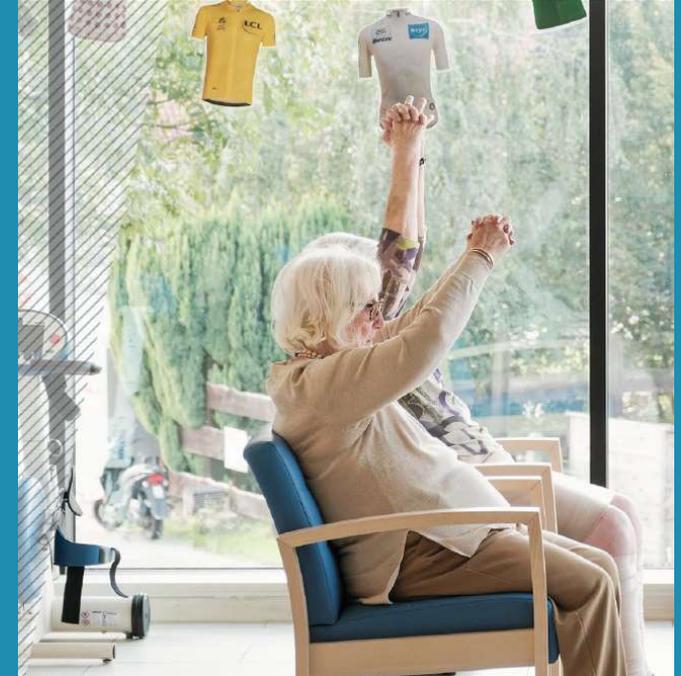


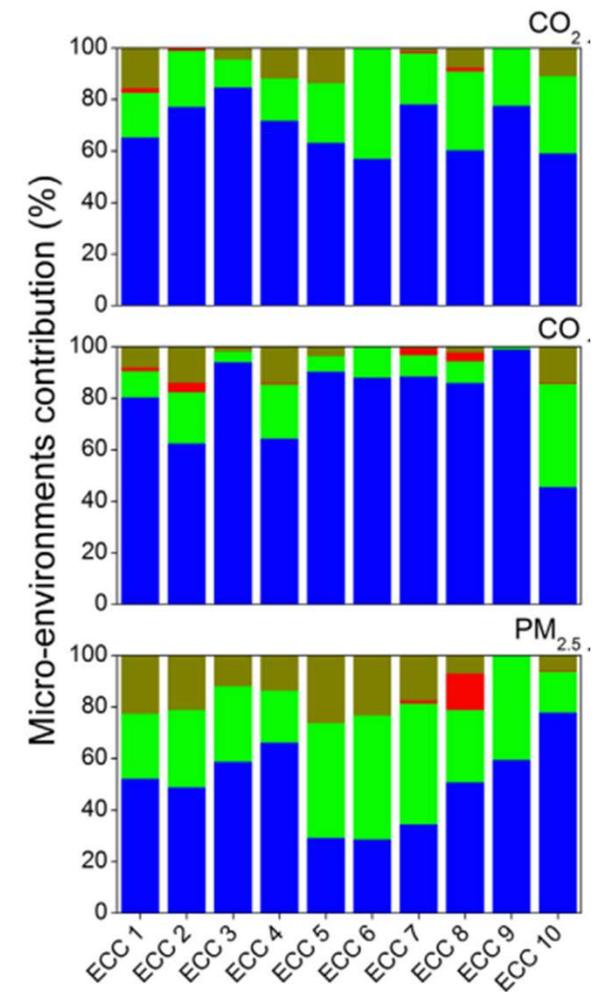
Quality manual as basis for a quality framework for ventilation in residential care facilities



Hilde Breesch, Douaa Al-Assaad, Quinten Carton (KU Leuven)
Liesje Van Gelder, Maarten De Strycker (BCCA)

Context

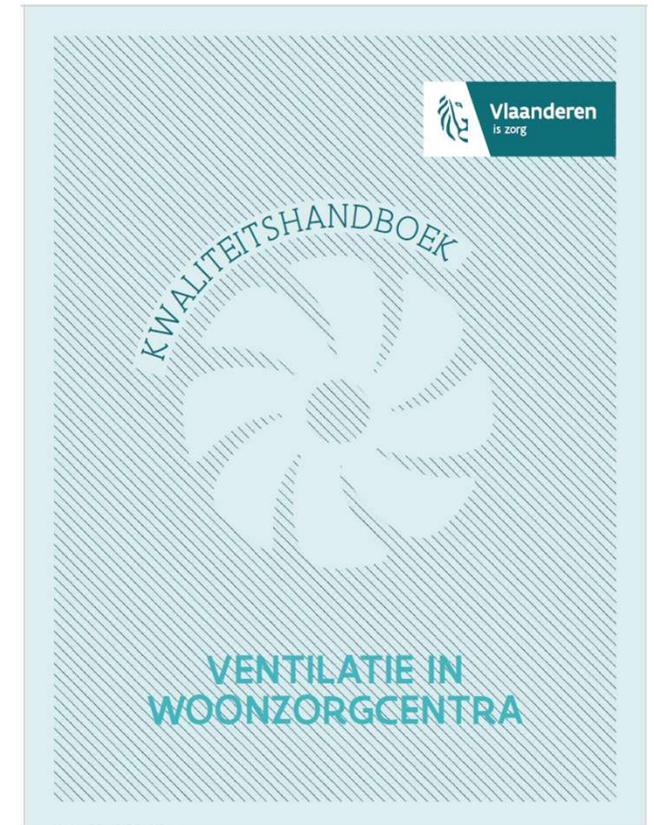
- Residential elderly care facilities
 - EU field studies show
 - Poor Indoor Air Quality (IAQ) and ventilation
 - Exposure to high levels indoor pollution -> wellbeing & health
 - Balance: IAQ <-> energy use, thermal comfort
 - Regulatory framework and knowledge lacking



Almeida-Silva et al. (2014)

Aim

- Develop tailored advice for ventilation in residential (elderly) care facilities
 - Quality manual
 - Target group: facility managers, technical services, management team
 - Method
 - Review legislation, standards & guidelines
 - Indoor Air Quality simulations
 - Focus: common room in elderly care facilities
 - Discussion + feedback in stakeholder group



Quality manual
“Ventilation in elderly care facilities”

Ensuring Healthy Indoor Air in Residential Care Facilities

What requirements must a ventilation system in residential care facilities meet?

When do we consider indoor air to be 'unhealthy', and how can you monitor that?

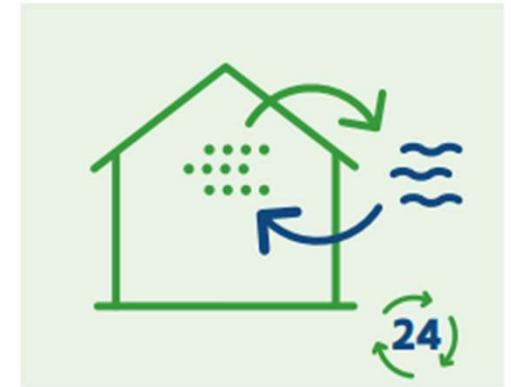
What measures should be taken to ensure good air quality throughout every season?

You'll find the answers in this quality manual. It is designed to support residential care facilities in improving ventilation and air re-
newal, ensuring a healthy living environment for residents, staff, and visitors.



Quality manual

- Content
 - Intro: why ventilation is important
 - Overview of legislation and guidelines in elderly care facilities
 - Ventilation systems in elderly care facilities
 - Step-by-step plan to implement ventilation
 - normal conditions
 - increased risk on infection with respiratory viruses
 - Ventilation strategy including window opening
 - Energy use of ventilation & window opening



Ventilation quality indicators

- CO₂-concentration
 - 1200 ppm: acceptable IAQ in elderly care facilities
 - 900 ppm: max when increased risk on infection with respiratory viruses
- Airflow rate
 - Non-residential rooms
 - 25 m³/(h.person)
 - 40 m³/(h.person)
 - Residential rooms: > 3.6 m³/(h.m²)

Step-by-step

1. Monitor CO₂-concentrations
 - Where? How often?
2. Evaluate monitoring results + take measures
 - Evaluation based on quality indicators
 - Measures
 - Decrease occupancy
 - Open the windows
 - Install ventilation systems
3. Maintain ventilation system
4. Develop ventilation plan



DEPARTEMENT
ZORG

**VERSE
LUCHT...
EEN
MUST**



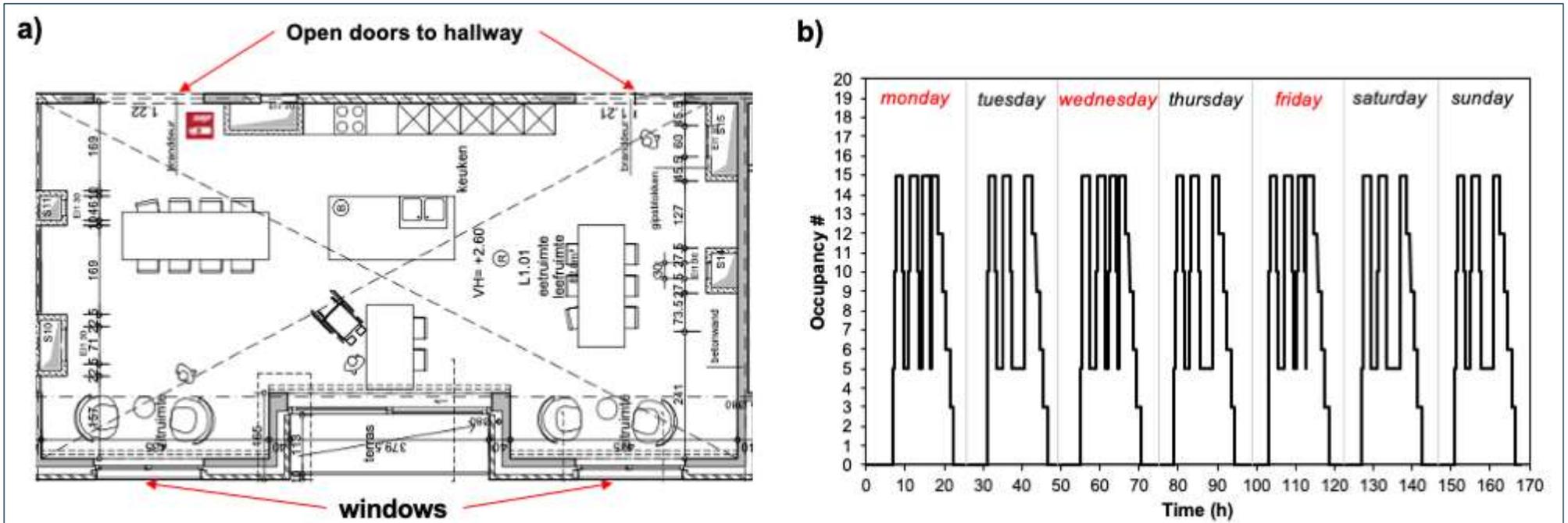
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gezondbinnen.be

V.L. Katriene Moykens, secretaris-generaal Departement Zorg, Koning Albert I-laan 35 bus 30, 1030 Brussel

Ventilation strategy common rooms

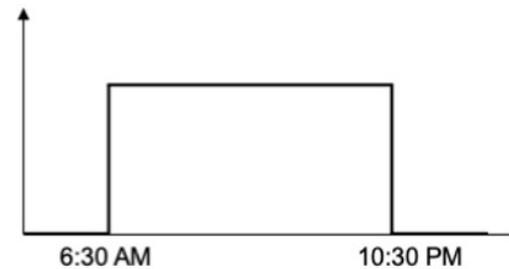
- Based on IAQ simulations in typical common room (1/2)
 - 13.3m x 6.8m x 2.7m
 - 5 to 15 persons



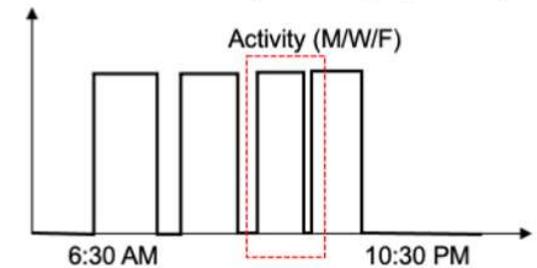
Ventilation strategy common rooms

- Based on IAQ simulations in typical common room (2/2)
 - Typical ventilation systems
 - Natural supply & extract
 - Mechanical extract
 - Balanced mechanical
 - Window opening patterns

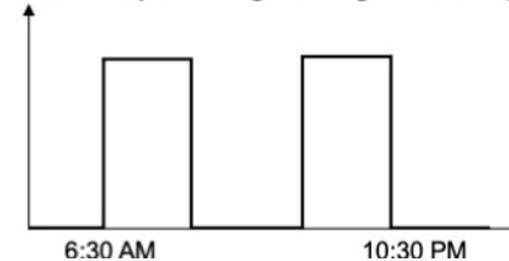
Pattern 1: Open all day 6:30 AM – 10:30 AM



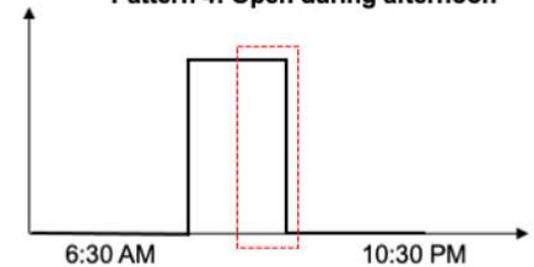
Pattern 2: Open during high occupancy hours



Pattern 3: Open during morning and evenings



Pattern 4: Open during afternoon



Ventilation strategy common rooms

- Without mechanical ventilation system

| CO2-concentration < 1200 ppm | |
|---|--|
| Heating season | Summer |
| <p>Extra measures always needed:</p> <ul style="list-style-type: none">• Open windows regularly<ul style="list-style-type: none">• South: pattern 2• North/East/West: pattern 3• Decrease or limit occupancy <p>Install ventilation system with min airflow rate of 25 m³/h.pers</p> | <p>Extra measures always needed</p> <ul style="list-style-type: none">• Open windows all day (pattern 1), not during heat waves• Decrease or limit occupancy <p>Install ventilation system with min airflow rate of 25 m³/h.pers</p> |

Ventilation strategy common rooms

- With mechanical extract ventilation system

| CO2-concentration < 1200 ppm | |
|--|---|
| Heating season | Summer |
| No extra measures needed | No extra measures needed |
| CO2-concentration < 1200 ppm | |
| Extra measures needed: <ul style="list-style-type: none">• Open windows regularly<ul style="list-style-type: none">• South/North/East: pattern 2• West: pattern 3• Decrease or limit occupancy• Increase airflow rate from 25 m³/h.pers to 36 m³/h.pers | Extra measures needed <ul style="list-style-type: none">• Open windows all day (pattern 1), not during heat waves• Decrease or limit occupancy• Increase airflow rate from 25 m³/h.pers to 36 m³/h.pers |



KWALITEITSHANDBOEK

VENTILATIE IN
WOONZORGCENTRA

Discussion

Questions to discuss

1. What are barriers to improve ventilation in care facilities?
2. What structural gaps exist in the regulatory framework concerning indoor air quality (IAQ) in residential care facilities?
3. How can we support care facilities in practically implementing tailored ventilation strategies for existing buildings? How can we avoid generic solutions like “open windows” being the only option during a pandemic? Which approach do you have in your country to improve ventilation?
4. Ventilation is a key strategy, but it involves the following trade-off: How do we prioritize between overheating risk and IAQ? What procedures and guidelines currently exist in care facilities to navigate these challenges?