Monitoring Belgian COVID-19 infections in work sectors in 2022

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1 Introduction

The workplace is among the main activities for a large proportion of the population, and consequently a source of potential infection. Hence, it is often (up to 25%) reported in the contact centre database as one of the collectivities visited by the index case. It is important to monitor the incidence of COVID-19 by sector as it can help us to better understand causes of increased infection rates and it can offer us ways to reduce infections without jeopardising the continuity of these sectors/companies for the benefit of all, first and foremost the companies and their workers. In contrary to previous reports only one source of information on infection in work sectors will be used: the RSZ/ONSS data. Due to changed policy concerning testing and contact tracing in March 2022, insufficient incidence data is available from the IDEWE contact tracing.

1.1 RSZ/ONSS data

The RSZ/ONSS data analyses of COVID-19 infections in the working population were set up in the first place to allow for signal detection. The alerts consist of 2 or more cases in the same company as well as the identification of employment of an index case in a risk sector as defined by the regional contact tracing agencies (daily alerts are sent by the RSZ/ONSS to the regions). Aggregated data show the evolution over time of the incidence in the sectors. It helps to better understand the spread of the virus in the active population. The latter is of interest here.

Data description: RSZ-ONSS has been receiving information regarding positive COVID-19 cases from Sciensano since 8 September 2020. RSZ-ONSS links this information to workplace-related databases, at the level of the national number (NISS). The linkage is allowed during a period of 14 days, after which the information on positive cases is destroyed, while the aggregated output tables are stored. Linkage is done of positive cases with the NSSO Dimona database of active workers since 8 September 2020. This covers most of the workers, such as private and public sectors, interim employment and job students. Since 12 January 2021, additional linkage of positive cases with the ARZA-RGTI (Algemeen Repertorium van de Zelfstandige Arbeiders - Répertoire Général des Travailleurs Indépendants) database was allowed, which covers self-employed workers.

Each company is classified by sector of its main activity (as attributed by the RSZ-ONSS), which are identified by the NACE code. This standard code classifies workplaces into 21 main sectors and then in subcategories for which the specificity depends on the chosen granularity (which can have up to 943 subcategories). However, although some companies or self-employed workers may be active in more than one sector, only one NACE number associated with the main activity is used in the analysis. This limitation is particularly important to consider for employees within national education. Because a vast majority of schools provide both primary and secondary education, the employees will be registered as working in "Secondary education" even when in reality they are primary school teachers.

Further, since the link of the cases is only identified at the level of the company, no information is available on the type of the job of the index case (e.g., administrative work in metal industry will be registered under metal industry). Further, information on the exact employment location is not always available and/or accurate (e.g., information on telework or temporary unemployment is not available).

Finally, the actual source of infection (in particular: at the workplace or elsewhere) cannot be traced back from this database. Thus, the size and extent of the database allows us to obtain a clear and precise picture of the level of infection within a given sector, without link to the source and circumstances of infection.

2 Methodology

2.1 COVID-19 14-day incidence

The data provided by RSZ/ONSS will be shown per work sector. Work sectors are divided by NACE codes and grouped into 5 levels of detail, going from 21 sectors at level 1 to 943 sectors at level 5. The evolution of the 14-day incidence of positive COVID-19 cases among all employees registered in the same sector (number of cases per 100,000 employees) is presented for the 5 levels of work sectors. A 95% confidence interval (CI)

for the incidence is calculated on a logit transformation of the incidence, after which it is backtransformed to the original scale.

At each of the 5 levels of detail of the work sectors, the highest incidences in the last 14-day period are selected (8 – 21 November 2022) and presented together with the COVID-19 14-day incidence over all work sectors ($\sim$ 4.5 million individuals) and the COVID-19 14-day incidence in the general population ($\sim$ 11.5 million individuals) for reference.

Because the number of employees in some occupational sectors is low compared to others, the precision of the 14-day incidence is low in such small sectors. Therefore, we select the highest incidences for level 1 sectors with a minimum of 10,000 employees and self-employed workers. For level 2 and 3 sectors with a minimum of 5,000 employees and self-employed workers are selected, while for level 4 and level 5, sectors with a minimum of 3,000 and 1,500 employees, respectively, are selected.

Note that for 25% of the self-employed a sector is missing in the ARZA-RGTI data. Positive cases of self-employed worker with missing sector information are left out of the analysis. Linkage to occupational data shows that missing sector information is dispersed over many sectors, so that the impact of missing data is not affecting a single sector excessively. There will be a slight underestimation of the true incidence, but the ordering among sectors is likely not affected.

Finally, we cannot exclude varying testing preparedness and custom between sectors.

3 Results

This report is accompanied with an Excel sheet, listing all sectors and all NACE-BEL sectors for further examination.

3.1 Level 1 work sector

Of the 20 sectors at level 1, the sectors with a 14-day incidence on 21 November 2022 significantly above the working population average is Human health and social work activities (sector Q) (Table 1 and Figure 1), but it is similar to the general population average. The 14-day incidences remains at low levels in all sectors. The working population average is 24% smaller then the general population average.

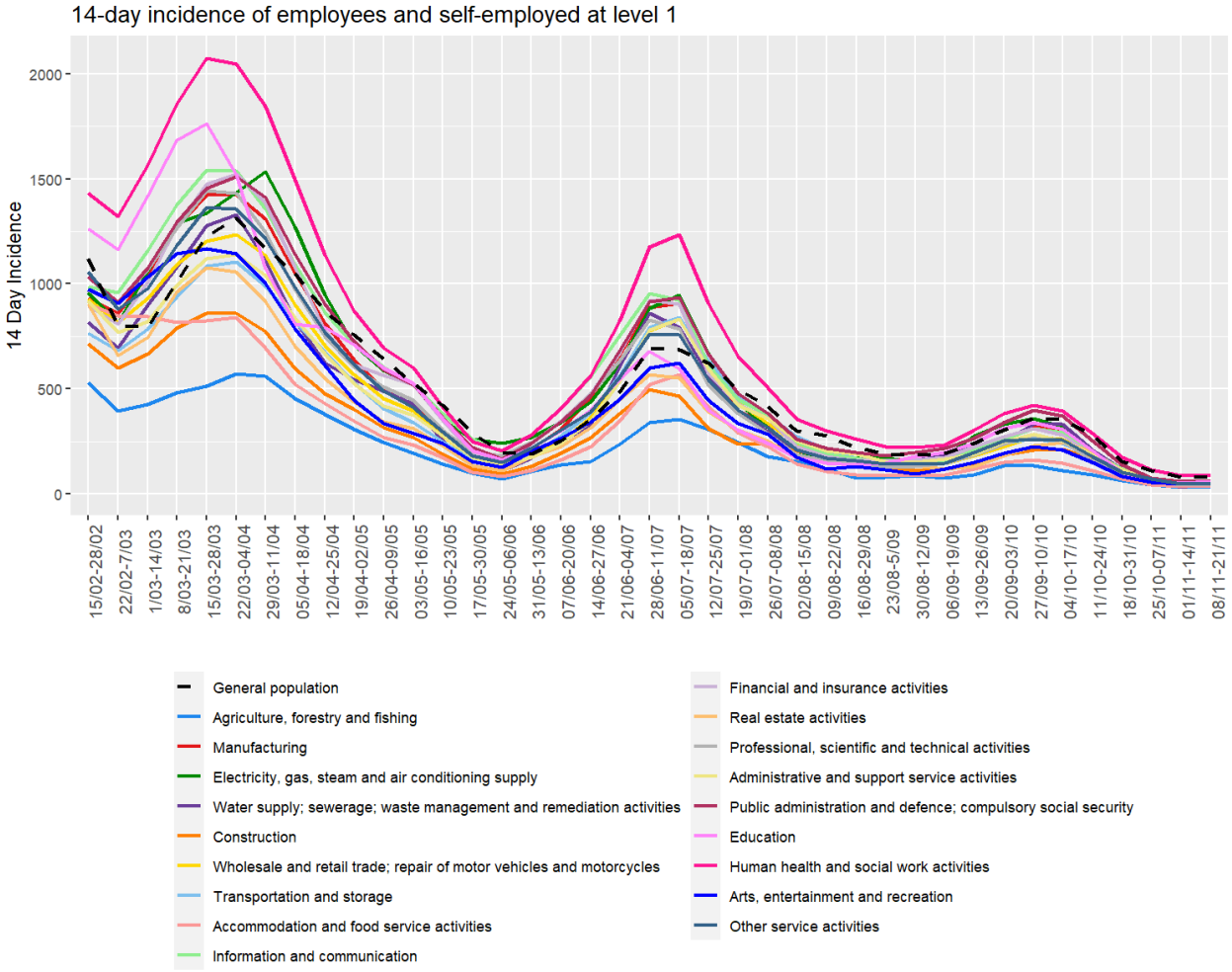

Figure 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 on 21 November 2022

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
Human health and social work activities	Q	680233	86(79;93)	90(83;98)	45(30;67)	8.17
General population			**84**	**84**	**84**	
Working population		**4557812**	**64(62;66)**	**64(62;66)**		
Public administration and defence; compulsory social security	O	544444	63(57;70)	63(57;70)		0.20
Education	P	614754	61(55;67)	61(55;68)	58(35;96)	4.36
Administrative and support service activities	N	444828	58(51;66)	62(54;71)	41(29;58)	18.35
Real estate activities	L	58182	55(39;78)	84(55;129)	33(18;60)	58.32
Water supply; sewerage; waste management and remediation activities	E	38462	52(34;81)	52(34;81)		5.83
Transportation and storage	H	317308	52(45;61)	54(46;63)	28(14;56)	9.07
Electricity, gas, steam and air conditioning supply	D	20000	50(27;93)	50(27;93)		6.20
Other service activities	S	160000	50(40;62)	55(41;74)	45(32;63)	49.60
Manufacturing	C	628571	49(44;55)	50(45;56)	37(25;55)	10.43
Information and communication	J	189796	49(40;60)	53(42;67)	38(25;58)	29.22
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	845833	48(44;53)	51(46;57)	38(30;48)	22.79
Arts, entertainment and recreation	R	118750	48(37;62)	47(34;65)	50(32;77)	35.02
Financial and insurance activities	K	161702	47(38;59)	52(41;66)	31(17;56)	22.40
Professional, scientific and technical activities	M	404348	46(40;53)	57(48;68)	32(25;41)	46.42
Construction	F	386364	44(38;51)	54(45;64)	28(21;38)	40.85
Accommodation and food service activities	I	341026	39(33;46)	41(34;49)	29(19;45)	21.67
Agriculture, forestry and fishing	A	84375	32(22;47)	28(15;54)	34(21;54)	63.71

3.2 Level 2 work sector

In the sectors at level 2 with a minimum of 5,000 workers, the sectors with a 14-day incidence on 21 November 2022 above the working population average are: Human health activities (sector 86) and Residential care activities (sector 87) (Table 2 and Figure 2).

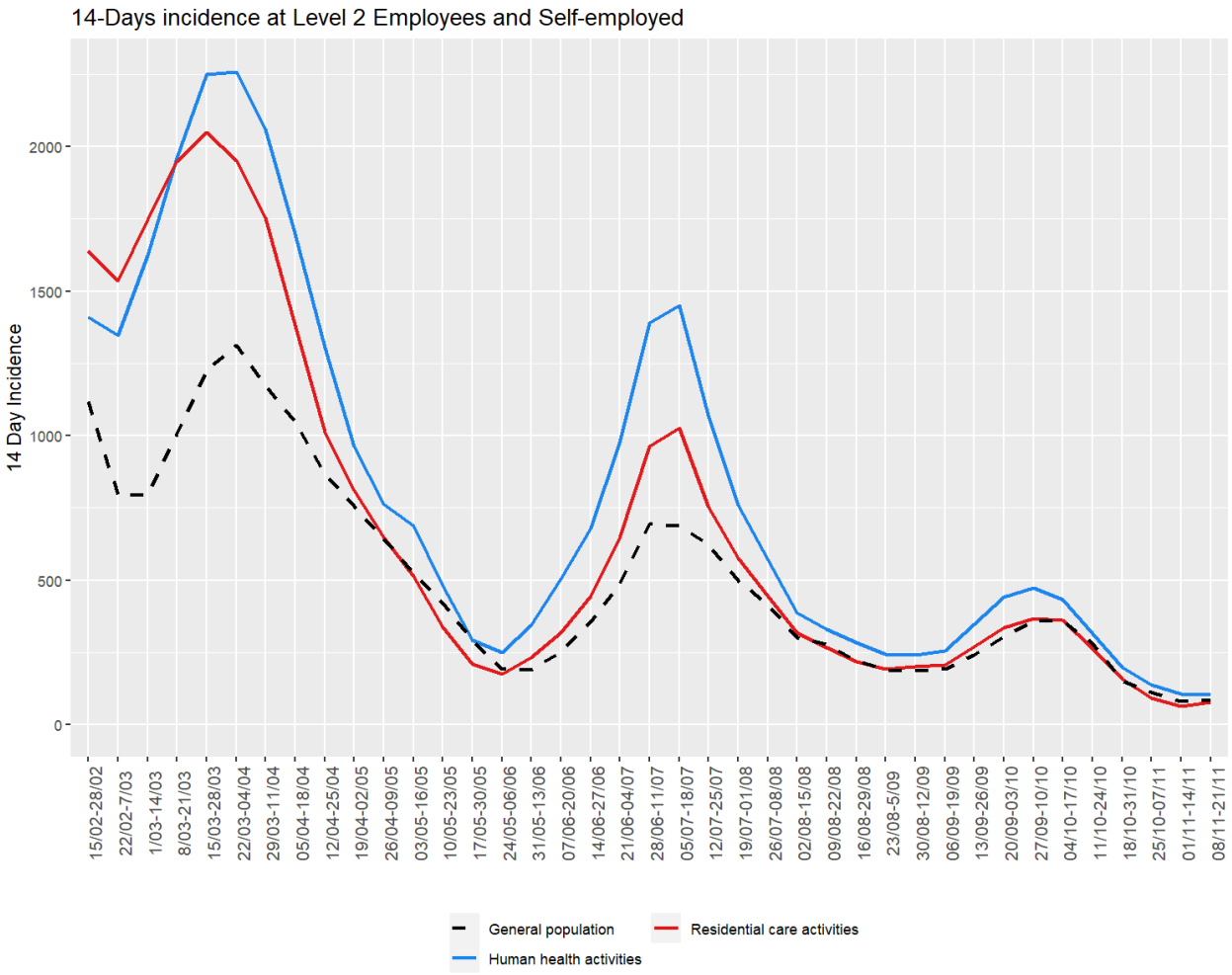

Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 on 21 November 2022

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
Human health activities	86	322115	104(93;116)	114(102;127)	44(29;67)	14.95
General population			**84**	**84**	**84**	
Residential care activities	87	183333	78(66;92)	78(66;92)	43(6;305)	1.29
Working population		**4557812**	**64(62;66)**	**64(62;66)**		

3.3 Level 3 work sector

In the sectors at level 3 with a minimum of 5,000 workers, the sectors with a 14-day incidence on 21 November 2022 significantly above the working population average are: Primary education (sector 852), Construction of other civil engineering projects (sector 429), Activities of call centers (sector 822), Hospital activities (sector 861), and Residential care activities for the elderly and disabled (sector 873) (Table 3 and Figure 3).

The incidences in education follow the trend in the working population except for the primary education, where incidences have been increasing in the last 14 days. The incidences in the remainng education sectors attain incidences similar to or lower than the working population average (Figure 4). A comparison between primary and secondary schools is inaccurate based on the available data. Indeed, the NACE-BEL code for school employees is assigned to the main activity of the school. Hence, for schools offering both primary and secondary education, all employees are counted as secondary education employees. Employees under the NACE-BEL code primary education are employees in schools that offer only primary education.

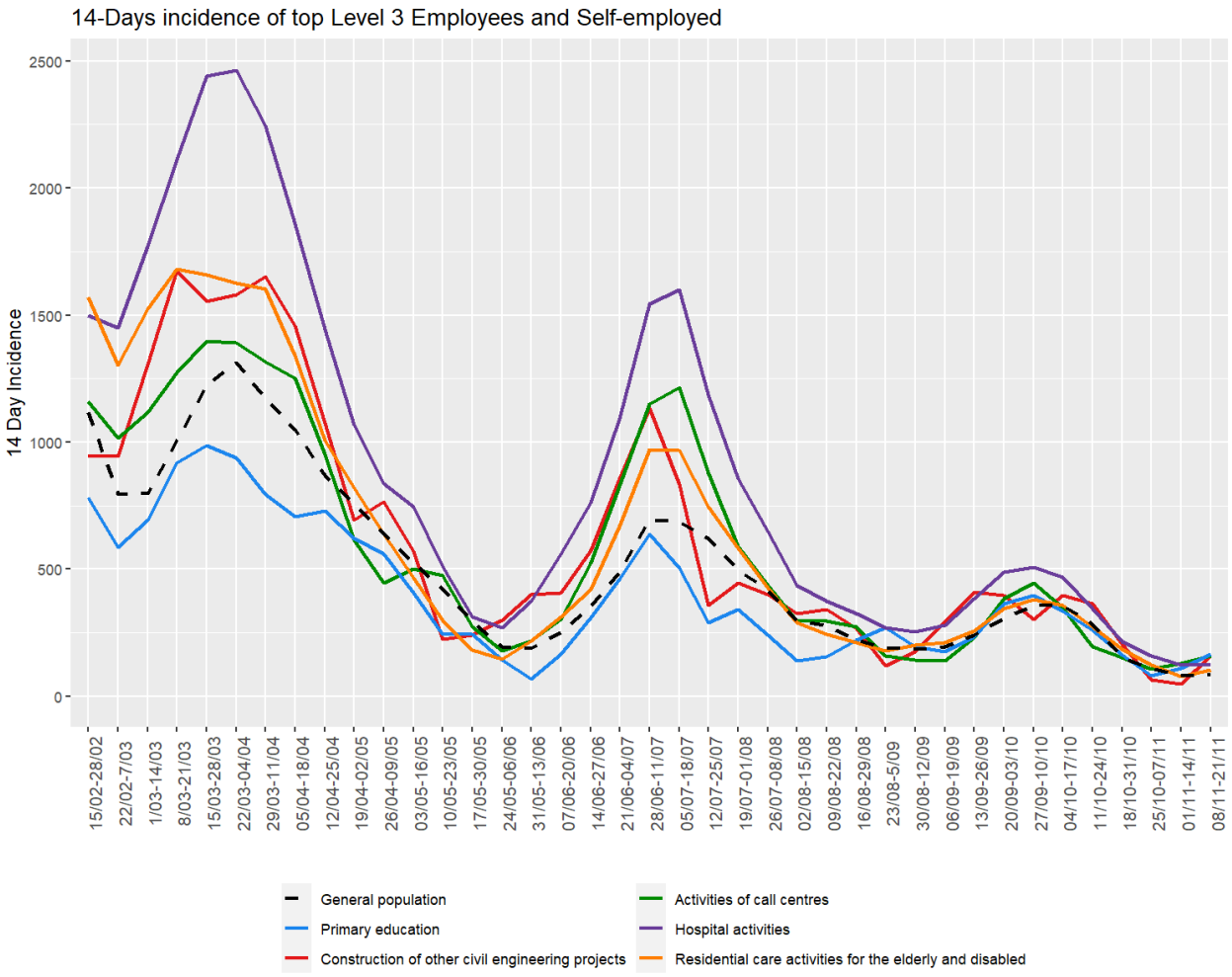

Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 in both employees and self-employed

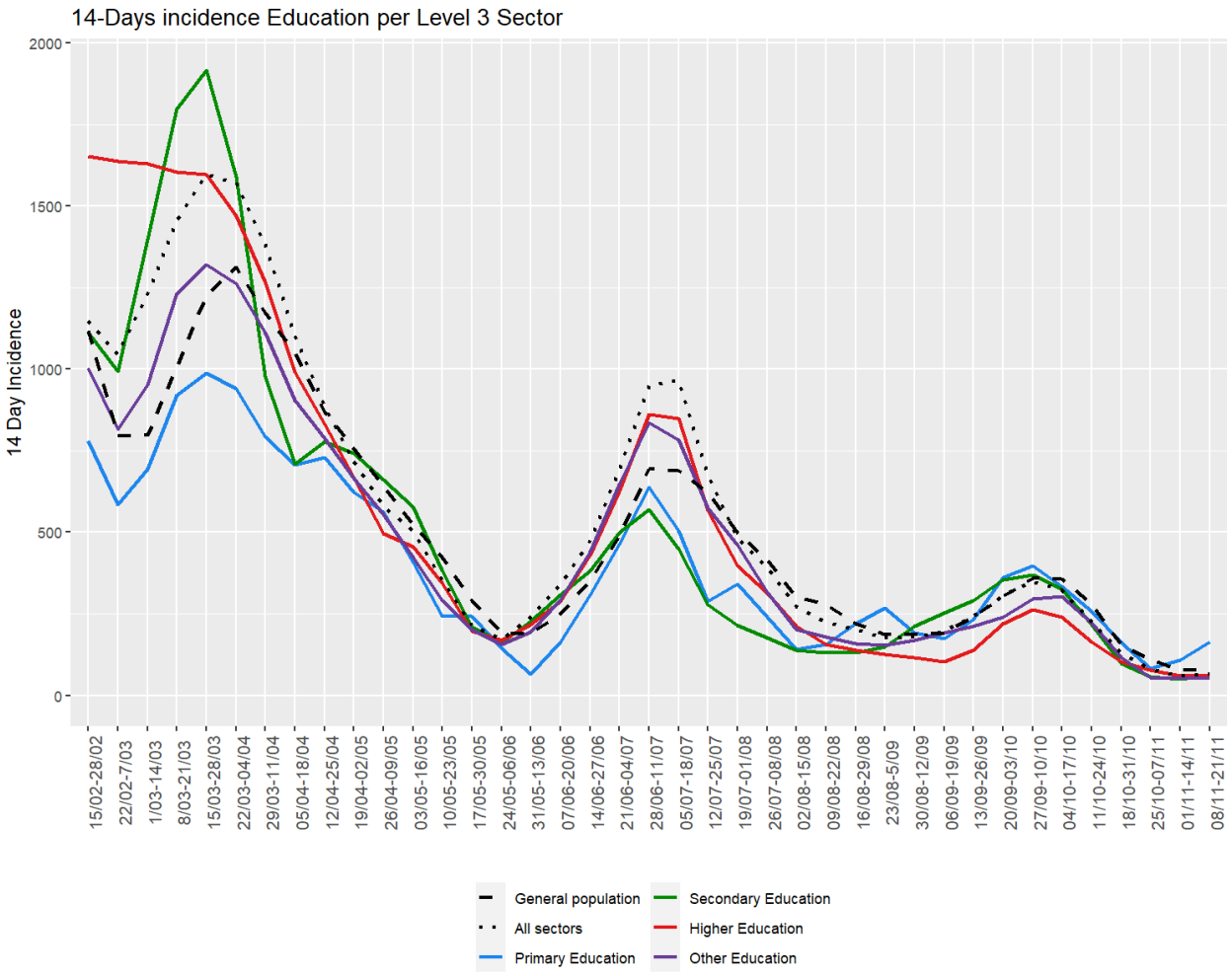

Figure 4: 14-Day incidence of COVID-19 infection in Education sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 21 November 2022

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
Primary education	852	7317	164(93;289)	164(93;289)		9.14
Construction of other civil engineering projects	429	6875	160(89;289)	160(86;297)		9.09
Activities of call centres	822	9375	160(96;265)	160(96;265)		2.24
Hospital activities	861	222764	123(109;138)	123(109;138)		0.32
Residential care activities for the elderly and disabled	873	68932	103(82;130)	103(81;130)		1.30
General population			**84**	**84**	**84**	
Working population		**4557812**	**64(62;66)**	**64(62;66)**		

3.4 Level 4 work sector

In the sectors at level 4 with a minimum of 3,000 workers, the sectors with a 14-day incidence on 21 November 2022 significantly higher than the working population average are:Manufacture of other inorganic basic chemical (sector 2013), Construction of water projects (sector 4291), Primary education (sector 8520), Activities of call centers (sector 8220), Hospital activities (sector 8610),Residential care activities for the elderly and disabled (sector 8730) and Urban and suburban passenger land transport (sector 8810) (Table 4 Figure 5).

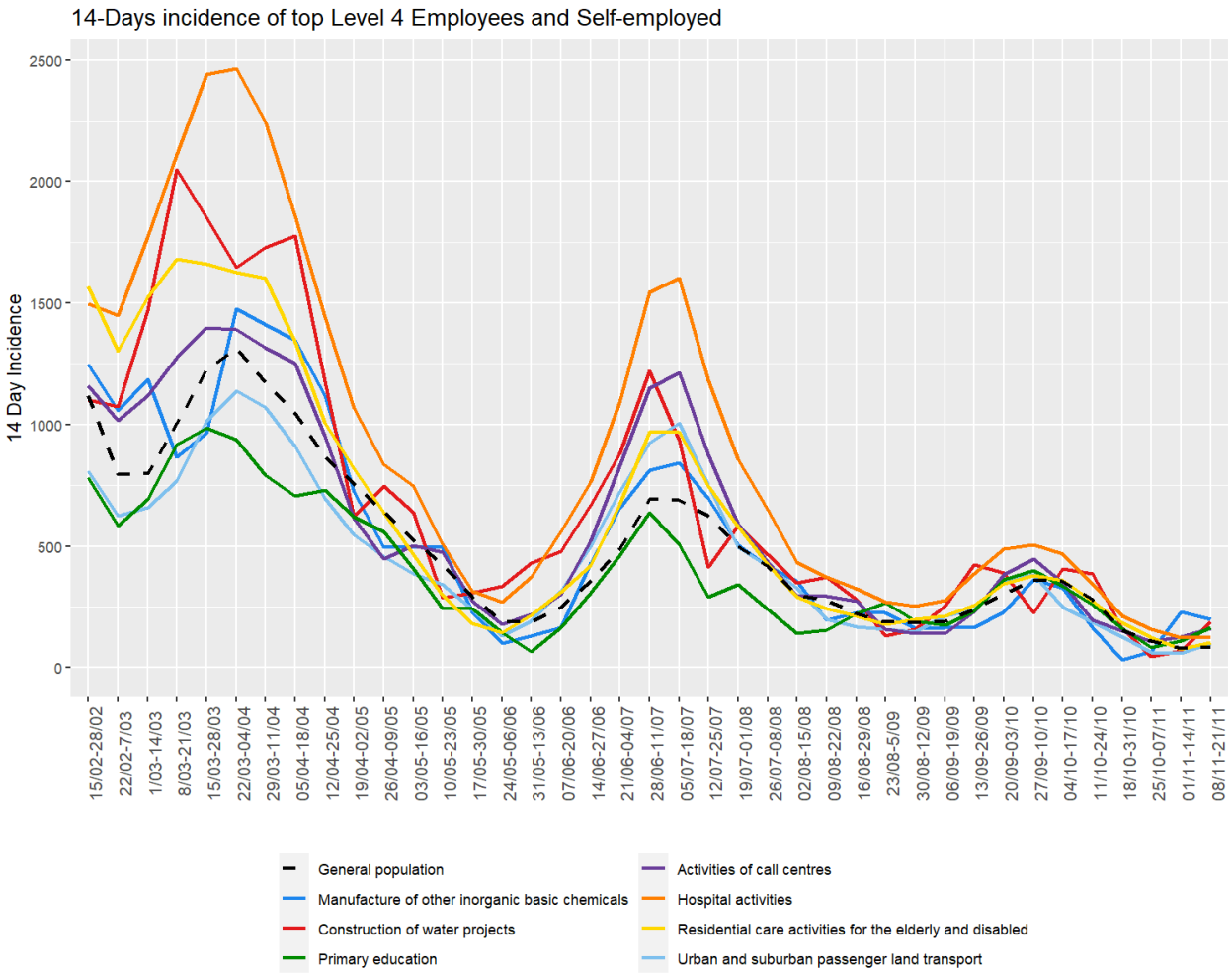

Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 21 November 2022

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
Manufacture of other inorganic basic chemicals	2013	3030	198(89;440)	198(89;440)		2.29
Construction of water projects	4291	4762	189(98;363)	181(91;362)		7.14
Primary education	8520	7317	164(93;289)	164(93;289)		9.14
Activities of call centres	8220	9375	160(96;265)	160(96;265)		2.24
Hospital activities	8610	222764	123(109;138)	123(109;138)		0.32
Residential care activities for the elderly and disabled	8730	68932	103(82;130)	103(81;130)		1.30
Urban and suburban passenger land transport	4931	30000	100(70;143)	100(70;143)		2.76
General population			**84**	**84**	**84**	
Working population		**4557812**	**64(62;66)**	**64(62;66)**		

3.5 Level 5 work sector

In the sectors at level 5 with a minimum of 3,000 workers, the sectors with a 14-day incidence on 21 November 2022 significantly higher than the working population average are: Manufacture of other inorganic basic chemicals (sector 20130), Activities of call centers (sector 82200),Other social security institutions (sector 84309), Residential care for the elderly (sector 87302, 87301), Freely subsidized primary education (sector 85204), General Hospitals (sector 86101), Urban and suburban passenger land transport (sector 49110) and Public Centers for Social Welfare (O.C.M.W.) (Table 5 and Figure 6).

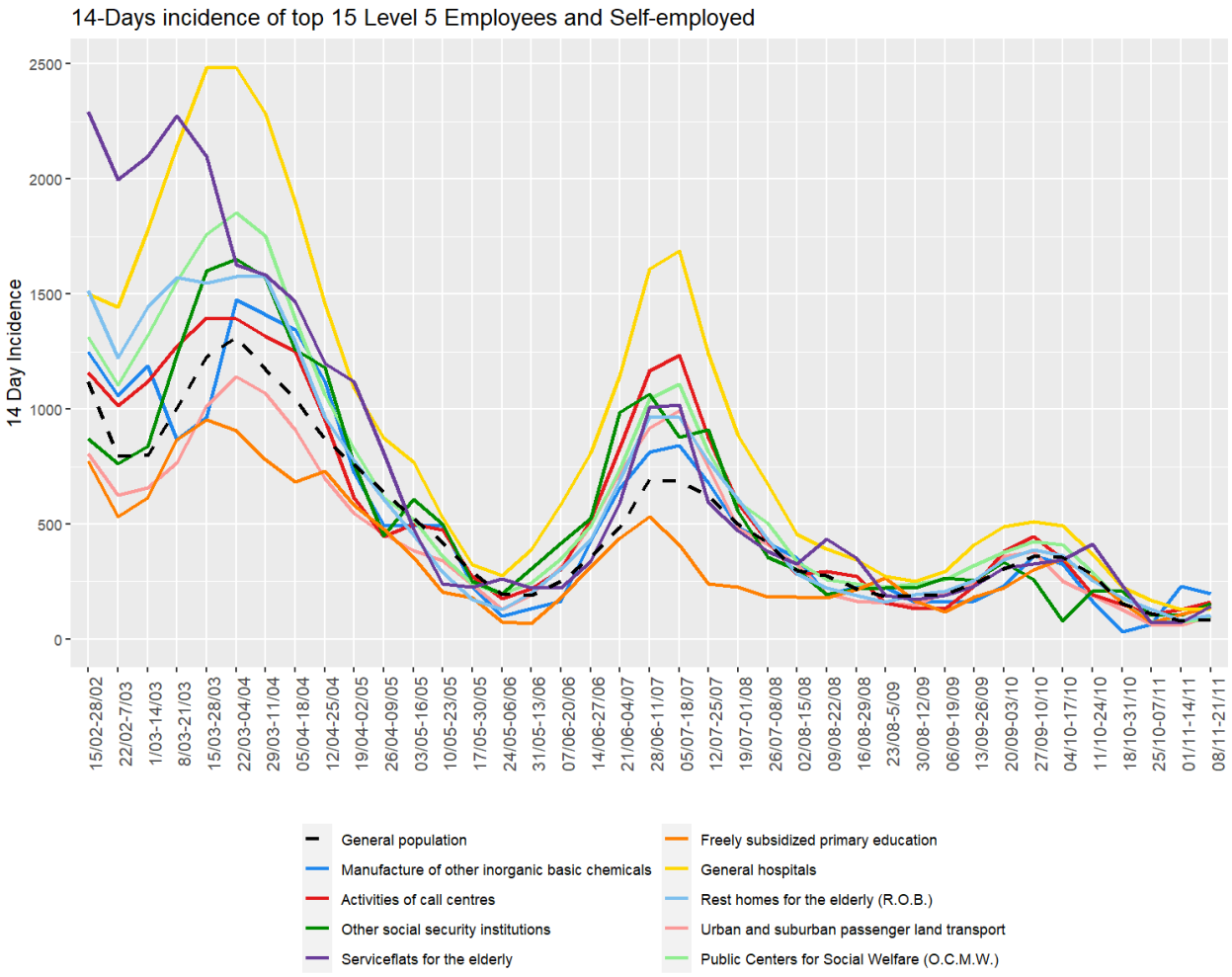

Figure 6: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 21 November 2022

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
DESCRIPTION_NL	NACE-code	Total number of workers	Incidence (95%CI) all workers	Incidence (95%CI) employees	Incidence (95%CI) self-employed	Percentage of self-employed workers
Manufacture of other inorganic basic chemicals	20130	3030	198(89;440)	198(89;440)		2.29
Activities of call centres	82200	9375	160(96;265)	160(96;265)		2.24
Other social security institutions	84309	3871	155(70;345)	155(70;345)		4.55
Serviceflats for the elderly	87302	5634	142(71;284)	142(71;284)		3.54
Freely subsidized primary education	85204	5674	141(71;282)	141(71;282)		10.03
General hospitals	86101	178947	133(117;151)	133(117;151)		0.26
Rest homes for the elderly (R.O.B.)	87301	59223	103(80;132)	102(79;131)		1.08
Urban and suburban passenger land transport	49310	30000	100(70;143)	100(70;143)		2.76
Public Centers for Social Welfare (O.C.M.W.)	84115	85714	91(73;114)	91(73;114)		0.16
General population			**84**	**84**	**84**	
Working population		**4557812**	**64(62;66)**	**64(62;66)**		

Finally, when considering specifically the non-medical contact professions, we see that the incidence in the beauty saloons and the hairdressers remain below the working and general population average (Figure 7).

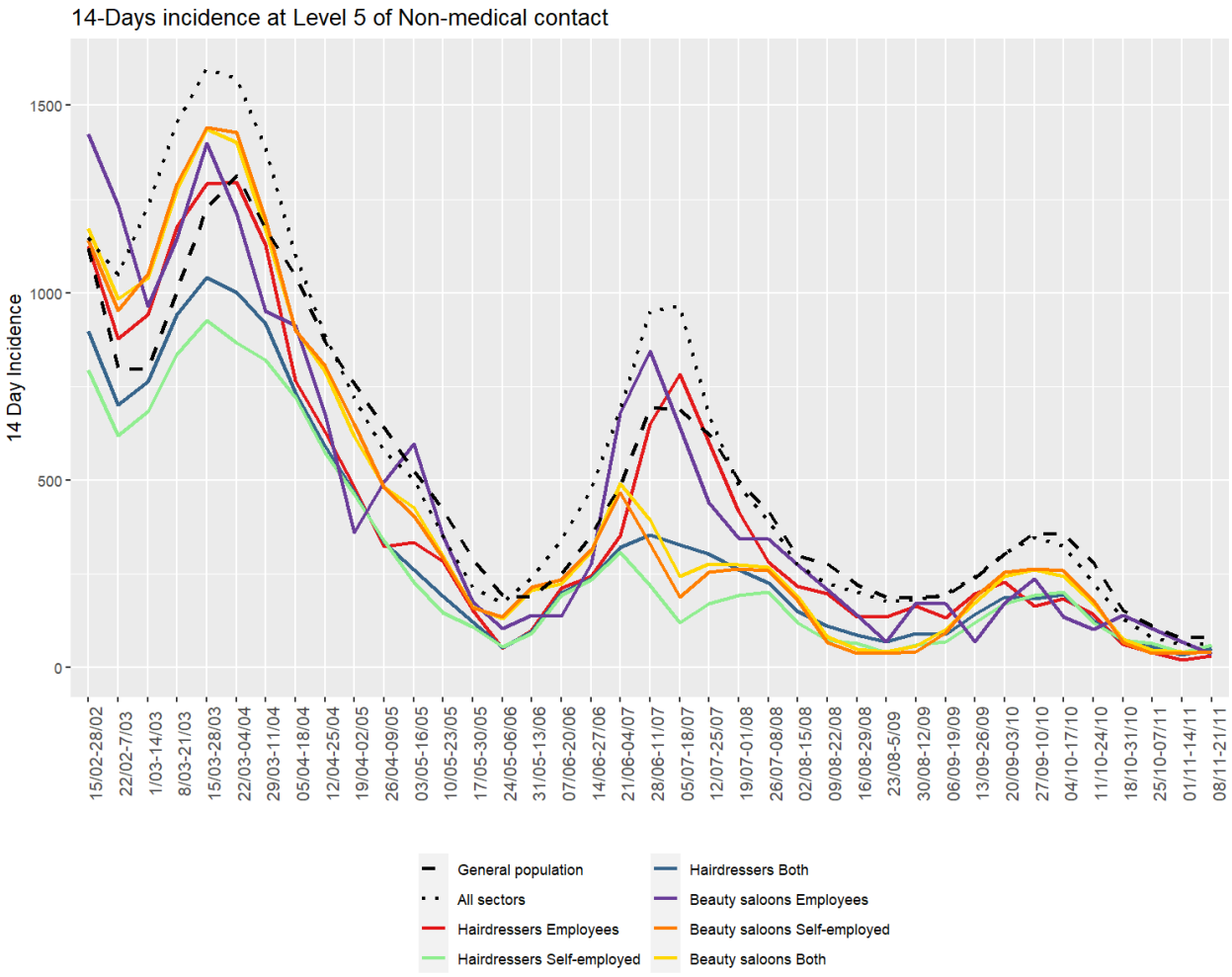

Figure 7: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

3.6 Additional analyses

3.6.1 Cross-level overview

When contemplating the 14-day incidences across NACE-BEL sectors, it is possible to gauge the contribution of each sub-level sector to the higher level incidence (Figure 8).

The 14-day incidence in the Human health and social work sector (sector Q) is elevated compared to the working and general population (Figure 8), which is mainly due to Hospital activities and residential care activities for the elderly.

Although the 14-day incidence in Education (P), Public administration and defence (sector O), Construction (F) Administration and support service activities (N) and Transportation and storage (sector H) is below the working population average, Primary education, Public Centers for Social Welfare, construction of water projects, activities of call centers and Passenger land transport show an increased incidence.

It is encouraging that the incidence in Other service activities (sector S), Arts, entertainment and recreation (sector R) and Accommodation and food service activities (sector I) is similar to or below the general and working population average.

The sectors Manufacturing (sector C) and Wholesale and retail trade (sector G) are sectors with the highest number of sublevels. This results in large differences in 14-day incidences within the sector. It is encouraging that only one manufacturing sector shows an increased incidence and none in the retain and wholsesale sector (Figure 8).

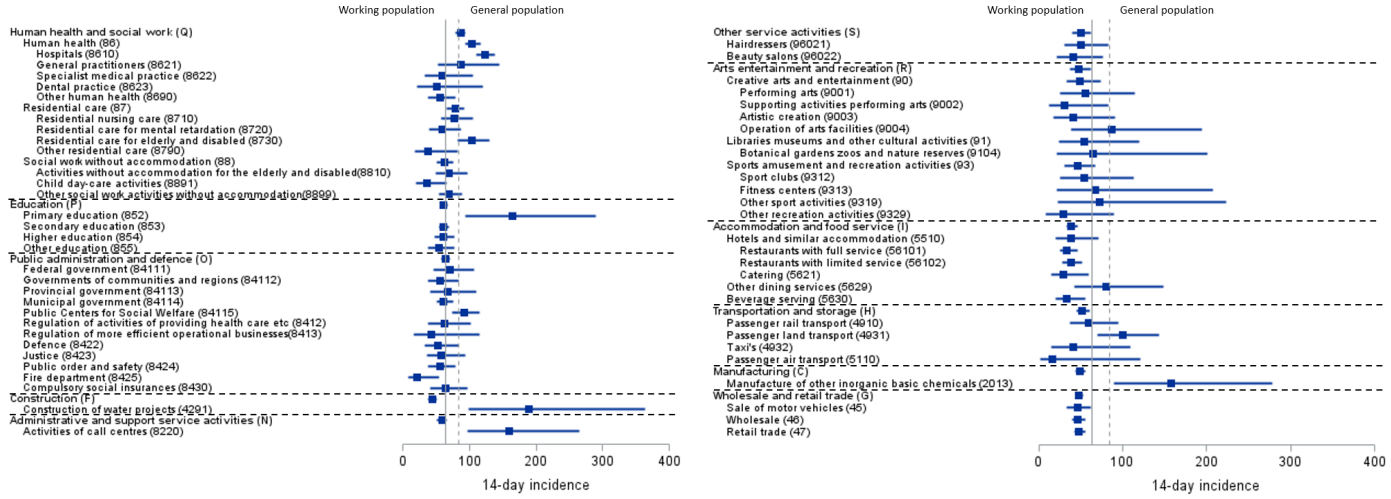

Figure 8: Forest plot of 14-Day incidence and 95% CI of selected sectors on 21 November 2022 in both employees and self-employed.

4 Conclusion

Despite the limitations of the data, the RSZ/ONSS data demonstrates that the 14-day COVID-19 incidences in most sectors remain at a low level in the last 2 weeks. The highest incidences are present in the health and social work sector. The average incidence in the working population is 24% lower than the average incidence in the general population, suggesting that infections are less common in working adults than in children and the elderly. Although the changed testing procedure in schools and the general population may influence this comparison.
Vigilence is required in especially education, manufacturing, human health, residential care, social work and public administration sectors since they're not able to telework.

Although no conclusions can be drawn regarding the location of infection (workplace or elsewhere) nor the location of employment (at work, telework, or temporarily unemployed) of the employees in the RSZ/ONSS data, the contact tracing in the segments under surveillance by IDEWE showed that in the index cases, where this information was available, 7% indicated that the workplace was certainly the source of infection. Due to changed testing policy in March 2022, insufficient data is available from the contact tracing to provide accurate results.

It is important to carefully monitor the incidence of COVID-19 in all sectors, especially sectors with frequent high risk contacts with an increased incidence compared to the working population average. Hospital activities, residential care for the elderly, primary education and Passenger land transport all show an increased incidence compared to the general population average and require continuous careful attention.

For some sectors the reason for the higher incidences is not immediately obvious, such as Activities of call centers, Construction for water projects and Public Centers for Social Welfare. It would be worthwhile to evaluate the hygiene protocols and its practice in these sectors, although the changed testing procedure and low 14-day incidence in general may be partly responsible.

The incidence in non-medical contact professionals is below or equal to the working and general population average.

It is encouraging to note that employees in other service activities, arts, entertainment and recreation, accommodation and food services, manufacturing and wholesale and retail sectors are well protected, as they are often not able to telework.

Acknowledgments

We wish to thank Hilde Vanacker, Chris Verbeek and Hilde de Raeve for their contribution to the analysis of the contact tracing data.