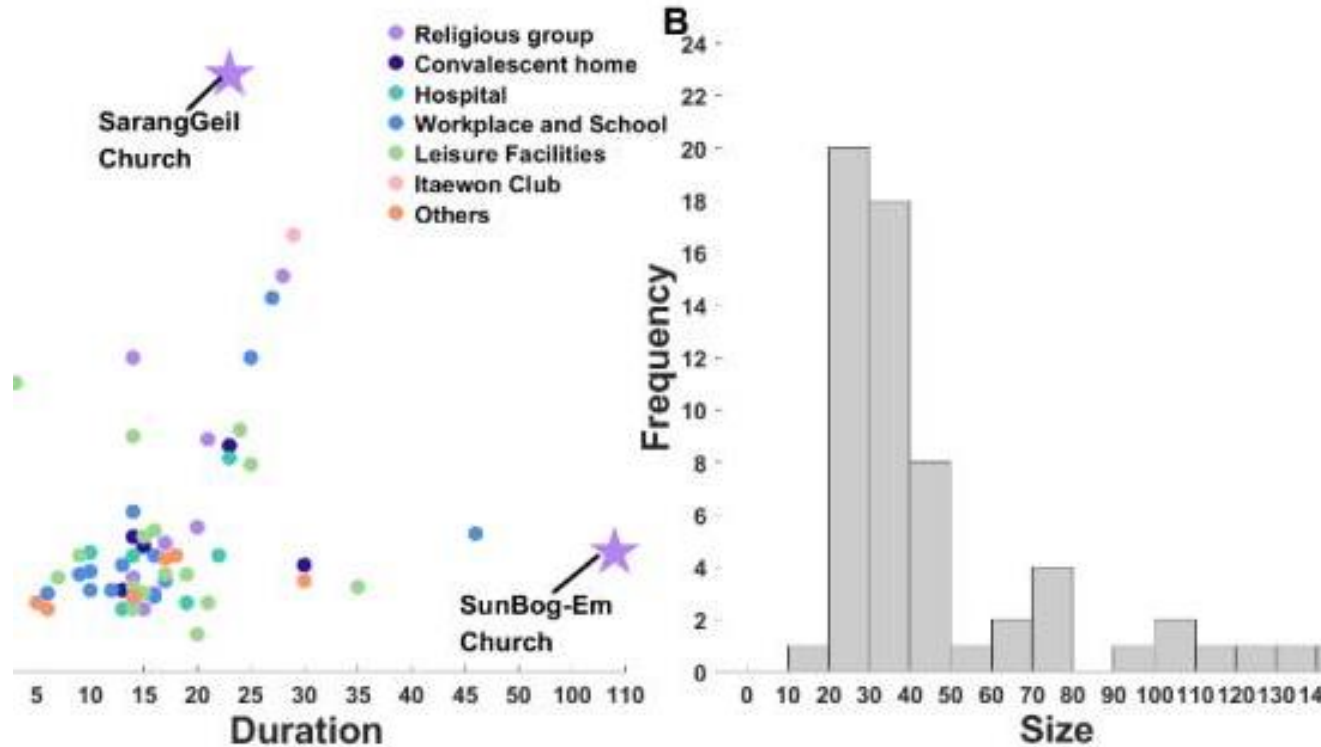
- Bogoch, I. I. *et al.* Potential for global spread of a novel coronavirus from China. *Journal of Travel Medicine* **27**, taaa011 (2020).

Lack of Case Recognition



Tuite, A. R. *et al.* Estimation of Coronavirus Disease 2019 (COVID-19) Burden and Potential for International Dissemination of Infection From Iran. *Annals of Internal Medicine* **172**, 699–701 (2020).

Superspreading events



- 1.
- Lee, H., Han, C., Jung, J. & Lee, S. Analysis of Superspreading Potential from Transmission Clusters of COVID-19 in South Korea. *IJERPH* **18**, 12893 (2021).

IPAC Implications

- Creating safe workplaces for staff
- PPE in PPE shortages
- Outbreak management, both staff and patient
- Balancing what happens outside institution with inside institution
- Resources
- Health care staffing

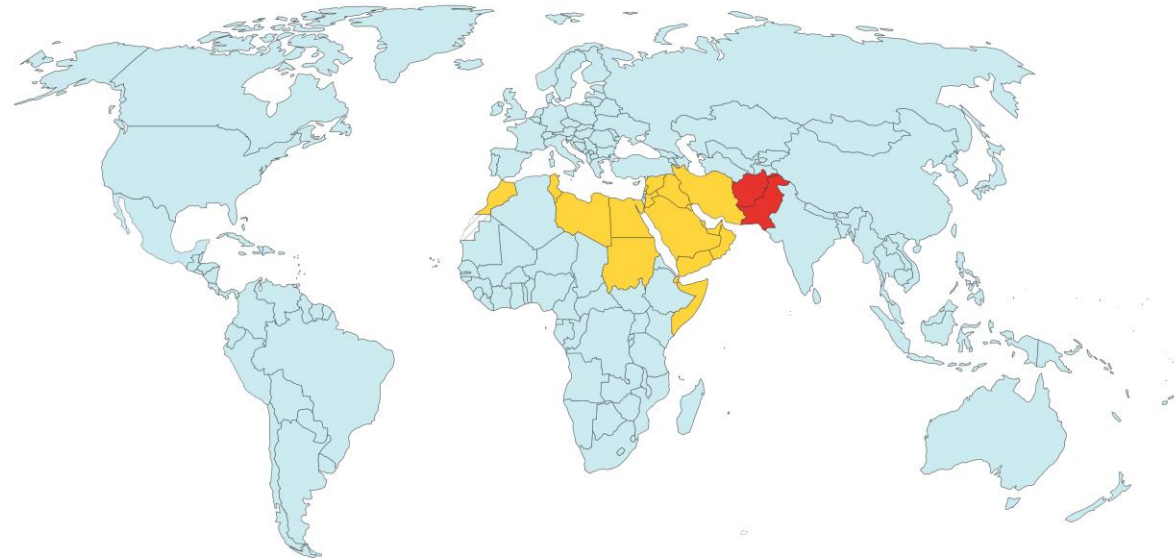


A resurgence of Polio

Progress towards polio eradication, 2020

Countries where there are any cases of paralytic polio from wild polioviruses are considered endemic.

Our World
in Data



WHO Region certified polio-free endemic polio-free (not certified) No data

Source: Global Polio Eradication Initiative

OurWorldInData.org/polio • CC BY

Note: The country Nauru already eradicated polio in 1910 which explains the starting date of this map. The first "larger" countries' eradication of polio can be seen after 1960.

There are two types of poliomyelitis vaccine, Salk and Sabin Comparison Between Salk and Sabin Poliomyelitis Vaccines

	Salk (IPV)	Sabin (OPV)
1	Inactivated (killed)	Live attenuated
2	Injectable	Oral
3	In developed countries	In developing countries
4	Prevents spread of wild polio virus to the nervous system through blood	Limits multiplication of wild poliovirus in the intestine and therefore reduces faecal transmission.
5	No shedding of vaccine virus in the stool	Shedding of vaccine leading to passive immunity of close contacts
6	Expensive (needles & syringe)	Cheap & Easy
7	No side effects	Side effects: vaccine associated paralysis (1/3,000,000 doses)



Morbidity and Mortality Weekly Report (*MMWR*)

CDC

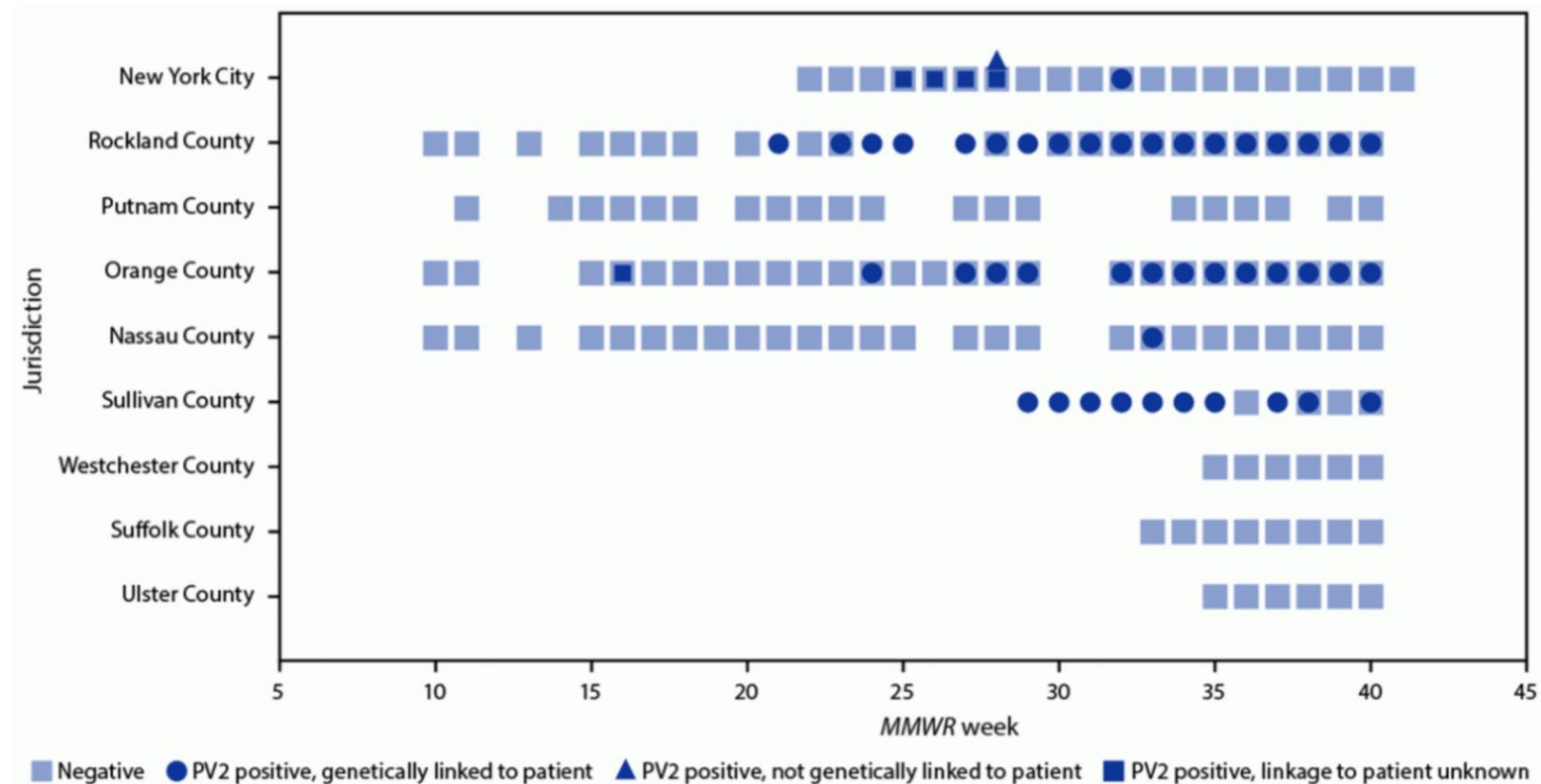
Public Health Response to a Case of Paralytic Poliomyelitis in an Unvaccinated Person and Detection of Poliovirus in Wastewater — New York, June–August 2022

Case

- Unvaccinated man, attended a large gathering (Rockland NY)
- In a week developed acute flaccid paresis along with nonspecific GI symptoms
- Stool sent off per protocols – pos for VDP2 - first case of paralytic polio in USA for decades
- Implications
 - A single paralytic polio case means likely hundreds/thousands of undiagnosed asymptomatic case

Wastewater

FIGURE 1. Wastewater* polio test results,† by jurisdiction[§] (N = 1,053) — 13 counties in New York and New York City, March 9–October 11, 2022



The paradox

-
- Elimination of polio requires most countries to convert to IPV
 - Difficult to scale up in resource poor nations, where polio can become resurgent
 - Oral polio vaccine easy, but vaccine derived polio makes elimination difficult, especially with those not immunized
 - Unclear of what the burden is globally

A solution?



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™



Morbidity and Mortality Weekly Report (*MMWR*)

CDC

Genetic Characterization of Novel Oral Polio Vaccine Type 2 Viruses During Initial Use Phase Under Emergency Use Listing — Worldwide, March–October 2021

Weekly / June 17, 2022 / 71(24);786–790

Novel Polio Type 2 vaccine

-
- Novel polio virus with genetic changes around neurovirulence domain to maintain stability
 - Real life data (~ 215 stool isolates from surveillance from millions of doses)
 - NO reversions to neurovirulence (compared to 100% of old)

IPAC Implications

-
- No onward transmission in hospital, however, community risk is ongoing
 - Large communities with VDP mixing with large communities of unvaccinated may lead to more transmission
 - Unclear of what's “under the surface”
 - Long term disease elimination strategies with vaccines are tricky (but still markedly help)

GUNS N' ROSES



WELCOME TO THE JUNGLE

ALBUM ASPIRINELLE CE 5 EXCEPTO SIMXIF

The Future

- Infectious disease threats more linked due to
 - Globalization/Travel
 - Climate change
 - Mixing of populations
 - Lack of resources for LMIC
- Implications for clinical settings depend on host / pathogen / environment – one cycle of disease may show up with another (i.e. monkeypox)
- Precaution needed early re routes of transmission, but need to generate real world evidence.
- Exposure risks – inpatient, outpatient, laboratory

Malaria

1 Tables

2 Table 1. Clinical characteristics and history of the source and nosocomial malaria cases.

Case	Type	Hospital	Age (year)	Sex	Date of first admission	Reason for first admission	Country of contamination	Care unit of first admission	Days between the first and second admission	Second admission	% par.	Nosocomial transmission	Status
1	Autochthonous	1	9w	F	10-2007	Meningeal syndrome	—	Emergency	18	Emergency (hospital 1)	4.5	Confirmed	Recovered
	Imported malaria	1	4	M	10-2007	<i>P. falciparum</i> imported malaria	Cameroon	Emergency	—	—	0.78		Recovered
2	Autochthonous	2	75	F	11-2019	Altered general condition	—	Emergency	10	Emergency (hospital 2)	16	Confirmed	Recovered
	Imported malaria 1	2	35	F	11-2019	<i>P. falciparum</i> imported malaria	Ivory Coast	Emergency	—	—	1.6		Recovered
	Imported malaria 2	2	69	M	11-2019	<i>P. falciparum</i> imported malaria	Gambia	Emergency	—	—	0.55		Not confirmed
3	Autochthonous	3	70	M	06-2021	Decompensated heart failure	—	Emergency	18	Emergency (hospital 3)	2.8	Confirmed	Died
	Imported malaria	3	35	M	06-2021	<i>P. falciparum</i> imported malaria	Cameroon	Emergency	—	—	ND		Recovered
4	Autochthonous	4	2	F	07-2021	Acute gastroenteritis	—	Emergency	14	Emergency (hospital 4 bis)	7.4	Confirmed	Recovered
	Imported malaria	4	5m	M	07-2021	<i>P. falciparum</i> imported malaria	Cameroon	Emergency	—	—	12		Recovered
5	Autochthonous	5	50	F	09-2021	SARS-CoV-2	—	Intensive care unit	20	Intensive care unit (hospital 5)	7.5	Confirmed	Recovered
	Imported malaria	5	45	M	09-2021	<i>P. falciparum</i> imported malaria	Niger	Intensive care unit	—	—	1.4		Recovered
6	Autochthonous	6	72	M	09-2021	Lung infection	—	Emergency	16	Emergency (hospital 6 bis)	1.3	Confirmed	Recovered
	Imported malaria	6	50	F	09-2021	<i>P. falciparum</i> imported malaria	Mali	Emergency	—	—	5.7		Recovered

Note – % par., parasitaemia in percentage. The “autochthonous” case 1 was 9 weeks of age; the imported case 4 was 5 months of age. ND, not determined.

1.

Coppée, R. *et al.* Nosocomial malaria transmissions resolved by genomic analyses - a retrospective case report study in France (2007-2021). *Clin Infect Dis* ciac813 (2022) doi:[10.1093/cid/ciac813](https://doi.org/10.1093/cid/ciac813).

Malaria

- Genetically related on sequencing of noso/primary case
- Unclear what the source was – some side by side, some on same ward
 - ? Anopheles in hospital – unlikely given single events and no vector locally, large geographical range
 - ? Multi used vials or glucometers

The Laboratory

- Certain pathogens non transmissible in human systems but very transmissible in laboratory
- Melioidosis – grows like pseudomonas, but has different odor (should not be sniffing plates)
 - Routinely not seen here – but outbreak associated with aromatherapy spray in USA
- Brucellosis
 - Increasing travel/refugees from endemic area
- Coccidioidomycosis
 - Increasing cases in SW USA, now a major travel destination for Canadians

The way forward

- There are still wins to be had
- Monkeypox infection – well known practice, and despite fears of airborne transmission, likely pattern was contact/fomite driven
- Thousands of patients seen and diagnosed in clinics across the world
- Very few documented true nosocomial cases – most of these in literature had clear breeches (needlestick injury, not wearing gloves)
- Many “exposed” individuals without appropriate respiratory protections, but still used appropriate contact PPE – without any conversions
- Outbreak is now largely fading

But work needs to be done

- UK – High Consequence infectious diseases network
- 7 sites – 5 dedicated to airborne HCID, 2 dedicated to non airborne VHF – negative pressure with high end ventilation systems
- Network of clinicians, nurses, IPAC prepared, as well as education for NHS
- Lab serum screen multiplex for travellers – custom tests based on region, symptom duration

Lassa

- Returned travellers from Mali
- First traveller mild symptoms – some symptoms but resolved quickly – never tested
- Family member presented with severe VHF – tested positive for Lassa
- Third family member eventually positive
- Significant exposures from traveller 1 – no evidence of downward transmission
- Underscores importance of looking (high risk for nosocomial transmission if ongoing cases)

The path forward

- Diseases will interact with healthcare system due to globalization etc
 - Inpatient
 - Outpatient
 - Laboratory
- Weird new methodologies of infection
- Lots of close calls
- Adherence to IPAC principles often is enough
- Going forward – travel history, phone a friend, don't be afraid that something might happen

Thank you!