



Modular rooms with controlled pressure
An effective aid for the fight against aerobic viral clusters



The medical approach

How to contain a dangerous enemy

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Airborne Infectious Disease Management

Temporary Negative Pressure Isolation TNPI

TNPI is considered when airborne infection isolation is needed and there are no available or insufficient AIIRs, such as can happen when there is an outbreak of an airborne infectious disease with large numbers of communicable patients. Temporary isolation is designed to protect patients and staff from contracting or transmitting highly infectious diseases

Agent	% Lethality (if untreated)	Incubation Period (days)	Infectious Dose (# organisms)	Vaccine/Treatment
Bacteria				
Anthrax	>90	1-6	1-10 ³	Yes/Yes
Plague	90	2-3	100-15,000	No/Yes
Tularemia	35	3-6	10-50	No/Yes
Brucellosis	5	5-60	10-100	No/Yes
Virus				
Smallpox	30	7-17	10-100	Yes/No
Ebola	50-90	4-21	1-10	No/No
VEE	1	2-6	10-100	No/No
Toxin				
Botulinum Toxin	>90	1-5	1 ng/kg	No/Yes

Human respiratory syncytial virus COVID-19

Portable anterooms: advantages and disadvantages

Portable anterooms can be purchased with portable filters to create a space at the entrance to a standard room for TNPI.

ADVANTAGES:

- the relatively easy conversion of regular rooms to AIIRs without manipulation of the existing room ventilation
- they're easy to set up and convenient to use because any chosen room can be converted quickly

DISADVANTAGES:

- the inability to move beds through the door
- they do not depressurize the room unless the room door is open.



Steps for using a Portable Anteroom

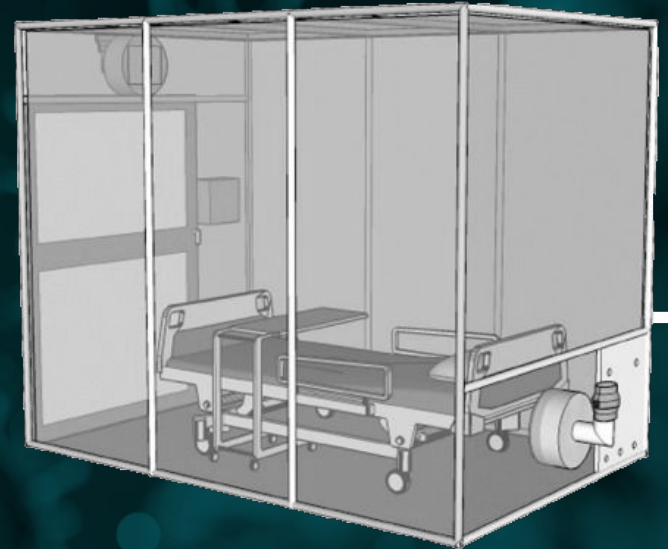
1. Set up anteroom to manufacturer's recommendations
2. Attach the HEPA machine
3. Open the doors while HEPA machine is on
4. Close the doors after the patient and/or caregiver enters or leaves the room
5. Both doors should never be open at the same time
6. Clean and disinfect the portable anteroom cover



Isolation surge capacity



The ability to manage high volumes of specialized patients.



When the quantity of engineered airborne infection isolation rooms is insufficient to meet surge demand for patient isolation, hospitals can take various measures to protect patients and staff.

- Housing large numbers of patients with airborne infectious diseases is challenging.
- Provide areas with safeguards to protect you and other patients from exposure to airborne infectious agents.

The goal of isolation surge capacity

A safe area or anteroom should be created between the IDZ and the rest of the hospital. A portable HEPA filter is used to pressurize the anteroom. This also provides clean air in the anteroom. Different models of HEPA filters have different configurations of the air intake. Regardless of the model, the air intake should be drawing air into the HEPA filter from the IDZ. The filtered exhaust should be discharged into the anteroom. An airtight seal should be made for all connections. The anteroom should be large enough to accommodate function (for example, change clothes, hang PPE, dispose of waste, etc.). An infectious disease zone (IDZ) is a space used to isolate large numbers of patients



BioContainment Critical Care Unit (BCCCU)

= Critical Care Unit
+ Biocontainment Patient Care Unit



- Facility designed and operated to maximize patient care with appropriate infection control practice and procedure.
- These units are safe and physically separated from other patient care areas
- Special air-handling systems with advanced personal protection measures for staff

Why have a biocontainment chamber?



**AVOID
SPREADING THE
VIRUS**

PRESERVE OTHER PATIENT

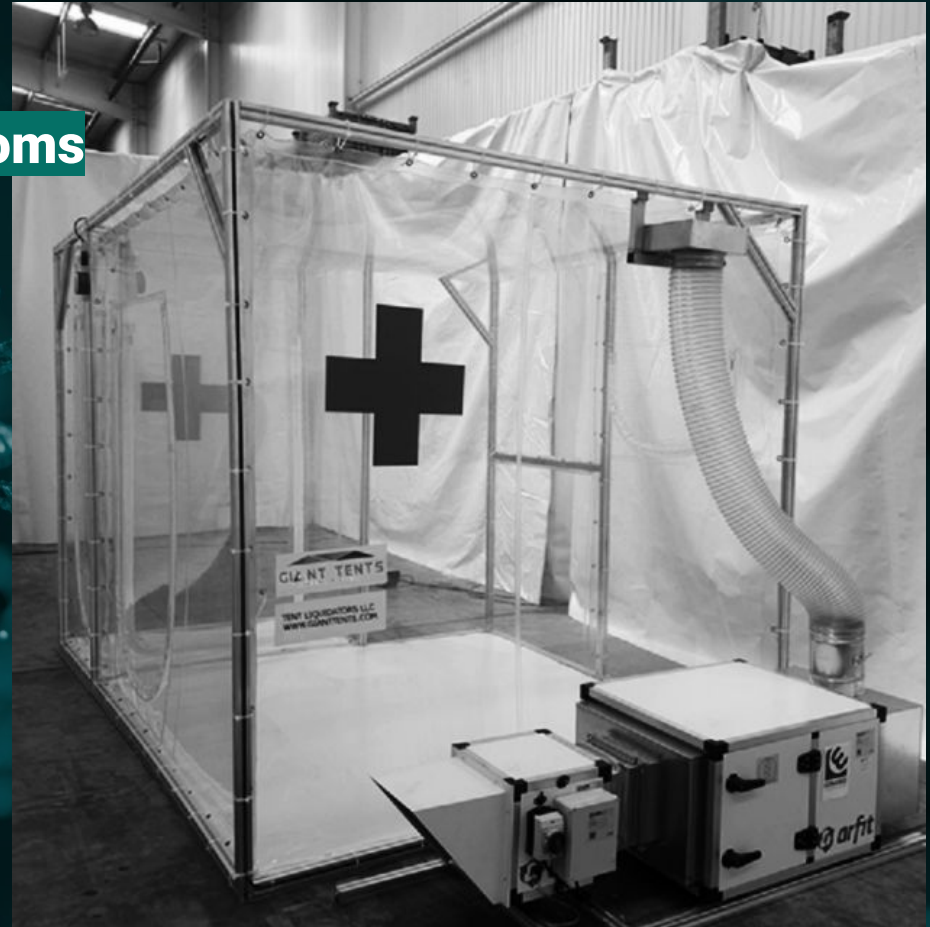
ENSURE THE STAFF SAFETY

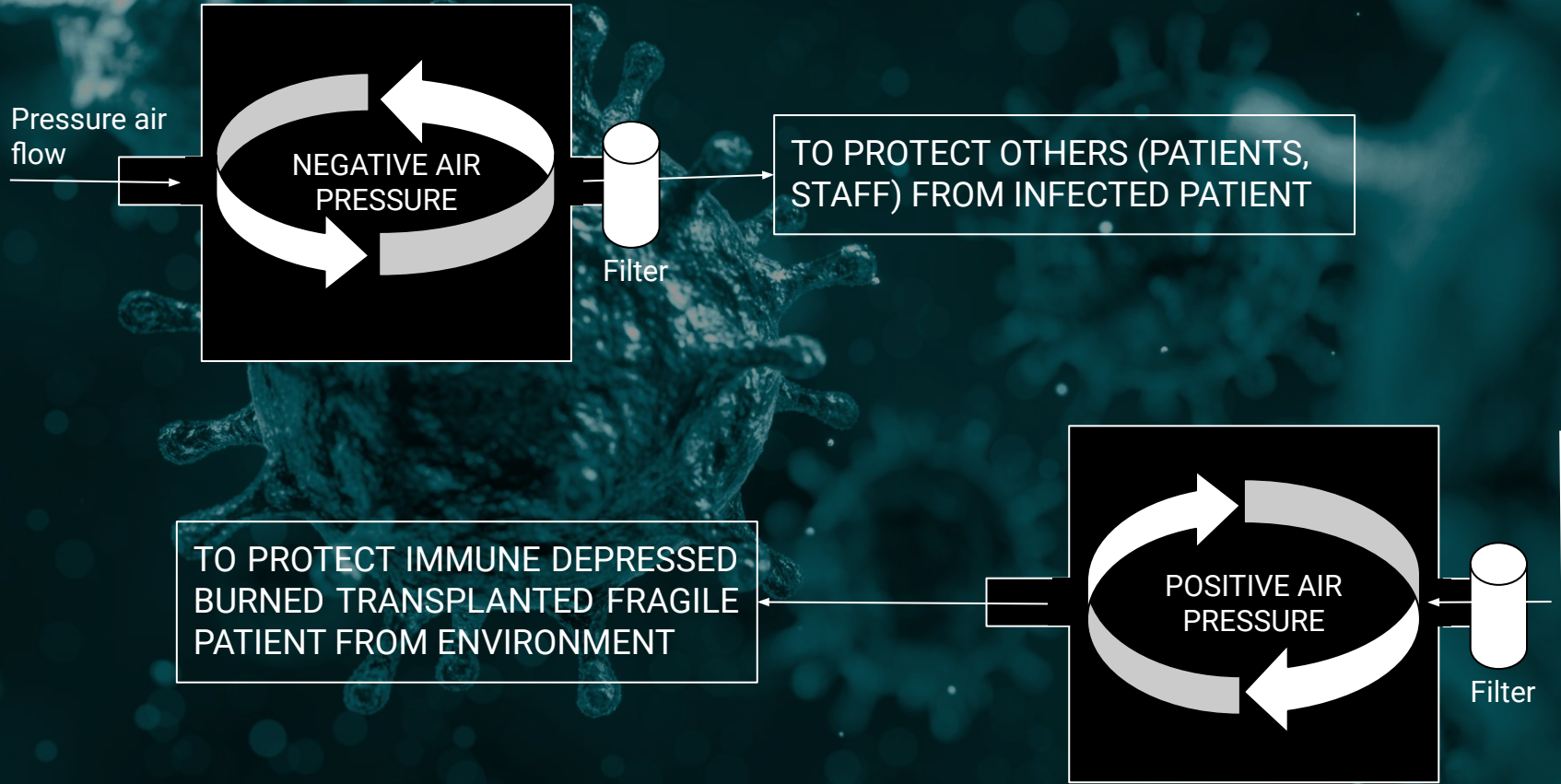
REDUCE SOCIAL COSTS OF CARE

Purpose of Negative Pressure Rooms

To contain airborne contaminants within the patient room

- VIRUSES
- BACTERIA
- FUNGI
- YEASTS
- MOLDS
- VOC'S (VOLATILE ORGANIC COMPOUNDS)
- SMALL PARTICLES AND CHEMICALS
- OTHER AIRBORNE HOSPITAL PATHOGENS

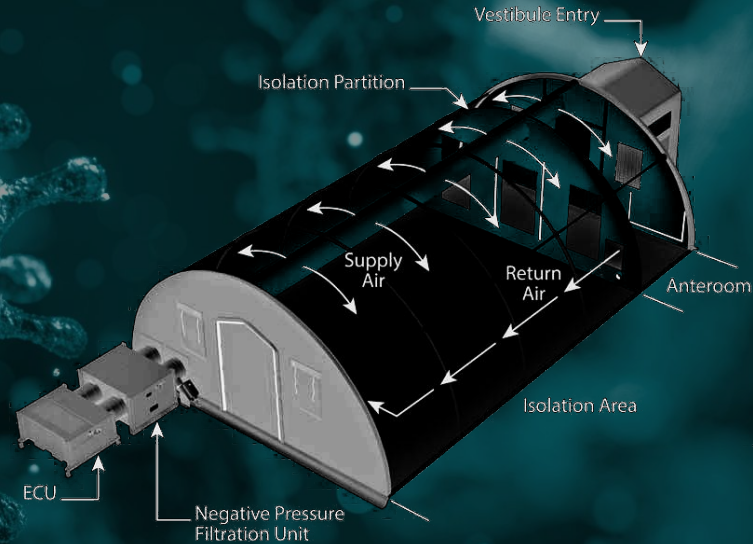




Rooms to Negatively Pressurize

Rooms that should be negatively pressurized according to the 2018 FGI Guidelines ANSI/ASHRAE/ASHE Standard 170-2017 include, but not only:

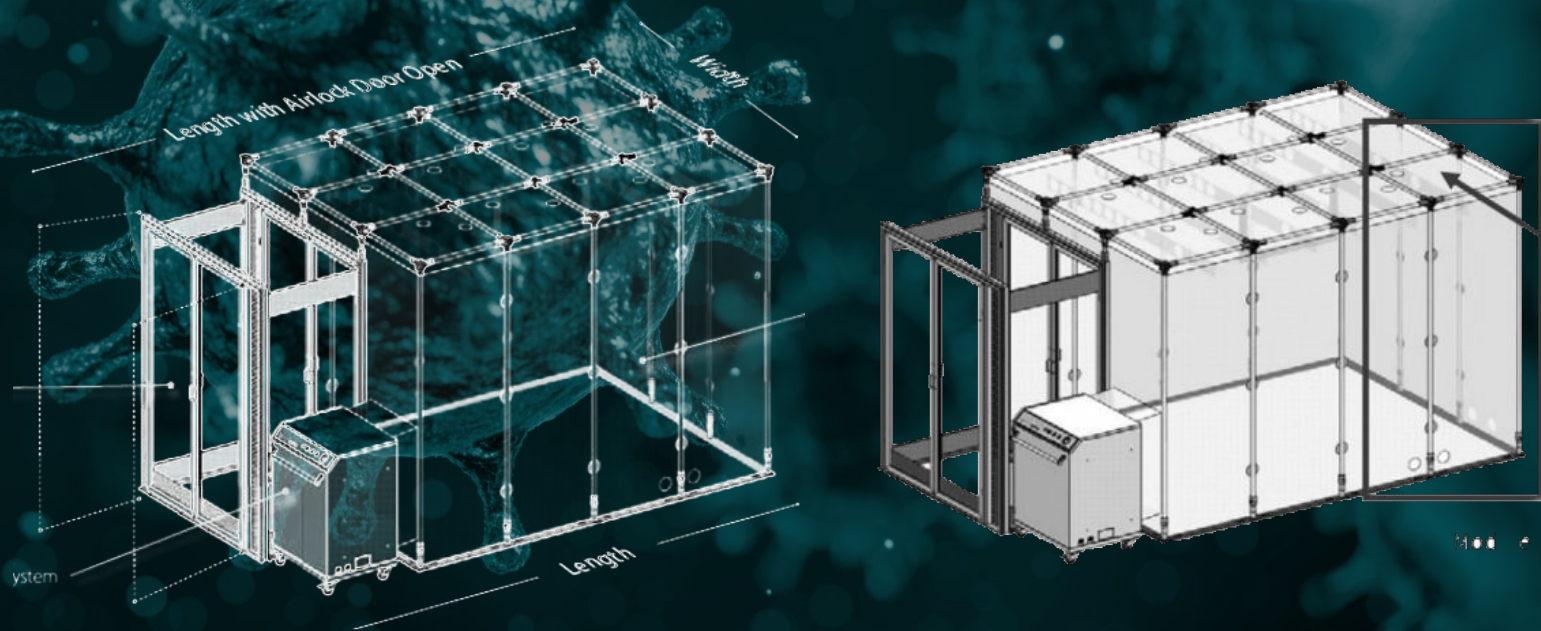
- Triage
- Emergency Department
- Public Waiting Areas
- Emergency Department
- Decontamination
- Radiology Waiting
- Rooms
- Bathrooms
- Airborne Infection
- Isolation (All) Rooms
- Laboratory Work Areas
- Autopsy Rooms



When rooms are not properly pressurized (negative or positive), airborne contaminants can escape putting the health of patients, staff, and visitors at risk. To help you navigate through these challenges, we need an effective device to reduce the risk of virus spread.

Heavy solutions

The solutions offered by the market are many, technologically advanced, some difficult to manage and very expensive. The solution shared by all is to isolate the infected patient.



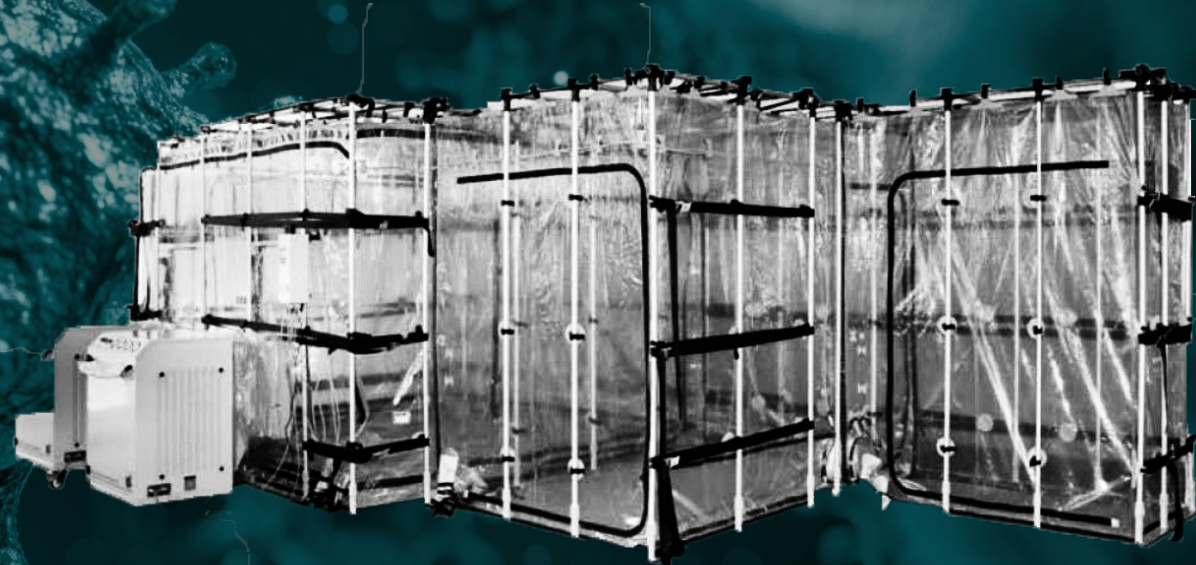
Light solutions

Our lightweight biocontainment chamber is a modular, customizable insulation system that can be assembled in a few hours and without the need for any preparation - if not space - in every hospital and health center.

The system consists of 3 parts:

1. aluminum frame
2. medical grade PVC curtain
3. motor unit / absolute HEPA / ULPA

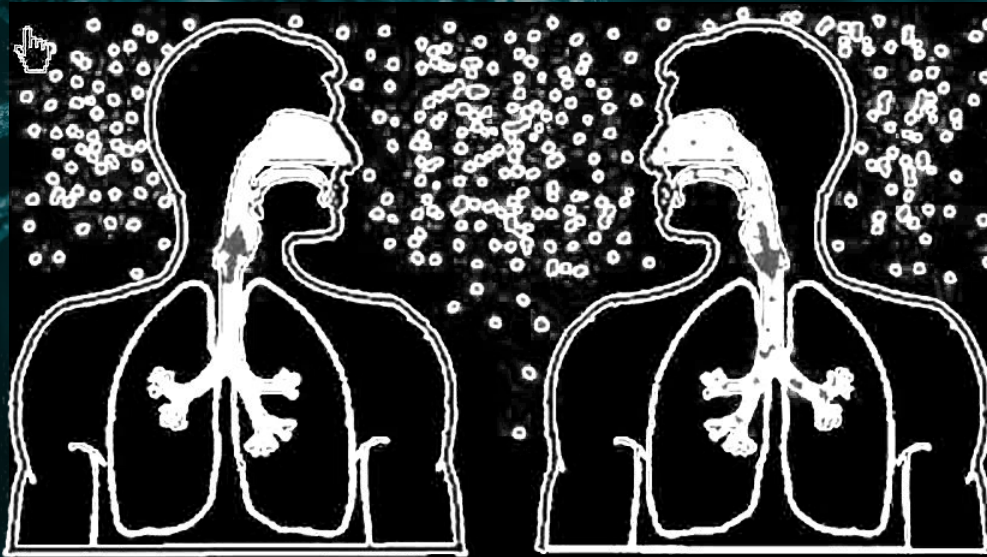
filters, certified UNI EN ISO. The aluminum frame and medical grade PVC curtain are produced in Bulgaria, the motors and the filters in Israel by the leader company in this segment, Bethel Ltd.



IsoArk 220x520 for use in power plants
with FA 2000 HSKA filtration system

Light solutions

A negative pressure isolation room is commonly used for patients with airborne infections. Although COVID-19 is currently not considered to be an airborne disease, according to the CDC, a patient known to have contracted the coronavirus can spread it person-to-person. This means between people who are in close contact with others (within about 6 feet), through respiratory droplets produced when an infected person coughs or sneezes. These droplets can reach other people who are nearby or possibly be inhaled into the lungs. For these reasons we need facilities to place infected COVID-19 patients in isolation rooms.





The technical approach

Filters for biocontainment rooms

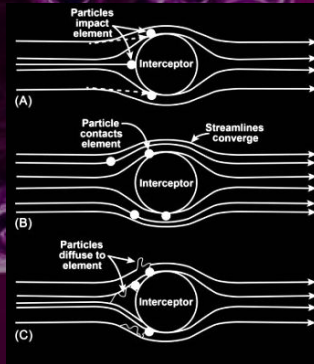
Eng Massimiliano Simoncini, Phd Biomedical device expert, Bologna

Filters for the Pandora Portable Isolation Chamber

A sequence of layers of dense fibers to create a fine mesh filter that removes contaminants of decreasing dimensions as air is forced through them



Filtration mechanism is a combination of three main methods to trap contaminants: diffusion, interception, and inertial impaction



Pandora filter effectiveness

STANDARD EN 1822-1-2019 CLASSIFICATION

FILTER CLASS	INTEGRAL VALUE		LOCAL VALUE	
	EFFICIENCY %	PENETRATION %	EFFICIENCY %	PENETRATION %
E10	≥ 85	≤ 15	-	-
E11	≥ 95	≤ 5	-	-
E12	≥ 99,5	≤ 0,5	-	-
H13	≥ 99,95	≤ 0,05	≥ 99,75	≤ 0,25
H14	≥ 99,995	≤ 0,005	≥ 99,975	≤ 0,025
U15	≥ 99,9995	≤ 0,0005	≥ 99,9975	≤ 0,0025
U16	≥ 99,99995	≤ 0,00005	≥ 99,99975	≤ 0,00025
U17	≥ 99,999995	≤ 0,000005	≥ 99,9999	≤ 0,0001

HEPA Filters

99.97% effective for eliminating particulate matter of 0.3 micron diameter or larger

ULPA Filters

99.999 % effective for eliminating particulate matter of 0.12 micron diameter or larger

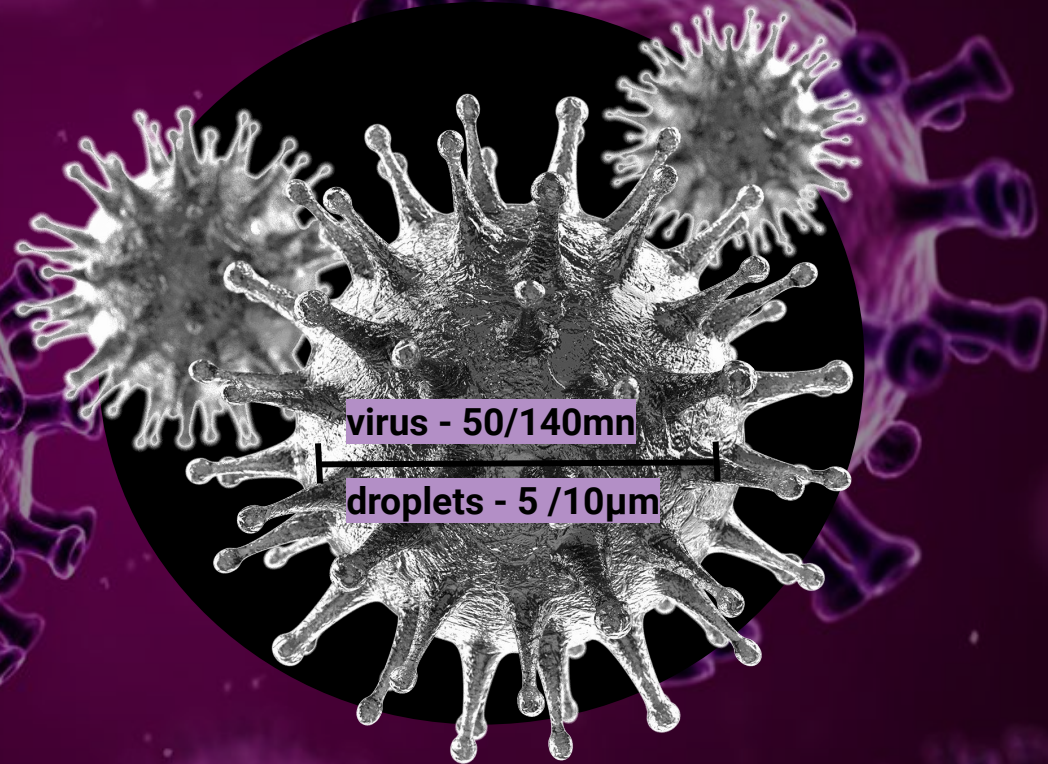
ULPA U15

ULPA U17



Effectiveness vs viruses

- the diameter of the virus has been found to range between 50 nm to 140 nm
- Filtering capabilities are up to 0.12 μm
- Virus can't fly, they desplace inside much larger droplets
- the diameter of droplets is from 5 to 10 μm , well within filter capabilities





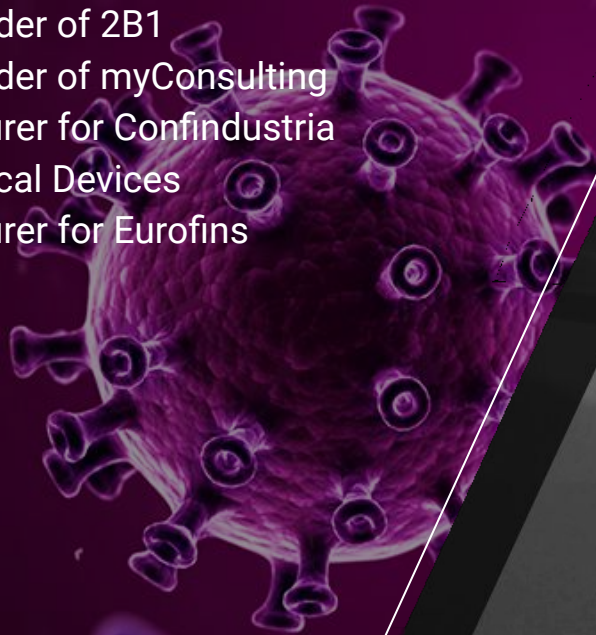
The technical approach

The importance of control: European compliance of medical devices

Eng. Carlo Miglietta, expert on European regulations on medical devices - Milano (IT)

Speaker: Ing. Carlo Miglietta

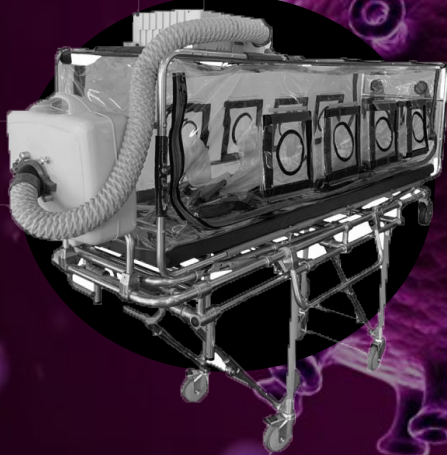
- Degree from Milan Polytechnic
- Consultant for companies in the healthcare sector
- Founder of 2B1
- Founder of myConsulting
- Lecturer for Confindustria Medical Devices
- Lecturer for Eurofins



Questi dispositivi, detti interspinosi in quanto posti tra due processi spinosi adiacenti, consentono di distrarre posteriormente l'unità funzionale spinale consentendo la decompressione delle stesi radicalari e del canale. Svolgono il loro effetto in estensione.



Other isolation rooms



EMERGENCY
TRANSPORT



IN-HOSPITAL
AND
RECOVERY
TRANSPORT



Costs & Sustainability

Two systems compared: costs, training, maintenance, warranty

Mr. Letterio Oliva, CEO Novamed s.r.l, supervisor R&D Starchers industries - Messina(IT)

Two systems compared: benefits and maintenance costs

Controlled pressure biocontainment chambers certainly will become part of every hospital facility, whether:

- they are already in function for this pandemic (or future pandemics);
- they will be used with positive pressure for the defense of patients with compromised immune systems;
- they are in masonry, structural and permanent;
- they are with a light structure (i.e. our model Pandora);
- they are financed by European funds



Chamber set up to visit patients at the Cotugno hospital



Benefits of our system

In the fight against the pandemic, isolation rooms with negative pressure are invaluable tools and irreplaceable allies for vaccines. From a purely economic point of view, compared to the rise of infections there is no match: the modular structure of a room for small hospitals is simple to manage and has a much lower cost compared to the costs to be incurred every day for the treatment of a patient in intensive care.



Benefits of our system

Depending on the requests of the hospital, the room can also be expanded later, according to new and different needs, moved to other rooms and / or other hospital facilities or even to an outdoor area. It can be equipped with active and passive measurement and control systems, electronic management, induced microclimate, etc. And of course, as you have already understood, it can also be used with positive pressure.



The costs in detail will be expressed in an economic offer that will be sent in the next two days.

Mr. Letterio Oliva

After sale assistance

Our biocontainment room Pandora does not require any disposable materials. Once delivered, assembled on site, put into use and tested, we will provide an adequate training for use, disinfection and routine maintenance. From that date the 24-month full risk warranty will start.

Together with the economic offer you will receive a copy of the guarantee contract which will include



- preventive maintenance every 6 months;
- establishment of a dedicated call center with telephone intervention within 4 working hours (usually 50% of malfunctions are remotely resolved);
- technical intervention guaranteed on site within the following 12 working hours (we have collaboration agreements in place with technical assistance companies present throughout the national territory);
- all malfunctioning parts will be replaced with the relevant spare parts;
- in case of malfunctioning of the blower / filters group these will be immediately replaced temporarily so that the room will continue to operate

