European workshop #3 for PREZODE
December 16, 2021

PREZODE

Preventing zoonotic disease emergence

WELCOME

Please:
- note that the session will be recorded

- write your full name in the zoom

- During the workshop if you want to talk, write « questions » or « comments » in the tchatbox

https://prezode.org/

PREZODE Europe Workshop #3

PREZODE

Preventing zoonotic disease emergence

Presentation of the PREZODE initiative

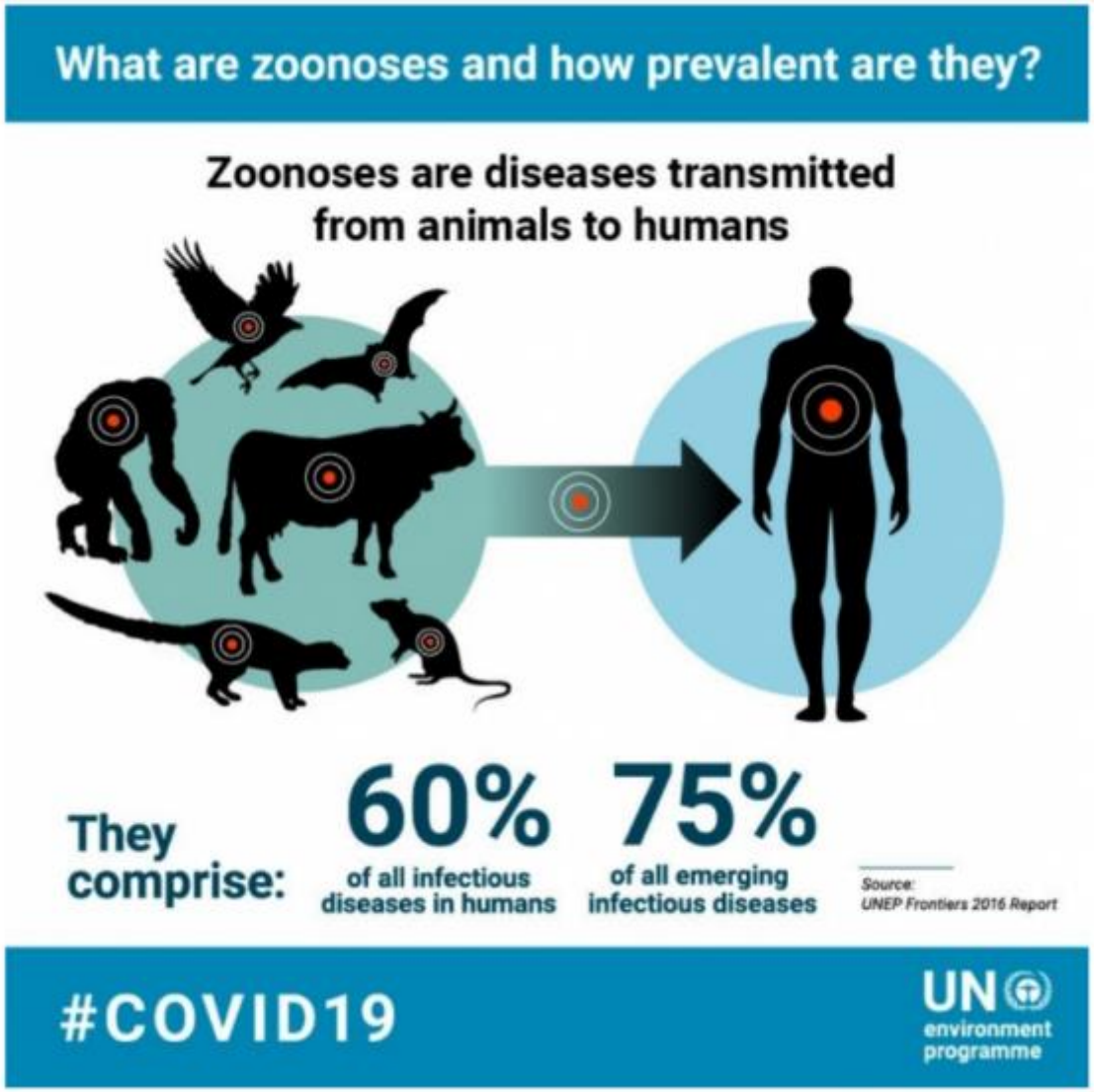
Jean François SOUSSANA (INRAE)

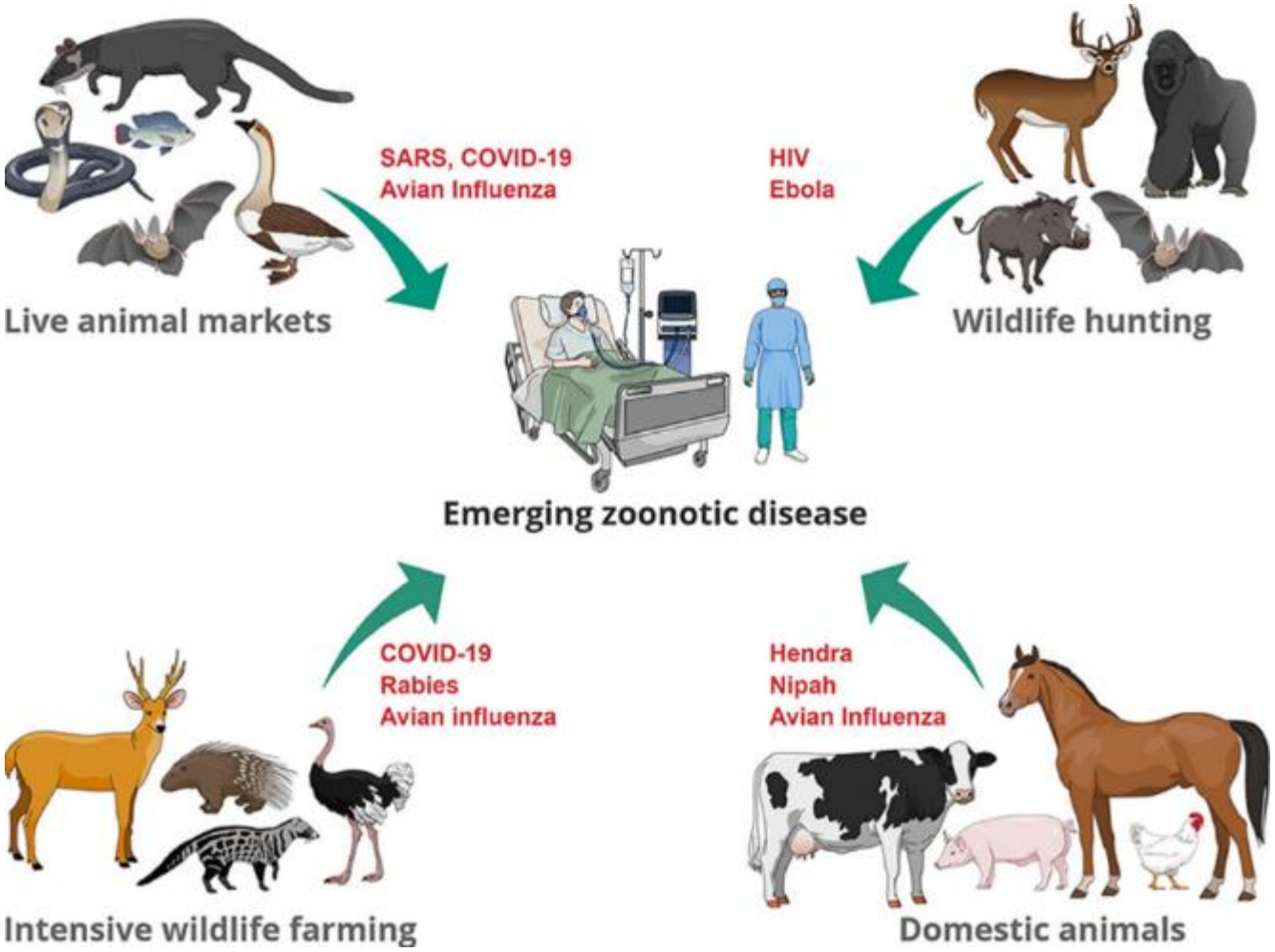
PREZODE

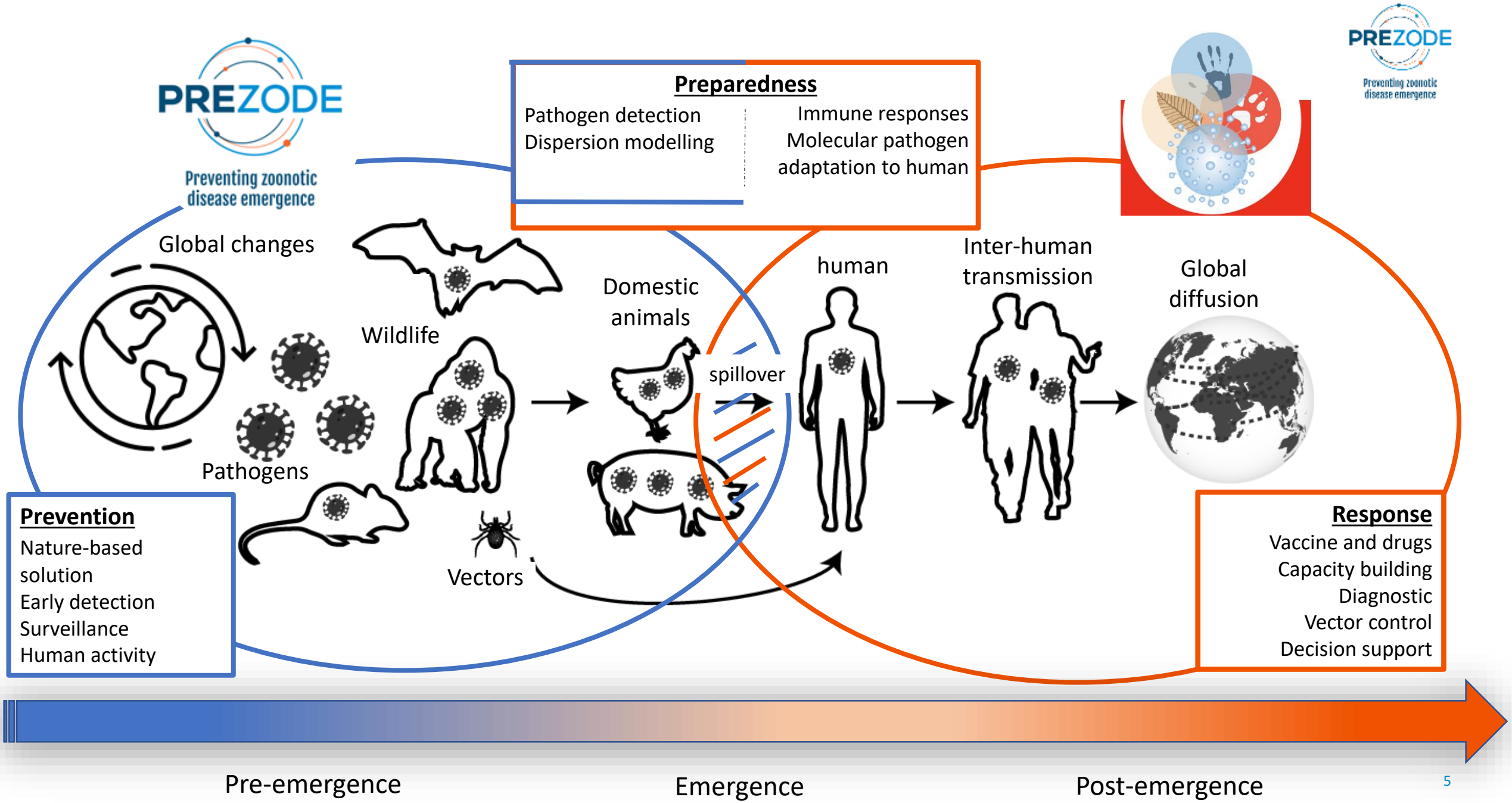
Preventing zoonotic disease emergence

Context

The importance of zoonoses

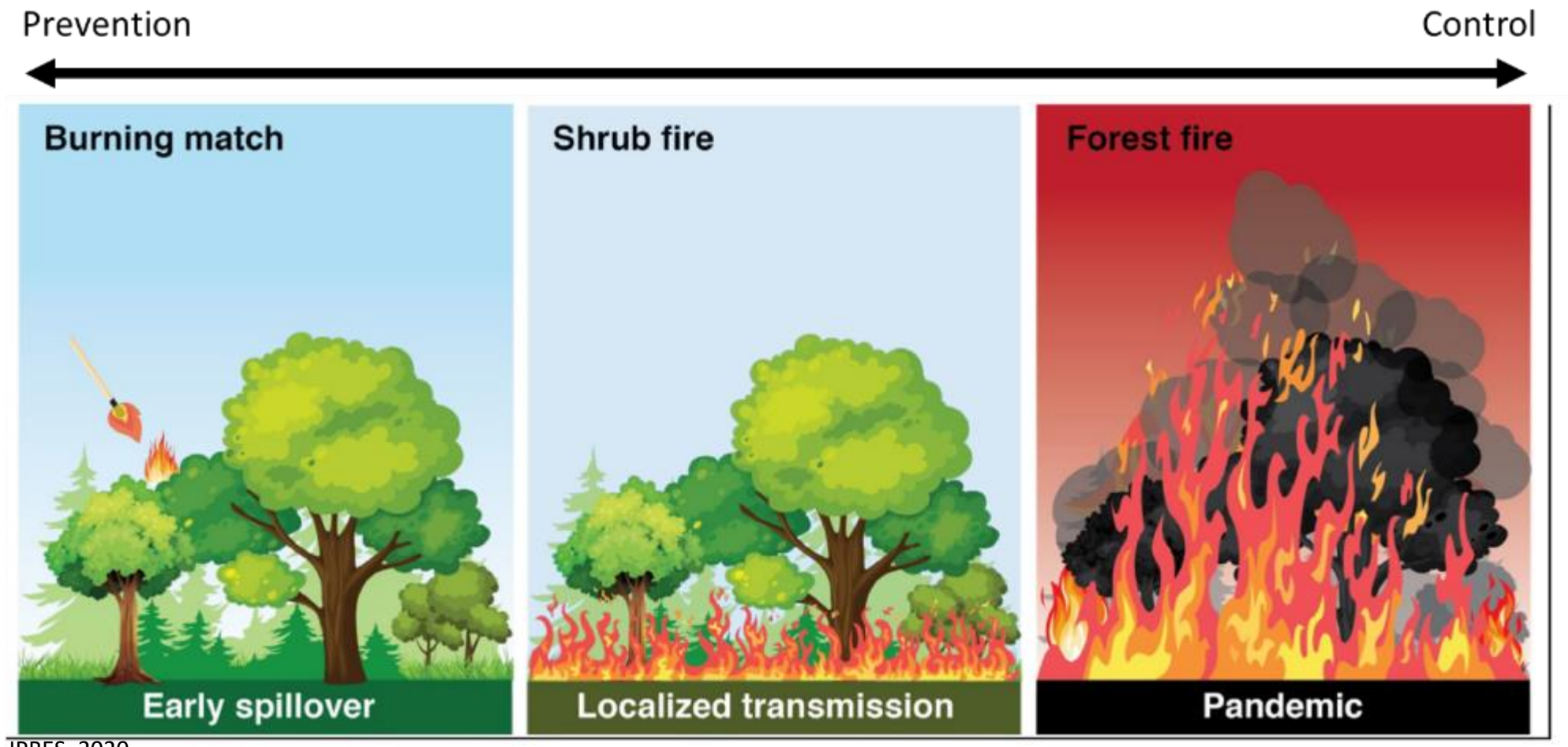





PREZODE
Preventing zoonotic disease emergence
Preparedness
Pathogen detection
Dispersion modelling
Immune responses
Molecular pathogen adaptation to human
Global changes
Wildlife
Domestic animals
human
Inter-human transmission
Global diffusion
spillover
Pathogens
Vectors
Prevention
Nature-based solution
Early detection
Surveillance
Human activity
Response
Vaccine and drugs
Capacity building
Diagnostic
Vector control
Decision support
Pre-emergence
Emergence
Post-emergence

PREZODE
Preventing zoonotic disease emergence

The need for a change in paradigm:
PREVENTION and BOTTOM-UP approaches



IPBES, 2020

PREZODE

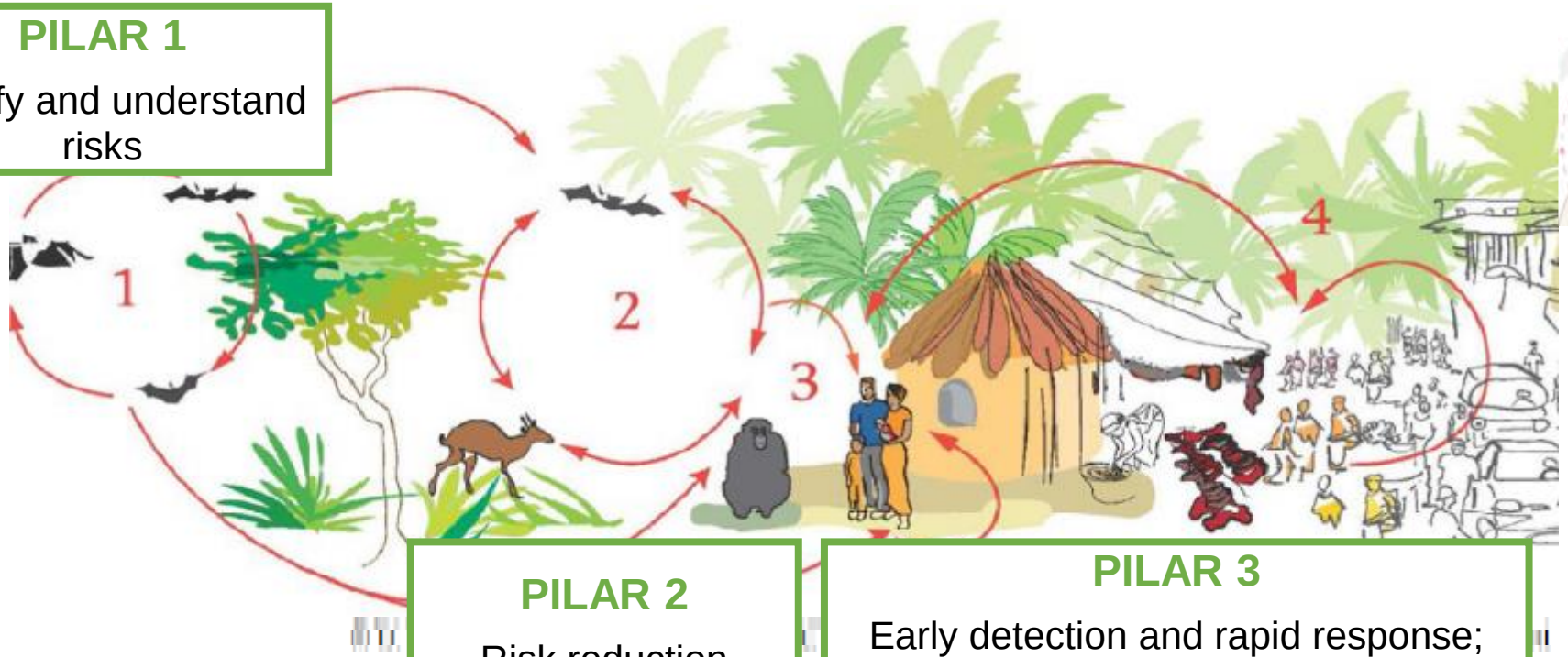
Preventing zoonotic disease emergence

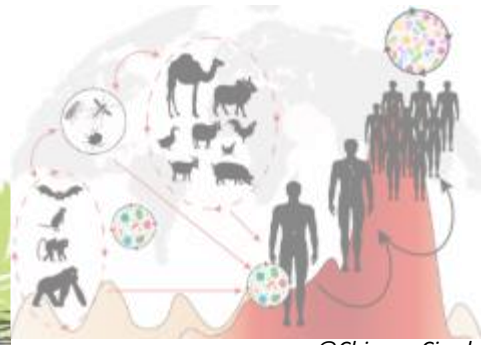
An international initiative

VISION AND OBJECTIVES

PILAR 1

Identify and understand risks





@Chirara, Cirad

PILAR 2

Risk reduction

PILAR 3

Early detection and rapid response; Socio-economic constraints

PILAR 4

Scaling up emerging risks surveillance systems

PILAR 5 Engaging and empowering local and national stakeholders; strengthening One Health networks

IDENTIFY AND UNDERSTAND RISKS to CO-DEVELOP SOLUTIONS TO REDUCE THEM

STRENGTHENING EARLY WARNING SYSTEMS, OPERATIONAL FROM LOCAL TO GLOBAL

Objectives

The international initiative PREZODE aims to constitute:

- A framework for implementing and coordinating research projects, surveillance networks and operational projects to maximize their impact.

- A platform for sharing knowledge from past, current and future projects and for capitalizing on activities in different regions of the world

- A resource center available to decision-makers to enable public policies to be put in place for reducing the risks of zoonotic infectious diseases emergence.

PREZODE: a common framework to foster collaboration and impact

PREZODE
Preventing zoonotic disease emergence

- The PREZODE initiative has been officially launched at the **One Planet Summit** by the President of France Emmanuel Macron.

- PREZODE has already received the support of international organizations (WHO, FAO, OIE, UNEP, World Bank), as well as the European Commission through the voice of its President, Ursula von der Leyen

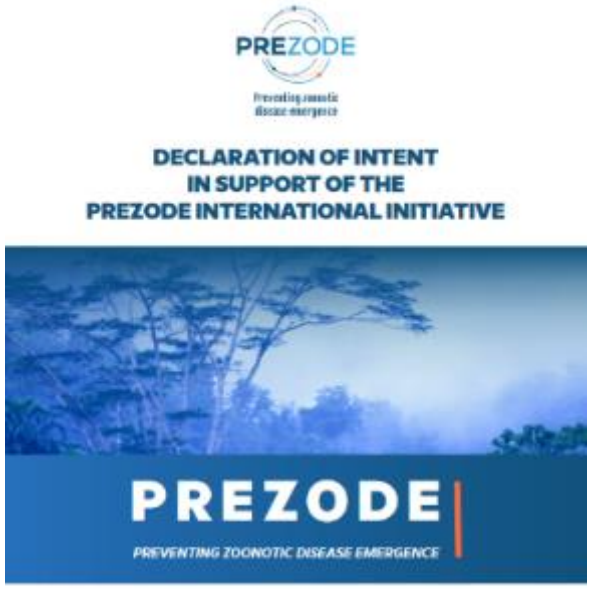
- In France, dedicated funding for research (30 millions €) plus development aid (30 millions € per year) from 2022

PREZODE: a common framework to foster collaboration and impact

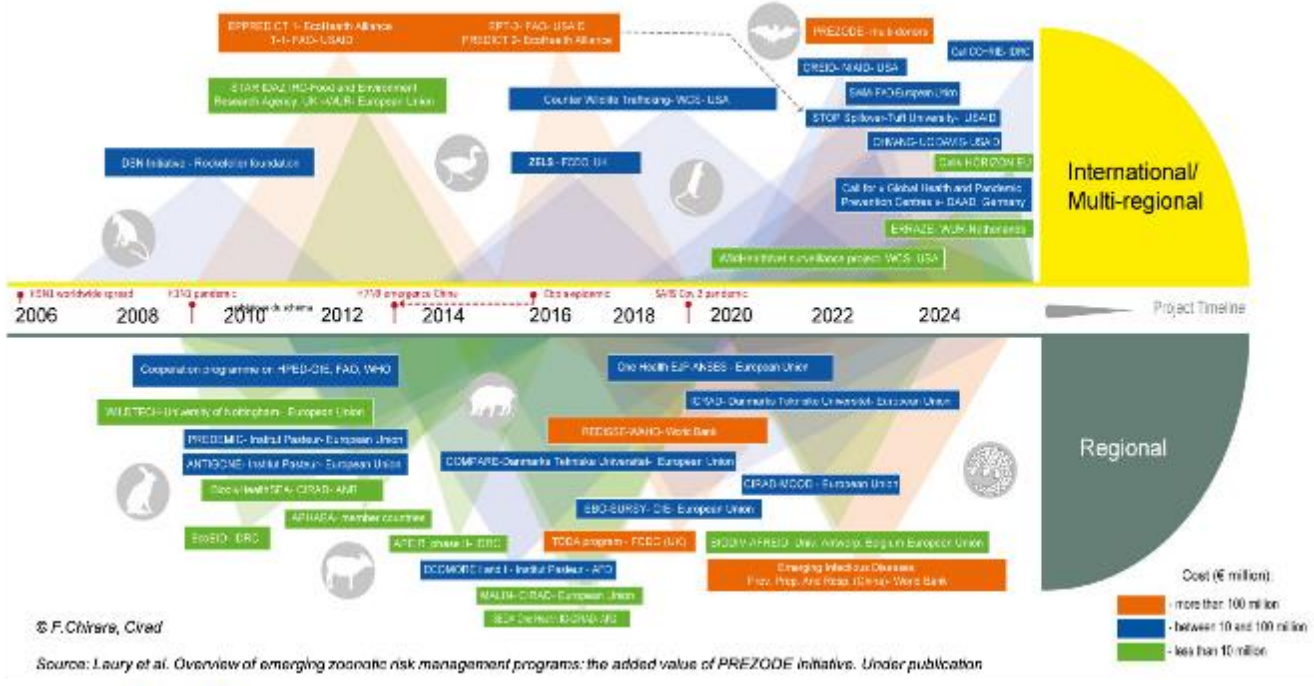
- So far, 6 countries and more than 80 institutions have signed the declaration of intent in support of the PREZODE initiative

- Signing partners

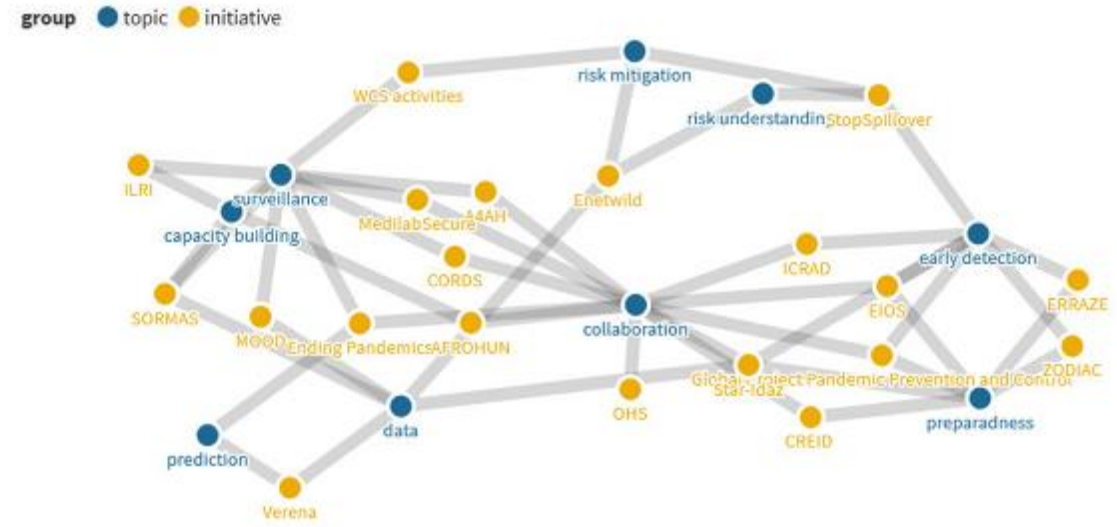
are not asked for any financial commitment and will be involved in the international governance of PREZODE



PREZODE: a common framework to foster collaboration and impact



Source: Laury et al. Overview of emerging zoonotic risk management programs: the added value of PREZODE initiative. Under publication



Ensuring an optimal

- Connection
- Communication
- Collaboration

With and between other programmes

Global Programme (GV) Pandemic Prevention and Response. One Health

AFROHUN

MediLabSecure

EIOS EPIDEMIC INTELLIGENCE FROM OPEN SOURCES

One Sustainable Health

PREZODE Preventing zoonotic disease emergence

MOOD

THE PANDEMIC INSTITUTE

ERRAZE

Ending Pandemics

CREID Centers for Research in Emerging Infectious Diseases

icrad

CORDS Connecting Organizations for Regional Disease Surveillance

USAID | PREDICT

ENETWILD

ILRI INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

DIAC

sormas

Verena The Viral Emergence Research Initiative

PICREID

WildHealthNet

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Preventing zoonotic disease emergence

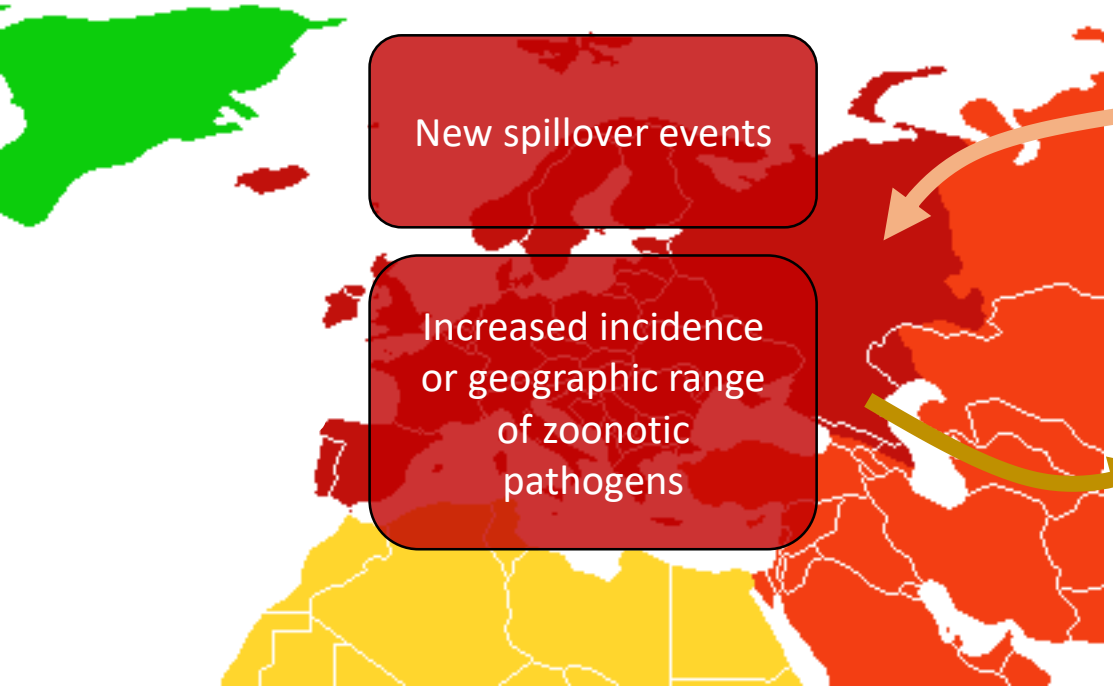
Emergence of zoonotic diseases
Exemples in Europe

Gwenaël Vourc'h (INRAE) and Gilles Salvat (ANSES)

Emerging zoonotic diseases of interest in Europe

→ **PREZODE –** prevention of zoonoses emergence
→ Special interest on zoonoses with pandemic potential (widespread drivers, interhuman transmission potential, …)

In Europe



New spillover events

Increased incidence or geographic range of zoonotic pathogens

From outside Europe

Introduction of zoonotic pathogens

To outside Europe

Contribution of European activities to « remote risk of emergence »

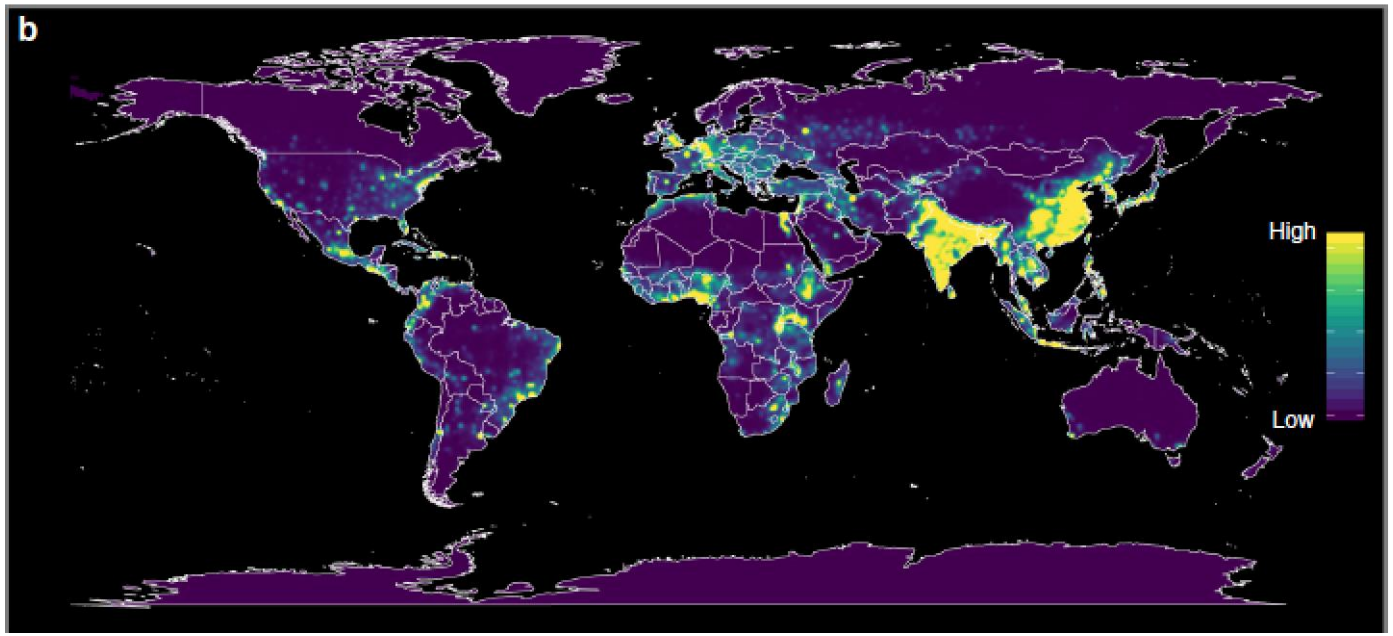
→ **CASE STUDIES**

- Spillover events
- Avian influenza HP
- West-Nile
- CCHF

→ **Scientific and societal challenges to evaluate contribution**

New spillover events

Spillover events in Europe



Heat maps of predicted relative risk distribution of zoonotic (from wildlife) emerging infectious disease events

Allen et al 2017 Nature communication
https://doi.org/10.1038/s41467-017-00923-8

- Emergence events : « the **original** case or cluster of cases representing an infectious disease emerging in human populations **for the first time** »
- From **wildlife origin**
- 1970-2008

→ 147 events altogether

- 24 events for Europe
- ca. ½ of the events are caused by food-borne bacteria or parasites
- 4 virus

New spillover events

Introduction of zoonotic pathogens

Influenza emergence and zoonotic potential in Europe

Wild migratory birds present in Europe (end of summer and falls) and coming from Asia highly contaminated for 5 years by H5Nx (mainly H5N8) Clade 2.3.4.4b of the A/Goose/Guangdong/1996-Like H5N1 Highly Pathogenic Avian Influenza Viruses

Automn 2021 : Many outbreaks in Europe with a HP H5N1 both in wildlife and domestic birds.

2021: No event of transmission to human in EU at the time this year …

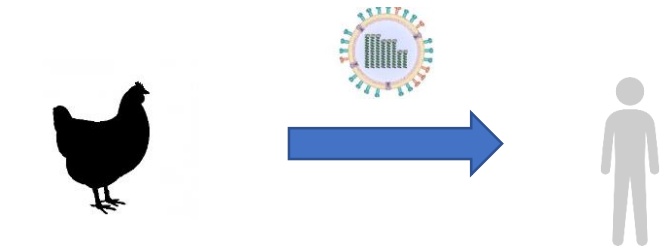
Summer 2021 : 15% of the investigated wildbirds on lake Ubsu-Nur in Russia/Mongolia border contaminated by HP H5Nx

But weak signal from Russia 2020: employees of a big poultry farm (800 000 birds) highly exposed to contaminated birds during stamping out showed antibodies and weak symptoms against H5N8.

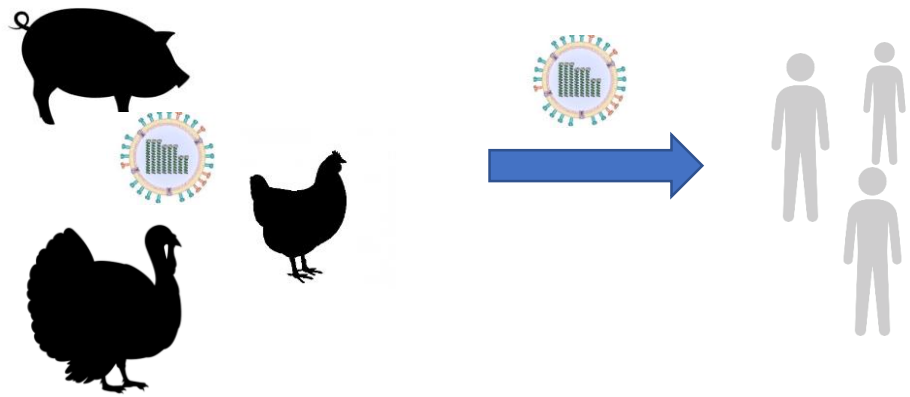
New spillover events

Introduction of zoonotic pathogens

Influenza emergence and zoonotic potential in Europe



Direct transmission from birds to human is possible but not directly pandemic (no human to human transmission : avian viruses bind to SAα2,3Gal receptors while human viruses bond to SAα2,6Gal receptors)



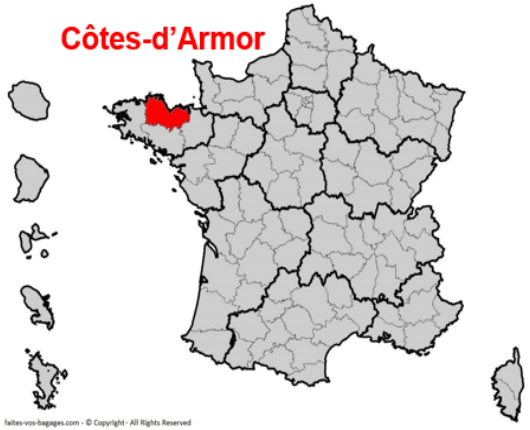
But swine (and turkeys) could harbor both kind of receptors and being infected either by avian, swine or human viruses : possible reassortments, possible spillover to come.

Human case of influenza A(H1N2)v of swine origin in France 2021

Case description

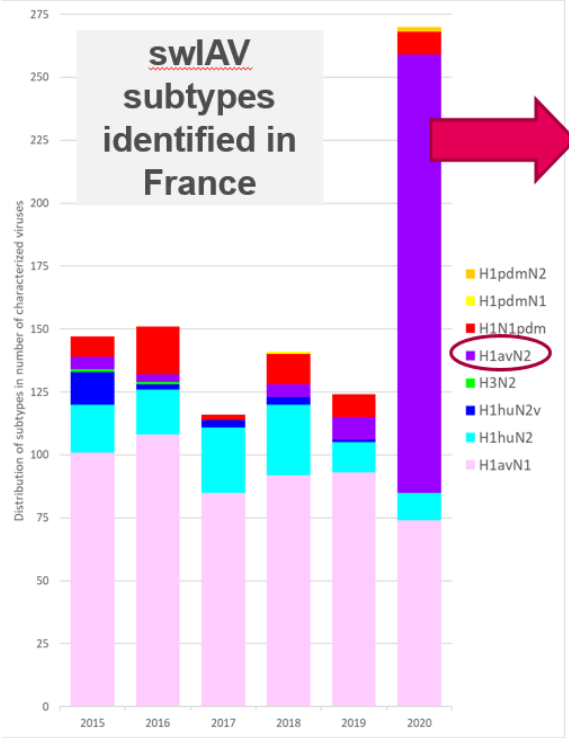
Santé publique France

- **03/09/21**: notification by the NRC (Institut Pasteur, Paris) of a confirmed human case of infection by an influenza virus A(H1N2)v of swine origin
- **Male, 60-69 y.o., comorbidities** (chronic lung disease)
- **Direct exposure to swine** (fattening farm) within the week before symptoms
- 14/08/21 : influenza-like illness (fever, shiver, cough)
- 18/08-25/08 : hospitalisation (**including ICU**)
- **Completely recovered**



Epidemiology of A(H1N2)v, clade 1C.2.4, in France (Anses)

Santé publique France



Anses – Chastagner et al., in prep; Hervé et al., BE, 2021

$H1_{av}N2$ genotype	HA (clade)	NA	PB2	PB1	PA	NP	M	NS
#A	1C.2.1							
#B	1C.2.1							
#C	1C.2.1							
#D	1C.2.1							
#E	1C.2.4							
#F	1C.2.?							

- *Eurasian avian-like* = EA
- DK-EA lineage
- pdm
- Scotland/94
- Gent/84
- Seasonal-like H3N2 (2003)

Genotype $H1_{av}N2$ #E (DK-EA2020 genogroup)

- First detection in February 2020 in Brittany
- Epidemic wave
- Rapid spread within the pig population in Western part of France
- Most prevalent swIAV subtype identified in 2020-2021 in France
- Also responsible for infections in turkeys breeder flocks

Human case of influenza A(H1N2)v of swine origin in France 2021

Epidemiological investigations

Human investigations :

8 co-exposed persons identified

None reported symptoms

Serum samples in 7/8, **serological assay ongoing at the NRC**

No increased influenza A detections in Brittany since August 2021

Syndromic surveillance of acute respiratory illness shows no signs of increasing trend in the area

Animal investigations (Anses) :

13/09 : visit to the farm by a team of epidemiologists and vets ; sampling of 30 pigs (1 month post-exposure)

No flu symptoms among the animals detected this summer, a few losses

Nasal swabs : all RT-PCR negative for swine influenza (including A(H1N2)v)

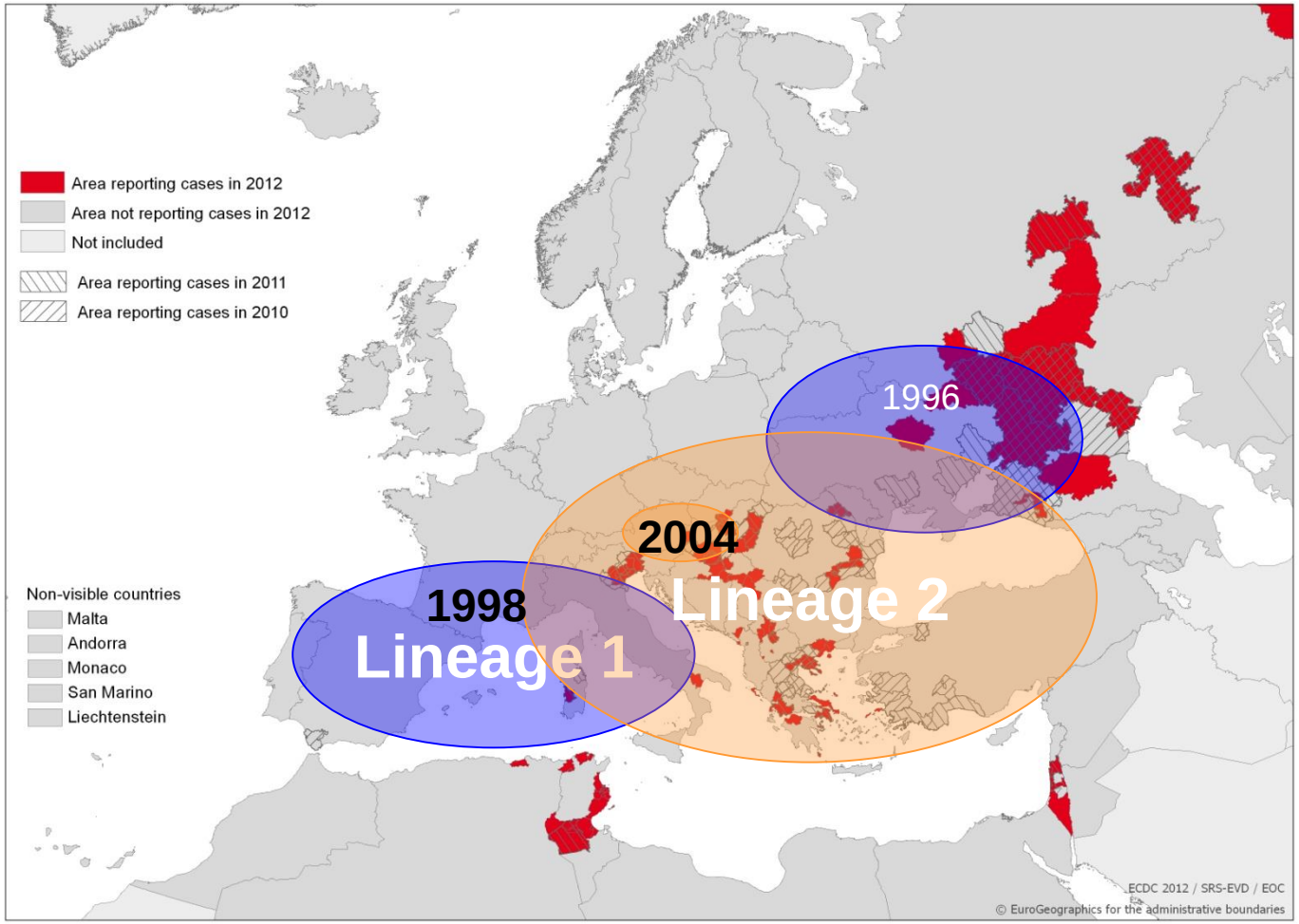
Serum samples : **detection of antibodies against swine influenza HA of clade 1C.2.4**

Risk analysis and response

- Direct exposure to pigs is the most probable source of infection in this case, even though human-to-human transmission can not be excluded at this stage
- No secondary transmission event from this case detected so far, serological analysis ongoing
- A(H1N2)v, clade 1C.2.4, has recently emerged and very rapidly spread through Western France ; data lacks on its adaptation to human
- 10/09/21 : information about this situation released by the health authorities to all healthcare professionnals in Brittany
- **National guidelines in case of suspicion of swine flu :** systematic testing for influenza in case of acute respiratory illness + SARS-CoV-2 negative + exposure to swine
- Information of pig farmers / other professionnels exposed to pigs

Increased incidence or geographic range of zoonotic pathogens

West Nile, an emerging virus in Europe



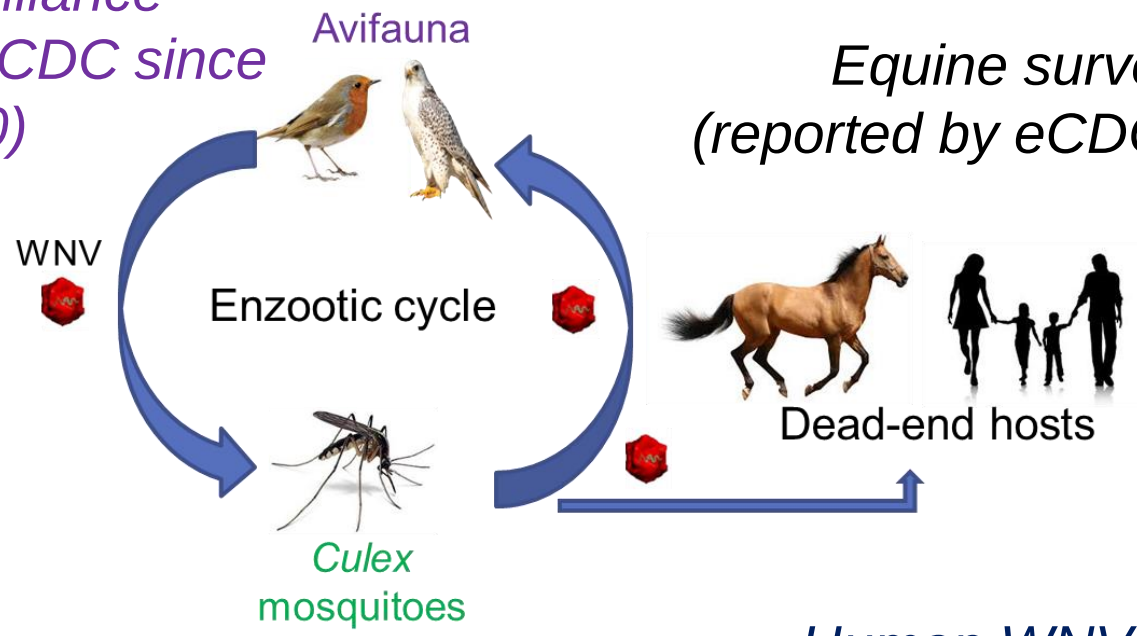
eCDC

"One health" approach for WNV surveillance in EU

West Nile virus (WNV) infection is notifiable in humans and equids in the European Union

Bird surveillance (reported by eCDC since 2020)

Equine surveillance (reported by eCDC since 2017)

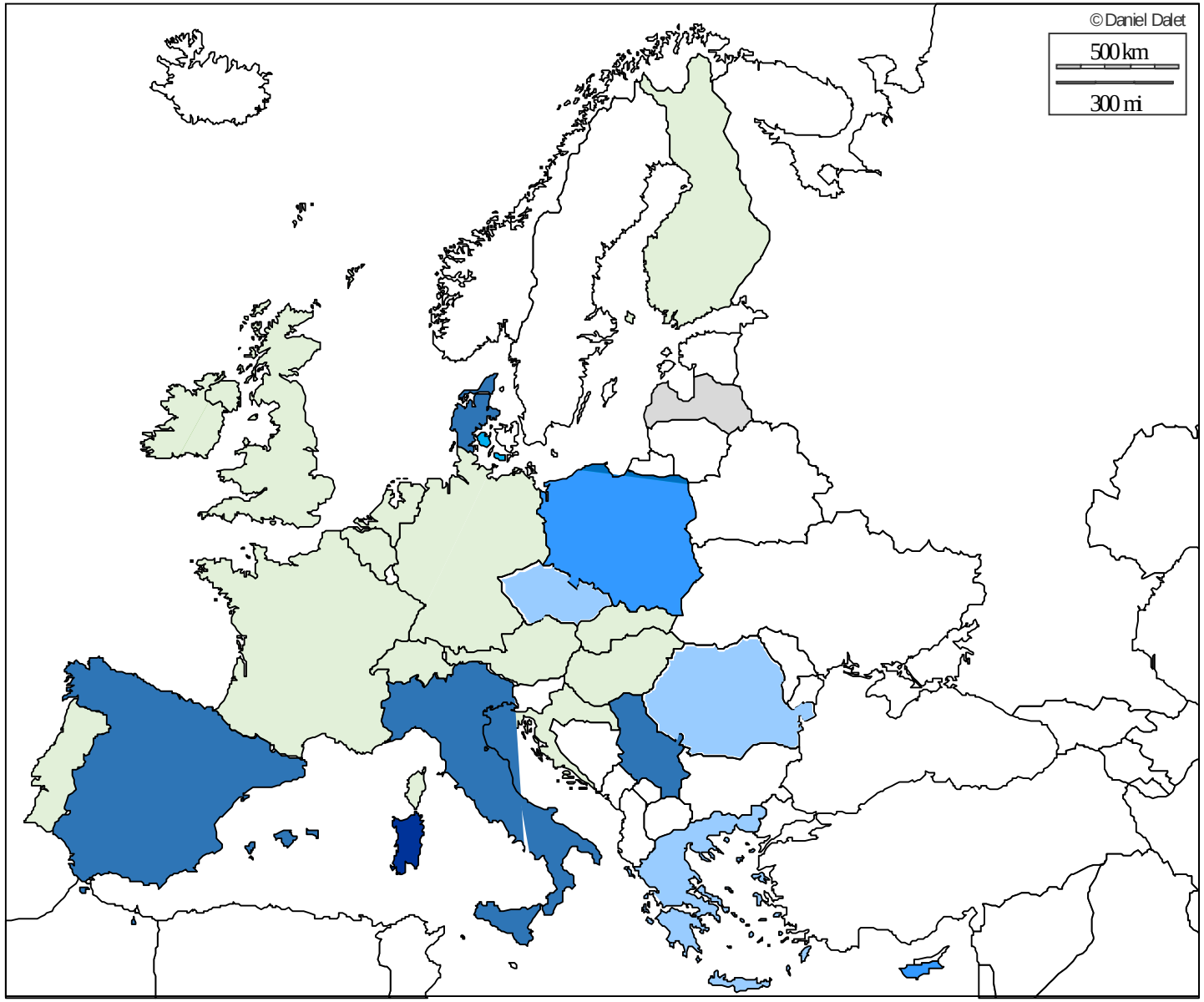


Entomological surveillance

Human WNV surveillance (reported by eCDC since 2010)

G Gonzalez, 2021

Surveillance system implemented in the EU

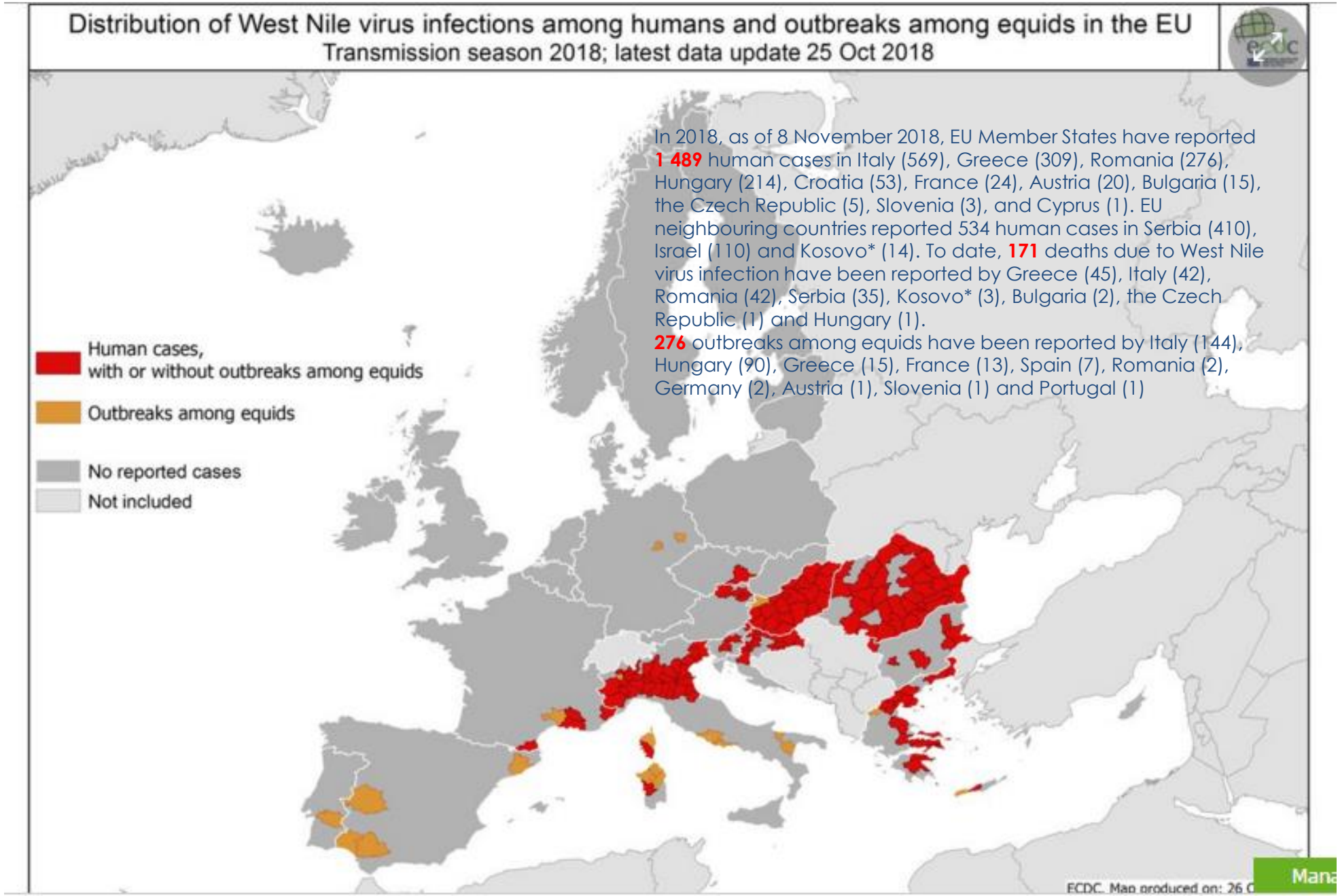


Active surveillance

Passive surveillance

No surveillance

G Gonzalez, 2021



In 2018, as of 8 November 2018, EU Member States have reported **1 489** human cases in Italy (569), Greece (309), Romania (276), Hungary (214), Croatia (53), France (24), Austria (20), Bulgaria (15), the Czech Republic (5), Slovenia (3), and Cyprus (1). EU neighbouring countries reported 534 human cases in Serbia (410), Israel (110) and Kosovo* (14). To date, **171** deaths due to West Nile virus infection have been reported by Greece (45), Italy (42), Romania (42), Serbia (35), Kosovo* (3), Bulgaria (2), the Czech Republic (1) and Hungary (1).

276 outbreaks among equids have been reported by Italy (144), Hungary (90), Greece (15), France (13), Spain (7), Romania (2), Germany (2), Austria (1), Slovenia (1) and Portugal (1)

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Increased incidence or geographic range of zoonotic pathogens

Introduction of zoonotic pathogens

Emergence risk of Crimean Congo haemorrhagic fever (CCHF)

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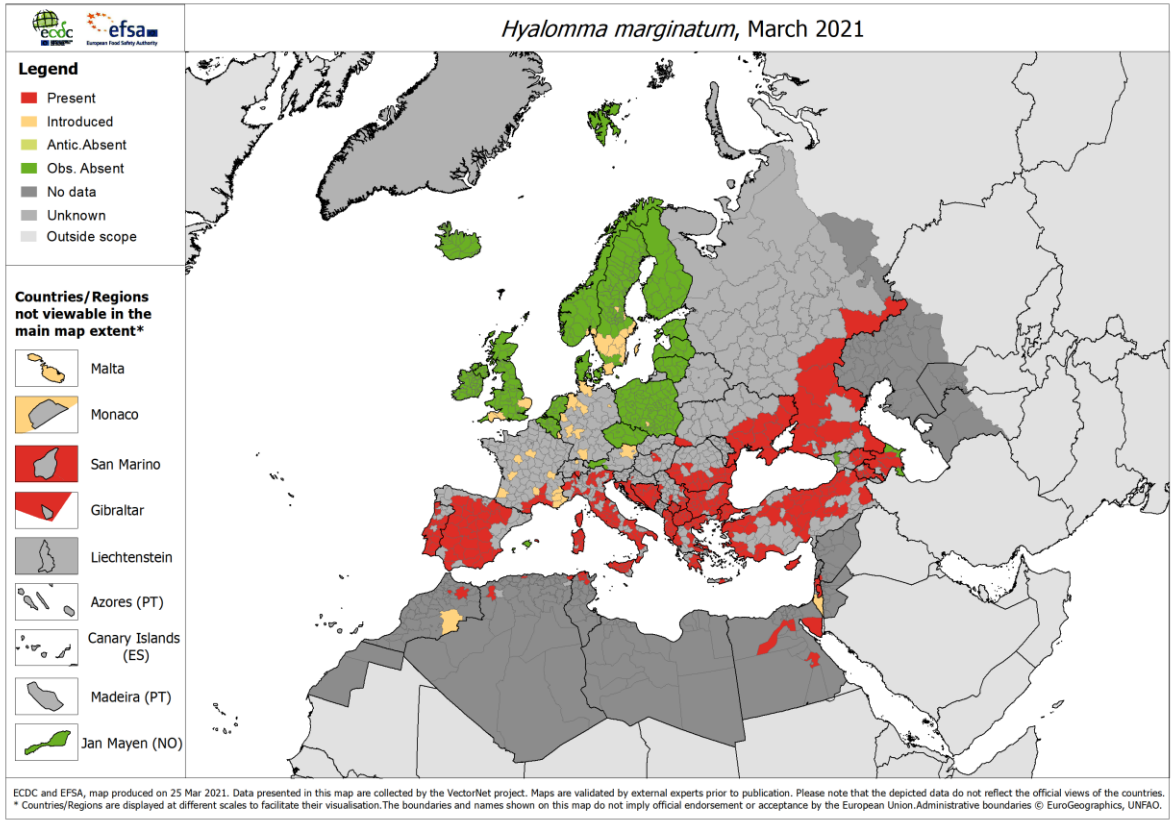
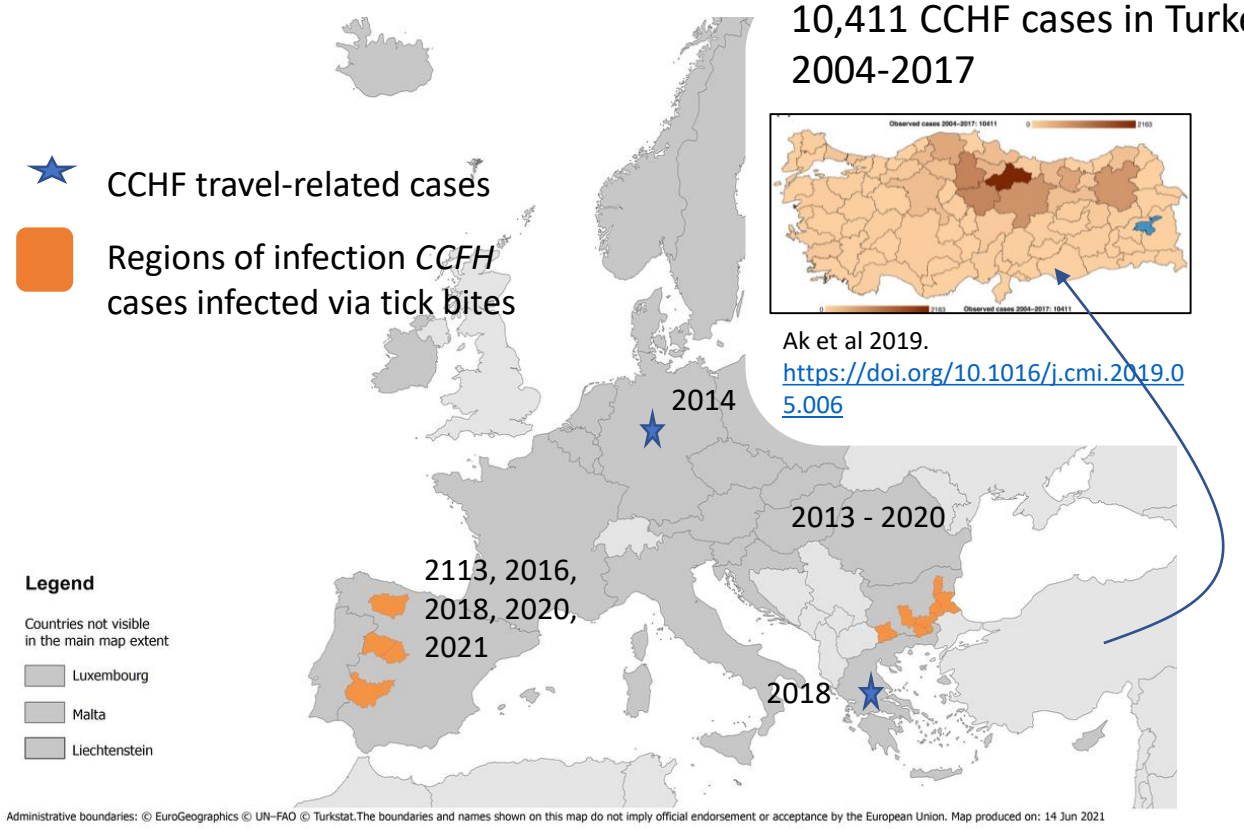
***Hyalomma marginatum* tick**



https://www.ecdc.europa.eu/sites/default/files/images/Hyalomma_marginatum_2021_03.png

Crimean-Congo haemorrhagic fever cases EU/EEA, 2013–present



10,411 CCHF cases in Turkey 2004-2017

Ak et al 2019. https://doi.org/10.1016/j.cmi.2019.05.006

https://www.ecdc.europa.eu/en/crimean-congo-haemorrhagic-fever/surveillance/cases-eu-since-2013

Conclusions

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Major risks within Europe

- Influenza virus → evolution of livestock farming, poultry/swine interface
- Vector-borne diseases → evolution with climate change and land-use

Contribution of European activities to risk outside Europe

- To be assessed

→ Challenges for surveillance system and prevention

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Preventing zoonotic disease emergence

The need to build impact pathway

Mireille MATT (INRAE)

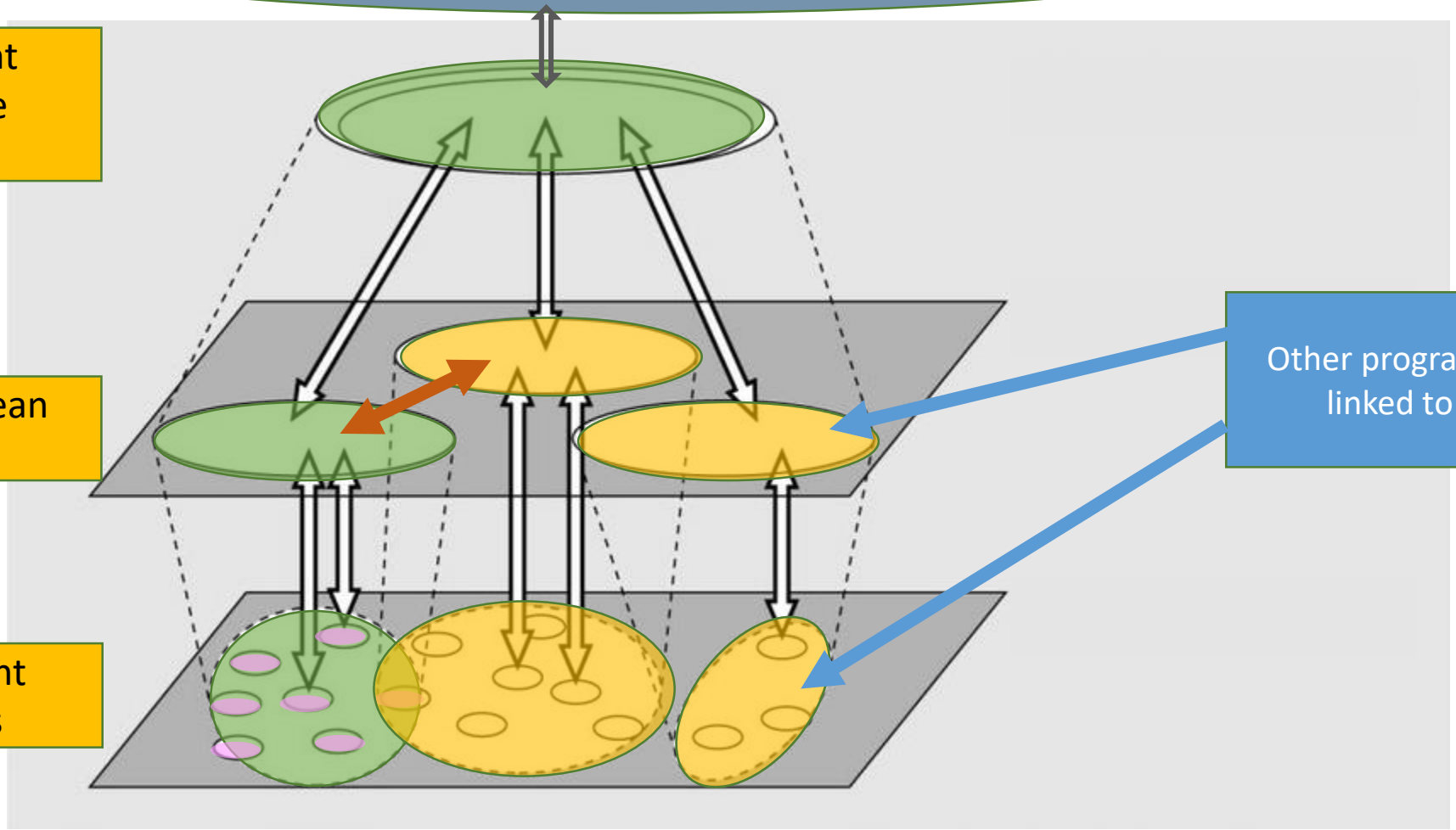
Mission “Prevent zoonotic disease emergence”

Grand Challenge : Good Health, wellbeing, sustainability

MISSION: Prevent zoonotic disease emergence

PROGRAM: European Initiative

PROJECT: Different funded projects



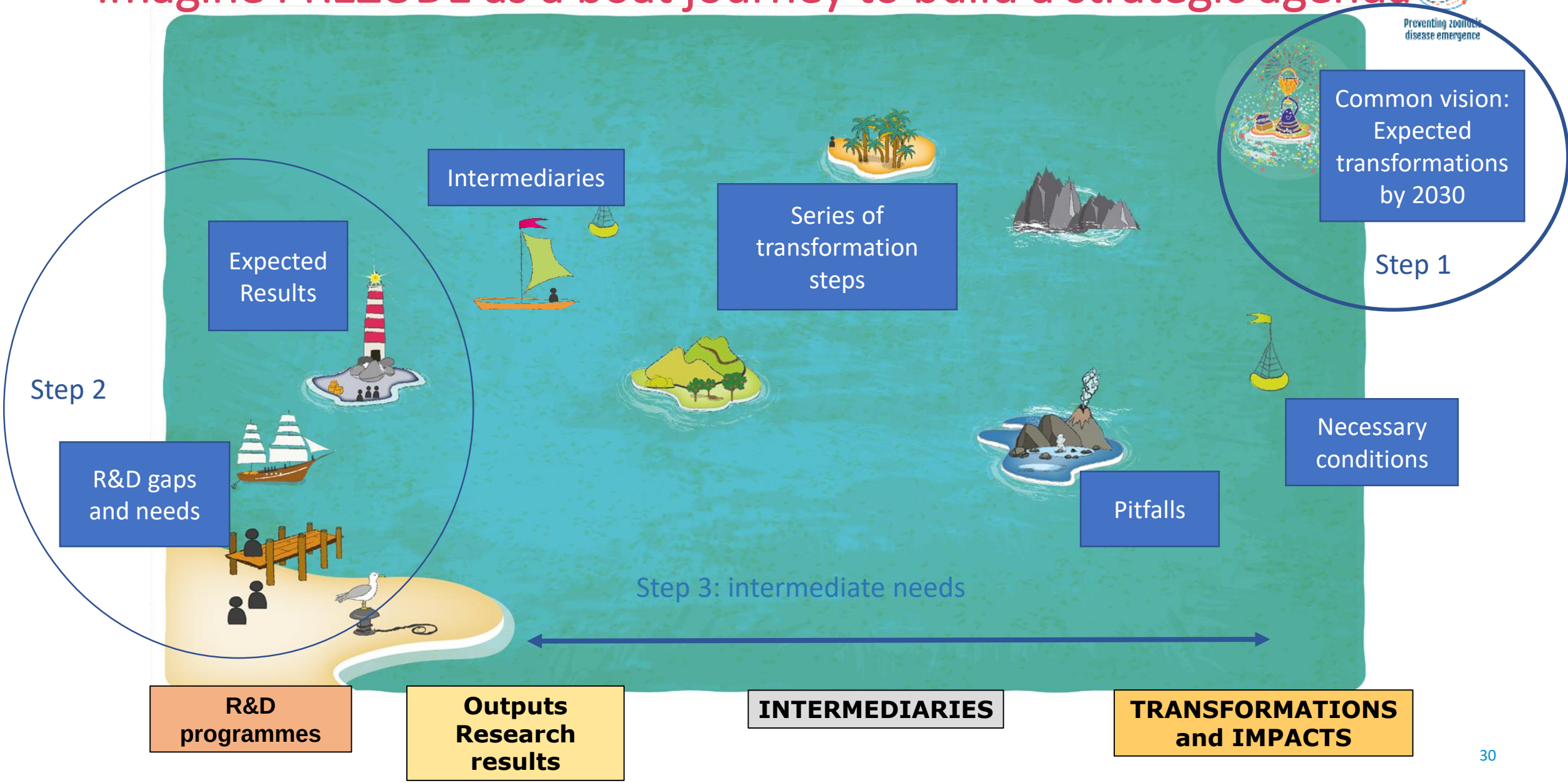
Other programs and projects linked to the mission

European Initiative = scientific excellence and expected societal impacts

- Scientific research as exploration: we have tools to guide and navigate towards excellence

- Can the same be said for navigating towards desirable societal impacts?

Imagine PREZODE as a boat journey to build a strategic agenda



Break out groups

Research gaps
Research needs

Intermediate needs
Operational needs

Tragets in Europe

Step 2:
agree, disagree, comment the research needs

Step 3:
agree, disagree, comment the operational needs

Step 1:
agree, disagree, comment the targets

Alignment

Alignment

Alignment

Elements to build a strategic European research agenda and an operational roadmap

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Synthesis from WS#1 and WS2 : from science to targeted transformations through impact pathway

Elisa BOHIN (INRAE) and Gwenaël VOURC'H (INRAE)

Workshop #1 – July 2021

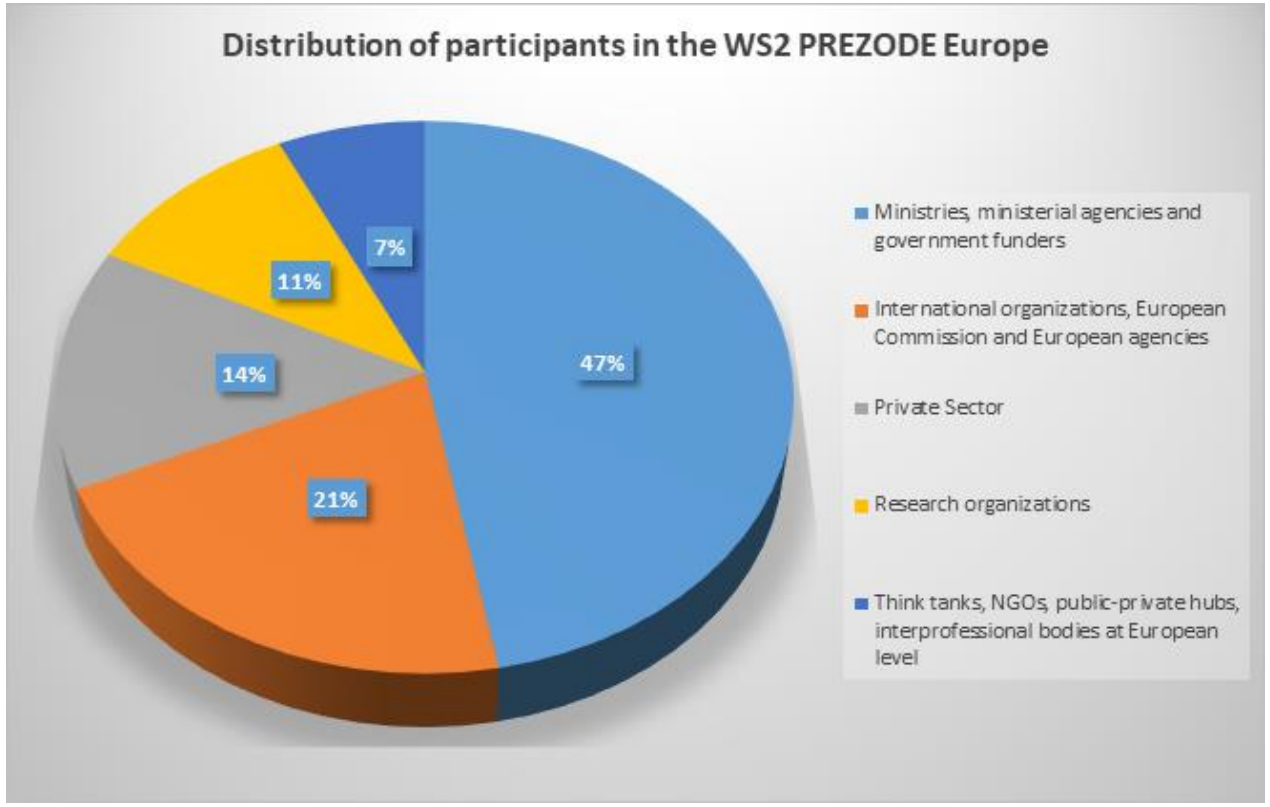
- With mainly scientists
- 125 participants, 19 European countries
- 3 break-out groups
  - ✓ Risk of zoonoses emergence
  - ✓ Mitigation of emergence
  - ✓ Surveillance

Ca 4 pages synthesis per break-out group

- Main stoke take research
- Research gap
- Contribution of science to change in the society

Workshop #2 – October 2021

- With mainly stakeholders
- 94 participants, 12 European countries
- 3 break-out groups
  - ✓ Agriculture, livestock, animal health
  - ✓ Biodiversity, wildlife, land use
  - ✓ Human health and food safety
- 3 break-out groups
  - ✓ Risk of zoonoses emergence
  - ✓ Mitigation of emergence
  - ✓ Surveillance



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Ca 4 pages synthesis per break-out group

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- Contribution of science to change in the society

Within European specificities

Workshop #2 – October 2021

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- 3 break-out groups
  - ✓ Risk of zoonoses emergence
  - ✓ Mitigation of emergence
  - ✓ Surveillance

600 notes on Klaxoon board !

- Expected/needed research results
- Transformations needed
- Vision in 2030

Impact pathway

Targets

Sustainable livestock farming with low risk of zoonoses

- Zoonotic risk reduction from livestock
- Agroecology
- Food safety & security
- Sustainable land management
- Fair income for farmers
- Increase animal welfare

Efficient detection and surveillance network for zoonoses

- Accessible data
- Data protection
- Interoperability of network
- Speed of sharing
- Efficient early warning

Integrated public policies - One Health

- Co-design of public policy
- Empowerment of local communities
- Capacity building of smallholder
- Economic sustainability
- International cooperation

Wildlife with high biodiversity and low risk of zoonoses emergence

- Zoonotic risk reduction from wildlife
- Biodiversity conservation
- Sustainable wildlife management
- Animal welfare

Reduction of the remote impact of Europe on zoonotic risk

- No impact of European consumption and production
- Sustainable diet
- Economic sustainability
- Sustainable European tourism

Impact Pathway

Research needs	*Intermediate / transformation needs*	Targets
• **General knowledge** on multi-host pathogens, microbiota, systemic approaches, risk perception, prioritization of threats		**Sustainable livestock farming with low risk of zoonoses**
• Evolution of the risk in the context **of different types of farming**	• *Public policies and subsidies regarding the evolution of livestock farming and animal health regulation*	**Controversial issues** Animal welfare - outdoor breeding // Biosecurity
• Consequences of changes in **wildlife communities and vectors** due to main drivers • Impact of **conservation strategy** on zoonotic risk • Role of legal and illegal **trade**	• *Biodiversity management* • *Value of biodiversity* • *Rules on wildlife trade*	**Wildlife with high biodiversity and low risk of zoonoses emergence**
		Controversial issues Separated approach // Holistic approach

Impact Pathway

Research needs	*Intermediate / transformation needs*	Targets
• Integrate of **FAIR data** in research	• *Data policies*	
• Develop **new tools** for diagnostic & early detection	• *Harmonization and availability of tools* • *Technological development*	**Efficient detection and surveillance network for zoonoses**
• Develop **integrated strategy** to improve surveillance (relevant sampling, identified high priorities, involvement of actors, account of social, economical, societal impacts)	• *One Health surveillance* • *Actor engagement* • *Value of surveillance*	
• Increase **representation** of risk and **predictive** performance of models	• *Coordinated international surveillance strategy*	

Controversial issues

High tech, efficient tools // low prices

Strengthen current network // develop new

Impact Pathway

Research needs	*Intermediate / transformation needs*	Targets
• Investigate how to put **efficient One Health framework**	• *Regional strategies* • *Actor engagement* • *Shared responsibilities*	**Integrated public policies - One Health**
• Increase our understanding of the **interface between sciences and policy**	• *Training* • *Communication*	**Controversial issues** Science-based public policies // democracy based public policies
• Increase our understanding of benefit **from international cooperation** on zoonotic prevention	• *International cooperation and protocols*	**Reduction of the remote impact of Europe on zoonotic risk**
• Investigate **how to measure remote impact**	• *Links with other agendas*	

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Break-out groups

SESSION 1 - 3 break-out groups 9:45 – 10:10

ROOM 1 – Livestock – biodiversity – from risk to solutions

Simone Sommer (Univ Ulm, Germany)

Amélie Desvars-Larrive (Vet Med Univ Vienna, Austria)

Assisted by Gwenaël Vourc'h (INRAE, PREZODE)

→ Klaxoon board: https://app.klaxoon.com/join/H6RFDVM

ROOM 2 – Surveillance system

Thibaud Porphyre (VetAgro Sup, France)

Assisted by Murielle Trouillet (INRAE, PREZODE)

→Klaxoon board: https://app.klaxoon.com/join/JBBH62S

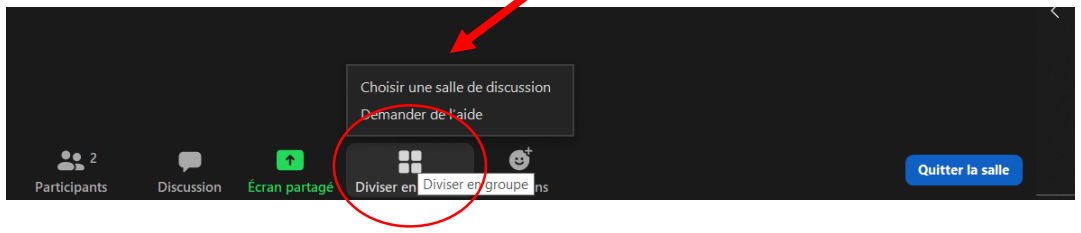
ROOM 3 - Integrated Public Policies on One Health – remote impact of European activities

Pikka Jokelainer (Statens Serum Inst, Denmark)

Assisted by Elisa Bohin (INRAE, PREZODE)

→ Klaxoon board: https://app.klaxoon.com/join/RSVVMDG

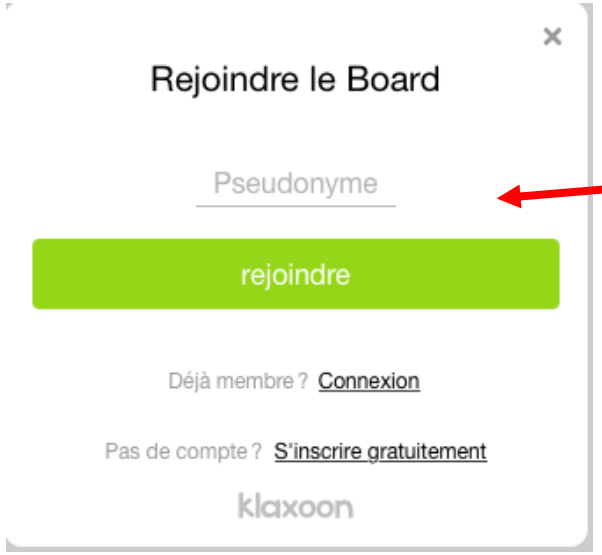
How to join a room?



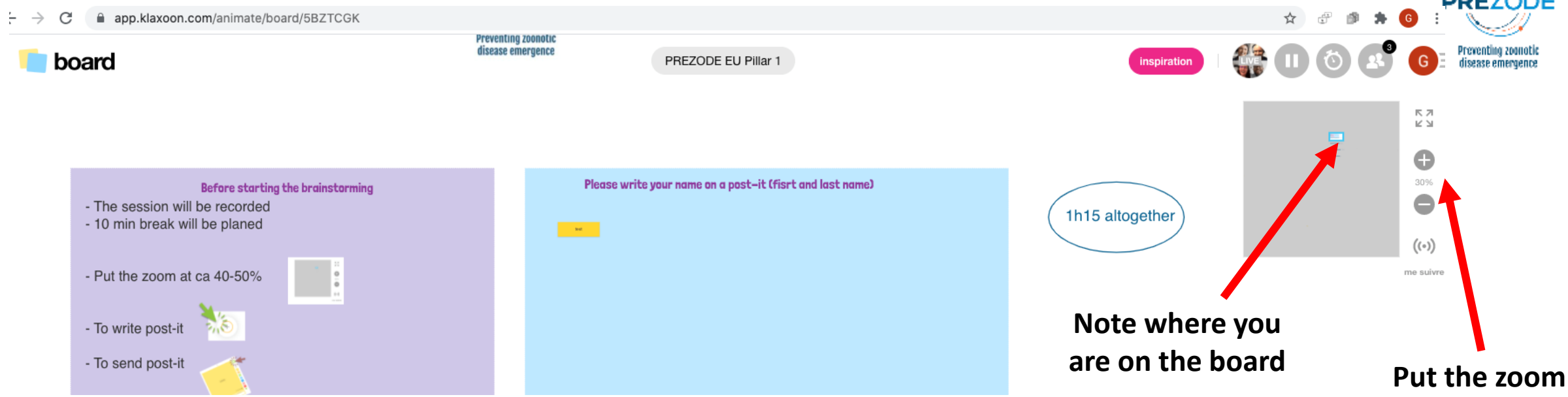
3 Klaxoons

You should not need to log in to Klaxoon → you can close this box

You have to enter a pseudo to start



Put in « nickname » your first and last name

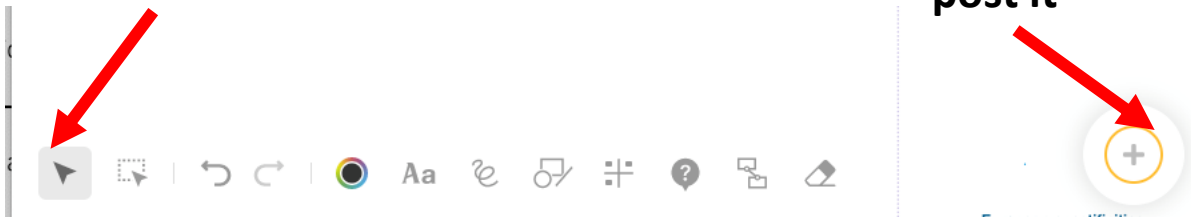


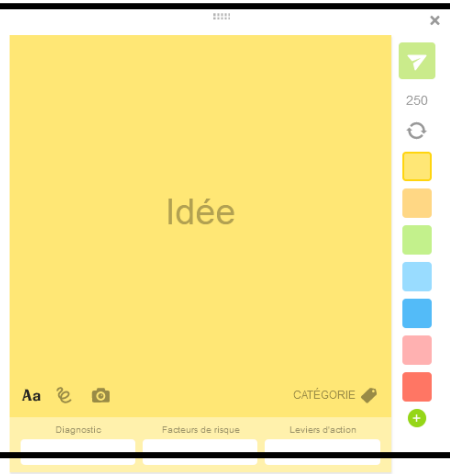
Note where you are on the board

Put the zoom between 30 – 50 %

To move around

Click to create a post it





Send the post-it

It will appear on the board in the center of the screen

PREZODE Europe Workshop #3

PREZODE

Preventing zoonotic disease emergence

PREZODE Europe Workshop #3

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Preventing zoonotic disease emergence

Reports from break-out groups

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Preventing zoonotic disease emergence

Conclusion

Next steps

Jean François SOUSSANA (INRAE)

WHERE ARE WE?
WHAT ARE THE NEXT STEPS

- Framing the initiative
- Launching the first national research program in France
- Co-developing the initiative with all the relevants stakeholders
  - Regional and national co-design workshops
  - Scientific events
  - → Strategic agenda

CONTRIBUTIONS NEEDED

- Alignment across existing and planned initiatives
- International organisations
- Foundations
- Countries
- Science and development partners

2021

Construction of the initiative in link with the other programmes

Engagement by countries, international organizations, research anf training actors and other stakeholders

2022-2023

Strategic agenda, and first implementation plan

Engagement by countries, international organizations and stakeholders

2024-2025

Second implementation plan

Targeting operational outcomes

WHERE ARE WE?
WHAT ARE THE NEXT STEPS

PREZODE
Preventing zoonotic disease emergence

Regional workshops – CO-DESIGN STEP 1
Building up a Common vision; Which obstacles; important actors; other initiatives

Regional workshops – CO-DESIGN STEP 2
Need for changes, actors and activities

Regional workshops – CO-DESIGN STEP 3
Regional ROADMAP; pilot countries Phase 2 and 3

COUNTRY WORKSHOPS
Activities; partners, calendar; funds

December 2020

May – July 2021

September – October 2021

October 2021

November 2021

2022

5 Regional workshops:
to prepare the launch of the initiative – to assess its needs

Scientific Workshops 5 Pillars
Contribute to Scientific strategic agenda

Deliverables 2021 - Regional level
- Scientific strategic agenda
- Operational roadmap

A pool of more than 1000 contributors, from 120 countries

Pre-selection Pilot countries → 1st phase Countries' workshops → 1st phase implementation → 2nd & 3rd phases 2023 & 2024

AFD Project Phase 1 Instruction calendar

Way Forward

PREZODE: Preventing zoonotic disease emergence

PREZODE: a common framework to foster collaboration and impact

- By building collaborations with other partners
- By securing the required level of funding
- By building joint programmes…

- In 2022:
  - Setting up an international governance for the initiative
  - Proposing a strategic research agenda and an operational workplan
  - Launching the first operational programs

PREZODE

Preventing zoonotic disease emergence

PREZODE Europe Workshop #3

Many thanks for your participation !