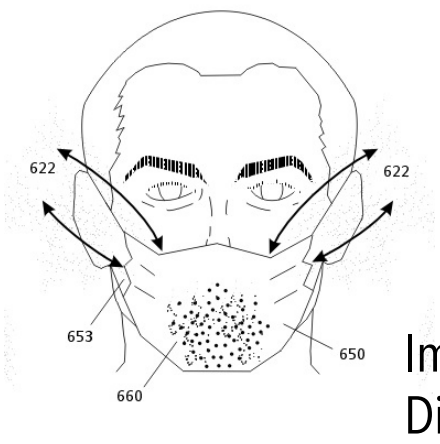
Subinoculum theory with kinematic prophylaxis

XX century



Incomplete filtration
Not for bioaerosols

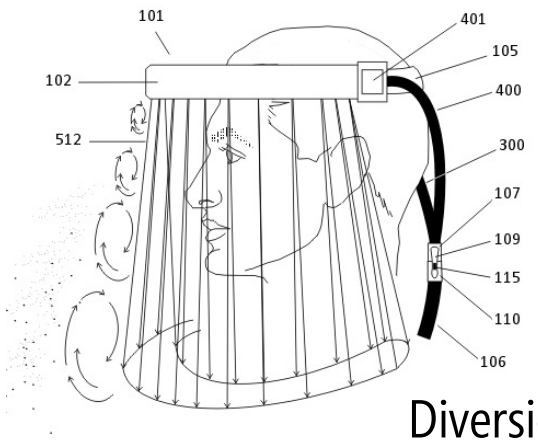
New paradigm

Efficacy x10, $x10^2$ $x10^3$?(*)

(*) Pending evidence
Pre-experimental Planning

Impaction
Diffusion
Interception
Electrostatic attraction

XXI century



Kinematic barrier
Specific against bioaerosols

Diversion
Dispersion
Dilution
Removal

Inoculum Theory - M. Gandhi, C. Beyrer, E. Goosby
https://doi.org/10.1007/s11606-020-06067-8

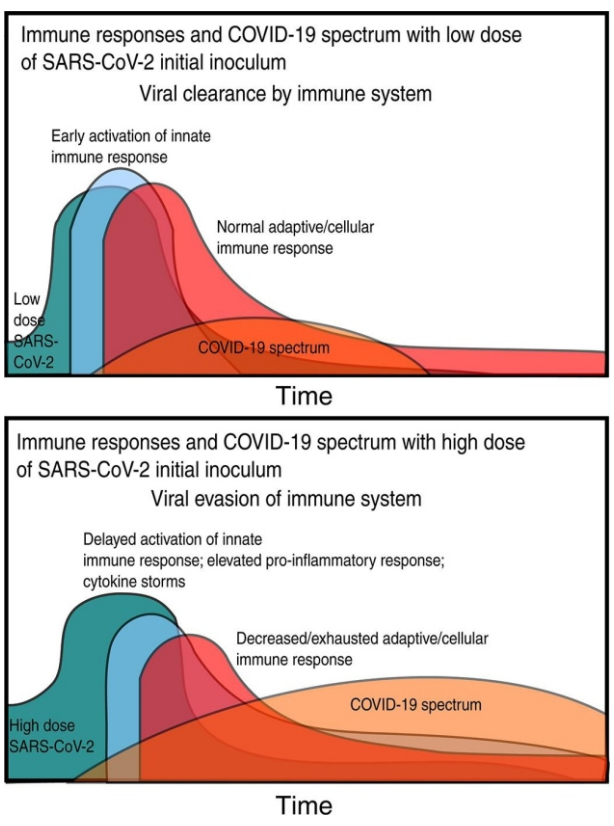
Ro = Ro-1 -> less severity & more mild illnesses

Subinoculum Theory - Airepi
https://airepi.com

Ro ~ 0 -> less mild illnesses & more asymptomatics

Hypothesis of the dose of virus in the initial inoculum

Wim Van Damme, Ritwik Dahake, Remco van de Pas, Guido Vanham, Yibeltal Assefa
https://doi.org/10.1016/j.mehy.2020.110431



Hypothesis

1. At an individual level: "viral dose in inoculum is related to severity of disease (dose-response relationship)".

2. At a cluster level: "severity of disease is related to transmission potential", leading to clusters of mild cases and clusters of severe cases.

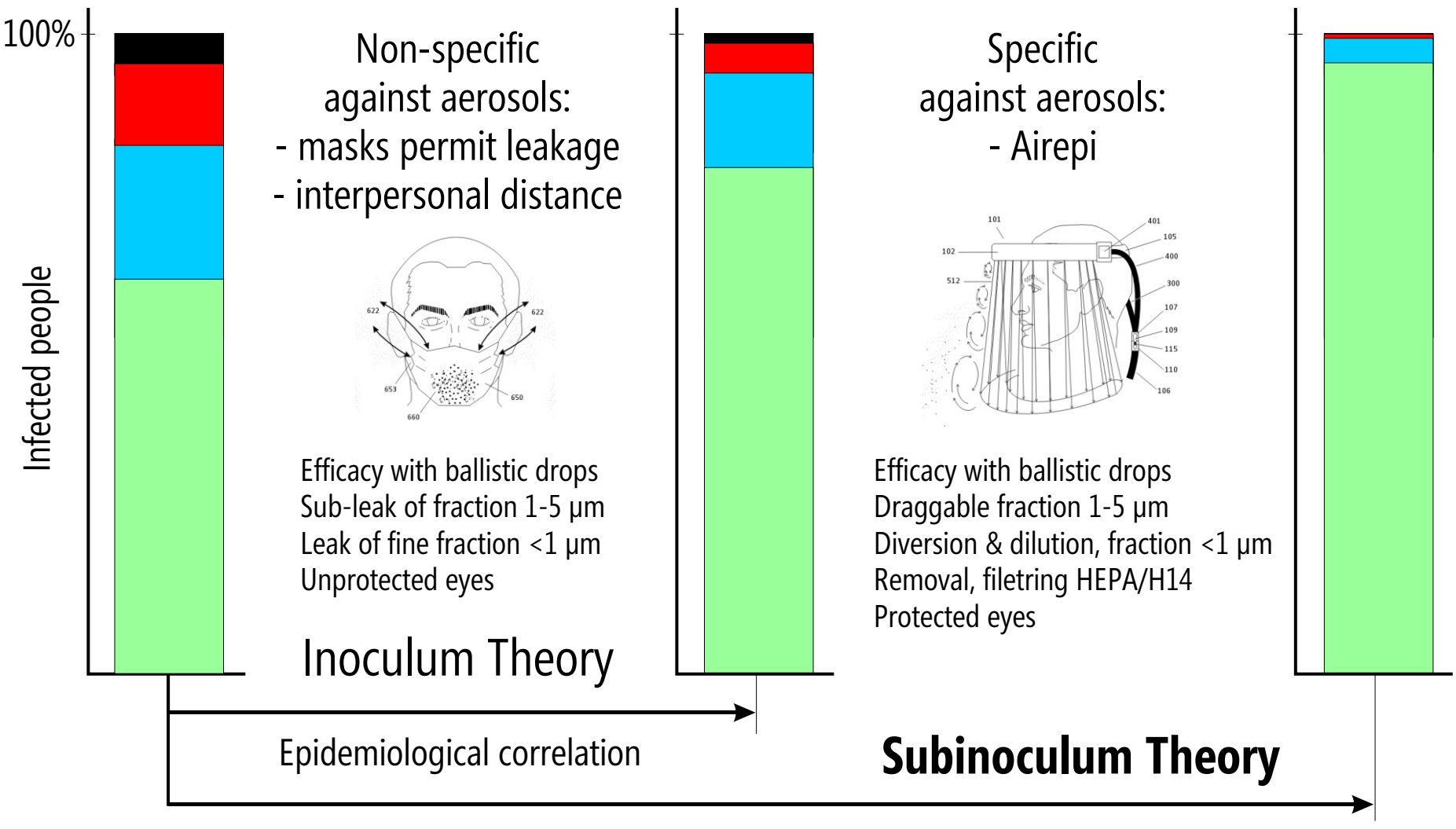
3. At a community level: "in certain contexts, chains of severe cases can build up through intensive transmission with high inoculum to severe local outbreaks, which can result in large-scale intensive epidemics; while this is less likely in other contexts".

Prognosis of COVID-19 disease according to prophylaxis

Without measures
Pandemic outbreak

Poor filtration efficiency
Measures taken

Kinematic barrier
Measure under investigation



Hypothesis

1.- An air curtain with certain kinematic values is a more effective barrier against bioaerosols than prescribed masks, and independent of the exposure time, both for inertial particles (> 20 µm), draggables (1-5 µm) and brownians of fine aerosol (< 1 µm).

2.- The diversion, dispersion and dilution of the infectious aerosol keeps the inoculum below a dose (subinoculum) whose viral replication kinetics is lower than the innate response, allowing time for adaptive immunity to clearance the virus in a specific and robust way.

1st Patent for Kinematic Prophylaxis

SPTO
ES-P202030970
Application Patent

PORTABLE AIR CONFINEMENT DEVICE FOR THE KINEMATICS PROPHYLAXIS OF AIRBORNE TRANSMISSION BY PATHOGEN AGENTS THROUGH RESPIRATORY DROPS AND BIOAEROSOLS

Airepi
https://airepi.com

February 8, 2021