



**PASTEUR
NETWORK**

Pasteur Network's Annual Meeting 2022

"The Start of a New Chapter"



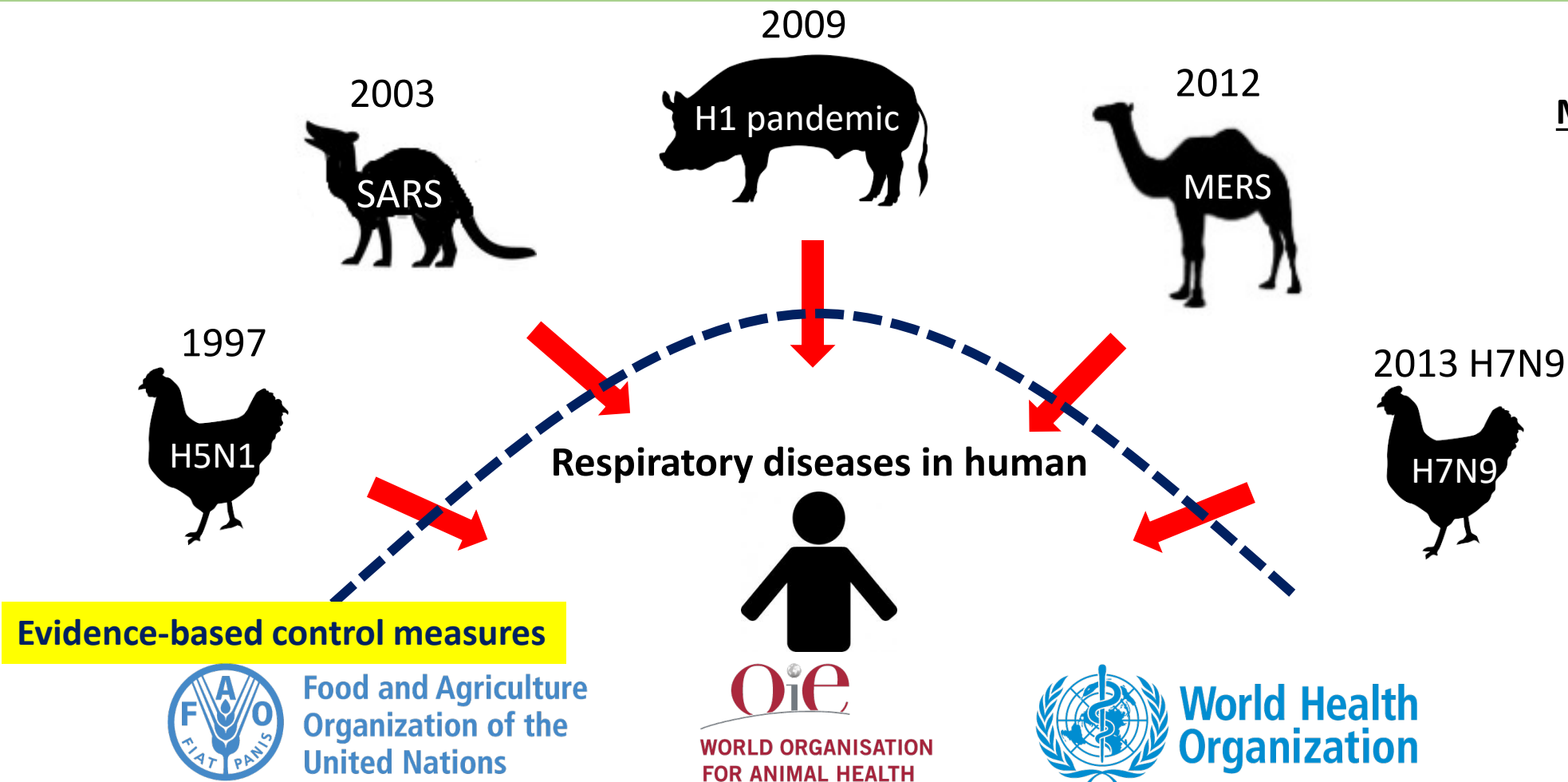
LKS Faculty of Medicine
HKU-Pasteur Research Pole
香港大學-巴斯德研究中心



**HKU
Med**

LKS Faculty of Medicine
HKU-Pasteur Research Pole
香港大學-巴斯德研究中心

Rome wasn't built in a day, but it must have a start.....



Multidisciplinary approach

- Animal models
- Antivirals
- Basic virology
- Clinical studies
- Molecular Diagnosis
- Evolution
- Ex vivo models
- Immunology
- Pathogenesis
- Transmission
- Surveillance
- Stem cell research
- Vaccines

Our prior understanding on bat coronaviruses help to develop diagnostic assays to detect COVID-19 patients

10 Jan: First genome in public domain

16 Jan: **HKU submitted its protocol to WHO**

24 Jan: WHO posted it for public use



HKU Med LKS Faculty of Medicine
School of Public Health
香港大學公共衛生學院

Detection of 2019 novel coronavirus (2019-nCoV) in suspected human cases by RT-PCR

This protocol is designed to detect 2019-nCoV in human clinical specimens. The two monoplex assays described here are reactive with coronaviruses under the subgenus *Sarbecovirus* that includes 2019-nCoV, SARS-CoV and bat SARS-like coronaviruses. The rationales for using this detection approach are: 1) the genetic diversity of 2019-nCoV in humans and animals is yet to be fully determined and 2) many laboratories lack positive controls for 2019-nCoV. *Viral RNA extracted from SARS-CoV can be used as a positive control in the assays below.* As SARS was eliminated in humans, suspected cases that are positive in these RT-PCR assays should be considered to be infected by the 2019-nCoV. The N gene RT-PCR is recommended as a screening assay and the Orf1b assay as a confirmatory one. In the event of a positive PCR result, sequence analyses of the amplicons will further help to confirm the result and to distinguish between SARS-CoV and 2019-nCoV. An N gene positive/Orf1b negative result should be regarded as indeterminate and the case is recommended to be referred to a WHO reference lab for further testing.

Institutions received controls and diagnostic reagents from HKU



**PASTEUR
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★ 13 countries from 4 regions



**World Health
Organization**



IAEA

International Atomic Energy Agency
Atoms for Peace and Development

Global SARS-CoV-2 Isolates Accessioned To-Date

Producing SARS-CoV-2 Isolate



All available as isolates from BEI Resources

* = cultured genome sequence publicly available

Italicized = available as gRNA from BEI Resources

Bold = also available as gRNA from ATCC

Scientific impacts

- Basic virology
- Clinical virology
- Clinical diagnosis
- Clinical treatment
- Epidemiology
- Molecular epidemiology
- Sero-epidmiology
- T cell Immunology
- Pathogenesis
- Virus transmission
- Virus evolution

THE LANCET
Respiratory Medicine

Tropism, replication competence, and innate immune responses of the coronavirus SARS-CoV-2 in human respiratory tract and conjunctiva: an analysis in ex-vivo and in-vitro cultures

Clinical Chemistry

Molecular Diagnosis of a Novel Coronavirus (2019-nCoV) Causing an Outbreak of Pneumonia FREE

Pasteur Network Annual Meeting | November 2022

nature

Article | Published: 01 February 2022

SARS-CoV-2 Omicron variant replication in human bronchus and lung ex vivo

THE LANCET

Transmission of SARS-CoV-2 delta variant (AY.127) from pet hamsters to humans, leading to onward human-to-human transmission: a case study

nature
immunology

TECHNICAL REPORT

<https://doi.org/10.1038/s41590-020-0773-7>

ORF8 and ORF3b antibodies are accurate serological markers of early and late SARS-CoV-2 infection

EMERGING INFECTIOUS DISEASES®

Probable Transmission of SARS-CoV-2 Omicron Variant in Quarantine Hotel, Hong Kong, China, November 2021

nature
medicine

BRIEF COMMUNICATION

<https://doi.org/10.1038/s41591-022-01705-6>

Check for updates

OPEN
Neutralizing antibodies against the SARS-CoV-2 Delta and Omicron variants following heterologous CoronaVac plus BNT162b2 booster vaccination

nature communications

SARS-CoV-2 specific T cell responses are lower in children and increase with age and time after infection

nature

Pathogenesis and transmission of SARS-CoV-2 in golden hamsters

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Infectious Diseases

nature

Infection of dogs with SARS-CoV-2

Viral load of SARS-CoV-2 in clinical samples



Local and international public health impacts

Local



The Government of
the Hong Kong Special Administrative Region



Weekly and adhoc report to our observations to
relevant stakeholders (e.g. FHB, CHP, AFCD, HA
and HMRF)



Community testing;
Quarantine hotel policy;
More stringent testing policy for high risk groups;
New recommendation of ventilation in high risk settings;
etc

Outstanding Project Team on COVID-19 Research Awards

Health Research Symposium 2021, FHB

International



Food and Agriculture
Organization of the
United Nations



PI serves as a member in various COVID-19
task forces in WHO, OIE and FAO



Virus evolution, diagnosis, risk assessment and zoonosis



Recommendations

Example

Genomic sequencing of SARS-CoV-2

A guide to implementation for maximum impact on public health

8 January 2021



<https://www.who.int/publications/i/item/9789240018440>

Keys: Teamwork, teamwork and teamwork



- Identify the problems
- Narrow down the scope to an addressable one
- Talk to and engage stakeholders asap
- Out-reach decision makers and their advisors
- Importance of network, appreciate one's strengths and limitations
- Provide realistic options/solutions
- Be vigilant, accept the fact that we do not live in a perfect world
- Answers should be available in a timely manner
- Confidentiality and building trust
- It is not a pure scientific research
- The benefit should be mutual

Academics, local government, hospital networks, international organizations, journalists, local funding agents, airport



INTERNATIONAL PASTEURIAN RESEARCH PROGRAM IN RESPONSE TO CORONAVIRUS IN AFRICA (REPAIR)

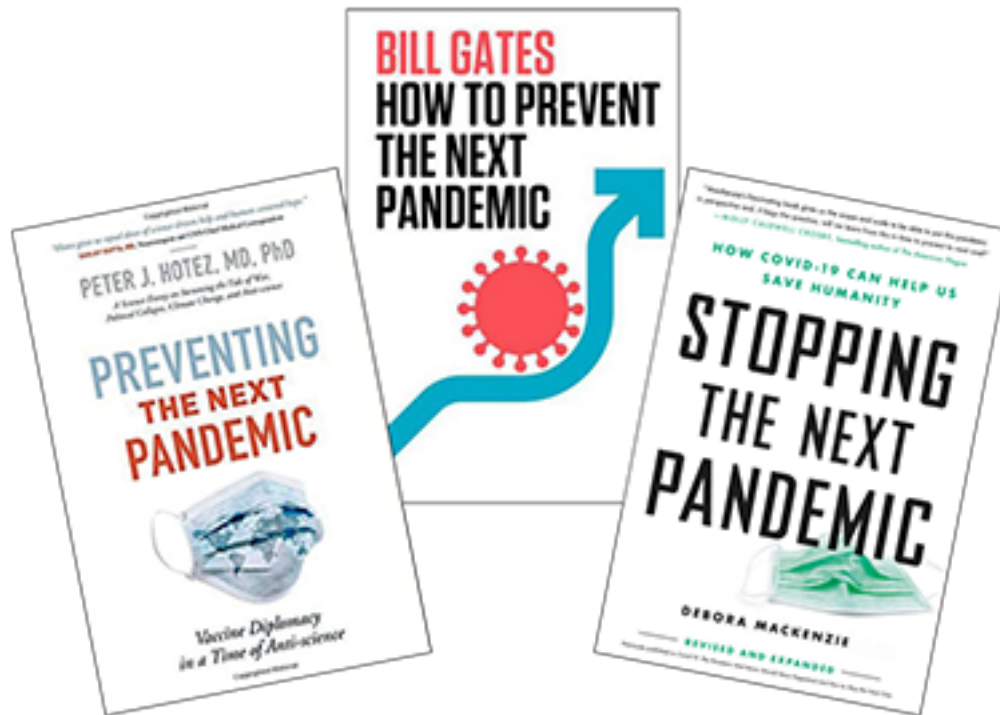
A multisite collaborative research program of the Pasteur Network in response to Coronavirus in Africa

- Maghreb region: IP de Tunis, IP d'Algérie and IP du Maroc.
- West Africa and Sahel: IP de Dakar, IP de Côte d'Ivoire, IP de Guinea and CERMES in Niger.
- Central Africa: IP de Bangui, Pasteur Center in Cameroon.
- Southern Africa: IP de Madagascar.

Bi-monthly Call of PN Asia-Pacific Region

- AMR and COVID-19

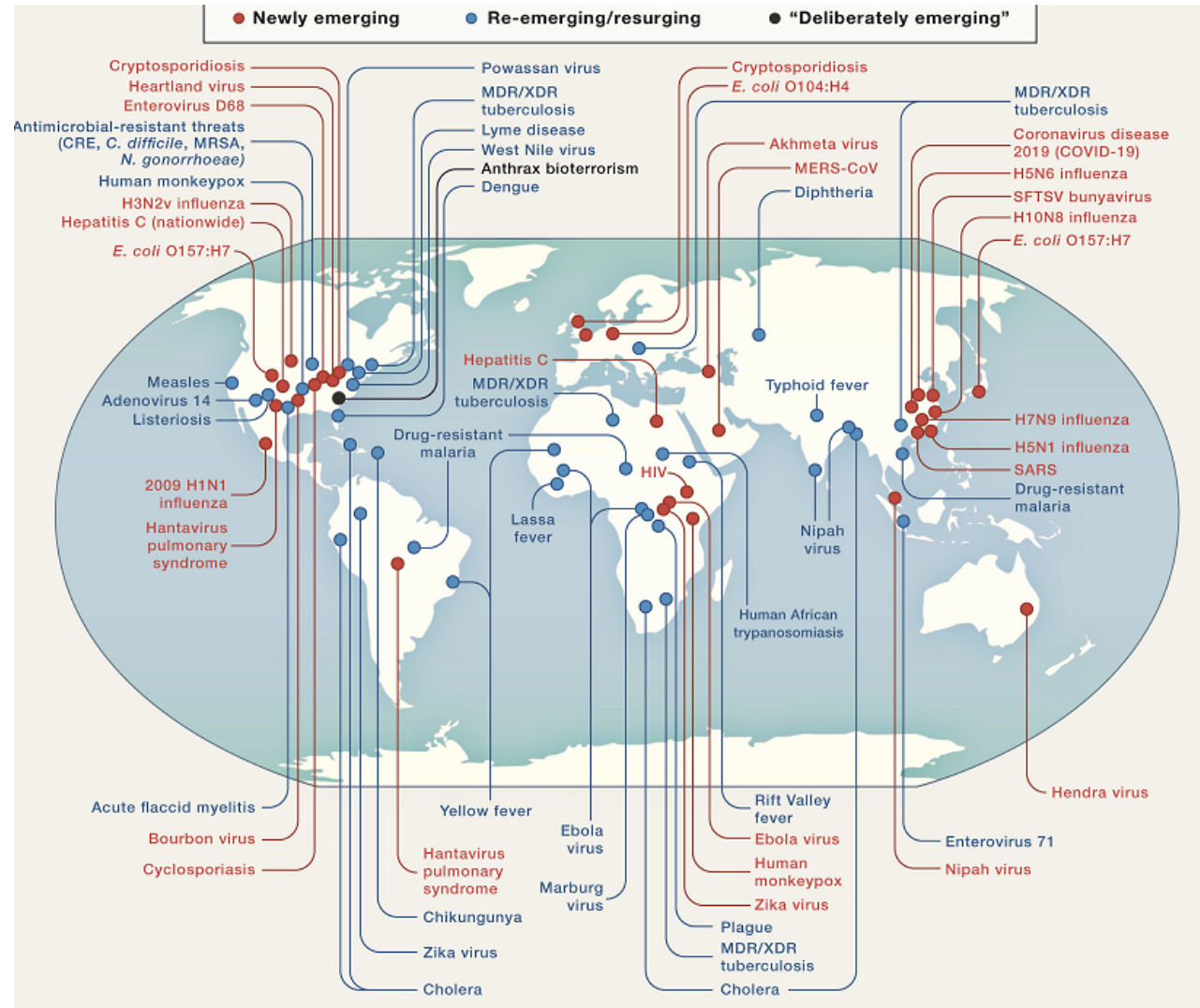
Are we ready for the next pandemic?



- Prevention
- Mitigation

Preparedness and response to outbreaks:

Emerging infectious diseases



De-risking!

Morens and Fauci, Cell 2020

PASTEUR NETWORK

Pasteur Network is a worldwide network of 33 members, united by Pasteurian missions and values, which contribute to the improvement of global health.



Americas

- BRAZIL**
 - Fiocruz
portal.fiocruz.br/en
 - Scientific Platform Pasteur-USP*
sppu.com.br/en/
- CANADA**
 - INRS-Armand Frappier Santé Biotechnologie Research Center
inrs.ca/en/
- FRANCE**
 - Institut Pasteur de la Guadeloupe
web.pasteur-guadeloupe.fr
 - Institut Pasteur de la Guyane
pasteur-guyenne.fr
- URUGUAY**
 - Institut Pasteur de Montevideo
pasteur.uy/en

Euro-Mediterranean

- ALGERIA**
 - Institut Pasteur d'Algérie
pasteur.dz
- BELGIUM**
 - Sciensano
sciensano.be/en
- BULGARIA**
 - Stephan Angeloff Institute of Microbiology
microbio.bas.bg/wordpress/index.php/en/
- FRANCE**
 - Institut Pasteur (Paris)
pasteur.fr/en
 - Institut Pasteur de Lille
pasteur-lille.fr/en/
- GREECE**
 - Hellenic Pasteur Institute
pasteur.gr/en
- ITALY**
 - Institut Pasteur in Italy – Cenci Bolognetti Foundation
institutopasteuritalia.it
- MOROCCO**
 - Institut Pasteur du Maroc
pasteur.ma
- RUSSIA**
 - Institut Pasteur in Saint Petersburg
pasteur.org.ru
- TUNISIA**
 - Institut Pasteur de Tunis
pasteur.tn

Africa

- CAMEROON**
 - Pasteur Center in Cameroon
pasteur-yaounde.org
- IVORY COAST**
 - Institut Pasteur de Côte d'Ivoire
pasteur.ci
- GUINEA**
 - Institut Pasteur de Guinée
www.pasteur-guinee.org
- MADAGASCAR**
 - Institut Pasteur de Madagascar
pasteur.mg
- NIGER**
 - CERMES
cermes.net
- CENTRAL AFRICAN REPUBLIC**
 - Institut Pasteur de Bangui
pasteur-bangui.org
- SENEGAL**
 - Institut Pasteur de Dakar
pasteur.sn/en

Asia-Pacific

- CAMBODIA**
 - Institut Pasteur du Cambodge
pasteur-kh.org
- CHINA**
 - Institut Pasteur of Shanghai – Chinese Academy of Sciences
english.shanghaipasteur.cas.cn/
 - HKU-Pasteur Research Pole
www.hkupasteur.hku.hk/
- SOUTH KOREA**
 - Institut Pasteur Korea
ip-korea.org
- FRANCE**
 - Institut Pasteur de Nouvelle-Calédonie
institutpasteur.nc
- IRAN**
 - Institut Pasteur in Iran
en.pasteur.ac.ir
- LAO PDR**
 - Institut Pasteur du Laos
pasteur.la
- VIETNAM**
 - National Institute of Hygiene and Epidemiology (Hanoi)
nha.org.vn/en
 - Institut Pasteur in Nha Trang
<http://pasteur-nhatrang.org.vn/>
 - Institut Pasteur in Ho Chi Minh City
pasteurhcm.gov.vn

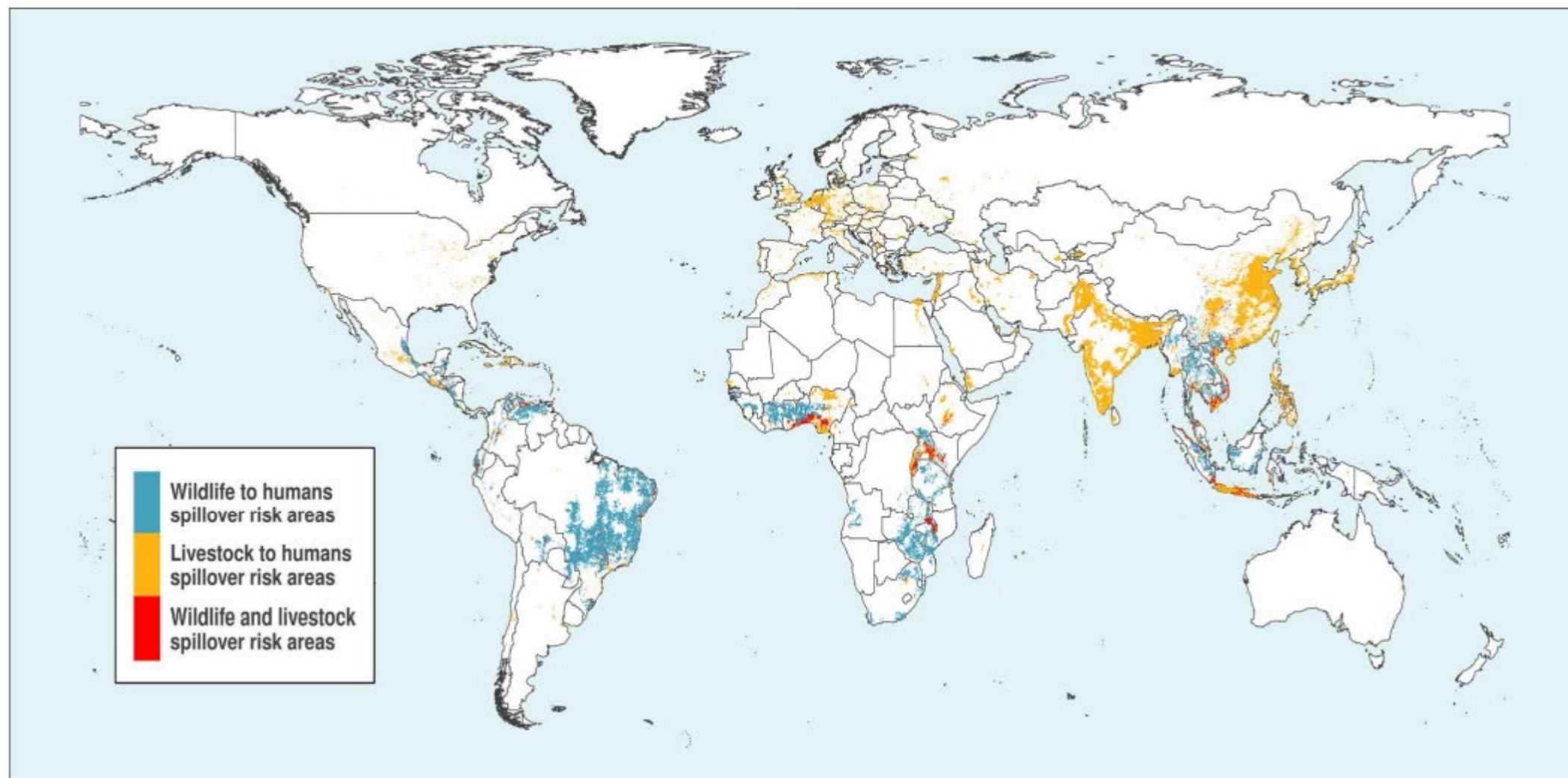


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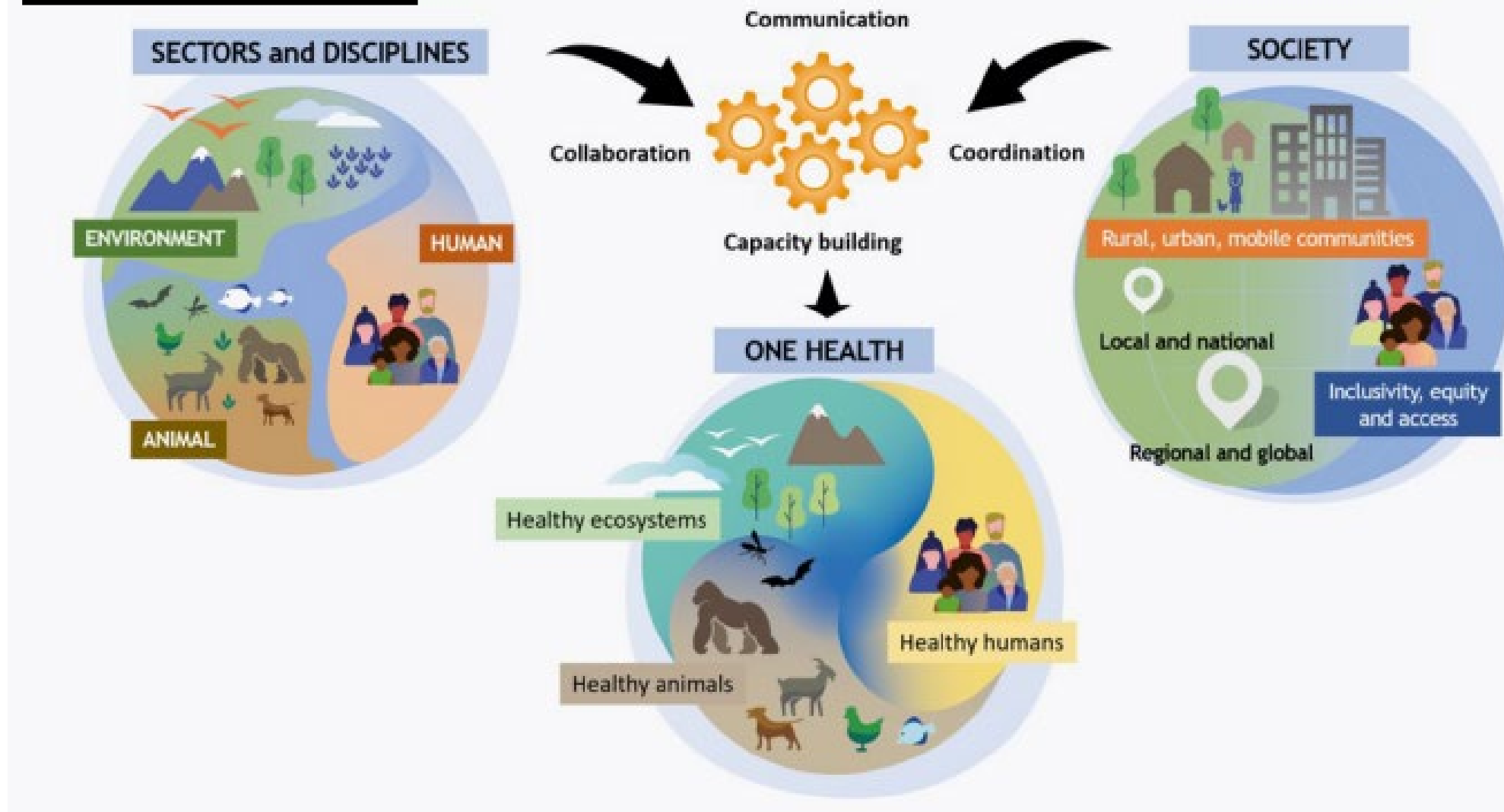
United for Global Health

Map for active interfaces between wildlife, livestock and humans

Note: Highlighted areas represent the intersections of: Deforestation risk of 70 percent up to 2030 Hewson (2019); biodiversity, defined as the number of species above the 85th global percentile for all birds, rodents, primates, or bats from biodiversitymapping.org; livestock (pigs or chickens) density above 85th global percentile from FAO; and population density above 200 people per km² from UN World Gridded Population.²³



One health:

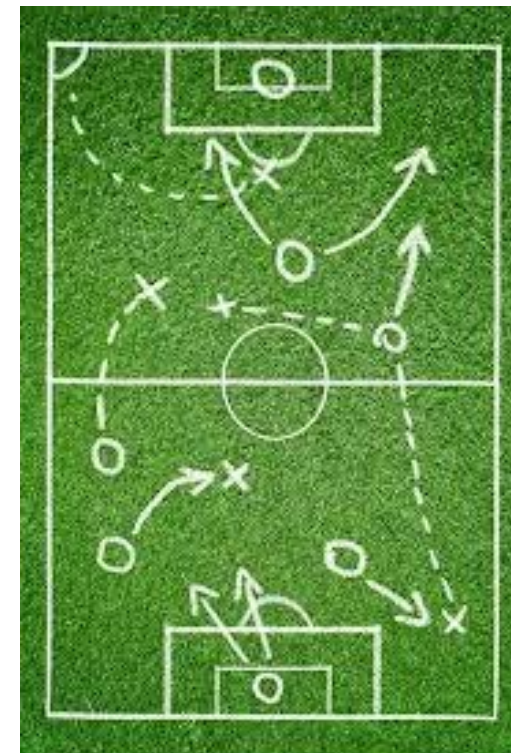


- Cost-benefit analysis (investing One health is a bargain to humankind at all levels!)
- Sustainable environment for our future generations

We need:

- A global network, engaging most of us to work on the same or similar themes with global impacts (could be in different research areas);
- Network directory of 'Who's Who'
- Identify differences, and map for synergy;
- Biobank (animal and human samples);
- Logistics;
- Sequence database;
- Protocols;
- Sample sharing;
- Capacity building;
- Contingency funds.

Immediate actions



Practice does not
necessary make
perfect, but it makes
improvement

