

Suggested measures to be taken in different levels of threat of respiratory infections (as monitored in the ‘Respiradar’).

Strategic scientific committee, October 2023

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1. Rationale

On August 24 2023, the following working method for surveillance of respiratory pathogens in Belgium has been approved by the RMG:

- Weekly publication of the ‘Respiratory bulletin’ by the Respiratory Infections team (Epidemiology of infectious disease service of Sciensano), on Wednesdays. This bulletin includes a table showing 6 indicators chosen for Respi-Radar (see Table 1 below).
- When criteria for increased circulation and/or increasing strain on the health care system are fulfilled (i.e. ≥ 4 indicators at least in yellow OR ≥ 2 in orange OR ≥ 1 in red) or when any other alerting signal from other surveillances is received by Sciensano, the “RAG respi” group of experts is convening the next day to discuss the epi situation and define a risk level. In the absence of increased circulation and/or strain on the health care system, the risk level is ‘green’, i.e. not requiring additional measures besides universal infection prevention measures.
- A report will be made after each RAG Respi meeting, to be validated by the RAG experts. The conclusions will be presented at the RMG on Thursday pm.

Table 1. Criteria used for the assessment of the different alarm levels in the ‘Respiradar’ (Sciensano)

Drempelwaarde	Huisartsconsultaties voor griepachtige klachten ^a	Huisartsconsultaties voor andere acute luchtweginfecties ^a	Griepachtige klachten in woonzorgcentra ^b	Ziekenhuisopnames voor SARI infecties ^c	Ziekenhuisopnames voor SARI infecties met ernstige verwickelingen ^c	Concentratie van SARS-CoV-2 in afvalwater ^d
geel	128 - 507	1208 – 1293	7-13	4,4 – 9,8	0,68 - 1,4	5 – 9
oranje	507 - 783	1293 – 1984	13-20	9,8 - 33,7	1,4 - 3,03	10 - 14
rood	>783	>1984	>20	>33,7	> 3,03	≥ 15

This document describes a set of non-pharmaceutical interventions (NPI) that can be implemented within society in the different risk levels (green, yellow, orange, red) in order to:

1. decrease further pathogen transmission (in particular to vulnerable persons)
2. decrease the pressure on the health care system, to allow the entire health care system to function as normal as possible and to prevent severe and long standing disruption- of health care services
3. maximally preserve ‘business continuity’ in the educational system, public services (e.g. public transport), workplaces,... and minimize the impact on peoples’ daily lives and mental wellbeing

With the description of a set of NPI's, this document aims to serve as a toolbox of possible measures that can be discussed and decided upon at the RMG in function of the risk level.

The principles listed in this document are based on peer reviewed scientific literature (mainly systematic reviews and meta-analyses) and international policy documents (WHO, ECDC) in addition to earlier work of the GEMS, the RAG, the SSC and national and international 'lessons learned' documents. Of note, the interpretation of findings from systematic reviews is not always unequivocal, given the combined nature of interventions and given the moderate to high risk of bias observed in the majority of studies performed during the pandemic years 2020-2022. Also, in the selection and positioning of certain NPI's, several aspects need to be taken into account, including the presumed effectiveness to reduce transmission, cost and feasibility of implementation, acceptability within the population, unintended side effects (e.g. mental health, financial implications), taking into account special needs of populations with increased health risk (see below).

This document is therefore to be considered as a living document, as it will be revised regularly and updated with new insights, such as, for example, the conclusions of the OECD evaluation of the Belgian COVID-19 pandemic response, the Generic Preparedness Plan (GPP), other evaluations, new research insights, etc.

The specific measures to be taken within the health care sector (e.g., testing, isolation, PPE) for the different risk levels will be proposed by the SHC/CSS/HGR in a separate document.

2. Basic principles

- a. A generic set of measures, to be adapted by pathogen, according to its predictability. Every respiratory pathogen (e.g., RSV, influenza, SARS-CoV-2) has its own characteristics in terms of transmission, dynamics, spectrum of disease, availability and effectiveness of vaccines and effective therapies. In case of increasing risk caused by a specific pathogen, the set of measures may need to be adjusted for that specific pathogen (based on the actual dynamics of the transmission in society at that moment) on top of a generic set of measures that are effective across respiratory pathogens. A clear distinction has to be made between fluctuations of seasonal influenza and other known respiratory viruses (i.e. more or less predictable, short lived peak period, limited impact on broader society, target of medically at-risk persons is possible) versus an epidemic with a new and unpredictable respiratory pathogen ('respiratory Pathogen X') or a new, highly infectious or severe SARS-Cov-2 variant, which has a broader susceptible population and is more unpredictable in terms of dynamics and vulnerable groups¹.
- b. Respiratory precautions in combination with enhanced hand hygiene are the backbone for respiratory viruses (although the relative weight of the interventions may differ between pathogens). Respiratory precautions include: attention to sufficient ventilation/indoor air quality, the use of masks, keeping distance, reduction of crowding in indoor spaces, giving preference to outdoor activities, hand hygiene, cough etiquette,
- c. Combination of measures: application of the Swiss cheese model: no single measure is perfect, a combination of several interventions together with clear, repeated and targeted communication

¹ We refer to the CDC definition of an epidemic: 'an epidemic is an unexpected increase in the number of disease cases or health related behavior in a specific geographical area with rates that are clearly above the expected occurrence in a community or region'.

is required to have an effective impact on viral transmission reduction. Once installed, there is need to maintain a stable and intuitive set of measures with clear criteria for lifting them.

- d. Basic measures should be communicated and reminded every fall (e.g. 'Winterplan' or 'Respiratory season's plan'). Circulation of respiratory pathogens is seasonal in Belgium, with a strong emphasis on fall, winter and early spring. We propose, therefore, to communicate basic measures, on a yearly basis at the end of summer, with the following points of attention:
- i. Permanent attention for cough etiquette and hand hygiene
 - ii. Permanent attention for indoor ventilation at home as well as in public/work/educational places (as stipulated in the Ministerial Decree dd. 6/11/2022)
 - iii. Seasonal vaccination for all persons with increased medical risk², health care workers (influenza, covid, pneumococcal vaccine where applicable) and persons around those with increased medical risk, as mentioned in the yearly advices from the Superior Health Council^{3,4,5}.
 - iv. Targeted use of masks (as described in SSC advice dd. 1/2/2023 and summarized in Annex 1) as a function of symptoms, underlying medical risk and local epidemiology
 - v. 'When ill, stay home' until resolution of symptoms, and wear a mask until day 10 after start of symptoms when in contact with others (in the case of COVID-19, as stipulated in <https://covid-19.sciensano.be/nl/procedures/isolatie>). Depending on the symptoms, telework could offer the possibility to resume/continue work activities. At the workplace this should be taken up in OSH-policies and absenteeism plans.

This 'Winterplan' should be communicated yearly, explained and repeated to the entire society, with specific attention to the most vulnerable and people in contact with them. It should also be included in the educational plan of schools, so that children can acquire preventive knowledge and skills from early ages onwards.

- e. Additional measures
- i. can be added when needed, to avoid excess mortality, severe disruption of health care services and/or of other societal functions such as education, public transport, economic sectors,...)
 - ii. should focus primarily on the protection of medically vulnerable patients (based on co-morbidity or age)
 - iii. the psychosocial impact of measures needs to be monitored and mitigated particularly for persons in a low socio-economical situation and /or persons at increased mental health risk.
 - iv. sector-specific measures may be needed (hence need to obtain sector-specific risk patterns and epidemiological data)
 - v. measures should intervene as minimal as possible in functioning of schools and youth activities (only when inevitable)

² This group includes persons with impaired function of the immune system, older ages (≥ 65 y) and those with underlying co-morbidities such as diabetes mellitus, severe chronic renal, cardiac, pulmonary or liver disease

³ <https://www.health.belgium.be/nl/advies-9767-vaccinatie-seizoensgebonden-griep-winterseizoen-2023-2024>

⁴ <https://www.health.belgium.be/nl/advies-9766-covid-19-vaccinatie-herfst-winterseizoen-2023-2024>

⁵ <https://www.health.belgium.be/nl/advies-9674-vaccinatie-tegen-pneumokokken-volwassenen>

- f. Timing is essential for measures to be effective. If taken, measures need to be early, targeted and clearly communicated in order to be effective and to avoid the need for interventions with more societal damage.
- g. Feasibility, logistic aspects as well as acceptability of certain measures need to be assessed during preparedness activities: cost, availability of necessary materials or infrastructure (e.g. need for rapidly available national stock). Acceptability of interventions may differ depending on personal (e.g. mask wearing) versus organizational efforts (e.g. ventilation); evidence from behavioral and motivational studies can inform choices.
- h. Clear and repeated communication and education in different ways (e.g. audiovisual messages including written messages and pictograms) and through different channels and adapted for different target groups (e.g. caregivers, youth, medically or socially vulnerable groups,...).
- i. Finally, preparedness requires timely investments in resilience, mainly:
 - (a) to equip and train personnel in workplaces, educational institutions, health care services and homes for the elderly, such that they can function optimally with minimal collateral damage under various degrees of NPIs.
 - (b) to work internationally on production capacity, guaranteed supply and equitable distribution of NPI and PI material (including vaccines), and investments in balanced, correct, credible and consistent information (as misinformation is internationally organized and needs to be addressed both locally and internationally).

	Seasonal variations of known (predictable) pathogens			Unknown/unpredictable pathogen
	Risk levels 'green' and 'yellow': very low circulation of respiratory pathogens, pressure on hospitals under control	Risk level 'orange': increasing pressure on healthcare system, intervention needed to reverse this trend	Risk level 'red': high risk of overburdening the healthcare system (expected)	Respiratory Pathogen X (outside Respiradar)
Personal measures		Recommendations from lower risk levels continue to apply in higher risk levels, only additional measures are mentioned		
	Cough etiquette and hand hygiene			
	Optimize indoor air quality	Strict (compulsory) ventilation criteria apply	Strict (compulsory) ventilation criteria apply	Strict (compulsory) ventilation criteria apply
	Seasonal vaccination, in particular when at risk, HCW or caring for at risk person			Depending on the pathogen, a large scale vaccination campaign or the availability of antiviral treatment should be considered in an early stage
	'When ill, stay home' until resolution of symptoms, and wear a mask until day 10 after start of symptoms when in contact with others			Formalized isolation, consider to quarantine contacts
	Mask wearing when symptoms and in contact with at risk persons	Mask wearing for all health care contacts, recommended for public transportation	Mask wearing for all health care contacts, recommended for public transportation and crowded indoors	Universal mask wearing for all indoor close contacts
Workplace	Optimize indoor air quality	Strict (compulsory) ventilation criteria apply	Strict (compulsory) ventilation criteria apply	Strict (compulsory) ventilation criteria apply
	'When ill, stay home' until resolution of symptoms, and wear a mask until day 10 after start of symptoms when in contact with others	Additional measures to reduce transmission at workplace (e. g. canteens)		
	Foresee: infection risk assessment, prevention plan, inclusion of stay/work from home policy in absenteeism plans			
		Consider to recommend telework	Telework highly recommended	Telework highly recommended/mandatory
Education system	Optimize indoor air quality	Strict (compulsory) ventilation criteria apply	Strict (compulsory) ventilation criteria apply	Strict (compulsory) ventilation criteria apply
	'When ill, stay home' until resolution of symptoms, and wear a mask until day 10 after start of symptoms when in contact with others			
			Mask wearing when symptoms, particularly when in contact with at risk persons	Universal mask wearing
			Consider brief periods of hybrid teaching (when all other interventions fail, with evidence that target group is in education, and provided logistics are available, depending on level of teaching)	Consider brief periods of distance teaching, depending on level of teaching; logistics to be prepared
Public transport	Optimize indoor air quality	Strict (compulsory) ventilation criteria apply		
	Masks recommended for at risk persons and all with symptoms	Consider to recommend masks for all	Masks highly recommended for all	Masks mandatory for all
International travel	Optimize indoor air quality	Strict (compulsory) ventilation criteria apply		
	Masks recommended for at risk persons and all with symptoms	Masks recommended	Masks highly recommended	Masks mandatory
				Discourage strongly, testing of returning travelers may apply
Private gatherings	Optimize indoor air quality	Strict ventilation recommended		
	When ill, stay home'	Discourage indoor gatherings, encourage personal testing pre-gathering (especially when vulnerable persons involved)	Discourage strongly indoor gatherings	Discourage strongly indoor and large scale outdoor gatherings
Public indoor places and events	Optimize indoor air quality	Strict ventilation criteria apply	Strict ventilation criteria apply	
	When ill, stay home'		Avoid/discourage crowding	Discourage strongly indoor and large scale outdoor gatherings
				Suspend nightlife, large scale indoor for brief periods

Annex 1. Conclusion/recommendations on the use of masks in the health care setting (SSC advice dd. 1/2/2023)

The aim of mask use in the (health)care setting is the prevention of all respiratory tract infections within the (health) care setting, in particular those with known important morbidity and mortality (e.g. COVID-19, influenza, RSV,...)

We propose to implement a revised version of the already existing measures to prevent respiratory tract infections within health care settings:

- Not confined to COVID-19, also applicable during other respiratory epidemics (e.g. influenza, RSV,...)
- depending on the epidemic level of the different respiratory pathogens (see below, may vary locally in function of risk assessment)
- regardless of vaccination status (but vaccination for COVID-19 and influenza remains highly recommended for HCW)
- 2 phases: on/off (important to keep also an 'off' phase during most of the year (summer, parts of spring and autumn), to avoid 'desensitization' towards IPC measures)
- 3 levels, according to the epidemiological risk assessment (see above):

		Epidemiological situation	Recommendation	Remarks
'OFF'	Level 1	under control e.g. summer time, no active outbreaks	<ul style="list-style-type: none"> • Standard precautions • Mask wearing by all workers and ambulatory patients with mild respiratory symptoms • Masks for all interactions with severely immuno-depressed patients 	<ul style="list-style-type: none"> • To be considered as the new 'standard precautions'
'ON'	Level 2	increasing strain on the health care system', e.g. winter season, active outbreak	<ul style="list-style-type: none"> • Precautions of level 1 PLUS • Mask wearing for all interactions between caregiver/patient and among patients (not living together e.g. in waiting room) 	<ul style="list-style-type: none"> • Cfr WHO 'targeted masking' • For long term care facilities/nursing homes, masks not to worn when residents are together (unless symptoms)
	Level 3	risk of overburdened health care system, business continuity problems	<ul style="list-style-type: none"> • Mask wearing for all persons present in the health care setting at all times, regardless of their contact with patients (i.e. all workers, patients, visitors) 	Cfr WHO 'universal masking'

3. References

1. Lionello Lorenzo, Stranges Debora, Karki Tommi, Wiltshire Emma, Proietti Chiara, Annunziato Alessandro, Jansa Josep, Severi Ettore, on behalf of the ECDC–JRC Response Measures Database working group. Non-pharmaceutical interventions in response to the COVID-19 pandemic in 30 European countries: the ECDC–JRC Response Measures Database. *Euro Surveill.* 2022;27(41):pii=2101190. <https://doi.org/10.2807/1560-7917.ES.2022.27.41.2101190>
2. ECDC expert consultation on the implementation and evaluation of non-pharmaceutical interventions December 2022
<https://www.ecdc.europa.eu/sites/default/files/documents/ECDC%20Expert%20Consultation%20on%20the%20Implementation%20and%20Evaluation%20of%20NPIs.pdf>
3. ECDC Technical Report. Impact of selected non-pharmaceutical interventions on EU adults' work-life balance during the COVID-19 pandemic, 2020–2022 August 2023
https://www.ecdc.europa.eu/sites/default/files/documents/Impact_of_selected_NPIs_on_EU_adult_work-life_balance_during_COVID-19_pandemic.pdf
4. Marília Silva Paulo et al. Impacts of public health and social measures on COVID-19 in Europe: review and modified Delphi technique. *Frontiers in Public Health* 2023
5. Madhusudanan A, Iddon C, Cevik M, Naismith JH, Fitzgerald S. 2023. Non-pharmaceutical interventions for COVID-19: a systematic review on environmental control measures. *Phil. Trans. R. Soc. A* 381: 20230130. <https://doi.org/10.1098/rsta.2023.0130>
6. Peters J, Farhadloo M. The Effects of Non-Pharmaceutical Interventions on COVID-19 Cases, Hospitalizations, and Mortality: A Systematic Literature Review and Meta-Analysis. *AJPM Focus* 2023 Jun 14;100125. doi: 10.1016/j.focus.2023.100125. Online ahead of print.
7. Juneau C, Pueyo T, et al. Lessons from past pandemics: a systematic review of evidence-based, cost-effective interventions to suppress COVID-19. *Systematic Reviews* volume 11, Article number: 90 (2022)
8. Wet 6 november 2022. Wet betreffende de verbetering van de binnenluchtkwaliteit in de plaatsen die publiek toegankelijk zijn.
https://www.health.belgium.be/sites/default/files/uploads/fields/fpshealth_theme_file/06112022_loi_qai_wet_blk.pdf
9. ECDC Technical Report. Considerations for the use of face masks in the community in the context of the SARS-CoV-2 Omicron variant of concern 7 February 2022.
<https://www.ecdc.europa.eu/sites/default/files/documents/Considerations-for-use-of-face-masks-in-the-community-in-the-context-of-the-SARS-CoV-2-Omicron-variant-of-concern.pdf>
10. ECDC Technicap Report. Guidance on ending the isolation period for people with COVID-19, third update 28 January 2022.
<https://www.ecdc.europa.eu/sites/default/files/documents/Guidance-for-discharge-and-ending-of-isolation-of-people-with-COVID-19-third-update.pdf>

11. Joint EASA-ECDC COVID-19 Aviation Health Safety Protocol. May 11, 2022.
(https://www.ecdc.europa.eu/sites/default/files/documents/Joint-EASA-ECDC-Aviation-Health-Safety-Protocol_issue%204.pdf)
12. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19-small-public-gatherings>