World Health Organization

# Science Driven Policies

## Indoor Air Quality

**Alice Simniceanu**
Epidemiologist,
Health Emergencies Programme
WHO

November 2022

https://www.who.int/data/gho/data/themes/air-pollution/total-burden-of-disease-from-household-and-ambient-air-pollution

# Air pollution

**99 %**

world's population live in places where air quality exceeds WHO guideline limits

**4.2 million**

deaths every year occur as a result of exposure to ambient (outdoor) air pollution

**3.8 million**

deaths every year as a result of household exposure

https://www.who.int/data/gho/data/themes/air-pollution/total-burden-of-disease-from-household-and-ambient-air-pollution

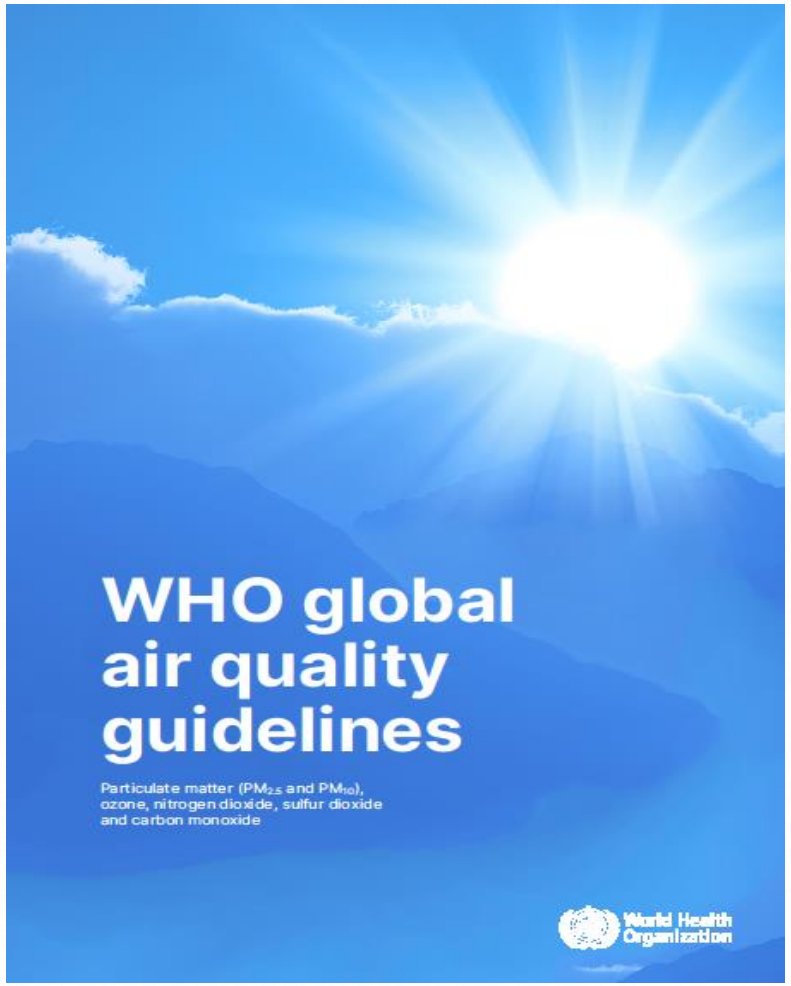
# Our work at WHO

Understanding the problem

Synthesizing evidence and knowledge

Working with partners

Identifying solutions for countries



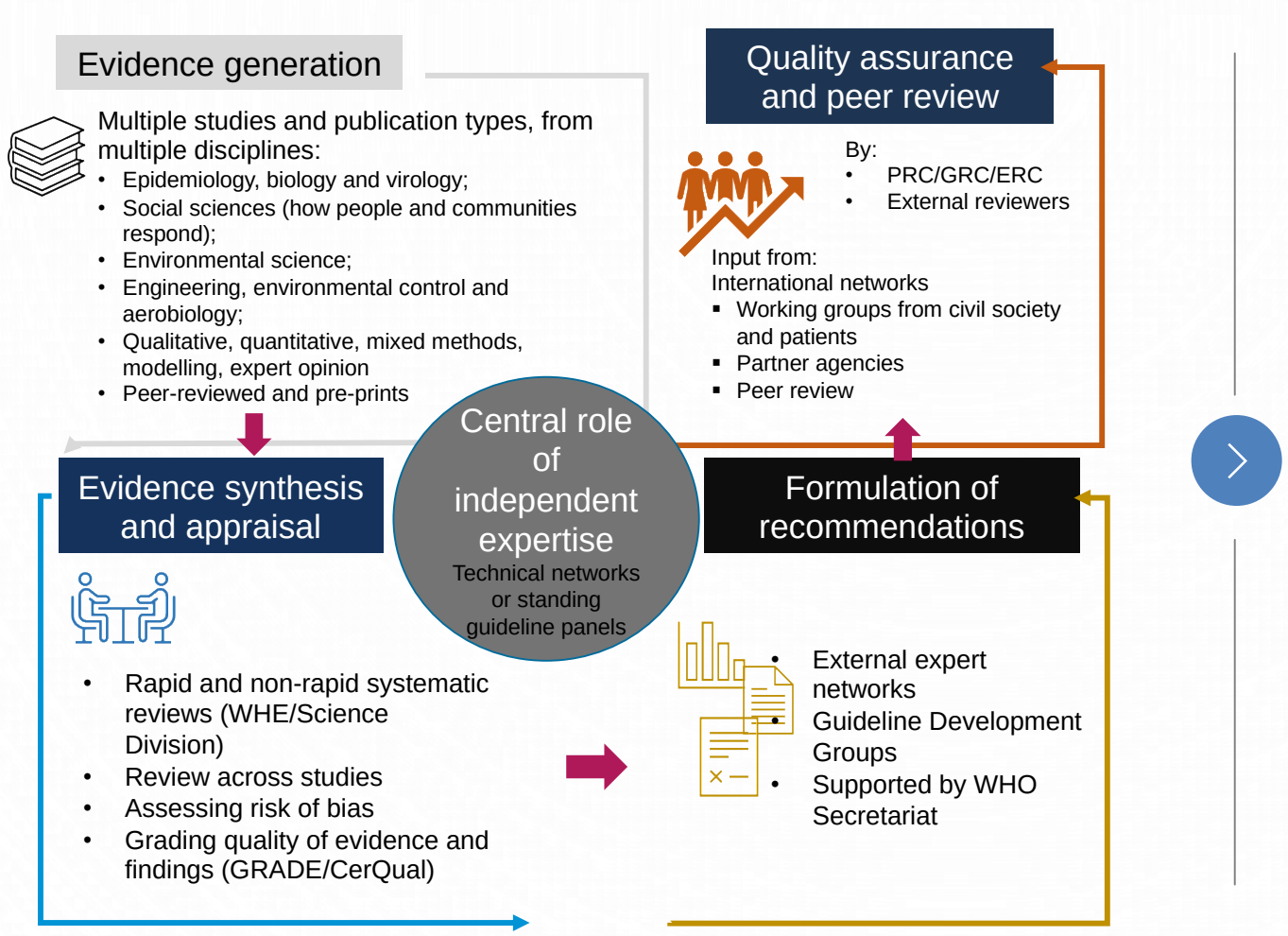
# Translating evidence into knowledge and action

## Science drives our understanding… Our guidance…. Our actions…


**Translating technical knowledge…**

**…into coordinated action**

# Knowledge to practice pathway



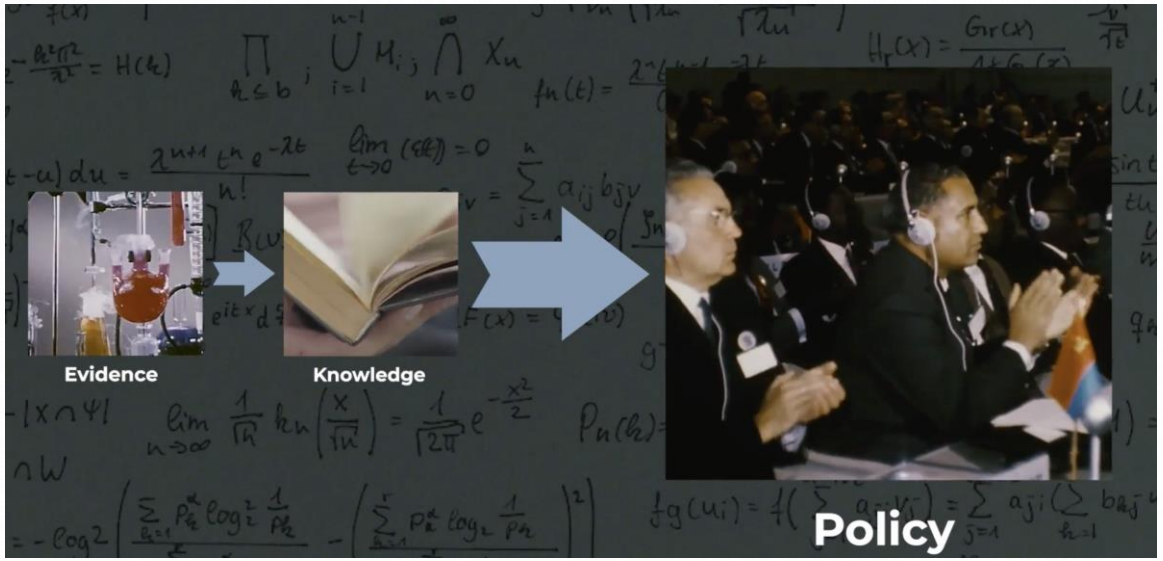

## Dynamic publication and update of living guidance and information products

- Translation – 6 UN languages/ 50+ languages for trainings
- International networks
- WHO regional and country offices
- WHO regional emergency directors
- Member State Briefings
- Operational and technical platforms
- Partner agencies
- Technical help desks
- WHO website (who.int)
- Open.WHO (learning platform)
- WHO Academy
- WHO Information Network for Epidemics (EPI-WIN)
- Social media
- Press briefings

# What is evidence-informed decision making?

- **Decisions and policies should be informed by best available evidence**
- **However, policies also take into consideration many other factors such as:**
  - Context
  - Public opinion
  - Equity
  - Feasibility of implementation
  - Affordability
  - Acceptability to stakeholders
  - Sustainability

**Guidance is not the same as policy**



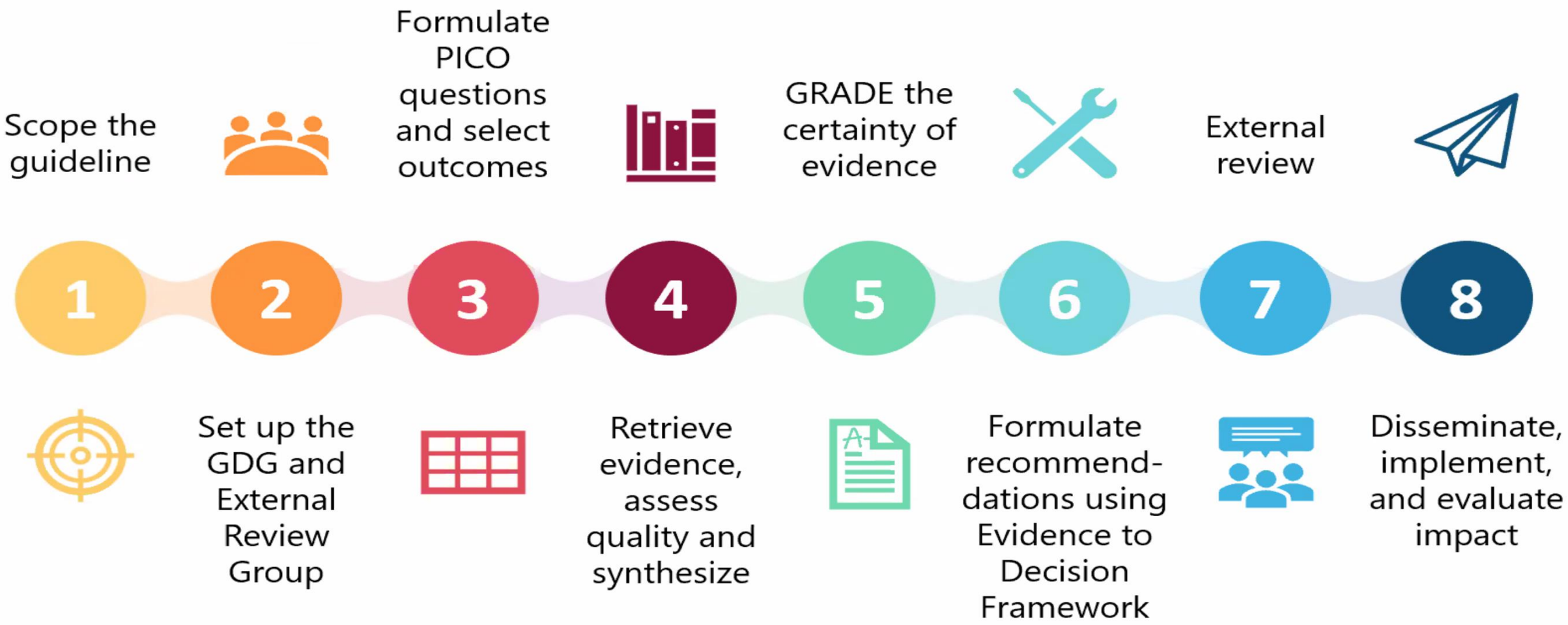
# Why science is needed in policy in public health emergencies

- **Science informed policies can lead to more effective, efficient and equitable interventions**
- **In a public health emergency**
  - Initially, much is unknown and uncertain
  - There are no/limited tools to mitigate the situation in the beginning
  - Acting on what evidence we do have is therefore critical
- **Clear science-informed policies can be more tailored and clarify (more) useful vs non/less useful interventions**
- **Evidence-informed policy therefore helps manage the impact of the emergency and saves lives in a dangerous, evolving and uncertain situation**

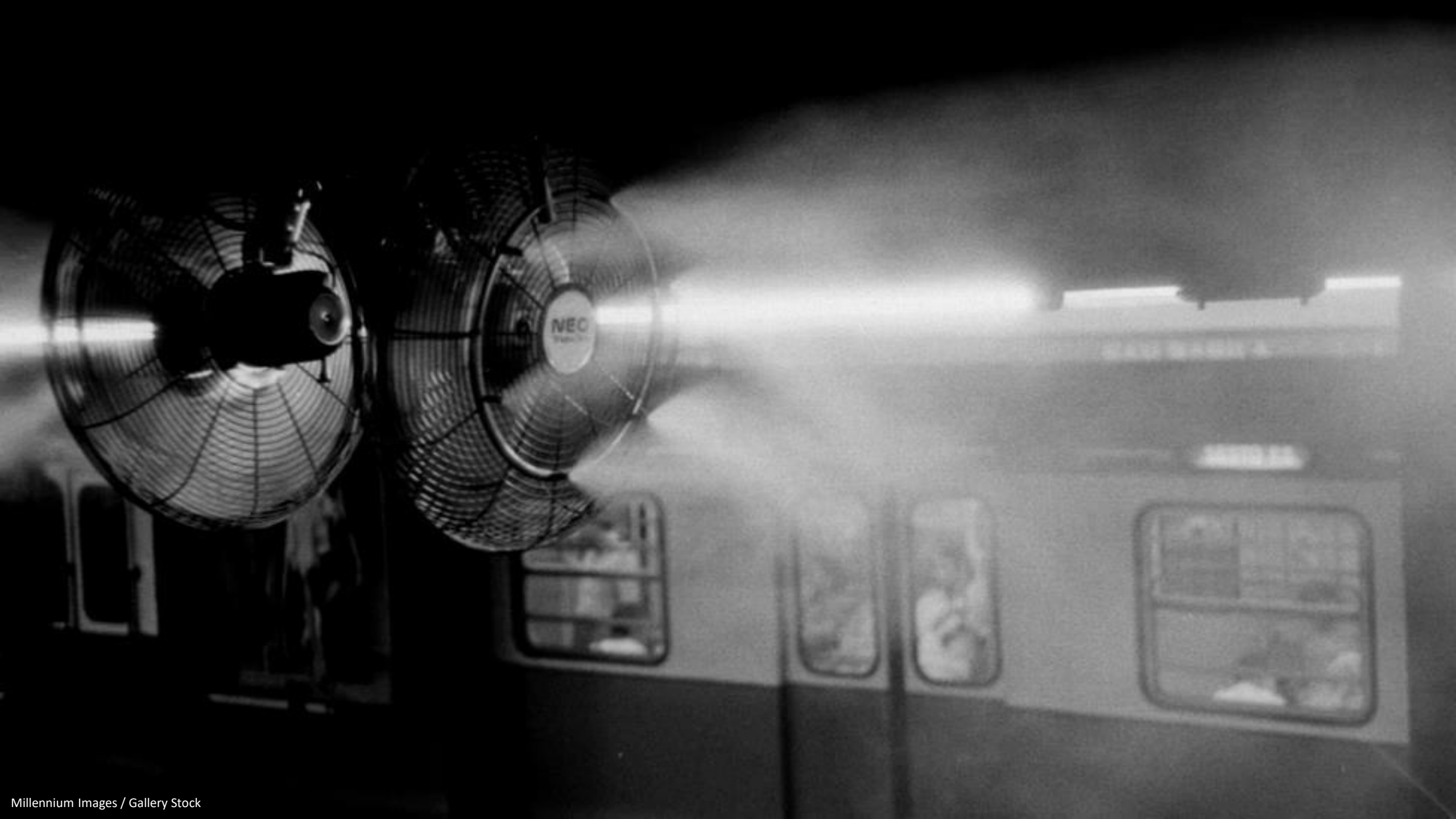
# Challenging factors

- Major emergencies may not be led by the health sector
- Decision making is often heavily influenced on political, economic and other interests
- Many decision makers do not fully understand the rigorous process of generating evidence or how long it takes
- Not all science is good science.  Pre-prints vs peer review.
- Critical to sensitize decision makers on how science is generated, its uncertainty, why it is important and that it changes
- Evidence-based policies vs policy-based evidence

# Guidance development – during COVID-19

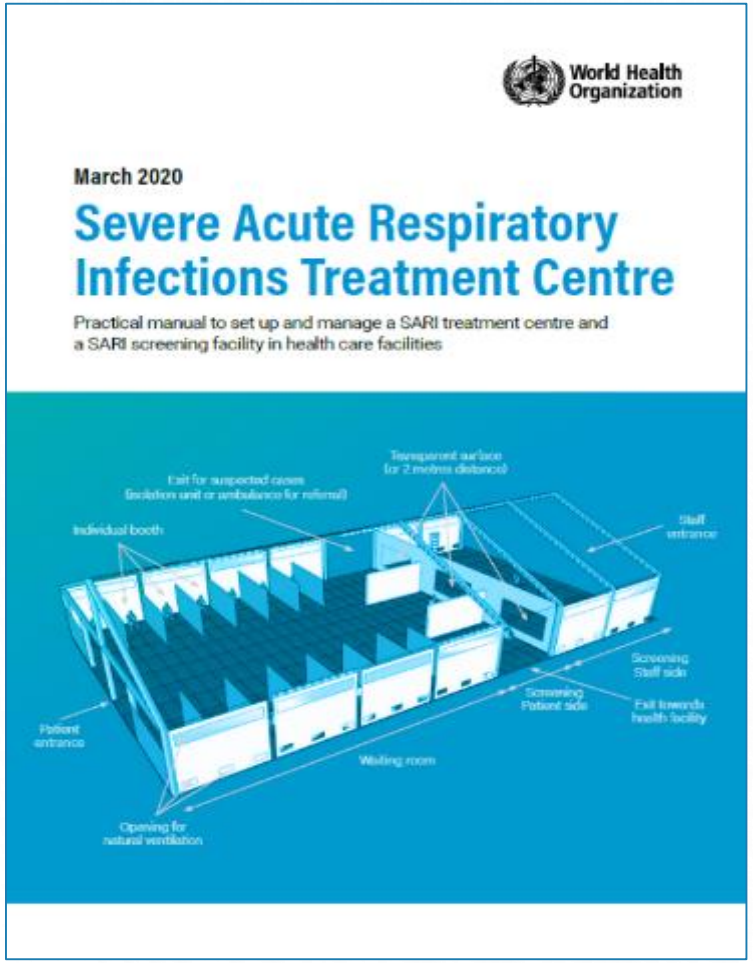


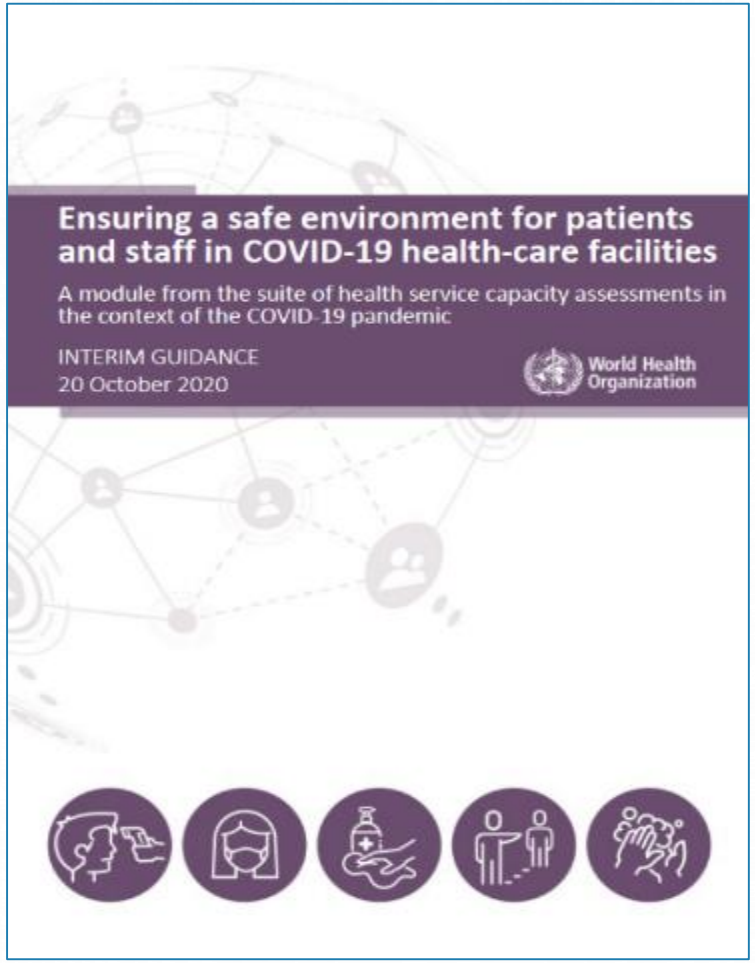
Alex Majoli, Covid on Scene
Cortona On The Move. 2022 - https://www.cortonaonthemove.com/exhibit/alex-majoli/

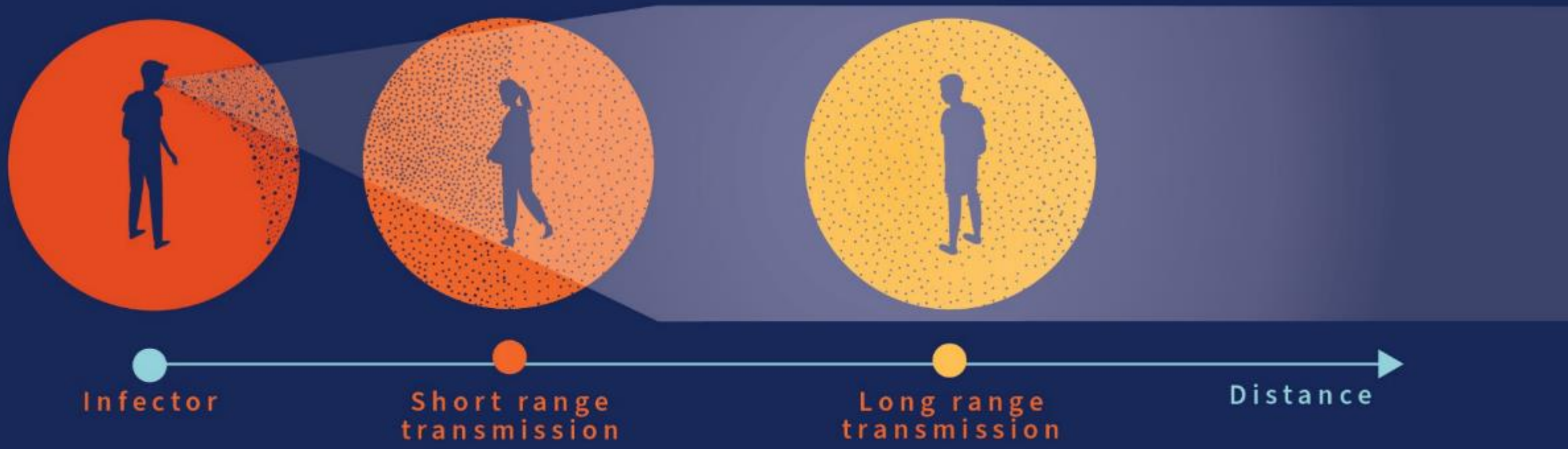



Millennium Images / Gallery Stock

# Guidance – ventilation and COVID-19





Infector
Short range transmission
Long range transmission
Distance

# Building environment, urban planning and public health

## Scientific know-how

- State of art,
- Terminology,
- New model for risk assessment,

$$P = 1 - e^{\left[Dose \frac{\ln(2)}{ID_{50}} T_{VOC} \left(\frac{1}{(1-HI_{exp})}\right)\right]}$$

## Urban Health & Planning

- Strong urban policies prioritizing health,
- Healthy urban planning,
- Building code and regulation,

## Guideline and standards

- Pathogens specific recommendations,
- Risk-based ventilation standards,
- Standardized protocols,

## Research & Development

- Multidisciplinary research agenda,
- Pathogen-host-environment interaction,
- Building environment, ventilation and air cleaning devices,
- Strengthen evidence base to help policy-makers
- Climate resilient and environment sustainable solutions,

# WHO – CERN Partnership

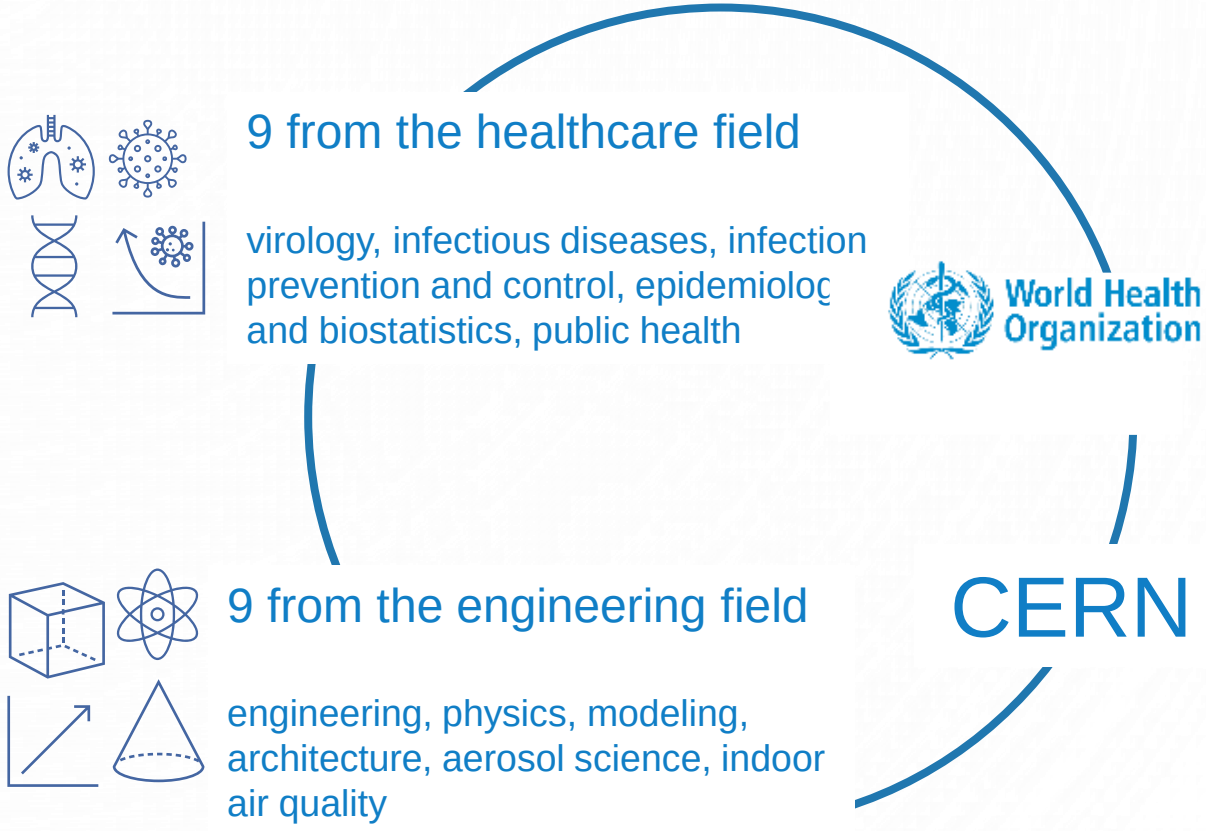
- Long standing partnership and cooperation on projects
- CERN approached WHO in 2020 to share their work and request technical input on CERN Airborne Model for Indoor Risk Assessment (CAiMIRA)
- Along with CERN's expertise in engineering, physics and modeling, and WHO's technical subject matter experts in SARS-CoV-2; a new project was born: Airborne Risk Indoor Assessment (ARIA).



# Airborne Risk Indoor Assessment - ARIA

1. Define a **standardized model, to quantify SARS-CoV-2 airborne risk** transmission in different indoor settings including residential, public and health care settings.
2. Provide a **standardized methodology** to define recommended indoor ventilation rate threshold values for different applications to drive policy and regulatory intervention related to indoor air quality and infectious diseases transmitted through the airborne route,
3. Guide the development of an **online, user-friendly tool** to enable the general public and building managers to assess SARS-CoV-2 airborne risk transmission in residential, public and health care settings to inform risk reduction measures.

## ARIA Working Group



# Airborne Risk Indoor Assessment - ARIA

AS

## Impact

**a) New ventilation standards linked to SARS-CoV-2 airborne risk**
healthcare facilities, residential and non-residential settings

**b) Provide tailored public health measure to the indoor setting in question**
utilize the measures which impact the most (availability, cost)

**c) Improved communication enabling informed decisions regarding enclosed spaces**
poorly ventilated space > ‘’airborne reduced risk certification’’?
‘’safer space’’ campaign?

**d) Risk assessment to inform IPC measures in healthcare settings**
type of mask, maximum occupancy, maximum time spent in room, etc.

**e) Baseline for which possibilities exist to test the transmission capacity for future SARS-CoV-2 VoCs**
and other pathogens

**f) More efficient and effective indoor ventilation / filtration**
impact/carbon cost reduced

ARIA translated into actions

# Airborne Risk Indoor Assessment - ARIA

AS

## Possible improvements

1. **Real-time health data access**
   Values require updates as new evidence become available (i.e., new viral load value, new VoC, etc.
   Increase accuracy by real-time access to:
   COVID-19 incidence by location (probability of infector in the space and natural immunity)
   Immunization coverage by location (vaccine immunity)

2. **Benchmark for clusters and across variants**
   increase accuracy

3. **Real-time meteorological data access**
   improved natural ventilation data

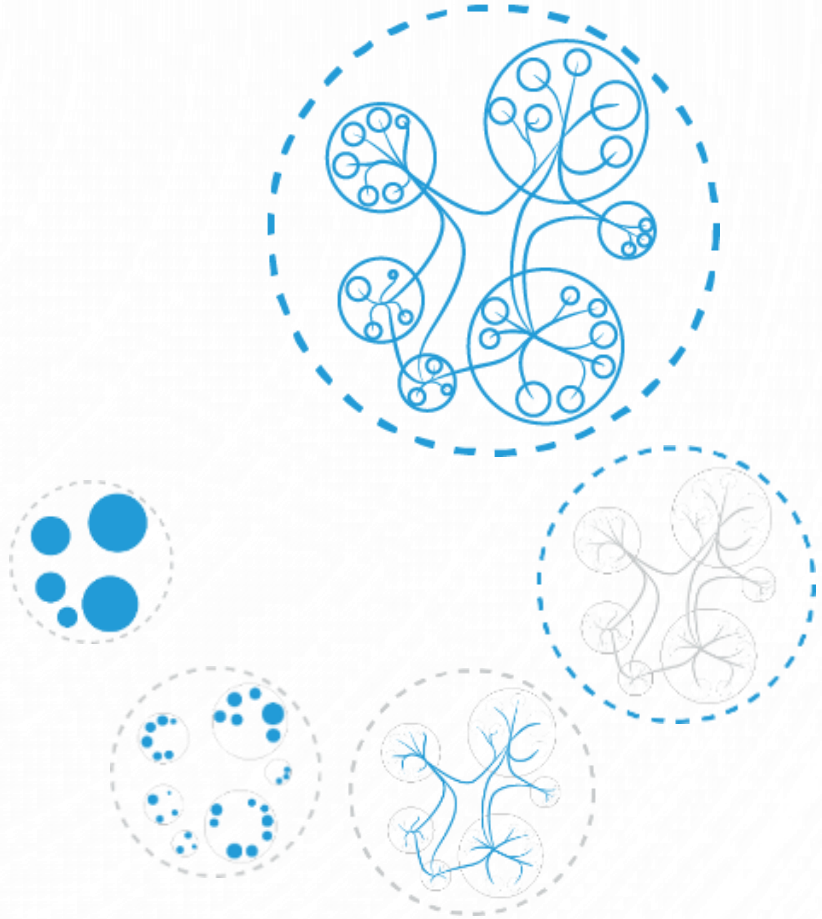
4. **Integration with CO2 real time monitoring**
   real time data on ventilation and occupancy

5. **Expanded to other pathogens**
   risk-based ventilation standards

## Potential future steps

# Future work and collaborations

- Development and finalization of the ARIA online tool
- Ongoing monitoring of evidence required to update variables
- Implementation applicability - HCF
- Expansion to potential other respiratory diseases



Contacts at CERN:

Andre Henriques
andre.henriques@cern.ch

Contacts at WHO:

Luca Fontana
fontanal@who.int

Alice Simniceanu
simniceanua@who.int

World Health Organization

# Thank You