

# Global Health Cast 35

April 27th, 2023

**Every Week**

12.00 noon - CET



Dr. Melvin Sanicas



Prof. Dr. Joe Schmitt

# What we talk about today

- **COVID-19 update**
- **RSVPreF OA: Efficacy and license**
- **COVID19: Past and future of vaccine platforms**
- **HPV vaccine – 1 dose sufficient?**
- **“Most Infectious Diseases”: Lassa Fever**

**Figure 1. COVID-19 cases reported by WHO Region, and global deaths by 28-day intervals, as of 16 April 2023\*\***

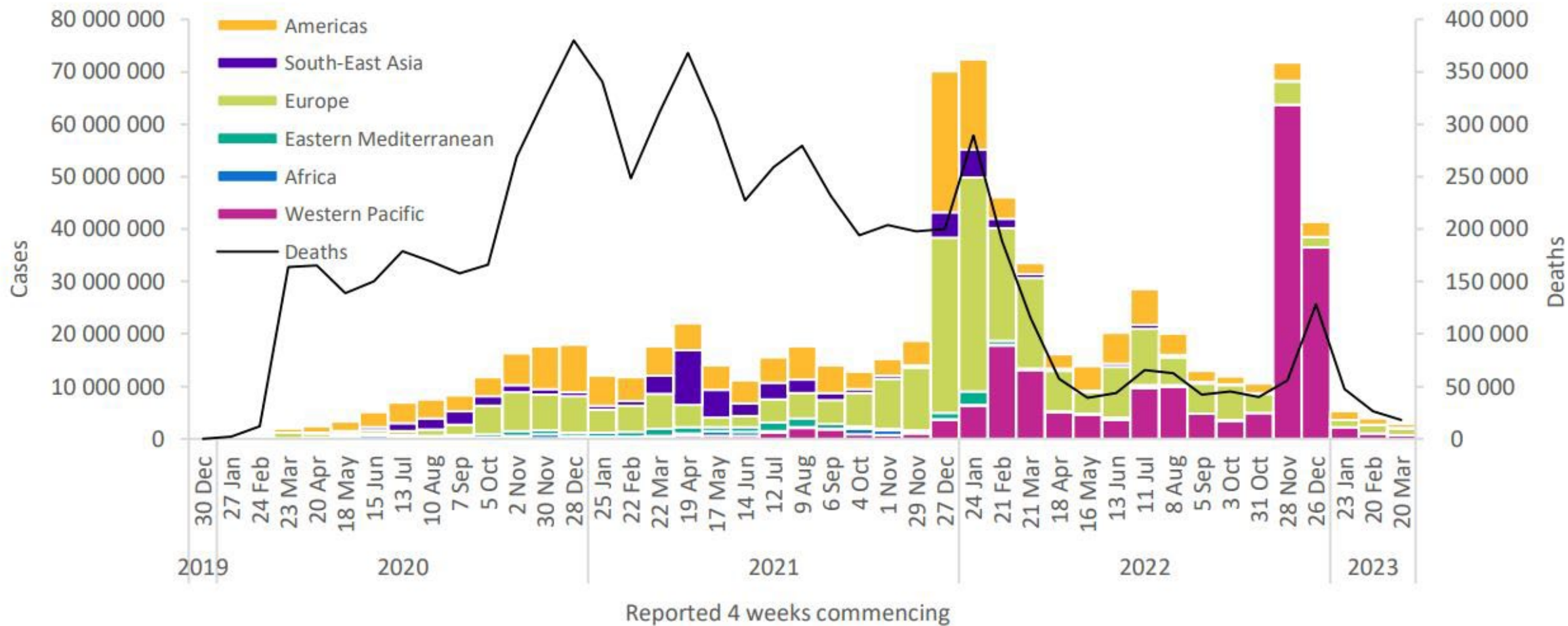
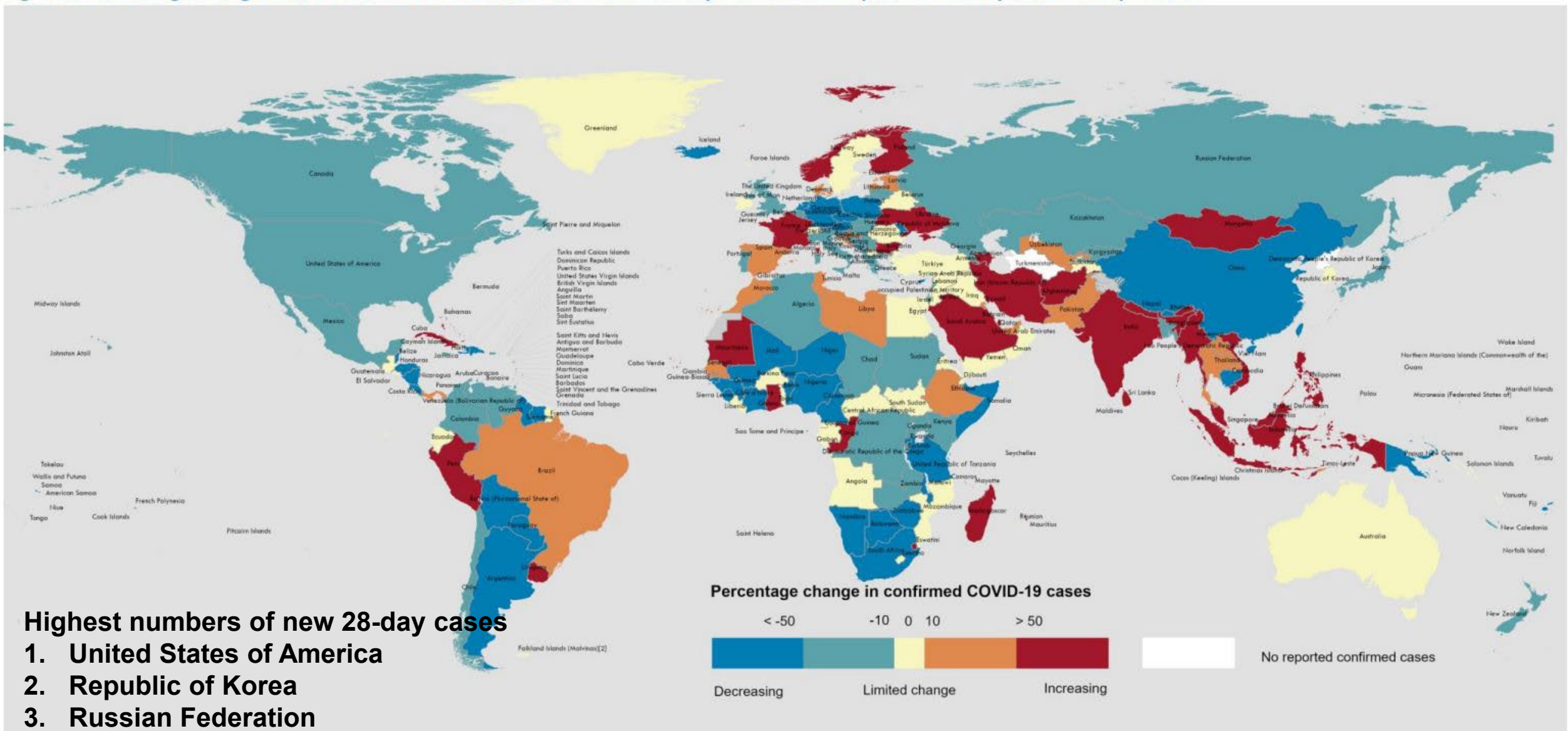


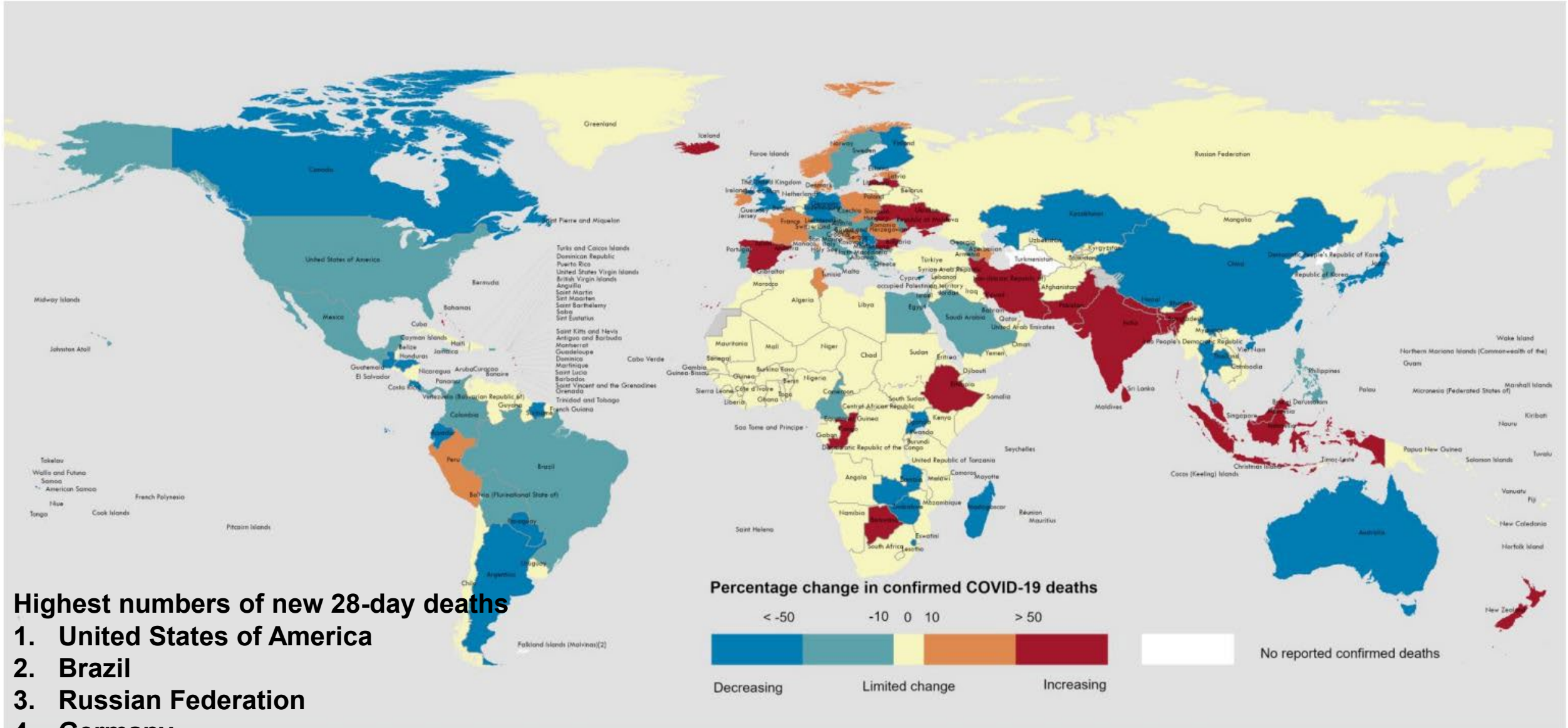
Figure 2. Percentage change in confirmed COVID-19 cases over the last 28 days relative to the previous 28 days, as of 16 April 2023\*\*



**Highest numbers of new 28-day cases**

1. United States of America
2. Republic of Korea
3. Russian Federation
4. France
5. Brazil

Figure 3. Percentage change in confirmed COVID-19 deaths over the last 28 days relative to the previous 28 days, as of 16 April 2023\*\*



- Highest numbers of new 28-day deaths**
1. United States of America
  2. Brazil
  3. Russian Federation
  4. Germany
  5. Islamic Republic of Iran

**Table 2. Weekly prevalence of SARS-CoV-2 VOIs and VUMs, week 9 to week 13 of 2023**

Lineage	Countries	Sequences	2023-09	2023-10	2023-11	2023-12	2023-13
XBB.1.5* (VOI)	96	163 056	46.24	47.30	47.45	48.94	50.81
XBB.1.16* (VOI) <sup>§</sup>	31	3038	0.52	1.19	1.99	4.18	4.15
BA.2.75*	121	106 256	5.13	4.91	4.66	2.10	1.76
CH.1.1*	88	41 605	6.44	5.68	5.46	4.66	5.18
BQ.1*	144	413 059	11.12	9.19	7.45	5.04	3.99
XBB*	124	84 336	8.40	11.67	14.62	19.95	25.80
XBB.1.9.1*	64	11 530	4.41	5.34	6.22	6.96	7.91
XBF*	49	8 947	1.08	1.21	0.93	0.78	0.70
Unassigned	98	293 052	10.42	8.83	8.92	7.75	0.46
Other <sup>†</sup>	207	6 693 030	1.08	1.04	1.02	1.42	2.07

\* Includes descendant lineages, except those individually specified elsewhere in the table. For example, XBB\* does not include XBB.1.5, XBB.1.9.1, XBF and XBB.1.16.

<sup>§</sup> The prevalence of XBB.1.16 was extracted from GISAID on 17 April 2023 using the nucleotide substitutions T12730A, T28297C, A28447G.

<sup>†</sup> Others are other circulating lineages excluding the VOI, VUMs, BA.1\*, BA.2\*, BA.3\*, BA.4\*, BA.5\*, BF.7\*.

# RSVPreF3 OA Efficacy in Older Adults

## BACKGROUND

RSV is an important cause of LRTI-ARI in older adults.

## METHODS

Ongoing, international, placebo-controlled, phase 3 trial, random 1:1 assignment of adults  $\geq 60$  years: single dose of **AS01E-adjuvanted RSV** pre F protein (RSVPreF OA; 120  $\mu\text{g}$ ) or placebo before the RSV season. Primary objective: VE against RSV-related (PCR+, subtype A and B) LRT / severe LRTI disease during one RSV season. (Lower limit of the CI around efficacy estimate  $> 20\%$ . RSV subtype (A and B) were performed. Safety evaluation.

## RESULTS

24,966 participants (12,467 RSVPreF3 OA; 12,499 placebo. Median follow-up 6.7 months,

VE: LRTI **82.6%** (96.95% CI, 57.9 to 94.1); 7 vaccine group versus 40 placebo-group cases.

VE severe LRTI **94.1%** (95% CI, 62.4 to 99.9) (**assessment by investigator**)

VE RSV-ARI: **71.7%** (95% CI, 56.2 to 82.3)

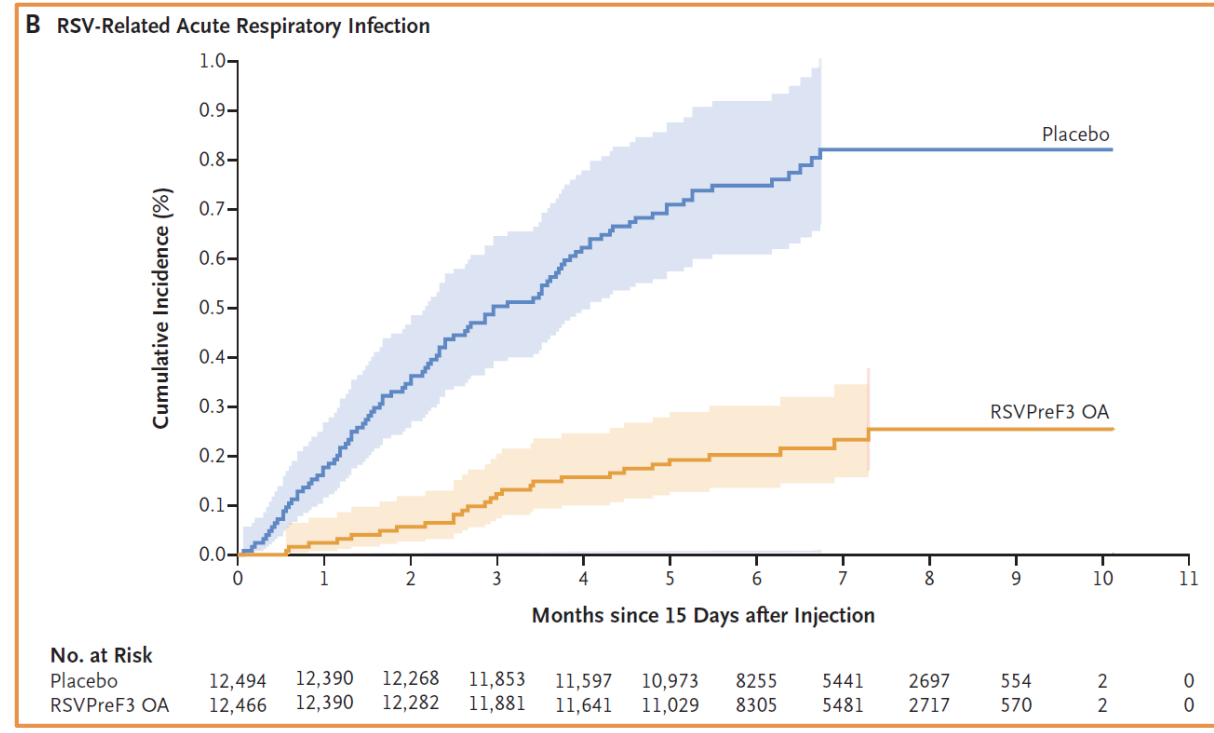
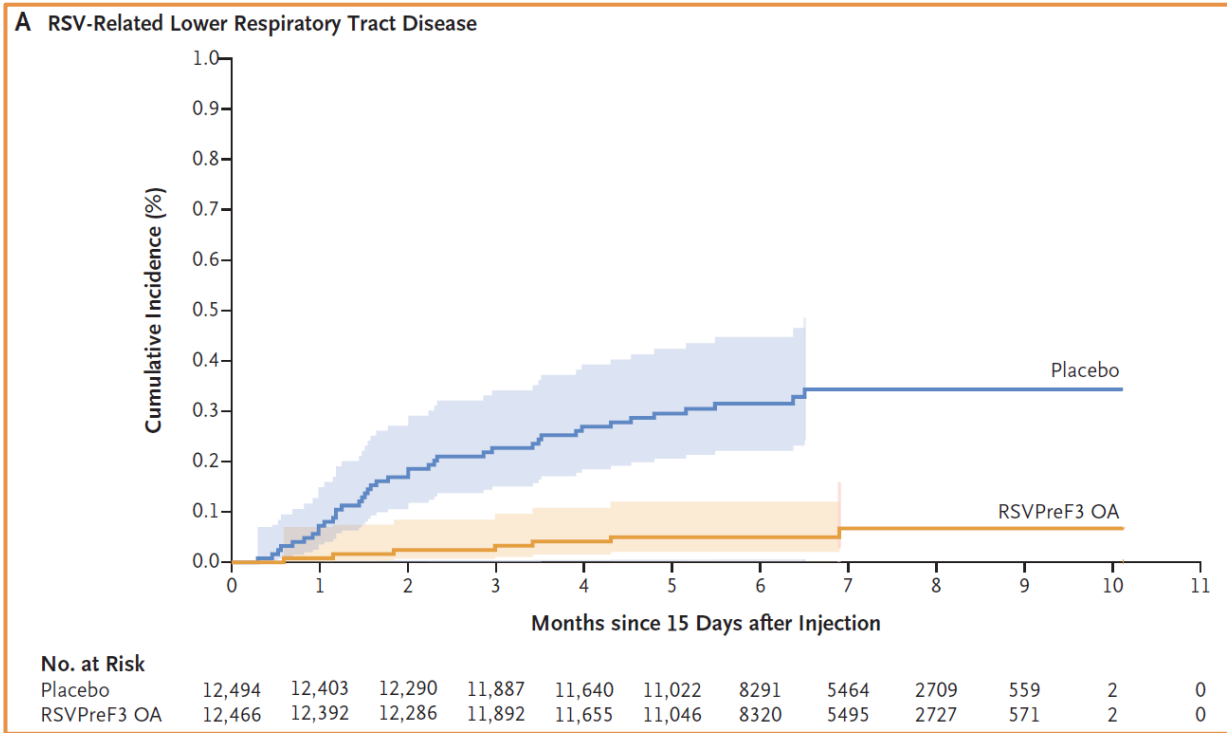
VE RSV-A/B LRTI: **84.6% / 80.9%**; ARI **71.9% and 70.6%**,

High VE in those with underlying diseases; RSVPreF3 OA more reactogenic than placebo. SAE / potential immune-mediated diseases similar in both groups.

## CONCLUSIONS

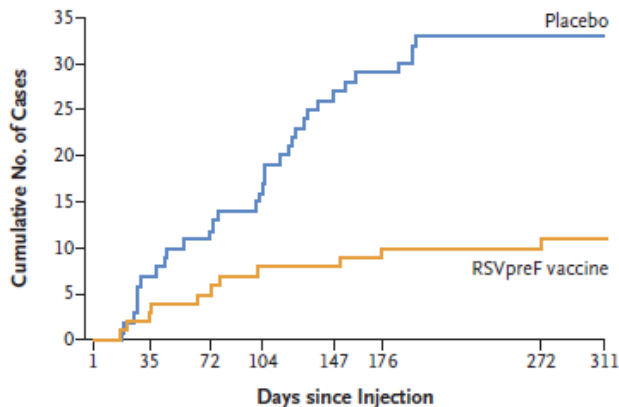
A single dose of the RSVPreF3 OA had acceptable safety profile and prevented RSV-related acute respiratory infection and lower respiratory tract disease and severe RSV-related lower respiratory tract disease in adults 60 years of age or older, regardless of RSV subtype and the presence of underlying coexisting conditions.

# Cumulative Incidence, RSV-Related LRT-disease / RSV-Related ARI





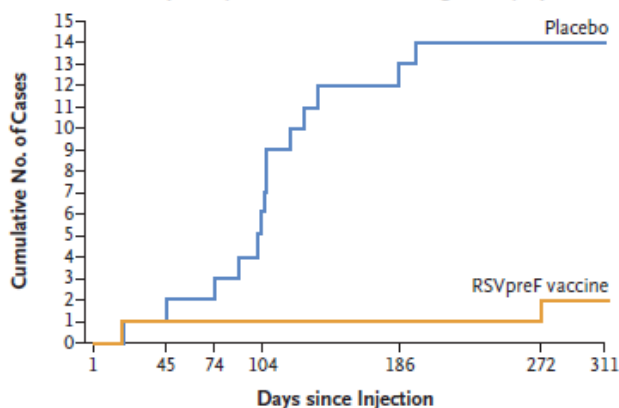
**A RSV-Associated Lower Respiratory Tract Illness with  $\geq 2$  Signs or Symptoms**



**Vaccine Efficacy  
(96.66% CI)  
percent  
66.7 (28.8–85.8)**

Cumulative No. of Cases	0	7	12	17	27	29	33	33
Placebo	0	7	12	17	27	29	33	33
RSVpreF vaccine	0	3	5	8	8	10	11	11

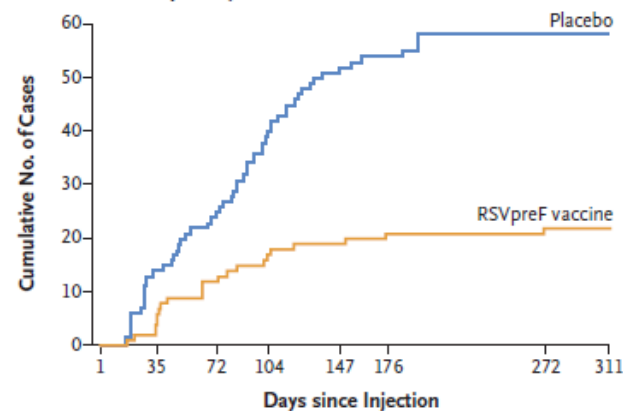
**B RSV-Associated Lower Respiratory Tract Illness with  $\geq 3$  Signs or Symptoms**



**Vaccine Efficacy  
(96.66% CI)  
percent  
85.7 (32.0–98.7)**

Cumulative No. of Cases	0	2	3	7	13	14	14
Placebo	0	2	3	7	13	14	14
RSVpreF vaccine	0	1	1	1	1	2	2

**C RSV-Associated Acute Respiratory Illness**



**Vaccine Efficacy  
(95% CI)  
percent  
62.1 (37.1–77.9)**

Cumulative No. of Cases	0	14	25	40	52	54	58	58
Placebo	0	14	25	40	52	54	58	58
RSVpreF vaccine	0	4	12	17	19	21	22	22

# Efficacy of Bivalent RSVpreF, Adults $\geq 60$ Years, (Interim)

# First vaccine to protect older adults from respiratory syncytial virus (RSV) infection



News 26/04/2023

EMA has recommended a marketing authorisation in the European Union (EU) for **Arexvy** (recombinant, adjuvanted), the first vaccine for active immunisation to protect adults aged 60 years and older against lower respiratory tract disease (LRTD) caused by respiratory syncytial virus (RSV).

RSV is a common respiratory virus that usually causes mild, cold-like symptoms. Most people recover within one to two weeks, but RSV can be serious in vulnerable people, including older adults and those with lung or heart disease and diabetes. In Europe, RSV causes an estimated 250,000 hospitalisations and 17,000 in-hospital deaths every year in people aged 65 years and older.

Arexvy contains an engineered version of the RSV fusion surface glycoprotein. This protein is essential for RSV to infect the body and is also the main target of the antibodies generated to fight the infection. The vaccine also contains an 'adjuvant', a substance to help strengthen the immune response to the vaccine. When a person is given the vaccine, their immune system generates specific antibodies and T cells that help prevent RSV infection.

# Covid vaccines doses per company in 2023 worldwide

Company		Number of Doses
Pfizer/BioNTech	(mRNA)	153,027,497,763
Moderna	(mRNA)	40,437,997,824
Oxford/AstraZeneca	(AdV)	15,681,378,479
Sinopharm/Beijing	(WV)	5,181,992,534
Johnson&Johnson	(AdV)	2,989,398,379
Sputnik V	(AdV)	2,256,033,397
Sinovac	(WV)	1,026,888,299
Novavax	(SU adjuv)	110,670,879
CanSino	(AdV)	97,695,715
Valneva	(WV)	1,602,322
Sanofi/GSK	(SU adjuv)	670,314
SKYCovione	(SU-np-ASO3)	50,282
Covaxin	(WV)	16,433

**>20 million lives saved to date**

# Future Covid Vaccine Pipeline

Platform		Candidate vaccines (no. and %)	
PS	Protein subunit	59	32%
VVnr	Viral Vector (non-replicating)	25	14%
DNA	DNA	17	9%
IV	Inactivated Virus	22	12%
RNA	RNA	43	24%
VVr	Viral Vector (replicating)	4	2%
VLP	Virus Like Particle	7	4%
VVr + APC	VVr + Antigen Presenting Cell	2	1%
LAV	Live Attenuated Virus	2	1%
VVnr + APC	VVnr + Antigen Presenting Cell	1	1%
BacAg-SpV	Bacterial antigen-spore expression vector	1	1%
		<b>183</b>	

## NEW Kenyan Study: 1-Dose HPV Vaccine Highly Efficacious over 3 years

- A randomized, multicenter, double-blind, controlled trial included 2,275 women between the ages of 15-20, who were randomly assigned to receive either a single dose of the bivalent or nonavalent HPV vaccine or the control vaccine.
- Participants were regularly tested for HPV DNA, with cervical and vaginal swabs collected at regular intervals.
- The results showed that the **single dose of both the bivalent and nonavalent HPV vaccines were highly efficacious**, with a **vaccine efficacy of 98%**. Additionally, the nonavalent vaccine had a vaccine efficacy of 96% for the nine types of HPV it targets.

*The Kenya Medical Research Institute (KEMRI) is a State Corporation established in Kenya in 1979 and currently ranks as one of the leading Centres of excellence in health research both in Africa globally.*

## 9 of the most infectious diseases the WHO has identified to date:

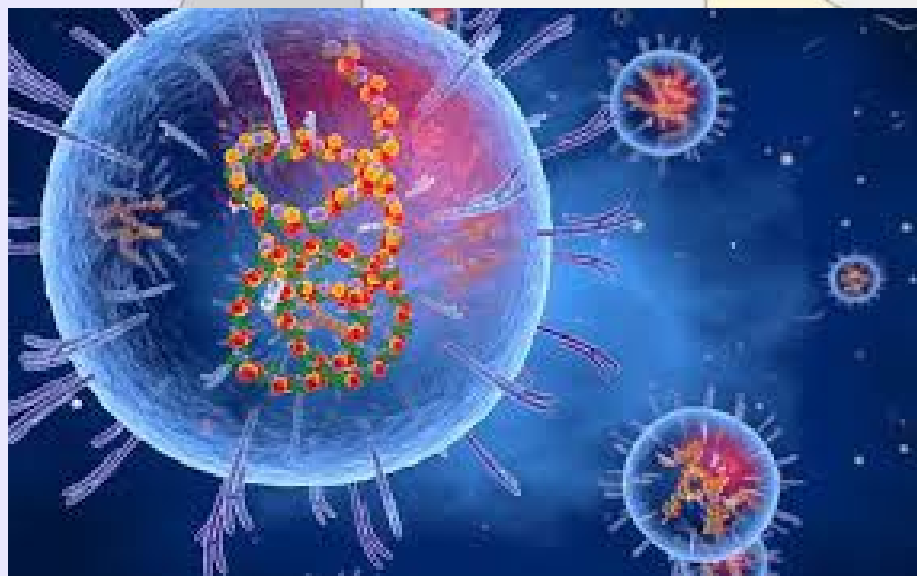
- ✓ Nipah virus **Check out GHC 33**
- ✓ Crimean-Congo hemorrhagic fever **Check out GHC 34**
  - Lassa fever
  - Rift Valley fever
  - Zika
  - Ebola and Marburg
  - Middle East respiratory syndrome (MERS)
  - Severe acute respiratory syndrome (SARS)
  - COVID-19





Disease X (any unknown pathogen that could cause a future outbreak)

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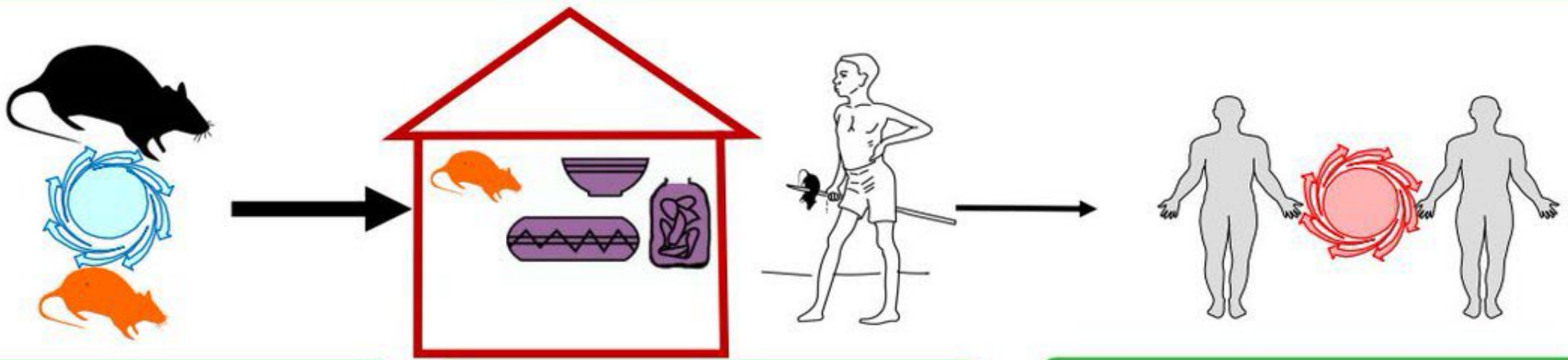
-  Lassa endemic areas
-  Countries with evidence of Lassa virus infection
-  Countries reporting outbreaks
-  Not applicable

**Lassa fever is reported in Benin, Côte d'Ivoire, Ghana, Guinea, Liberia, Mali, Nigeria, Sierra Leone and Togo**





# Lassa fever Transmission



## Reservoir *Mastomys* rats

- The virus maintains itself in *Mastomys* rat population
- Virus is present in urine and feces of infected rats

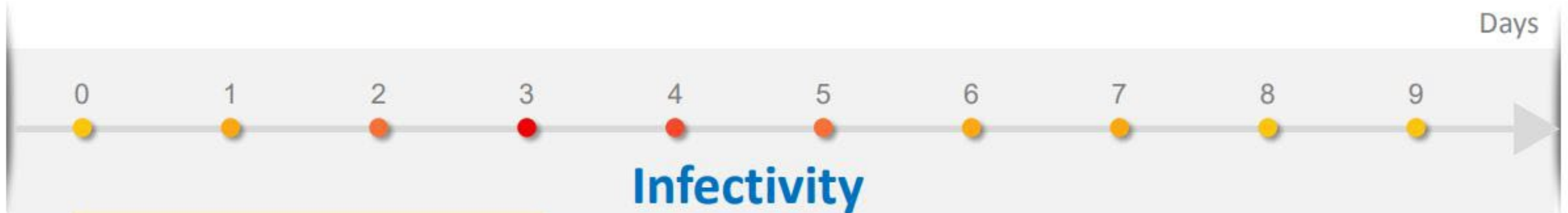
## Primary human infections

- 80 to 90 % of humans are infected through:
- Food or household items contaminated by infected rats' urine and faeces.
  - Direct contact while handling *Mastomys* rats (food source)

## Secondary human infections

- Secondary human-to-human transmission occurs through direct contact with the blood, secretions, organs or other body fluids of infected persons.

## Evolution of Lassa fever disease from symptom onset



- Fever
- Extreme fatigue
- General weakness

- Headache
- Severe sore throat
- Diarrhoea
- Vomiting

- Face swelling
- Low blood pressure
- Nose bleeding



- Particularly severe in pregnant women and their fetuses (fetal death rate greater than 85%)
- Increased maternal mortality in third trimester (greater than 30%)



- Significant cause of pediatric hospitalizations in some areas of West Africa
- Infants (up to 2 years old) can present a 'swollen baby syndrome' and is associated with high case fatality rate

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- **COVID19: Past and future of vaccine platforms**
- **HPV vaccine – 1 dose sufficient?**
- **“Most Infectious Diseases”: Lassa Fever**

**Unlike the brain,  
the stomach alerts you  
when it is empty.**

**The big difference is  
the stomach alerts only  
that person, but the  
brain alerts everyone  
else when it's empty.**