



**SANDPIT SESSION FUTURE HOSPITAL
VENTILATION IN HOSPITALS |
ROBERTO TRAVERSARI**

› DISCLOSURE

Dr. Roberto Traversari

› I have the following potential conflicts of interest to report:

- ☐ Consulting
- ☐ Employment in industry
- ☐ Stockholder of a healthcare company
- ☐ Owner of a healthcare company
- ☐ Other(s)
- ☒ I do not have any potential conflict of interest

› INTRODUCTION

Dr. Roberto Traversari

- › Working at TNO Building Physics and Systems BPS, Delft
- › Convener of CEN TC 156 Working Group 18 Ventilation in hospitals
- › Chair advisory body of ISSO (knowledge centre for the engineering sector)
- › coordinator expertise center for sustainable healthcare
(www.expertisecentrumverduurzamingzorg.nl)
- › Research subjects:
 - › Sustainability and energy
 - › Contamination control in health care

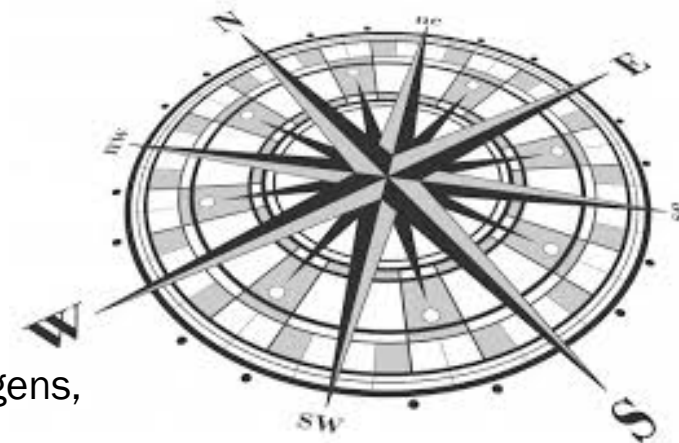
IMPORTANCE OF VENTILATION (JUST ONE OF THE ISSUES)

- › Ventilation (fresh air) is needed for:
 - › Hygiene aspects (prevention of spread, different requirements for functions)
 - › Good comfort (difference between staff and patients)
 - › Odour and particulate matter e.g. PM2.5
- › Drawbacks:
 - › Transportation of air through the building is energy intensive (up to 30% of the total electricity consumption)
 - › Security of supply is of great importance and results in complex systems
 - › Distribution systems have a large volume (need space in the building)
 - › Installations are restrictive for renovations and modifications
 - › High investments low energy tariff (very low ROI or very long period needed)



› FUTURE FUTURE VISION

- › Flexible future-proof and reusable ventilation systems that help prevent the spread of pathogens, odours, particulate matter and create a pleasant climate for patients and staff
- › Minimal amount of “expensive” and “energy intensive” outdoor air
- › Reliable systems that do not use fossil energy
- › Optimisation controlled/treated recirculation versus fresh outdoor air



Onderwerp	Effect geen invulling van onderzoeksvraag	Effect bij invulling van de onderzoeksvraag
1. Ventilatie		
2. Regelgeving/normering		
3. Effectiviteit maatregelen		
4. Stoomopwekking/ stoombevochtiging		
5. Bodemenergie		
6. Warmtapwater		
7. Beproeft innovatieve technieken		
8. All-electric		
9. Isolatie		
10. Warmtenet		

Sterk negatief effect op de voortgang
 Sterk positief effect op de voortgang

Geen effect op de voortgang
 Beperkt negatief effect op de voortgang op de lange termijn
 Positief effect op de lange termijn



CURE SECTOR

Kennis- en innovatieagenda

Versie 1.1 / November 2020

Introductie

Het primaire doel van het Expertisecentrum Verduurzaming Zorg (EVZ) is bijdragen aan

See www.expertisecentrumverduurzamingzorg.nl

› NEW DEVELOPMENTS TO CLOSE THE LOOP, CURRENT STATUS

- › Local ventilation systems (per room)
 - › a ventilation system per room
 - › heat recovery
 - › filtration (particles and odours)
 - › minimum amount of fresh air
- › Demand-driven ventilation (CO₂-based)
- › Switching off ventilation systems in operating rooms¹
- › Need for humidification²

¹ Traversari et al. Effect of switching off unidirectional downflow systems of operating theaters during prolonged inactivity on the period before the operating theater can safely be used. *Am J Infect Control*. 2017 Feb 1;45(2):139-144. doi: 10.1016/j.ajic.2016.07.019.

² Study will be published on www.expertisecentrumverduurzamingzorg.nl

› THE CHALLENGE

“RESEARCH QUESTIONS”

- › How can ventilation systems be designed to be “reusable” / more flexible during renovations?
- › What is the minimum required amount of fresh air for different functions to comply with the hygienic needs and comfort (recirculation versus fresh outdoor air)?
- › To what extent can ventilation systems help to prevent spreading of pathogens (pandemic resilient systems)?
- › Can ventilation systems be switched off during periods of prolonged inactivity in a room?
- › How can investments needed for the energy transition be funded (financing is often not a problem)?



› **THANK YOU FOR
YOUR TIME**

LOOKING INTO THE FUTURE

TNO innovation
for life

