

Evaluation RESPI-RADAR

June 2024

1.1. INTRODUCTION

The Respi-Radar tool has been used from September 2023 to March 2024, upon recommendation from the RAG ([RAG advice 23082023](#)). The purpose of the Respi-Radar was to assess the severity of the epidemiological situation of respiratory infections and to inform public health preparedness and response. The Respi-Radar was divided into three levels (yellow, orange and red) ; the « green situation » reflected the baseline situation.

The Respi-Radar was based on six indicators, from the surveillances of Influenza-Like-Illness (ILI), Severe Acute Respiratory Infections (SARI) and wastewater:

- Incidence of consultations at general practices (GP) for ILI symptoms (weekly incidence/100 000 inhabitants; data from the sentinel network of GPs)
- Incidence of consultations at GP practices for other Acute Respiratory Infections (ARI) (weekly incidence/100 000 inhabitants; data from the sentinel network of GPs)
- ILI in nursing homes (weekly incidence/1000 nursing home residents; data from the sentinel network of nursing homes)
- Incidence of hospitalisations for SARI (weekly incidence/100 000 inhabitants; data from the sentinel network of hospitals)
- Severe complications after SARI hospitalisations (weekly incidence/100 000 inhabitants that present at least one of the following during hospital stay: ARDS, ECMO, invasive ventilation, ICU stay or death ; data from the sentinel network of hospitals)
- SARS-CoV-2 concentrations in wastewater (number of treatment plants positive for the indicator “high circulation”; data from the wastewater surveillance)

Additional data further informed the assessment of the situation, such as data from the national reference laboratories which provided pathogen-specific information (including the genomic surveillance of SARS-CoV-2), the international situation and input from the experts of the RAG.

The objective of this document is to evaluate the Respi-Radar tool following its use during the autumn-winter season 2023-2024, and to draw conclusions for the assessment and management of respiratory infections in the coming seasons. *Note that the evaluation of the surveillance systems providing data to the Respi-Radar tool is out of the scope of this document.*

1.2. RECOMMENDATIONS FOR UPCOMING RESPIRATORY SEASONS

- The RAG recommends to continue the use of the Respi-Radar tool for upcoming respiratory infections seasons. The Respi-Radar allows for **monitoring trends** of respiratory infections in a standardized manner and provides clear **communication on the epidemiological situation** to the authorities, the healthcare sector, other stakeholders and the general public.
- There will be **no pre-defined control measures linked to the Respi-Radar levels**. Instead, the RAG recommends the development and implementation of a **Generic Plan** which would describe the measures to be applied (i) in healthcare care settings and (ii) by the general population, throughout the respiratory season (typically from October to March).
- The RAG-Respi group could also recommend to review/scale-up the measures described in the Generic Plan if needed (in case of unusual epidemiological situation for instance).
- The Respi Radar table and the color code will systematically be included in the weekly bulletin for Respiratory Infections.
- The **functioning** of the Respi-Radar remains unchanged, i.e, the Respi-Radar tool will be activated when an early signal is detected within the respiratory infections surveillance (carried out all year round by Sciensano through sentinel surveillance from GP practices, hospitals, nursing homes, wastewater, as well as other national or international signals). A RAG evaluation, based on a quantitative and qualitative assessment, will then be carried out.
- **Indicators included in the Respi-Radar table**
 - Incidence of consultations for ILI at GP practices
 - Incidence of consultations for ARI at GP practices
 - Incidence of ILI in nursing homes
 - Incidence of hospitalisations for SARI
 - Indicator from the wastewater surveillance covering SARS-CoV-2, RSV and Influenza
- **Indicators removed from the Respi-Radar table**
 - The incidence of severe complications after SARI hospitalisation is removed from the Respi-Radar table for the time being. It will be included again if the delay in obtaining data is reduced (by reporting severity information at patient admission, instead of at discharge)
- In addition to the Respi-Radar table, the following data can be used as **complementary information** when relevant:
 - Pathogen-specific data (including molecular/genomic surveillance and serology if/when available)
 - Vaccination
 - Infectieradar
 - Workload of GPs
 - Severe complications after hospitalisation
 - Mortality

- Scenario modelling
- International situation
- Feedback from experts from the RAG group (including reporting of outbreaks/clusters in specific settings)
- **Thresholds:** Maintain the MEM (Moving Epidemic Method) for the calculation of thresholds when possible.

1.3. EVALUATION OF THE EPIDEMIOLOGICAL SITUATION OF RESPIRATORY INFECTIONS USING THE RESPI RADAR (W29 2023-W13 2024)

1.3.1. Overview of the Respi-Radar results

Table 1 shows the consolidated data for the six indicators used for the Respi-Radar, by week, from 17 July 2023 (week 29) to 25 March 2024 (week 13).

The situation was assessed as being at baseline - green level - between July (week 29) and mid-November 2023 (week 45). Between 23 November 2023 (week 46) and 21 January 2024 (week 3), the epidemiological situation for respiratory infections was assessed as being at yellow level, given the increase observed for several indicators. This increase was due to a rise in the circulation of RSV in October, followed by SARS-CoV-2 in December. The yellow level means that the epidemic threshold was reached but that the situation was under control, and that the impact on the healthcare system (first and second line) was limited. Between 22 January 2024 (week 4) and 18 February 2024 (week 7), the epidemiological situation for respiratory infections was at level orange, mainly due to the increased circulation of the influenza virus and the resulting pressure on the healthcare system. The epidemiological situation was assessed as yellow again on 19 February 2024 (week 8), because despite a viral circulation above the epidemic threshold, the impact on the healthcare system was limited. Since 11 March 2024 (week 11), the epidemiological situation for respiratory infections has been back at baseline, i.e. Respi-Radar level green.

Depending on the level defined, the RAG proposed different actions. In September 2023, the level was green, but given the forthcoming respiratory season, the RAG recommended that the guidelines for handling COVID-19 and respiratory infections in general should be communicated again. In October 2023, the level was still green, but the RAG stressed the importance of maintaining the basic protective measures to prevent the situation from worsening. The RAG also highlighted the importance of vaccination against respiratory pathogens (influenza, COVID-19, RSV and pneumococcus) in order to protect vulnerable populations as much as possible. In November 2023, when the level was moved from green to yellow, the RAG referred to the advice of the Strategic Scientific Committee for recommendations to the general population: staying home when symptoms, ventilation of indoor space, mask wearing when symptoms, and vaccination of at-risk populations against respiratory pathogens. Pending the advice from the Conseil Supérieur de la Santé/Hoge Gezondheidsraad for recommendations to the healthcare sector, recommendations were formulated by the RMG. In January 2024, when the level moved from yellow to orange, no additional measures were set, but the RMG increased communication to the public and the healthcare sector to remind the measures described above and emphasize the importance of ventilation and protection of vulnerable populations.

Overall, the RMG validated the evaluation of the epidemiological situation of respiratory infections made by the RAG and the colour code attributed, weekly, on the basis of the Respi-Radar tool. The measures proposed by the RMG and IMC during the respiratory season 2023-2024 were only recommendations: the health care sector or general population were never obliged to implement these measures.

Table 1: Overview of the Respi-Radar results (w29 2023 – w13 2024)

Week	Indicators acute respiratory infections					COVID-19 specific indicator	Evaluation RAG
	Consultations GPs for ILI symptoms*	Consultations GPs for ARI*	ILI in nursing homes**	Hospital admissions for SARI*	Complications after hospitalisation for SARI***	Concentration SARS-CoV-2 in wastewater****	
2023w29	31	373	3	1,3	0,5	0	green
2023w30	36	435	3	2,3	0,1	0	green
2023w31	58	456	3	2,9	0,7	3	green
2023w32	29	425	2	2,0	0,3	7	green
2023w33	83	424	3	3,9	0,6	5	green
2023w34	85	477	5	5,1	0,7	8	green
2023w35	79	567	7	6,1	0,5	10	green
2023w36	140	718	6	6,4	0,0	14	green
2023w37	148	686	4	4,9	0,0	7	green
2023w38	147	859	5	6,2	0,0	9	green
2023w39	143	1066	8	8,2	0,4	14	green
2023w40	149	1061	7	6,6	0,4	10	green
2023w41	146	1025	4	6,7	0,3	15	green
2023w42	153	1098	6	8,5	0,4	11	green
2023w43	113	928	7	7,3	1,2	8	green
2023w44	156	889	8	11,3	0,7	9	green
2023w45	179	1314	5	12,1	0,3	10	green
2023w46	184	1087	13	11,1	2,7	14	yellow
2023w47	213	1107	10	12,7	1,8	19	yellow
2023w48	240	1332	11	13,6	1,3	20	yellow
2023w49	254	1468	15	12,6	2,3	24	yellow
2023w50	399	1426	5	16,7	1,4	22	yellow
2023w51	458	1515	9	14,5	1,4	27	yellow
2023w52	161	1262	8	15,4	1,8	19	yellow
2024w01	216	971	11	13,9	2,0	11	yellow
2024w02	298	1059	13	11,2	1,5	11	yellow
2024w03	325	1200	13	12,5	2,7	13	yellow
2024w04	636	1444	11	12,7	1,1	11	orange
2024w05	588	1623	12	14,8	1,8	9	orange
2024w06	557	1252	16	15,9	1,9	3	orange
2024w07	289	1061	7	11,6	1,2	4	orange
2024w08	330	1190	6	11,5	1,2	6	yellow
2024w09	228	921	8	11,5	0,6	4	yellow
2024w10	127	975	7	9,1	0,4	1	yellow
2024w11	153	813	7	9,2	0,8	2	green
2024w12	76	865	4	9,9	0,3	0	green
2024w13	81	901	2	6,7	0,0	0	green

* Weekly incidence per 100 000 inhabitants

** Weekly incidence per 1000 nursing home residents

*** Weekly incidence per 100 000 inhabitants. A complication is defined as death, ARDS, ICU admission, ECMO or invasive ventilation.

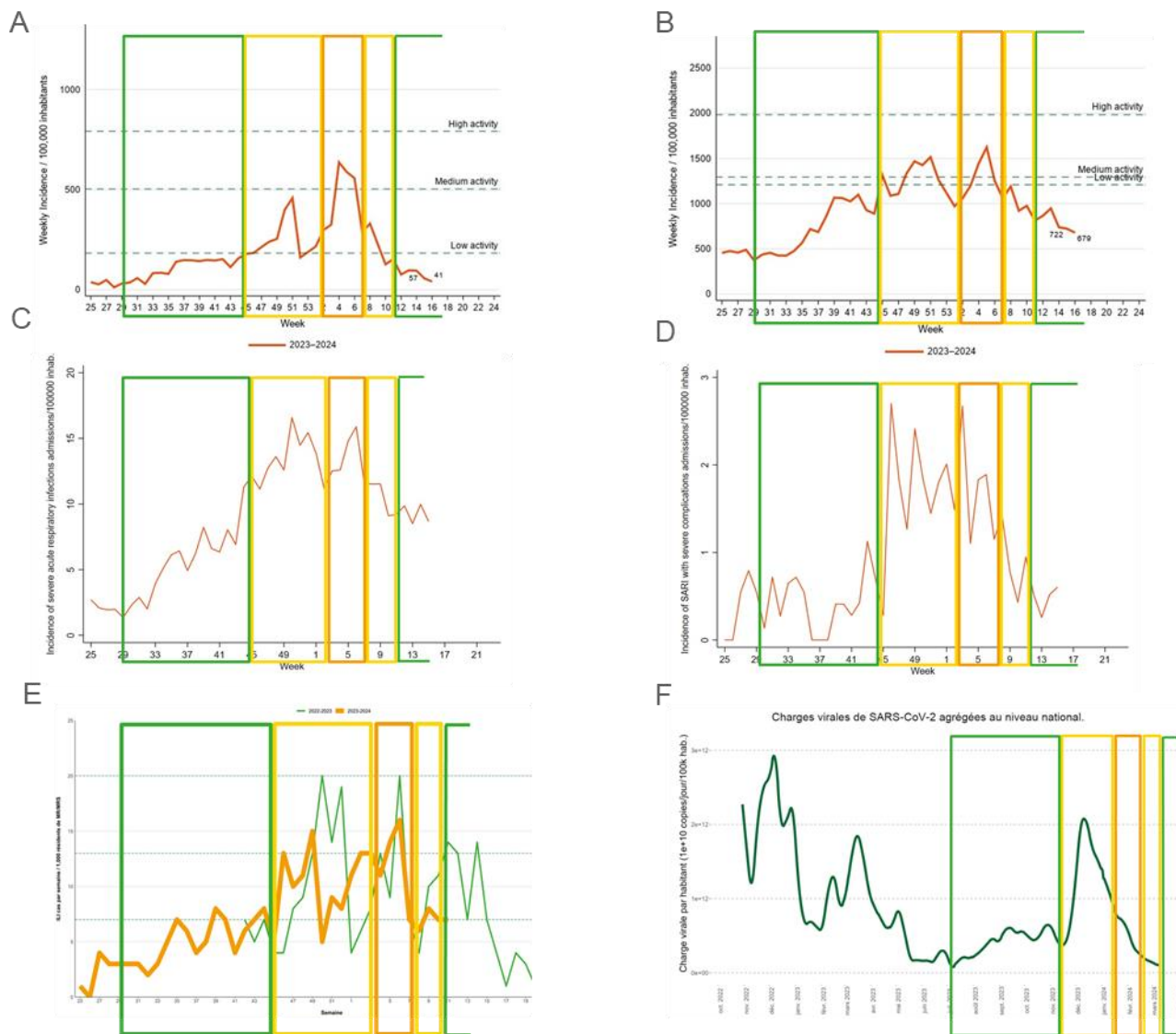
**** Number of treatment plants being positive for the « high circulation » indicator

1.3.2. Indicators used for the Respi-Radar tool

Figure 1 shows the evolution of each indicator used in the Respi-Radar table over time and the colour code attributed to characterize the overall epidemiological situation of respiratory infections. We examined whether the overall Respi-Radar level fitted the evolution of each indicator taken individually.

- ***Incidence of consultations at GP practices for ILI symptoms:*** the evolution of this indicator matched the Respi-Radar evaluation: increasing trends were observed when the level was changed from green to yellow then from yellow to orange. Conversely, the trend was decreasing when the level of the Respi-Radar changed from orange to yellow then from yellow to green (Fig 1A)
- ***Incidence of consultations at GP practices for ARI:*** the evolution of the indicator also matched the Respi-Radar evaluation, with an overall increasing trend when the Respi-Radar level was raised and a decreasing trend when the Respi-Radar level was reduced. However, the peak observed when the Respi-Radar level was orange was comparable to the peak observed when the Respi-Radar level was yellow (Fig 1B).
- ***Incidence of hospital admissions for SARI:*** the evolution of the indicator partially matched the Respi-Radar evaluation. There was an increasing trend when the Respi-Radar level moved from green to yellow. A second peak was observed when the Respi-Radar level moved from yellow to orange but this peak did not exceed the peak observed when the Respi-Radar was at yellow level (Fig 1C).
- ***Complications after hospitalisations for SARI:*** this indicator was often not available at the time of the Respi-Radar analysis (see below section 1.2.4 on completeness of the data). However, consolidated data show a partial match with the Respi-Radar levels attributed over time (Fig 1D).
- ***Incidence of ILI in nursing homes:*** this indicator is prone to fluctuations due to the varying number of nursing homes participating to the sentinel surveillance and the heterogeneous geographical representativeness. Nevertheless, the same conclusions can be made, with a partial match with the Respi-Radar levels over time (Fig 1E).
- ***Virus concentration in wastewater:*** during the period considered here (July 2023-March 2024), this indicator remained pathogen-specific, with only SARS-CoV-2 concentrations measured in wastewater. The indicator therefore did not match the Respi-Radar level which covered respiratory infections in general. During the respiratory season 2023-2024, the impact of COVID-19 remained limited (Fig 1F)

Figure 1: Evolution of the indicators used for the Respi-Radar tool and Respi-Radar level defined over time. A- Incidence of consultations at GP practices for ILI symptoms; B- Incidence of consultations at GP practices for ARI; C- Incidence of hospital admissions for SARI; D- Incidence of severe complications after hospital admissions; E- Incidence of ILI in nursing homes; F- Concentrations of SARS-CoV-2 in wastewater

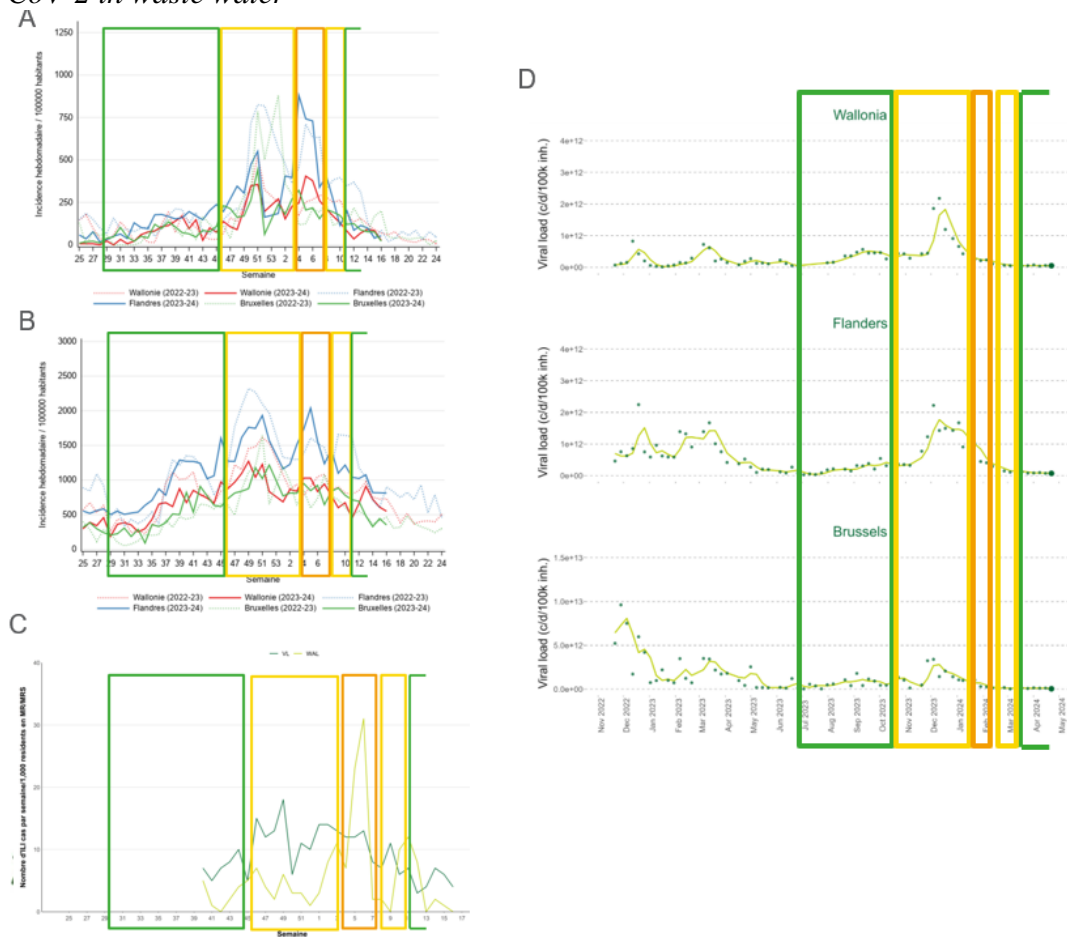


1.3.3. Relevance of the Respi-Radar at regional level

The Respi-Radar evaluation focused on the trends of each indicator at national level. Regional differences were taken into account to feed the discussion but the overall level defined by the Respi-Radar was always intended for the whole country.

Four of the six indicators of the Respi-Radar can be analysed at regional level: the incidence of consultations at GP practices for ILI, the incidence of consultations at GP practices for ARI, the incidence of ILI in nursing homes and the SARS-CoV-2 concentrations in wastewater. Figure 2 shows the regional trends of these indicators and the colour defined by the Respi-Radar over time. The trends for each of these indicators did not drastically differ by region, hence the colour code defined through the Respi-Radar at national level seemed also in accordance with the situation at regional level.

Figure 2: Evolution of the indicators used for the Respi-Radar tool by region and Respi-Radar level defined over time. A- Incidence of consultations at GP practices for ILI symptoms; B- Incidence of consultations at GP practices for ARI; C- Incidence of ILI in nursing homes; D- Concentrations of SARS-CoV-2 in waste water



1.3.4. Completeness of the data used for the Respi-Radar evaluation

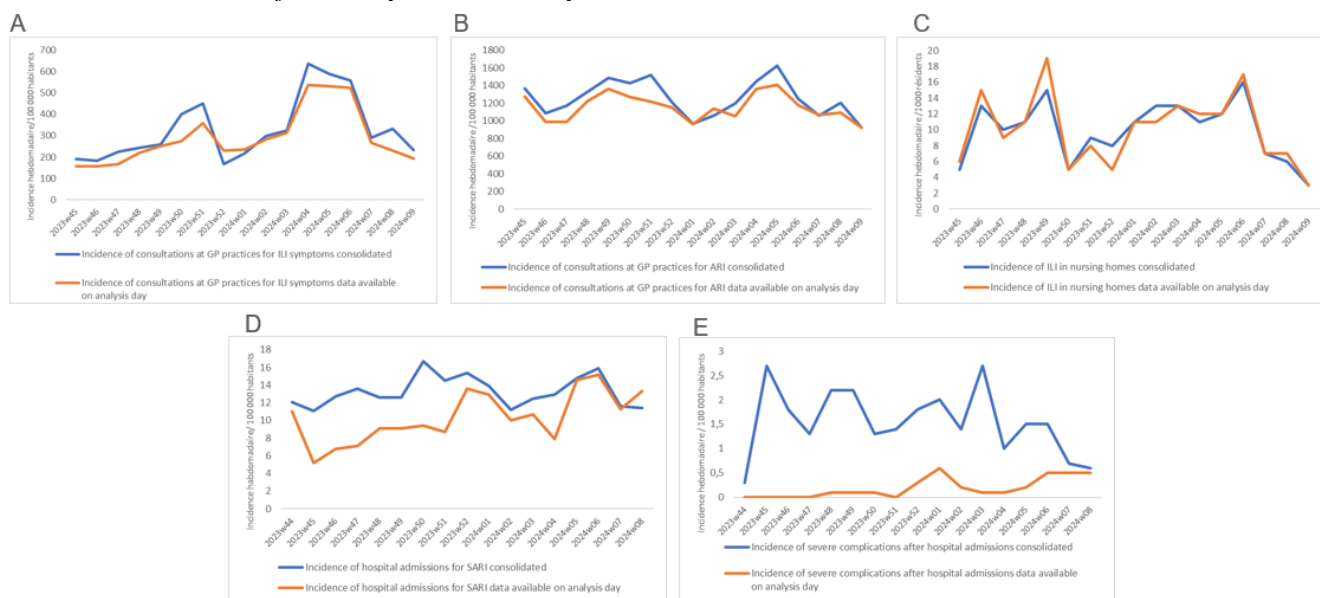
By completeness we mean the extent to which - at the moment of evaluation - all events which occurred during a given week are included in the value of the indicator for that week.

Figure 3 shows, for each indicator of the sentinel surveillances, a comparison of the data available at the time of the Respi-Radar evaluation and the data when consolidated. The results of the wastewater surveillance are not shown here as the data from this surveillance are complete at the moment of the evaluation and do not need consolidation.

Data from the sentinel network of GPs are slightly underestimated on the day of the Respi-Radar evaluation, with stronger underestimation when peaks are observed (Fig 3A and 3B). The trends are however correctly captured on the day of the evaluation. The results of the sentinel network of nursing homes show a slight overestimation or underestimation on the day of the Respi-Radar evaluation but the trend is also correctly captured (Fig 3C).

Data from the sentinel network of hospitals show an important underestimation on the day of the Respi-Radar evaluation. The incidence of hospital admissions for SARI was strongly underestimated from November to December 2023 due to several changes in the surveillance system (expansion of the sentinel network, change in the data collection system). The situation has greatly improved since January 2024 (Fig 3D). The incidence of severe complications after hospital admissions is not available at the time of the Respi-Radar evaluation (Fig 3E). This is a late indicator collected at patient discharge and which therefore typically requires 4 to 5 weeks to be consolidated.

Figure 3: Comparison of data available at the time of the Respi Radar analysis and consolidated data, w44 2023 – w9 2024. A- Incidence of consultations at GP practices for ILI symptoms; B- Incidence of consultations at GP practices for ARI; C- Incidence of ILI in nursing homes; D- Incidence of hospital admissions for SARI; E- Incidence of severe complications after hospital admissions. Orange line: data available at the time of the Respi Radar analysis; blue line: consolidated data.



1.4. EVALUATION EPIDEMIOLOGICAL SITUATION OF RESPIRATORY INFECTIONS IN OTHER COUNTRIES

On May 6th, questions have been asked on the *Population Health Information Research Infrastructure (PHIRI)* forum on the potential use of a management tool, similar to the Respi-Radar, to assess the severity of the epidemiological situation, in neighbouring European countries. Two questions have been asked:

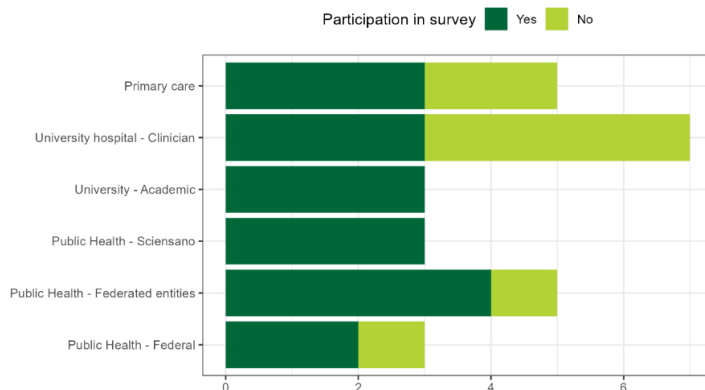
1. Does your country currently use a specific tool to assess the severity of the epidemiological situation of respiratory infections on a regular basis?
 - a. If yes, is it specific to certain respiratory infections? Which ones?
 - b. If yes, on which indicators is it based?
2. Is this tool used to guide decision making?

Based on replies from five countries (Slovenia, Norway, Italy, Austria and Serbia) and additionally collected information, no other European country seems to use a specific management tool to assess the severity of the epidemiological situation of respiratory infections in order to guide decision making. However, most countries do provide epidemiological data on respiratory infections through a report and/or a dashboard, based on similar surveillance systems than in Belgium (ARI, SARI, RSV, Influenza, COVID-19), to present the current epidemiological situation. Such epidemiological data might be used to inform and guide decision making but there is no evaluation of the epidemiological situation in a regular and structured way.

1.5. INPUT FROM MEMBERS OF THE RAG-RESPI GROUP ON THE USE OF THE RESPI-RADAR TOOL

A survey was designed by the RAG coordination team (Sciensano), based on the experience and feedback received over the course of the winter season 2023-2024. RAG experts were asked to provide feedback on the selection of indicators in the Respi-Radar, the epidemiological thresholds defined for these indicators, the correspondence between the Respi-Radar level and the epidemiological situation, and the use of the Respi-Radar as epidemiological or decision support tool. Members of the RAG-Respi group were invited to complete the survey between April 5 and April 19 2024. Figure 4 shows the number of invited and participating members by domain of expertise.

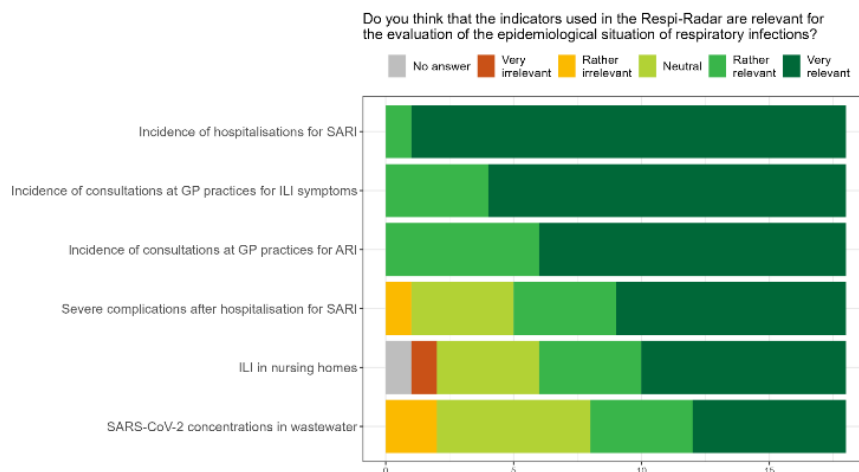
Figure 4: Participation to the survey by domain of expertise



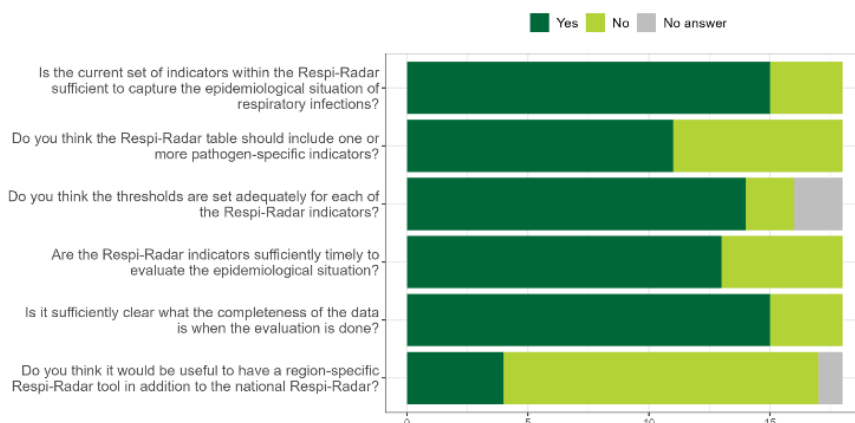
1.5.1. Results of the survey (Figure 5)

Figure 5: Feedback from RAG experts on the following topics: A- relevance of the indicators used within the Respi-Radar; B- indicators and thresholds; C- accuracy of the Respi-Radar; D- decision process; E- usefulness of the Respi-Radar tool

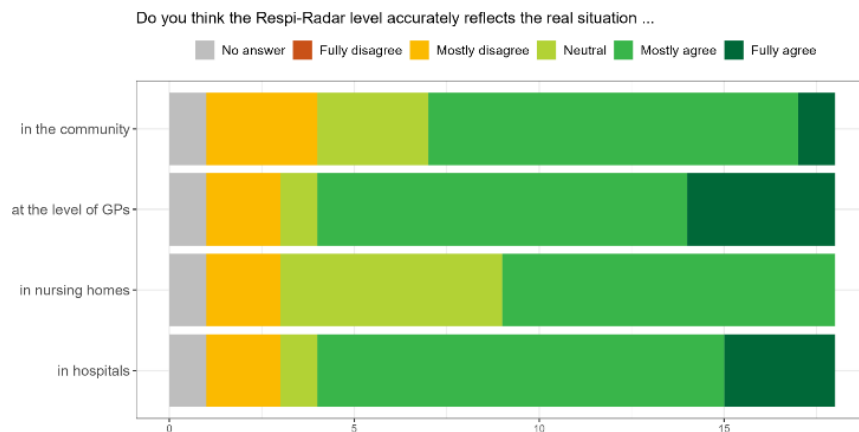
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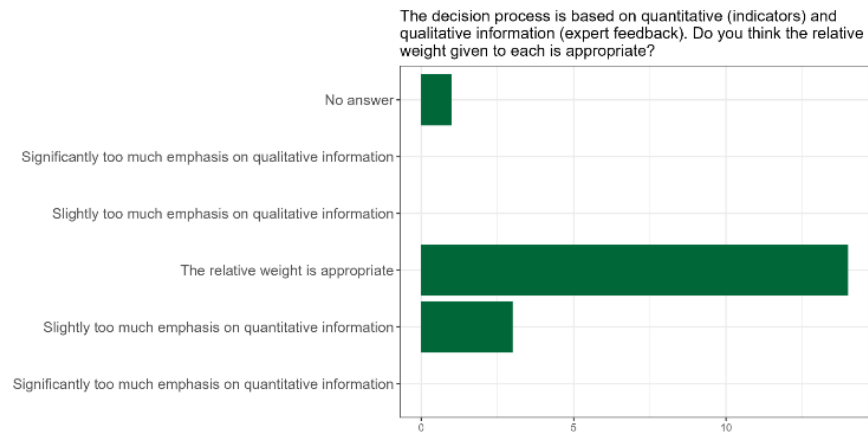
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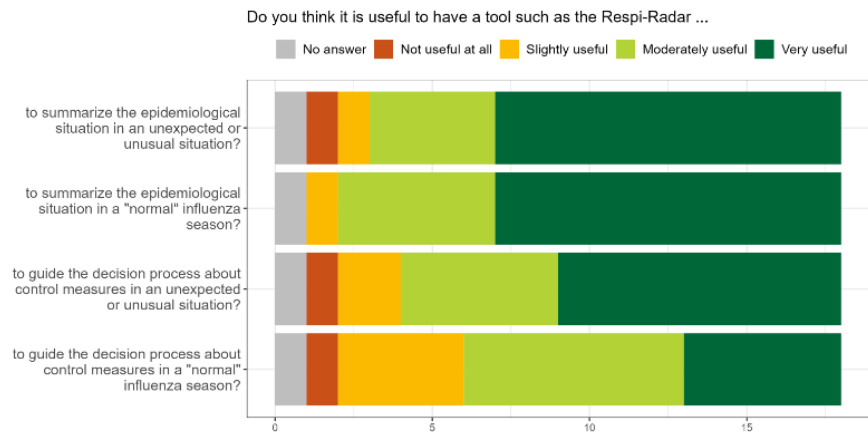
C



D



E



1.5.2. Points of discussion raised by the experts via the survey:

1.5.2.1. Possible additional indicators

15 out of 17 responders mentioned that the current set of indicators within the Respi-Radar is sufficient to capture the epidemiological situation of respiratory infections. However additional indicators were suggested by the experts as possibly interesting for the evaluation. Those include:

- **Serology for specific pathogens:** *serological data are at the moment not collected in a standardized form and are rather project-based. When relevant data would be available, it can be included as complementary information for the evaluation.*
- **RSV and Influenza in wastewater:** *RSV and Influenza are detected in wastewater, but no quantification is done. These data will be included in the weekly bulletin for Respiratory Infections from September 2024 onwards.*
- Indicator from **participatory surveillance for non-medically attended infections** such as data from infectieradar.
- Indicator of **pressure on healthcare system:**

- Bed occupancy: *currently not measured.*
- Workload of first line healthcare workers: *available in the weekly bulletin for Respiratory Infections (sentinel network of GPs).*
- Indicator from **event-based surveillance in collectivities**: clusters/outbreaks in nursing homes, schools, creches: *currently not followed up in a standardized manner. Outbreaks are followed up by the regions and the information can be shared at the RAG meetings.*
- **Pathogen-specific indicators**:
 - RSV: *already included in ILI and SARI surveillances, surveillance in wastewater in progress.*
 - Influenza: *already included in ILI and SARI surveillances, surveillance in wastewater in progress.*
 - Bordetella pertussis: *separate surveillance – different disease characteristics – different measures – specific RAG can be performed if needed (as in Sept 2023).*
 - Mycoplasma: *not included in ILI and SARI surveillances, but might be included in the future.*
 - Adenovirus: *included in ILI and SARI surveillances.*
 - Parainfluenza: *included in ILI and SARI surveillances.*
 - S. pneumoniae: *not included in ILI and SARI surveillances.*
- **Incidence of ILI in nursing homes** : *already included in the Respi-Radar, but efforts will be made to improve representativity (recruitment of additional nursing homes planned in Wallonia).*

1.5.2.2. Usefulness of the Respi-Radar tool for monitoring the epidemiological situation and/or for informing decision making

- Several experts mentioned that the Respi-Radar is a tool useful to monitor the epidemiological situation, rather than a tool to inform decision making.
 - The tool is easy to understand and allows for simple communication on the epidemiological situation.
 - The information is captured too late to inform decisions.
- Even if the tool does not inform decision making on control measures, it can still influence public perception & behaviour.
 - It can raise awareness (‘auto-evaluation’) among general public.
 - Other experts think the population will not change behaviour.
 - It can trigger extra communication about (generic) prevention measures.
- Several experts put forward the use of a *generic plan* which would provide measures applicable throughout the respiratory season.
- Several experts state that the Respi-Radar is not suited as a preparedness tool to inform policy in unexpected situation.
 - Other experts mention that the Respi-Radar could be useful to inform policy in an unexpected situation but only if pre-defined sets of measures, linked to the Respi-Radar level, are agreed upon and implemented in hospitals, nursing homes and general population.
 - Others emphasize the importance and the challenge of getting reliable data early in an epidemic with a new/unknown pathogen, due to the need to set up and scale-up testing and surveillance (e.g. case definitions).

The following persons participated to this advice:

Caroline Boulouffe (AViQ), Nathalie Bossuyt (Sciensano), Simon Couvreur (Sciensano), Isabelle Dagneaux (CMG), Laurane De Mot (Sciensano), Géraldine De Muylder (Sciensano), Pierre-Louis Deudon (CMG), Bertrand Draguez (SPF Santé), Sébastien Fierens (Sciensano), Niel Hens (UHasselt/UAntwerpen), Anne-Claire Henry (ONE), Raphael Janssens (Sciensano), Vicky Jaspers (KCE), Thomas Lamot (Vivalis), Quentin Mary (CMG), Kathlyn Rodière (ONE), Gerlant van Berlaer (SPF Santé), Claire Brugerolles (Sciensano), Naima Hammami (DZ), Geert Molenberghs (KULeuven/UHasselt), Lucie Seyler (UZBrussels), Jorgen Stassijns (Sciensano), Giulietta Stefani (Sciensano), Stefan Teughels (Domus Medica), Steven Van Gucht (Sciensano).