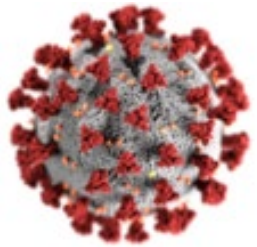
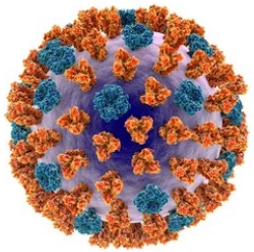
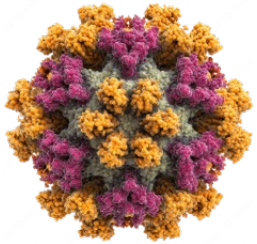




A Scandinavian perspective on future viral threats?

KITM, Lund Göteborg 3/9 2026

Declarations

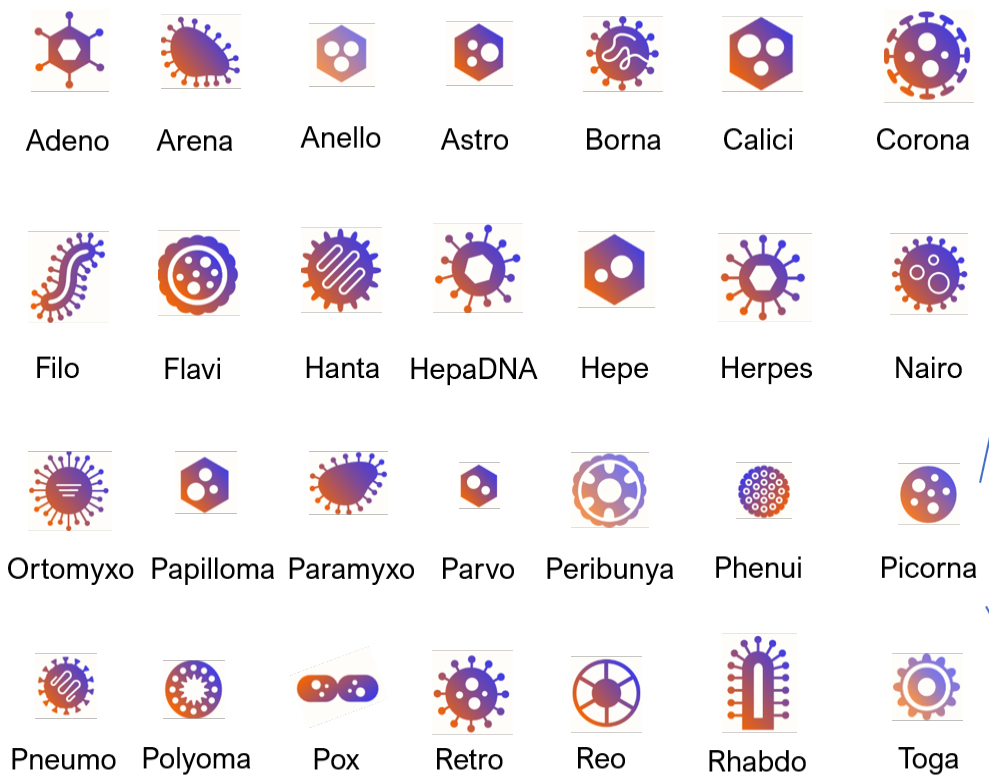
- Secretary general (10%) for Virus- och pandemifonden.

- Virus- och pandemifonden is supported by Cerus (and other companies): www.pandemifonden.se/foretag

- Aims of Virus- och pandemifonden: Strengthen research and share knowledge about virus-caused infections, diseases, outbreaks and pandemics, and their impact on public health, health care and society

https://www.pandemifonden.se/

Current viral threats: Almost 1000 known viruses, less than 5% can be treated with antivirals or prevented with vaccines



Polio (3)

Hepatitis A (4)

Rhino (>150)

Echo (29)

Parecho (18)

Entero (>40)

Coxsackie (27)

Cardio (8)

Almost *1000 known* viruses

Ca 30 can be treated or prevented

RAV Referensgruppen för AntiViral terapi

- BK-virus
- Covid-19
- Cytomegalovirus
- Epstein-Barr virusrelaterade sjukdomar
- Hepatit B-virus
- Hepatit C-virus
- Hepatit D-virus
- Herpes simplex och varicella-zoster virus
- HIV
- Influensa
- JC-virus
- Respiratory syncytial (RS) virus

https://forening.sls.se/rav/rekommendationer

Virus-caused infections lead to acute and secondary diseases

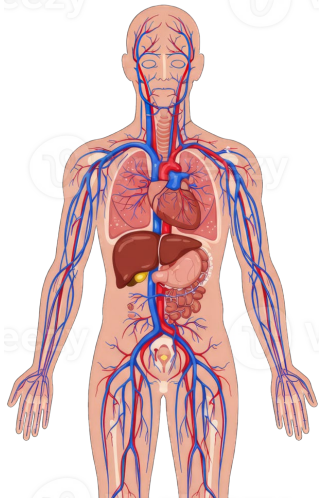
Known, acute diseases (examples)

Airways:
Rhinitis, laryngitis, tonsillitis, bronchitis, pneumonia, etc.

Gut:
Gastroenteritis

Brain:
Encephalitis, meningitis

Liver
Hepatitis



Less known, secondary diseases (exemples)

Cancer:
Cause of cancer
Infection sensitive patients

Cardiovascular diseases:
Increased risk for e.g. myocardial infarction, stroke

Autoimmune diseases:
Increased risk for for e.g. multiple sklerosis.
Infection sensitive patients

Diabetes:
Increased risk.
Infection sensitive patients

Brain and CNS (dementia?):
Permanent brain damage and dysfunctions.

Asthma and COPD:
Induce asthma and exacerbate both asthma/COPD.

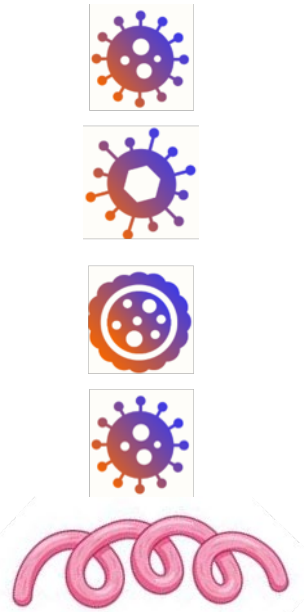
Postinfectious diseases:
Longcovid and ME/CSF.

Antibiotic resistance
Mistreatment of primary infections
Virual infections pave the way for secondary infections.

Point: Many good reasons to counteract virus-caused infections

Known threats of relevance, currently tested for among blood donors:

- **HIV**
- **Hepatitis B virus**
- **Hepatitis C virus**
- **HTLV 1/2**
- **Syphilis**



Known/future viral threats

Wet markets – Covid 19

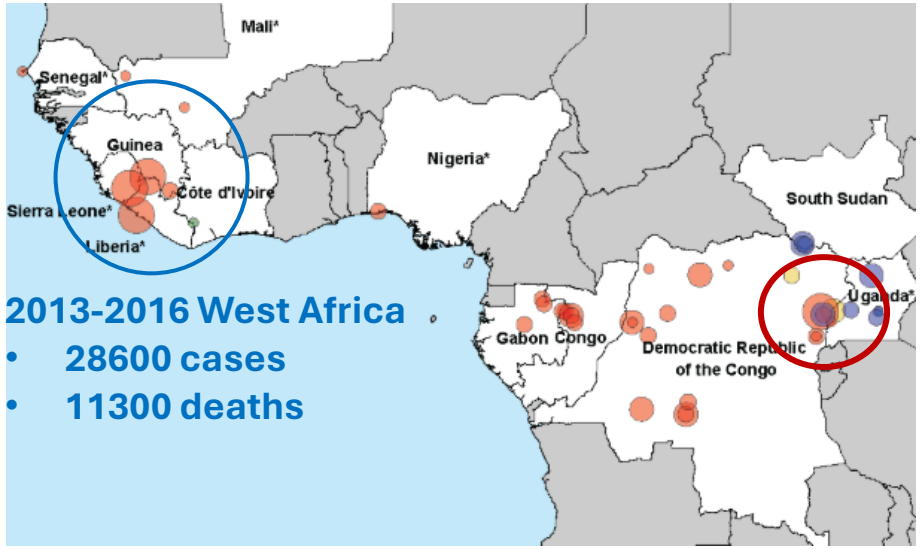
Neglected tropical diseases at the animal-human interface in the Greater Mekong Subregion: Two decades of surveillance in Laos and Cambodia. Blacksell et al. 2026. PLOS Neglected Tropical Diseases

“**Many infectious diseases** that affect people in Southeast Asia **originate from animals**, particularly in rural communities where livestock are raised close to households and food is often prepared using traditional methods.”

”… limited diagnostic capacity and fragmented surveillance..:”

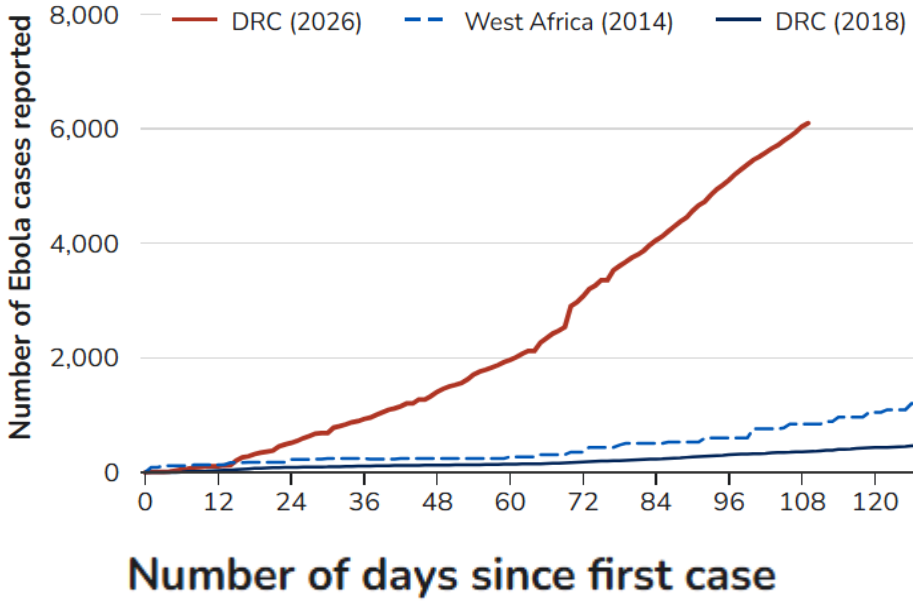
Known/future viral threats

Conflict zones – health care



2013-2016 West Africa
- **28600 cases**
- **11300 deaths**

DRC
- **>6100 cases**
- **>2900 deaths**



African fruit bat

Sources:
https://www.cdc.gov/ebola/situation-summary/index.html
https://www.cdc.gov/ebola/outbreaks/index.html
https://www.fda.gov/vaccines-blood-biologics/safety-availability-biologics/important-information-blood-establishments-regarding-ebola-disease-and-blood-donation

Known/future viral threats

Travelling/globalisation

Increasing population: > 8.3 Bn individuals

We like to travel!

Andes virus

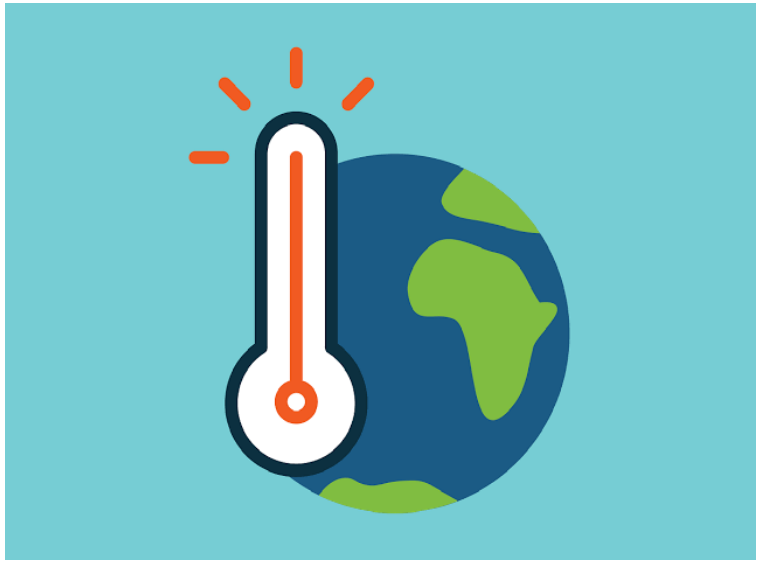
- 2026 Outbreak: 13 cases, three deaths.

Long-tailed pygmy rice rat

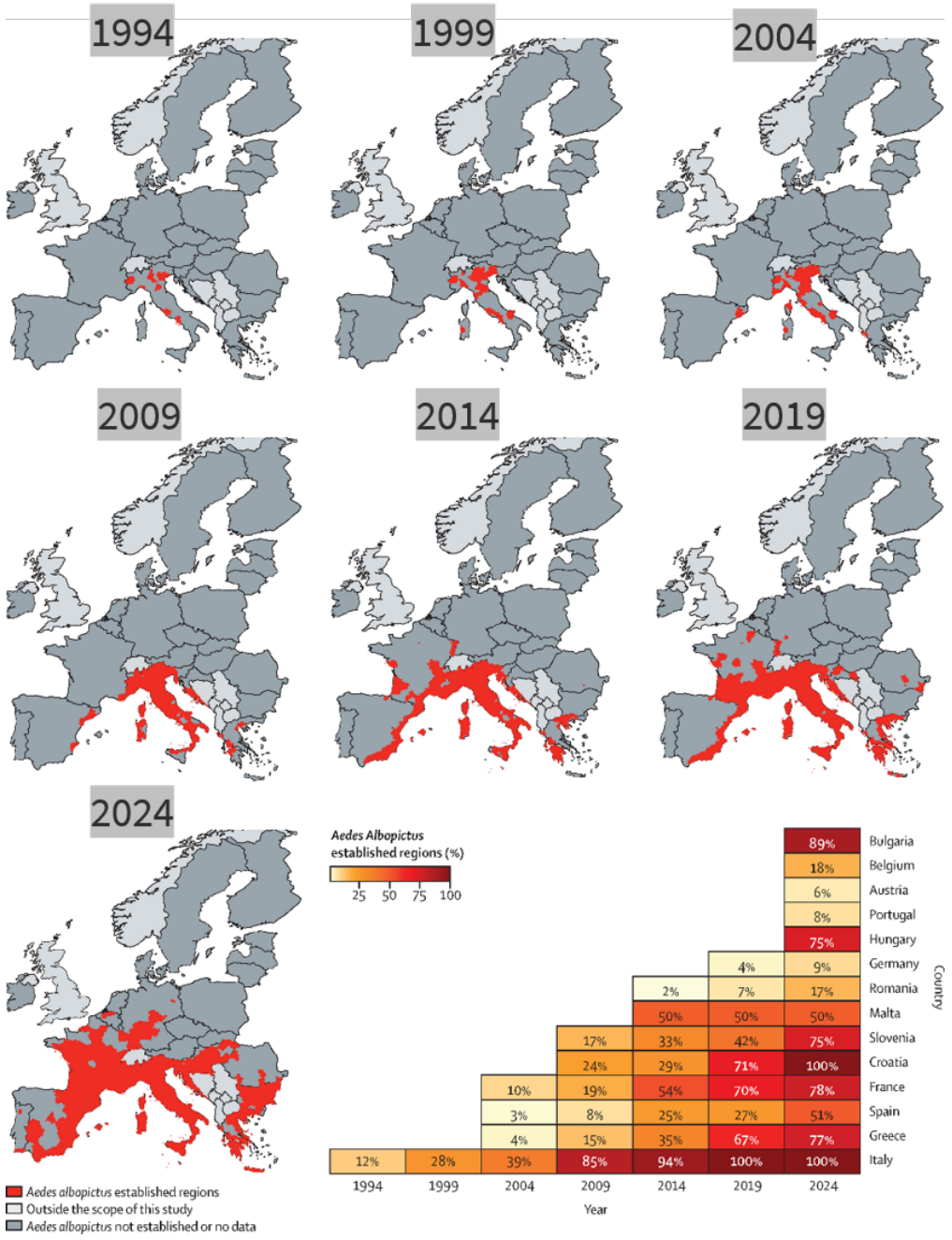
Sources:

1. https://www.worldometers.info/world-population/
2. https://www.who.int/emergencies/disease-outbreak-news/item/2026-DON611

Climate change



Aedes Albopictus distribution



Farrok et al. *Impact of climate and Aedes albopictus establishment on dengue and chikungunya outbreaks in Europe*: a time-to-event analysis. 2024. Lancet Planetary Health.

Known/future viral threats - *Flaviviridae*

Virus	Vectors		Documented transfusion-transmission
Dengue virus			**Yes**
Yellow fever virus		*Aedes*	**Yes**
Zika virus			**Yes**
West Nile virus			**Yes**
Japanese encephalitis virus		*Culex*	**Yes**
St Louis encephalitis virus			**Yes**
Tick borne encephalitis virus		*Ixodes*	**Yes**

Sources:
https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0010843
https://www.cdc.gov/dengue/transmission/blood-donations.html

Known/future viral threats – *Flaviviridae* – Zikavirus

World Health Organization

Health Topics | Countries | Newsroom | Emergencies

Home / Publications / Overview / Zika: the origin and spread of a mosquito-borne virus

Zika: the origin and spread of a mosquito-borne virus

Research

9 February 2016 | Publication

https://www.who.int/publications/m/item/zika-the-origin-and-spread-of-a-mosquito-borne-virus

Zika disease: Guillaine Barré and microcephaly

1960s to 1980s: Human cases reported only in Africa and Asia

2007: Outbreak on Yap, Micronesia

2013-2014: Outbreak in French Polynesia

2015: First reports of autochthonous transmission in Brazil.

Early 2016: PHEIC declared by WHO

End of 2016: In total: >750,000 suspected and confirmed cases reported.

Brazil: >3,000 cases of microcephaly

Sources:
https://pmc.ncbi.nlm.nih.gov/articles/PMC5853392/
https://www.who.int/emergencies/disease-outbreak-news/item/8-january-2016-brazil-microcephaly-en

March 31, 2014: "…in French Polynesia, [45 out of] *1505 asymptomatic blood donors are reported to be positive for Zika by PCR. These findings alert authorities to the risk of post-transfusion Zika fever.* **34.**

34. Musso et al. Euro Surveill. 2014. *Potential for Zika virus transmission through blood transfusion* demonstrated during an outbreak in French Polynesia, November 2013 to February 2014.

Barjas Castro et al. Transfusion 2016: *Probable transfusion-transmitted Zika virus in Brazil*
Donor called blood department three days after donation: Febril illness. Blood used during a liver transplantation. Recipient tested negative for DENV but positive for ZIKV. Sequencing: Identical genomes.

- **The *Aedes* mosquito was already there.**
- **Increasing population and travelling bring viruses to new places with susceptible populations of animals, and humans.**

Known/future viral threats – *Flaviviridae* – *Zika and* Dengue virus

Zika virus cases in Europe

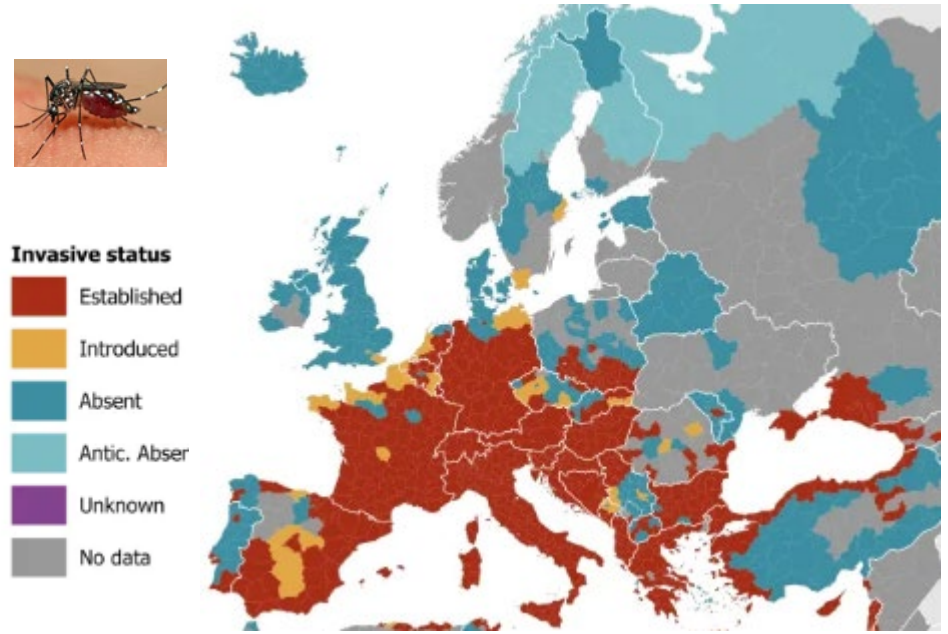
- 28 autochthonous cases since 2014.
- 20 during 2016. Most in France.
- Other cases in Germany and Norway (1).
- Travel-associated cases in Sweden since 2014: 55, of which 50 in 2016-2017.

Dengue virus cases in Europe

- Few autochthonous cases until 2022.
- 2024: 328 autochthonous cases
- Autochthonous cases so far in Croatia, France, Spain, Italy, Germany, and Portugal (not Sweden).
- Travel-associated cases in Sweden since 2008: Ca 150/year

https://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=70

Aedes invasive species distribution 2026



https://www.ecdc.europa.eu/en/publications-data/aedes-invasive-mosquitoes-current-known-distribution-april-2026

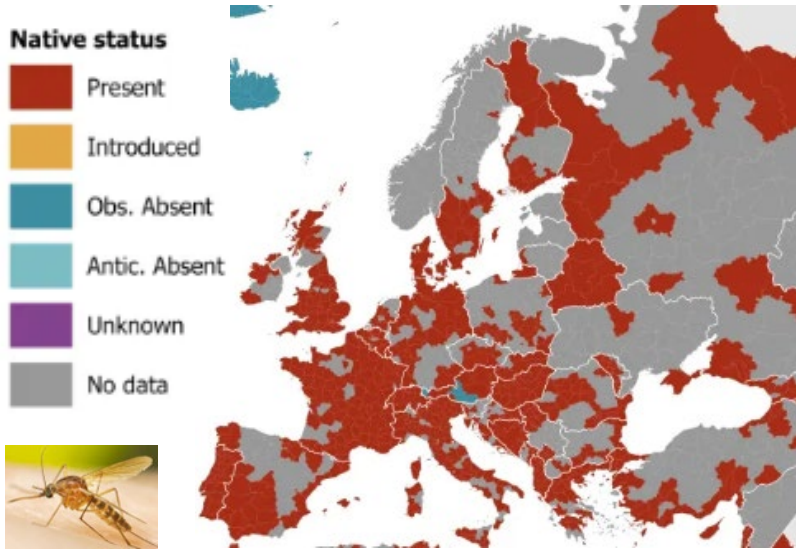
Autochthonous Dengue cases in Europe

Known/future viral threats – *Flaviviridae* – West Nile virus

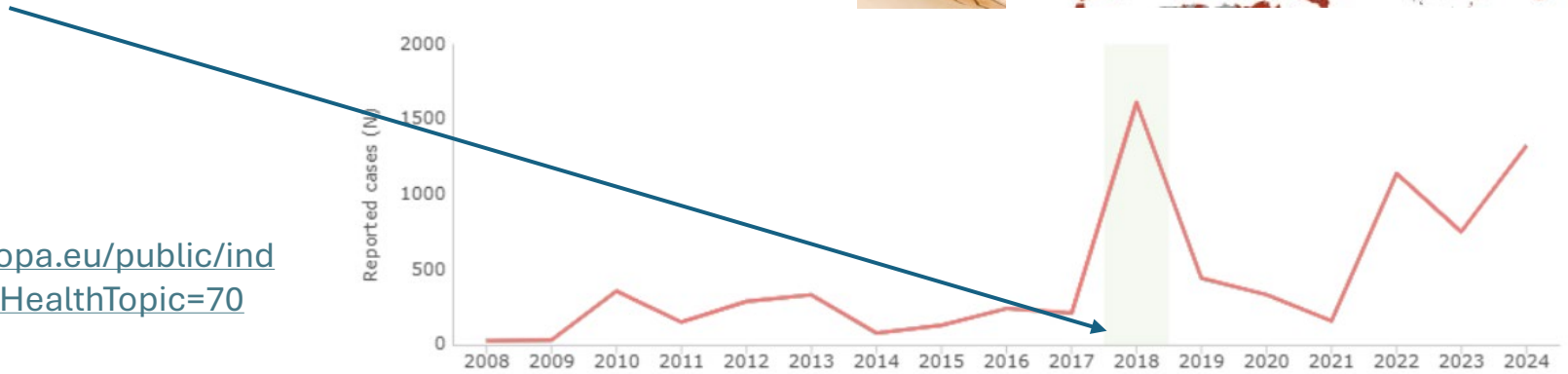
West Nile virus cases in Europe

- 2011: 128 autochthonous cases in Europe.
- 2020: 336 autochthonous cases in Europe.
- 2024: 1412 autochthonous cases in Europe.
- Autochthonous cases so far in 15 countries (not Sweden).
- Northernmost auth…: The Netherlands and Germany.
- Travel-associated cases in Sweden since 2008: 17, of which 12 in 2018.

Culex pipiens distribution, April 2026



https://www.ecdc.europa.eu/en/disease-vectors/surveillance-and-disease-data/native-mosquito-maps



https://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=70

Known/future viral threats

Some other viruses known to transmit by transfusion

Cytomegalovirus
Parvovirus B19
Epstein Barr virus
Hepatitis A and E virus, probably also hepatitis D virus (eliminated when eliminating HBV-positive blood)
Powassan virus
Ross River virus
Colorado tick fever virus

Sources:

https://academic.oup.com/cid/article/72/6/1051/5857602
https://www.mja.com.au/journal/2015/202/5/first-reported-case-transfusion-transmitted-ross-river-virus-infection
https://www.cdc.gov/colorado-tick-fever/causes-and-spread/index.html
https://pubmed.ncbi.nlm.nih.gov/2844331/
https://pmc.ncbi.nlm.nih.gov/articles/PMC4924464/
https://pubmed.ncbi.nlm.nih.gov/39421644/
https://pubmed.ncbi.nlm.nih.gov/42397729/
https://pubmed.ncbi.nlm.nih.gov/8555507/
https://onlinelibrary.wiley.com/doi/10.1111/trf.16149

Known/future viral threats

Some other viruses found in asymptomatic blood donors:

Chikungunya virus
Oropouche virus
Western equine encephalitis virus
Usutu virus
Influenza A virus H3N2
Parvovirus
Severe Fever With Trombocytopenia Syndrome Bunyavirus
Human Pegivirus
Torque Teno virus

Sources:
https://www.ijidonline.com/article/S1201-9712(26)00151-7/fulltext
https://pubmed.ncbi.nlm.nih.gov/42521678/
https://www.mdpi.com/2414-6366/11/5/138
https://pmc.ncbi.nlm.nih.gov/articles/PMC11860395/
https://wwwnc.cdc.gov/eid/article/26/7/20-0549_article#:~:text=Our%20study%20demonstrates%20the,theoretical%20grounds
https://pmc.ncbi.nlm.nih.gov/articles/PMC3666916/#:~:text=The%20paper%20by%20Sharp%20et,clotting%20factors%2C
https://academic.oup.com/cid/article/54/2/249/468741
https://medcraveonline.com/JHVRV/a-review-on-torque-teno-virus.html
https://pubmed.ncbi.nlm.nih.gov/41452102/

Malaria (can also be transmitted by blood transfusion) in Frankfurt airport workers
https://pmc.ncbi.nlm.nih.gov/articles/PMC6634438/
https://www.dw.com/en/frankfurt-airport-workers-die-after-malaria-infection/a-78512056

Unknown viruses in nature

Science Feb 23, 2018

The Global Virome Project

https://www.science.org/doi/10.1126/science.aap7463

"...we can reasonably expect that between 631,000 and 827,000 of these unknown viruses have zoonotic potential"

"We have no readily available technological countermeasures to these as-yet-undiscovered viruses."

Known/future viral threats

Important questions - viremia

- Are there *infectious* virus in blood from donors that can transmit further?
- How do we define viremia? RNA/DNAemia is not the same thing as viremia.
  Presence of viral DNA/RNA *does not prove but point at a risk* of the presence of infectious virus.
- No/few clinical microbiology laboratories isolate virus for diagnostic purposes.

Summary

- We know that many viruses are found in blood in asymptomatic individuals and blood donors
- Many documented cases of transfusion transmission.
- Epidemiological patterns change over time, now faster than before.
- *How do we prepare the blood supply organisation against known and unknown pathogens?*

Thx

Viruskollen.se – developed by Virus- och pandemifonden

www.viruskollen.se
www.pandemifonden.se