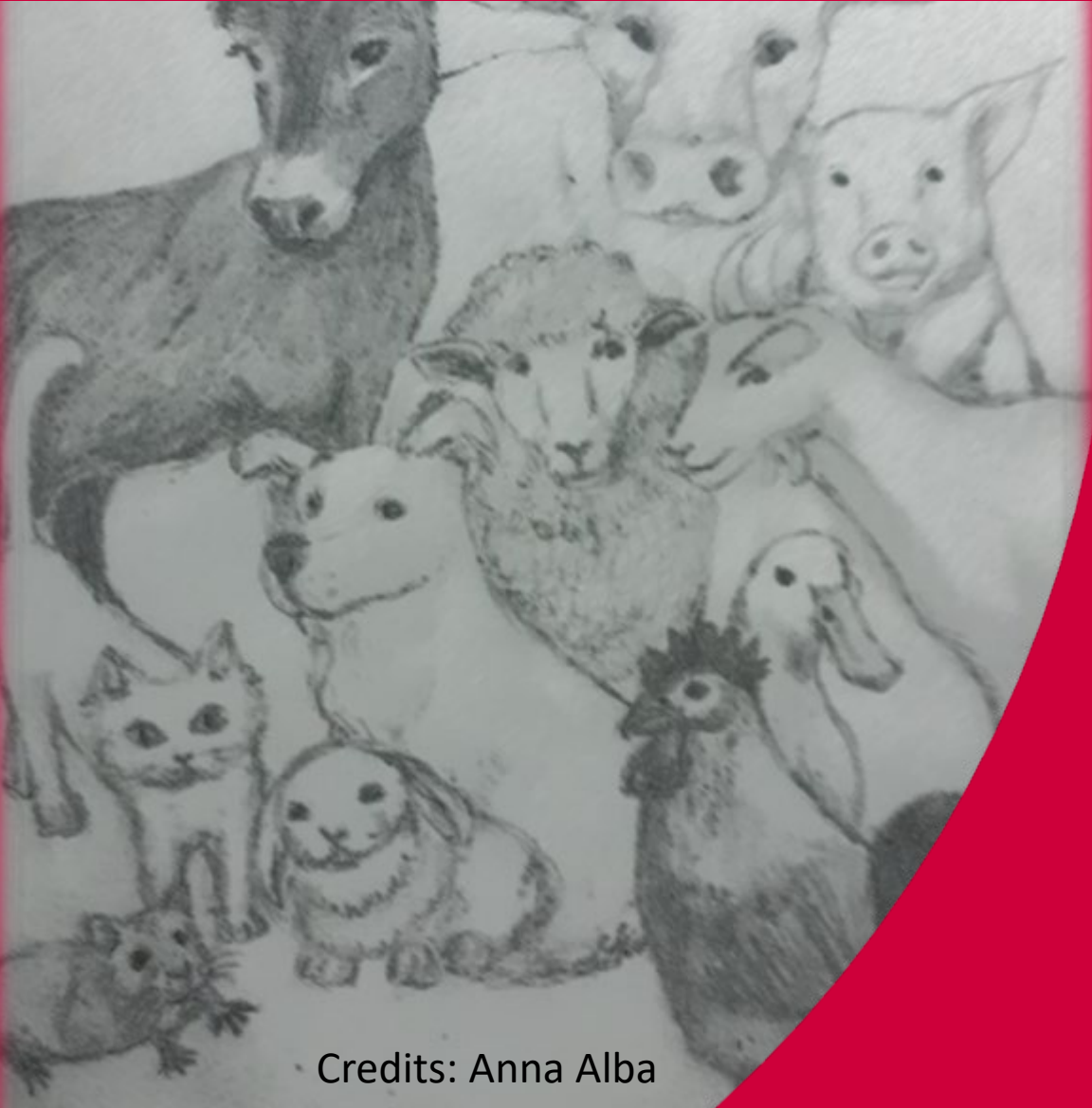




Credits: Anna Alba

One Health approach

tackling future challenges

Júlia Vergara-Alert



Generalitat de Catalunya
Government of Catalonia

IRTA

CRSA

Centre de Recerca
en Sanitat Animal

Zoonoses in numbers

Zoonoses are diseases that are transmitted from animals to humans

75%

of newly emerging infectious diseases are zoonoses



Credits: FAO

60%

of infectious diseases in humans are zoonoses

Zoonoses in numbers

2.5 billion
Cases of illness



2,7 millions
Deaths

Zoonotic influenza

Yellow fever

Coronaviruses diseases

Ebola haemorrhagic fever

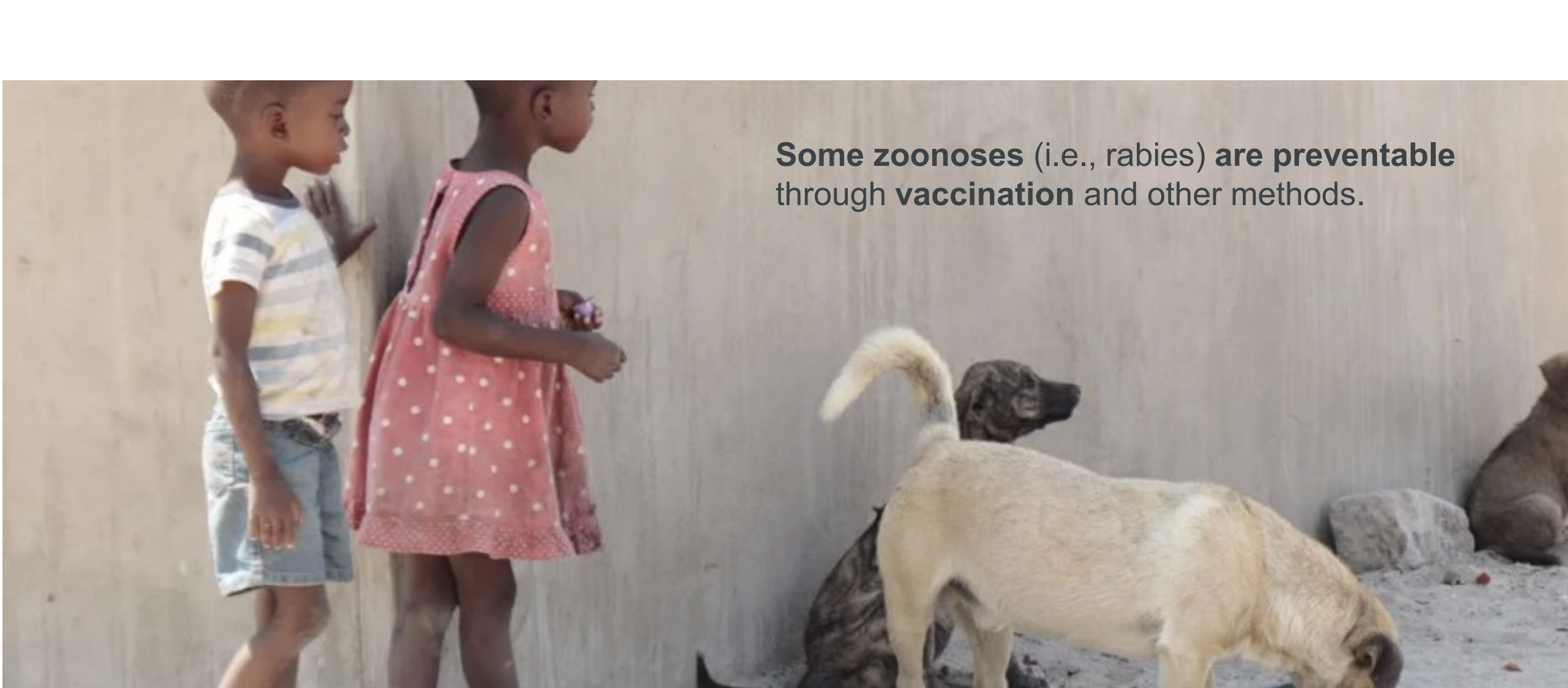
Rabies

Q fever

West Nile fever

Lyme disease

Brucellosis

A photograph showing two young children, a boy and a girl, standing in profile against a light-colored wall. The boy is on the left, wearing a striped t-shirt and shorts. The girl is on the right, wearing a pink dress with white polka dots. In the background, several dogs are visible, including a large light-colored dog in the foreground and darker dogs behind it. The scene is outdoors in a sunny environment.

Some zoonoses (i.e., rabies) are preventable
through **vaccination** and other methods.

Credits: Friedrich Loeffler Institute (FLI)
Namibia utilises One Health for rabies control including oral rabies vaccines for dogs



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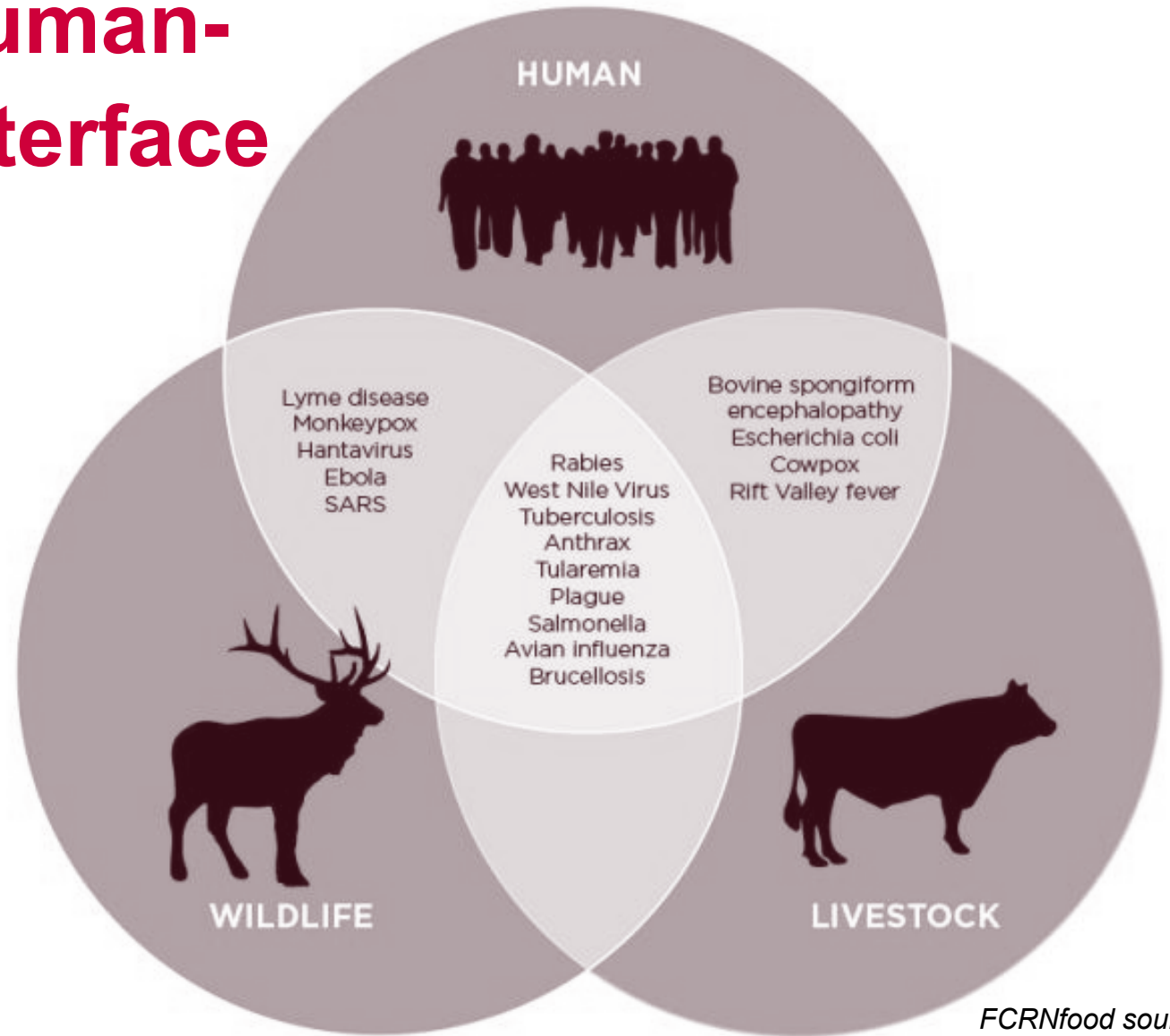
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Interactions at the human-animal-ecosystem interface

The One Health Approach



FCRNfood source

Interactions at the human- animal-ecosystem interface

How do viruses jump from animals to humans?



Direct contact with animal body fluids (saliva, feces, blood)



Indirect contact with areas where infected animals live:

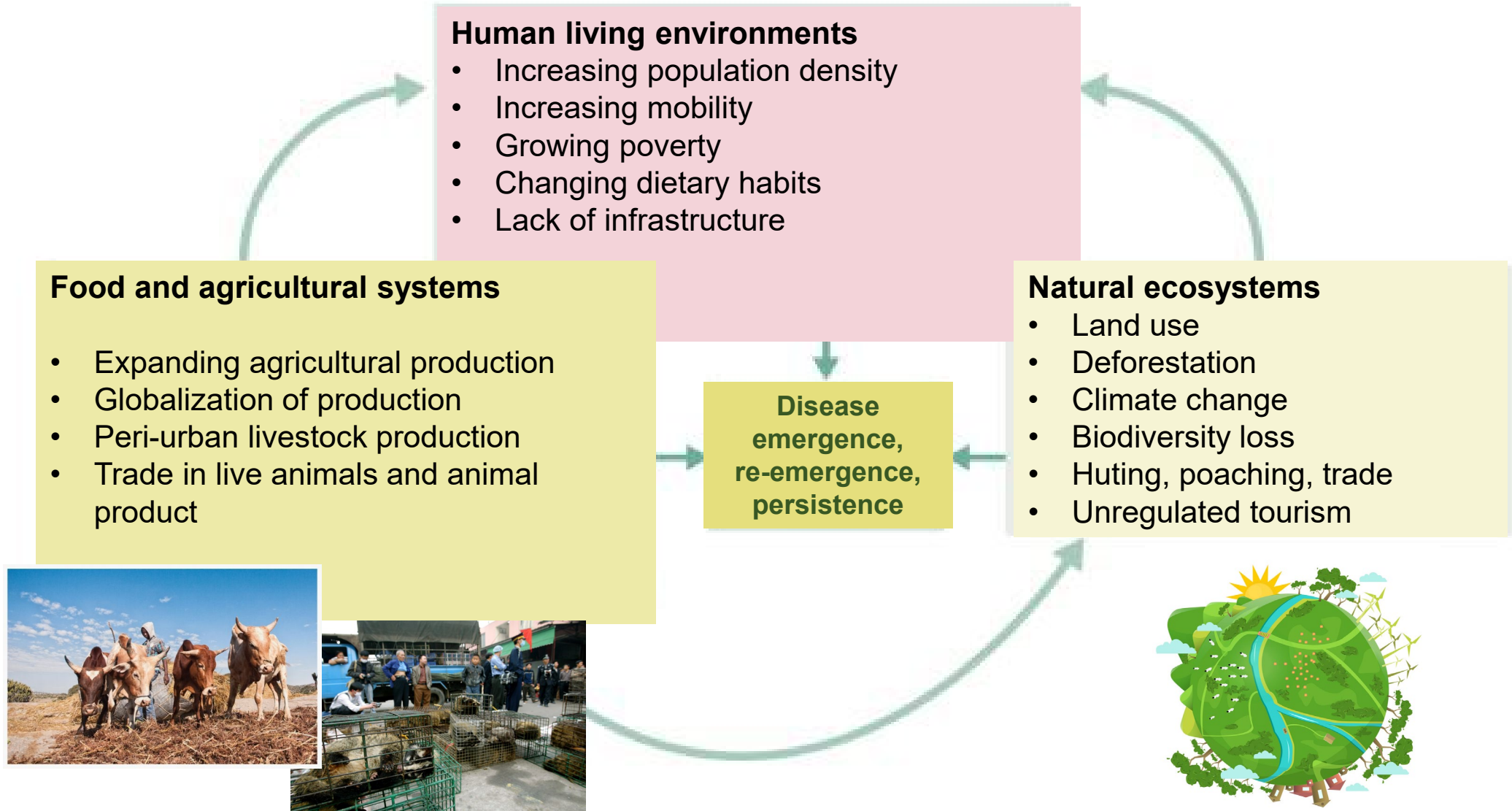
- Consumption contaminated products;
- Contact with contaminated water, soil, objects, others.



Vectors: organisms that transmit infectious diseases from animals-to-animals and from animals-to-humans.

https://foodsource.org.uk/sites/default/files/chapters/pdfs/foodsource_chapter_11.pdf

Interactions at the human- animal-ecosystem interface



The One Health it is not a new concept

460-370 BC Hippocrates

Argued that human health was subject to the condition of the “airs and waters”

1821-1902: Rudolf Virchow

Noted the link between diseases of humans and animals and coined the term “zoonosis”

1849-1919: William Osler

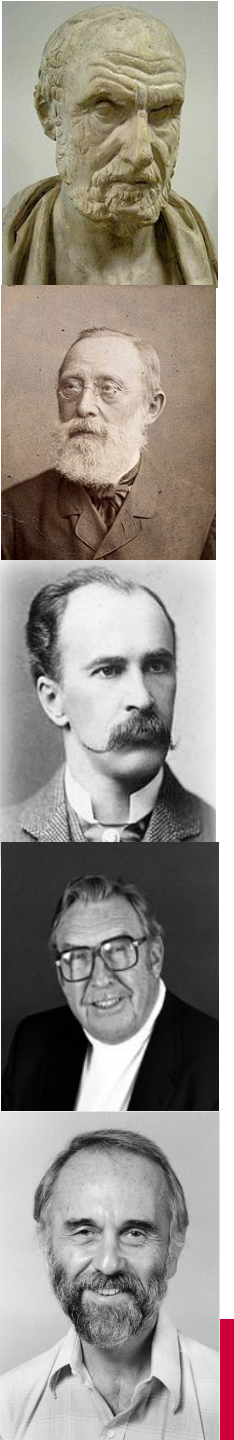
“Father” “ of Modern Medicine and Veterinary Pathology; “One Medicine”

1947: James H. Steele

Veterinary Public Health Division at CDC, USA

1927-: Calvin Schwabe

Uses the concept “One Health; importance collaboration human-veterinary medicine”



The One Health it is not a new concept



29th September 2004,
The Rockefeller University, Caspary Auditorium

“The One Health concept is a worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of **health care for humans, animals and the environment.**”

The One Health it is not a new concept

The Wildlife Conservation Society
publishes the “**12th
Manhattan Principles**”, 2004



programs
decisions prevention land
supplies animal one health
Recognize wildlife
people control food
human health water
domestic disease science
surveillance global needs...
implications link monitoring
health...Include healththreat

Role for One Health in the COVID-19 pandemic

Covid-19: 'One Health', la pieza clave para evitar futuras pandemias

Tedros Adhanom, director general de la OMS, destacó el papel del enfoque 'One Health' para conseguir un futuro mejor en el primer Día Internacional de la Preparación frente a las Epidemias, tras la crisis del coronavirus Covid-19



Tedros Adhanom Ghebreyesus, director general de la Organización Mundial de la Salud.



<https://www.animalshealth.es/profesionales/covid-19-one-health-pieza-clave-evitar-futuras-pandemias>

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RESULTS BY YEAR

1,015,852 results

Page 1 of 5,080



Food and Agriculture Organization of the United Nations



World Health Organization

UN Environment Programme joins alliance to implement One Health approach

18 March 2022

Joint FAO/OIE/WHO/UNEP Press release

One Health and Society



<https://www.agefotostock.com/age/en/details-photo/selection-of-international-newspapers/B33-410523>

El papel del periodista, clave para hacer llegar el concepto One Health a la sociedad

https://cordopolis.eldiario.es/cordoba-hoy/sociedad/papel-periodista-clave-llegar-concepto-one-health-sociedad_1_8430804.html

La perspectiva One Health
(Una Salut) contra la
pandèmia

ara



One Health and Society

El Médico
Interactivo

One Health: a por una sola
salud en todo el planeta

<https://elmedicointeractivo.com/one-health-a-por-una-sola-salud-en-todo-el-planeta/>

DV
DIARIO VETERINARIO

One Health, el camino para avanzar
en la salud pública

<https://www.diarioveterinario.com/t/2070433/one-health-camino-avanzar-salud-publica>

EFE:Salud

Los profesionales sanitarios se unen para impulsar un enfoque 'One Health'

Los colegios de Enfermería, Farmacia, Medicina y Veterinaria han lanzado un posicionamiento conjunto en el que hacen un llamamiento para implementar el enfoque 'One Health' con el objetivo de proteger la salud de la población

Examples of One Health

COVID-19 Pandemic

THE WALL STREET JOURNAL.

English Edition | February 10, 2020 | Print Edition | Video

CHINA

New Virus Discovered by Chinese Scientists Investigating Pneumonia Outbreak

Latest tally of people sickened in Wuhan is 59, with seven in critical condition

Por *Natasha Khan*

Actualizado jueves, 9 de enero de 2020 2:30 EDT

PRINT TEXT

HONG KONG—Chinese scientists investigating a mystery illness that has sickened dozens in central China have discovered a new strain of coronavirus, a development that will test the country's upgraded capabilities for dealing with unfamiliar infectious diseases.



Health Topics ▾ Countries ▾ Newsroom ▾ Emergencies ▾ About ▾

Emergencies preparedness, response

Home

Alert and response operations

Diseases

Biorisk reduction

Disease outbreak news

Pneumonia of unknown cause – China

Disease outbreak news
5 January 2020

On 31 December 2019, the WHO China Country Office was informed of cases of pneumonia of unknown etiology (unknown cause) detected in Wuhan City, Hubei Province of China. As of 3 January 2020, a total of 44 patients with pneumonia of unknown etiology have been reported to WHO by the national authorities in China. Of the 44 cases reported, 11 are severely ill, while the remaining 33 patients are in stable condition. According to media reports, the concerned market in Wuhan was closed on 1 January 2020 for environmental sanitation and disinfection.

The causal agent has not yet been identified or confirmed. On 1 January 2020, WHO requested further information from national authorities to assess the risk.



European Centre for Disease Prevention and Control

An agency of the European Union

All topics: A to Z

News & events Publications & data Tools About us

Home > Publications & data > Pneumonia cases possibly associated with a novel coronavirus in Wuhan, China

Publications & data

Pneumonia cases possibly associated with a novel coronavirus in Wuhan, China

Risk assessment
9 Jan 2020

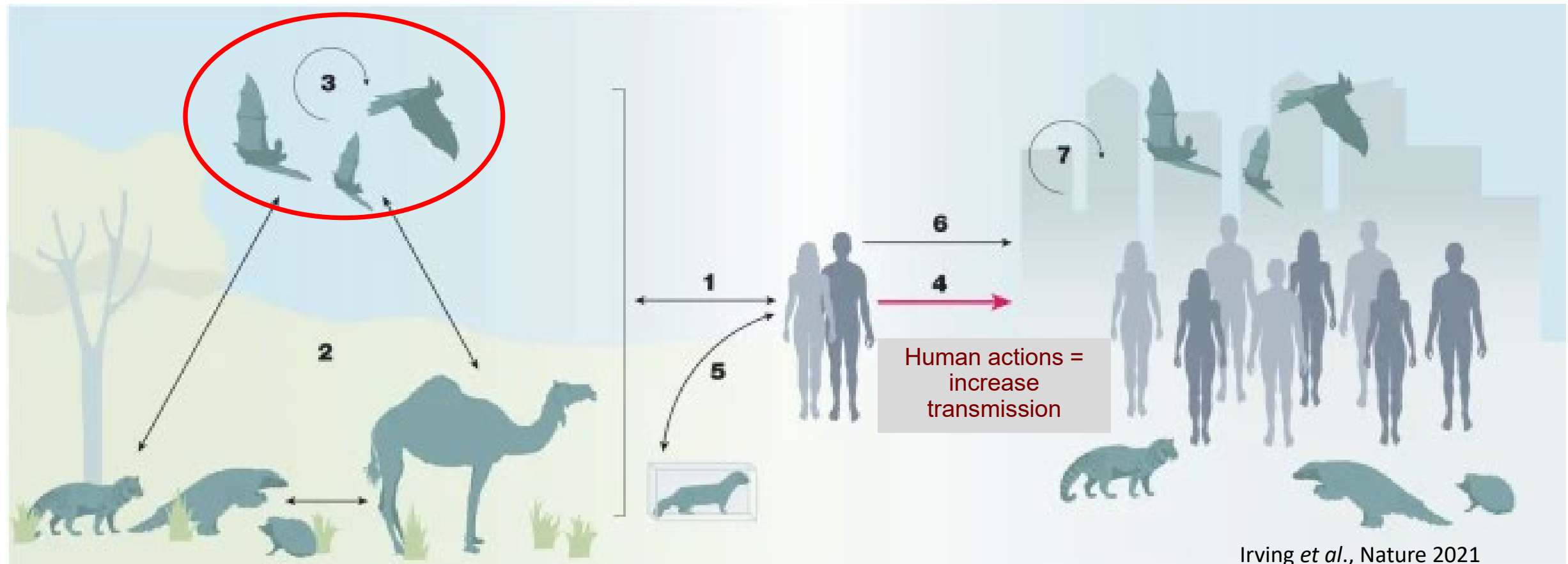
Cite:



On 31 December 2019, the Wuhan Municipal Health Commission reported a cluster of 27 pneumonia cases, including seven severe cases, with a common reported link to Wuhan's South China Seafood City market.

Examples of One Health

Coronaviruses – zoonotic transmission

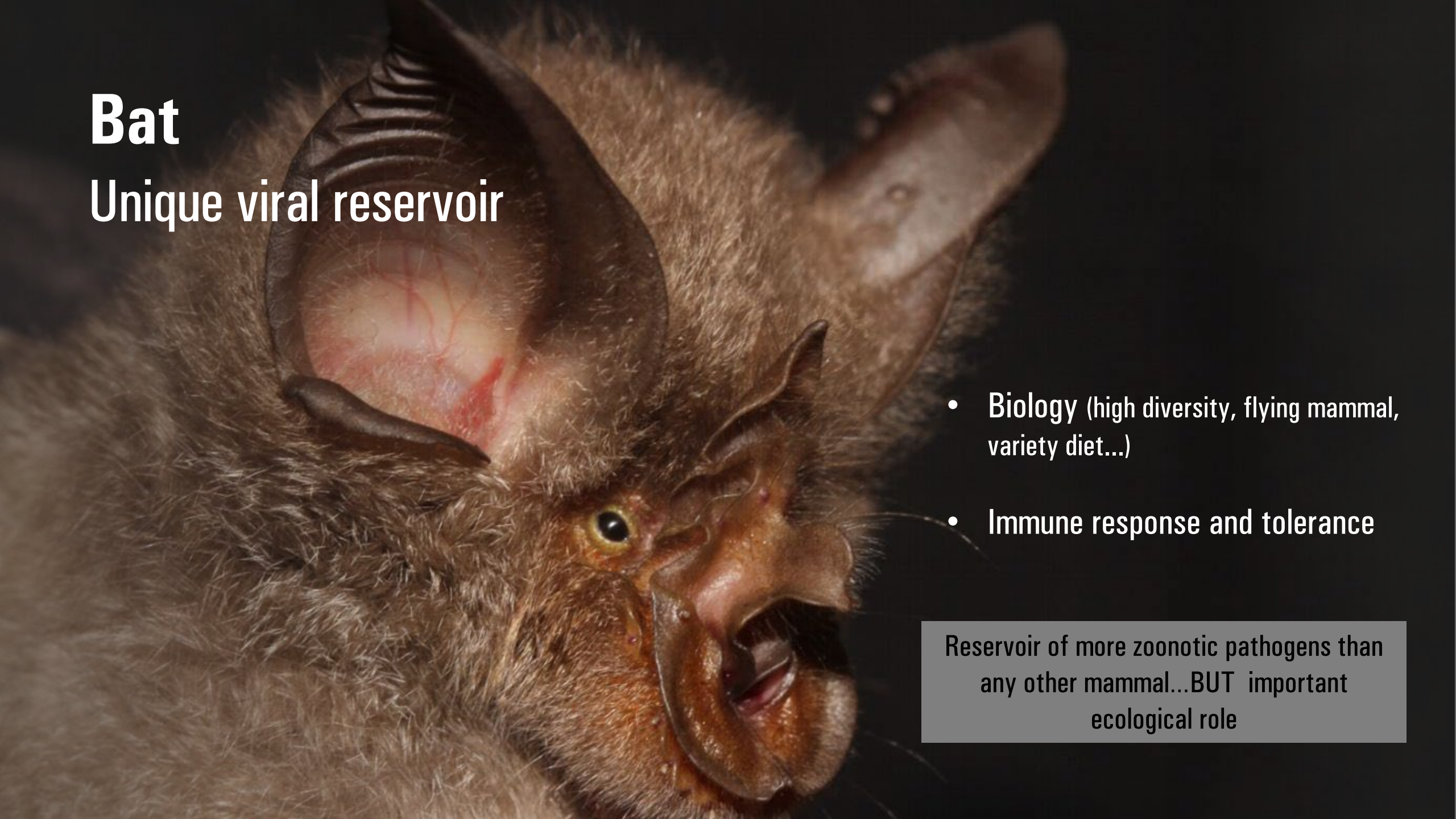


Bat

Unique viral reservoir

- Biology (high diversity, flying mammal, variety diet...)
- Immune response and tolerance

Reservoir of more zoonotic pathogens than any other mammal...BUT important ecological role



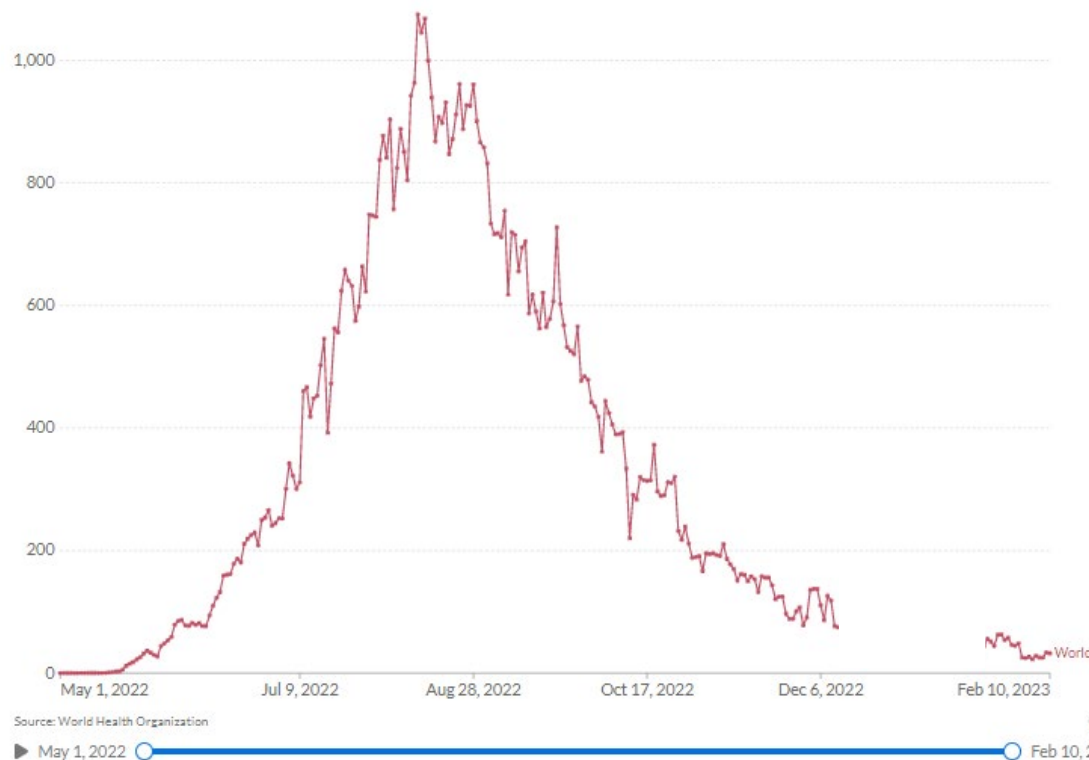
More examples of One Health

Mpox outbreak

Mpox: Daily confirmed cases
7-day rolling average

Our World
in Data

LINEAR LOG



abcNEWS

Monkeypox cases surpass 1,200 globally, but experts say the outbreak is 'controllable'

About 40 cases are suspected or confirmed in the U.S.

By [Mary Kekatos](#)

June 09, 2022, 10:54 PM

Share

#gencat

Agència de Salut Pública de Catalunya (ASPCAT)

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[Inici](#) > [Comunicat sobre l'alerta per casos de verola del mico \(Monkeypox\)](#)

Comunicat sobre l'alerta per casos de verola del mico (Monkeypox)

A data d'avui, s'han notificat un total de 2.248 casos sospitosos o probables de verola del mico a la Xarxa de Vigilància Epidemiològica de Catalunya (XVEC). D'aquests, de moment hi ha 1.558 casos confirmats.

Data d'actualització: 05.08.2022

More examples of One Health

Avian flu

RAPID COMMUNICATION

Highly pathogenic avian influenza A(H5N1) virus infection in farmed minks, Spain, October 2022

Montserrat Agüero^{1*}, Isabella Monne^{2,7}, O, Azucena Sánchez¹, Bianca Zecchin², Alice Fusaro², María José Ruano¹, Manuel del Valle Arrojo³, Ricardo Fernández-Antonio⁴, Antonio Manuel Souto⁵, Pedro Tordable⁵, Julio Cañas⁵, Francesco Bonfante², Edoardo Giussani², Calogero Terregino², Jesús Javier Orejas⁶

1. Laboratorio Central de Veterinaria (LCV), Ministry of Agriculture, Fisheries and Food, Algete, Madrid, Spain

2. Istituto Zooprofilattico Sperimentale delle Venezie (IZSVe), Legnaro, Italy

3. Counselling of Health, Xunta de Galicia, A Coruña, Spain

4. Galician Mink Breeders Association, Santiago de Compostela, A Coruña, Spain

5. Livestock Service, Counselling of Rural Affairs, Xunta de Galicia, A Coruña, Spain

6. Animal Health Service, Counselling of Rural Affairs, Xunta de Galicia, A Coruña, Spain



What a Bird Flu Outbreak Among Mink Could Mean for Humans

A new variant of avian influenza appears capable of spreading among mammals, highlighting the need for more proactive surveillance, experts said.

The New York Times



Notícies

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Un positiu de grip aviària a Arbeca obliga a sacrificar l'aviram en un radi d'1 km

Es confirma un brot de grip aviària en una granja d'indiots que ja ha obligat a sacrificar tot l'aviram de tres explotacions més que hi ha al voltant i a limitar el moviment d'aus

Redacció

10/02/2023 - 10.23 | Actualitzat 10/02/2023 - 22.47



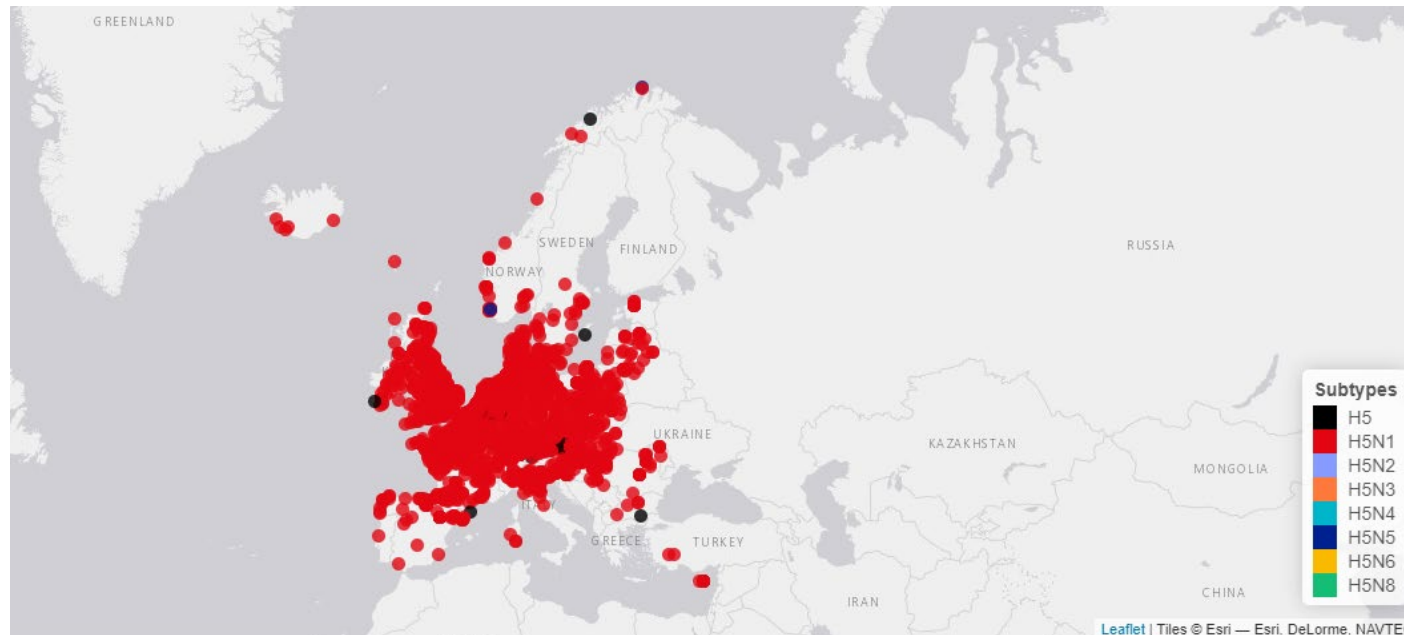
Will the bird flu outbreak turn into the next pandemic? And are we prepared?

ADRIANNA RODRIGUEZ | USA TODAY



More examples of One Health

Avian flu...2021-2022 largest avian flue epidemic in Europe



SOURCE: ADIS and WOA, updated on 26/05/2023
*United Kingdom (except Northern Ireland) data are sourced from ADNS up to 31/12/2020 and then from WOA. United Kingdom (Northern Ireland) data are from ADIS.

More examples of One Health

Avian flu...in humans

MENÚ   NEWSLETTER

Animal's Health



Detectan gripe aviar en un trabajador de una explotación avícola de España

El Ministerio de Sanidad ha comunicado la detección de gripe aviar A (H5N1) en una muestra de un trabajador de una explotación avícola de Guadalajara

Así, explica que el **27 de septiembre** de 2022, el **Centro Nacional de Microbiología** confirmó la detección en una muestra que se tomó el día 23 en el contexto de las acciones de control y detección precoz alrededor del foco.

El Ministerio de Sanidad recuerda que, desde 2003, se han notificado a la Organización Mundial de la Salud un total de **1.321 casos**, incluyendo 456 muertes por infección humana por influenza A (**H5N1**) en todo el mundo.

More examples of One Health

Avian flu...in humans



World ▾ Business ▾ Legal ▾ Markets ▾ More ▾



United States



2 minute read · April 29, 2022 7:39 AM GMT+2 · Last Updated 6 months ago

Aa

U.S. reports its first human case of H5 bird flu

Reuters

Jamie Grierson

Twitter @JamieGrierson

Fri 7 Jan 2022 14:26 GMT



The Guardian

First UK person to catch H5N1 bird flu strain is named

Alan Gosling, 79, tested positive having lived with about 20 ducks inside his home in Devon



Alan Gosling at his home in Buckfastleigh, Devon. Photograph: SWNS



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More examples of One Health

Avian flu...is it a human threat?

- Not all influenza viruses have the same transmission capacity.
- Need close contact with infected avian species.
- Human transmission effective only one day before symptoms and...
- Low transmission capacity via aerosols between humans. BUT...

More examples of One Health

Avian flu...is it a human threat?

Published in final edited form as:

Science. 2012 June 22; 336(6088): 1534–1541. doi:10.1126/science.1213362.

Airborne Transmission of Influenza A/H5N1 Virus Between Ferrets

Sander Herfst¹, Eefje J. A. Schrauwen¹, Martin Linster¹, Salin Chutinimitkul¹, Emmie de Wit¹, Vincent J. Munster¹, Erin M. Sorrell¹, Theo M. Bestebroer¹, David F. Burke², Derek J. Smith^{1,2,3}, Guus F. Rimmelzwaan¹, Albert D. M. E. Osterhaus¹, and Ron A. M. Fouchier^{1,†}



More examples of One Health

Avian flu...is it a human threat?

RAPID COMMUNICATION

Article submitted on 02 Jan 2023 / accepted on 18 Jan 2023 / published on 19 Jan 2023

Highly pathogenic avian influenza A(H5N1) virus infection in farmed minks, Spain, October 2022

Montserrat Agüero^{1,*}, Isabella Monne^{2,*} O, Azucena Sánchez¹, Bianca Zecchin², Alice Fusaro², María José Ruano¹, Manuel del Valle Arrojo³, Ricardo Fernández-Antonio⁴, Antonio Manuel Souto⁵, Pedro Tordable⁵, Julio Cañas⁵, Francesco Bonfante², Edoardo Giussani², Calogero Terregino², Jesús Javier Orejas⁶

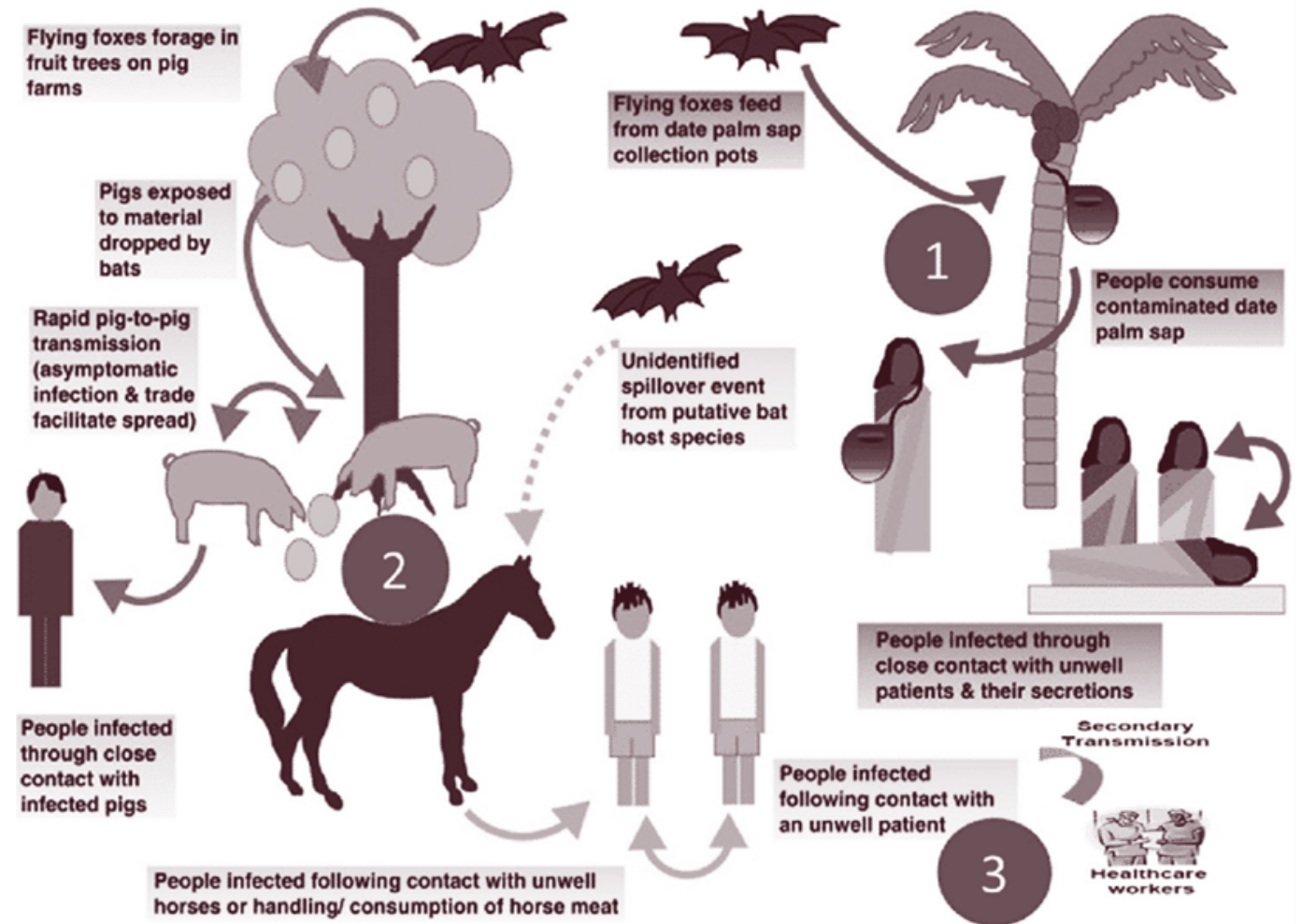
In October 2022, an outbreak in Europe of highly pathogenic avian influenza (HPAI) A(H5N1) in intensively farmed minks occurred in northwest Spain. A single mink farm hosting more than 50,000 minks was involved. The identified viruses belong to clade 2.3.4.4b, which is responsible of the ongoing epizootic in Europe. An uncommon mutation (T271A) in the PB2 gene with potential public health implications was found. Our investigations indicate onward mink transmission of the virus may have occurred in the affected farm.

Increased capability of aerosol transmission?

Higher activity of the PB2 (increased replication capabilities?)

More examples of One Health

Nipah virus transmission



More examples of One Health

Ebola virus transmission



In Africa a particular species of **fruit bat** is considered to be the possible host for Ebola virus

Primary host **fruit bat**

Secondary hosts

Gorillas

Chimpanzees

Antelopes

Pigs



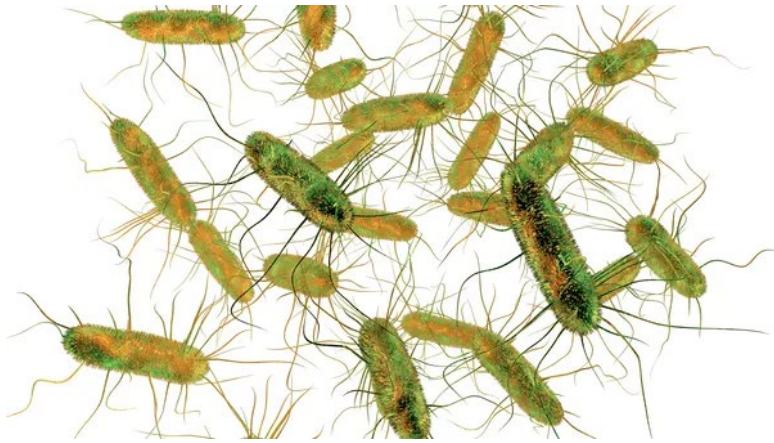
Humans are infected by close contact with the **blood, secretions, organs or other bodily fluids** of infected animals



Ebola then spreads through H2H transmission, with infection resulting from direct contact through **broken skin or mucus or bodily fluids**

Situation in Europe

Which zoonoses are more frequent?



SCIENTIFIC REPORT

APPROVED: 12 November 2021

doi: 10.2903/j.efsa.2021.6971



The European Union One Health 2020 Zoonoses Report

European Food Safety Authority
European Centre for Disease Prevention and Control

Campylobacteriosis was the most reported zoonosis in the EU in 2020, with 120,946 cases. It was followed by **salmonellosis**, which affected 52,702 people.

Listeriosis and **West Nile virus infections** were the diseases with the highest case fatality and hospitalisation rates – with most locally acquired human infections of West Nile virus reported in Greece, Spain and Italy.

How can we be better prepared?

Collaboration Strengthens Capacity on Zoonoses Anticipation and Preparedness.



World
Organisation
for Animal
Health
Founded as OIE



Credits: WOA

How can we be better prepared?

Priority diseases



Priority diseases



Communicable diseases
Ebola virus disease



Communicable diseases
Lassa fever



Communicable diseases
**Crimean-Congo
haemorrhagic fever**



Communicable diseases
**Middle East respiratory
syndrome coronavirus
(MERS-CoV)**



Communicable diseases
Nipah virus infection



Communicable diseases
Rift valley fever



Other
Zika virus disease



Communicable diseases
**Coronavirus disease
(COVID-19)**

Disease X

Cost of preventing future pandemic



OIE Animal Health @OIEAnimalHealth · 54m ...

Preventing future pandemics will likely cost between \$18-\$27 billion/year over 10 years. That may seem like a lot, but it's less than 1% of the cost of the current pandemic & avoids the additional suffering & disruption.

It's time to invest in pandemic prevention! #OneHealth



<1% Cost of COVID-19 pandemic

Bulletin of the Atomic Scientists

Investing in pandemic prevention is essential to defend against future outbreaks

If a pandemic occurred just once a century, it would be worth the United States investing billions of dollars annually to prevent it.

Nov 2, 2022

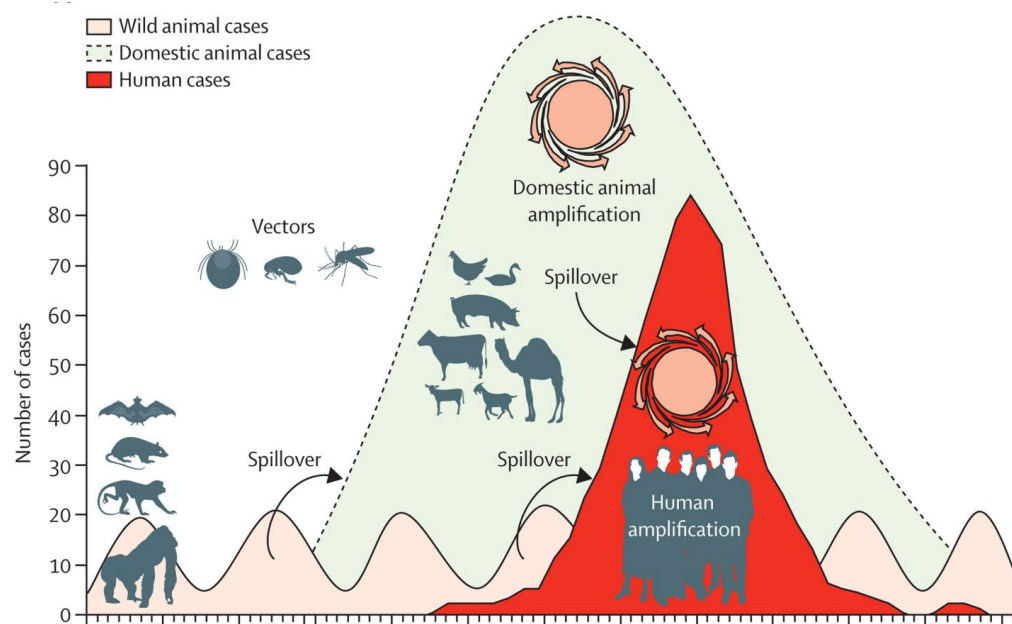


World Bank Estimates Cost of Global Pandemic Prevention at \$11.5bn

LATEST | 7 months ago

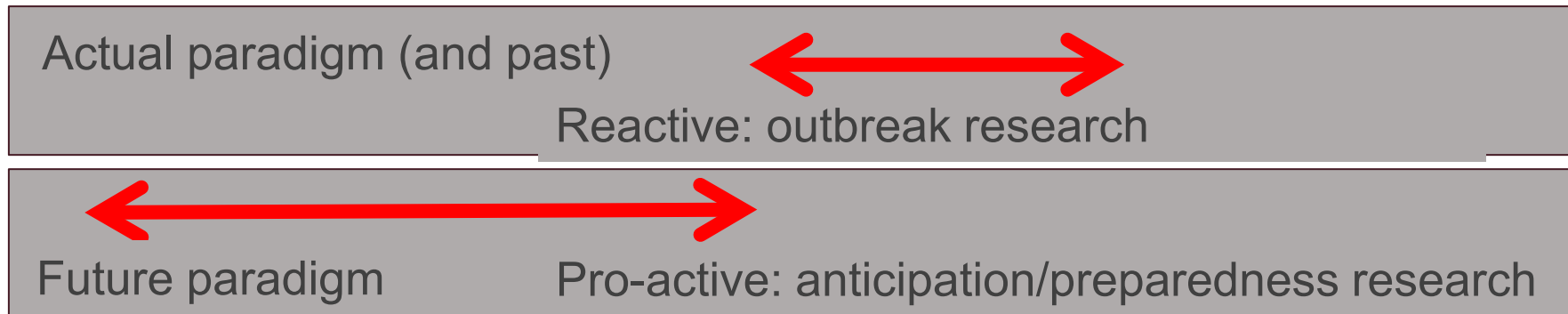
In a report released yesterday in Washington, United States, World Bank stated, "that prevention costs guided by a One Health approach – which would sustainably balance and optimise the health of people, animals, and ecosystems – would range from \$10.3 billion to \$11.5 billion per year, compared to the cost of managing pandemics which, according to the recent estimate by the G20 Joint Finance and Health Taskforce, amounts to about \$30.1 billion per year."

We need to change the paradigm



- ✓ Mapping what is around
- ✓ Identifying hotspots for change
- ✓ Assess potential human health impact
- ✓ Develop medical countermeasures

Karesh et al., 2012



Koopmans, 2019

The One Health Approach to combat pandemics

The World Economic Forum

What is the One Health approach - and how can it help pre-empt future pandemics?

The One Health approach integrates predictive modelling and surveillance used in disease control and climate change to fight infectious...

Aug 18, 2022



The Telegraph

Doctors and animal health experts must work more closely to prevent future pandemics, say scientists

The global spread of Covid-19 highlights the links between disease outbreaks in the animal and human worlds, report warns.

Jan 19, 2023

DTE Down To Earth

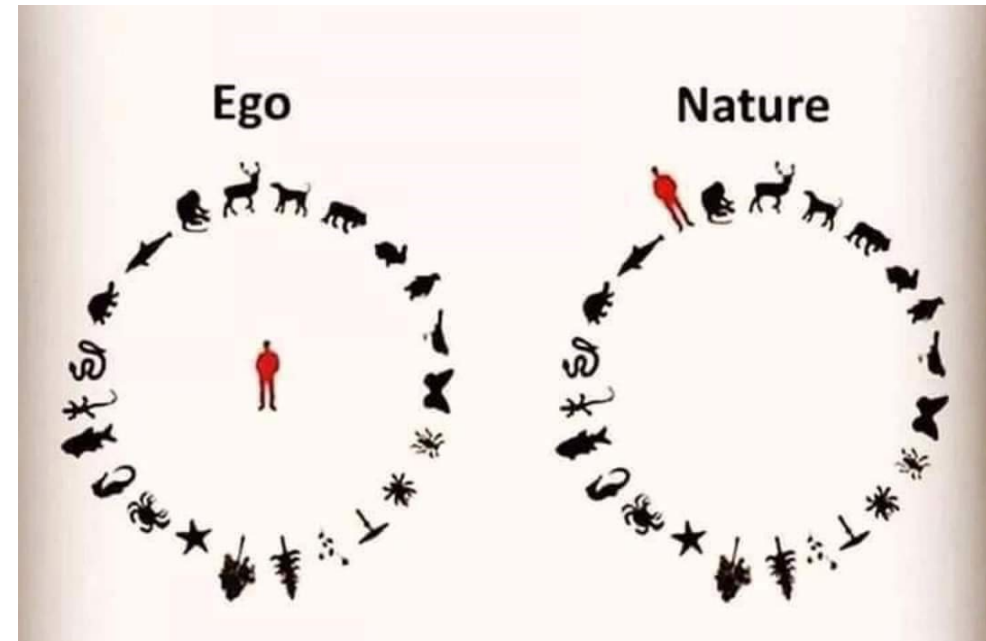
Experts urge One Health approach for disease control at pan-Africa meet

Effects of global warming, climate change are critical contributing factors to many of the health emergencies in Africa, say experts at...

Mar 9, 2023



eGo-centric vs eCo-centric

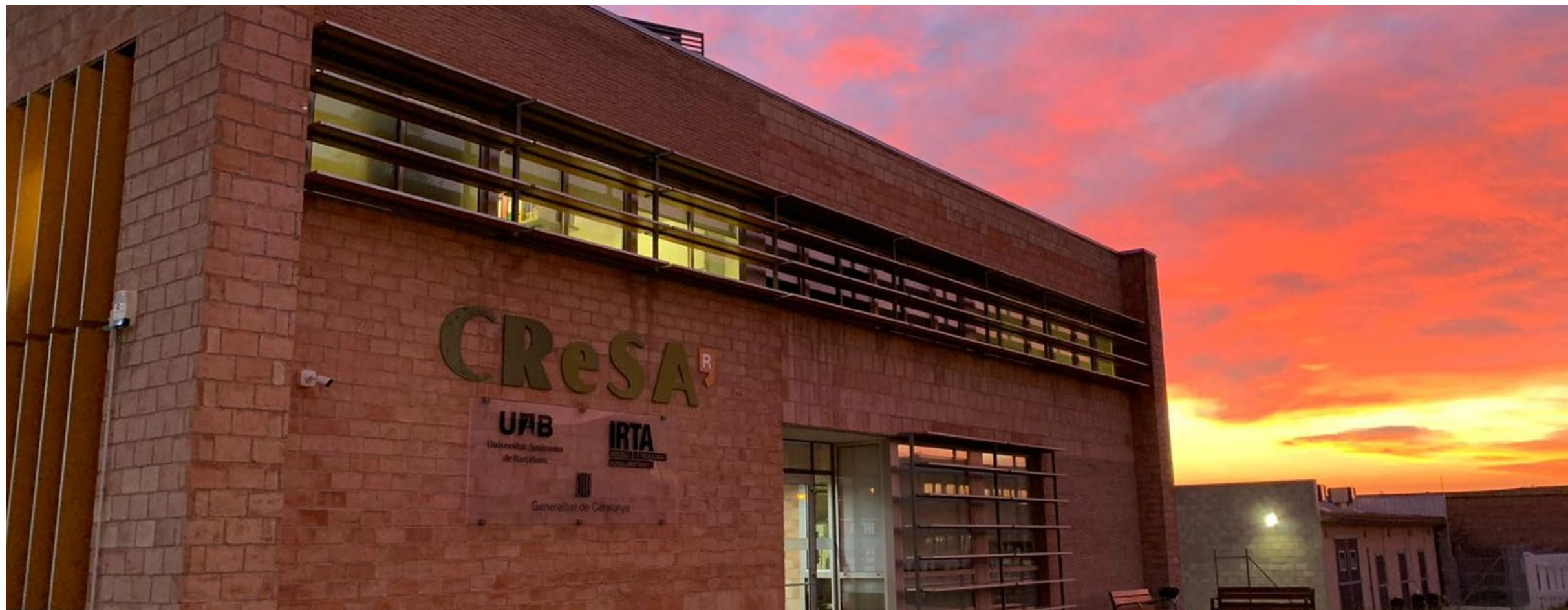


Coronavirus Research line

Highly pathogenic Coronaviruses – The Team



Many thanks for your attention!!



Life need not be easy,
provided only that it is not empty.

Lise Meitner - Austrian-Swedish physicist

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www.irta.cat

**“WE SHARE OUR SCIENCE
TO FEED THE FUTURE”**



 **Generalitat
de Catalunya**