

# 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 (13 – 26 September 2022) and presented together with the COVID-19 14-day incidence over all work sectors (~ 4.5 million individuals) and the COVID-19 14-day incidence in the general population (~ 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 26 September 2022 significantly above the working population average is Human health and social work activities (sector Q), Electricity, gas, steam and air conditioning supply (sector D), Public administration and defence; compulsory social security (sector O) and Education (sector P) (Table 1 and Figure 1). The 14-day incidences continue to increase in all sectors. The working population average is similar to the general population average.

14-day incidence of employees and self-employed at level 1

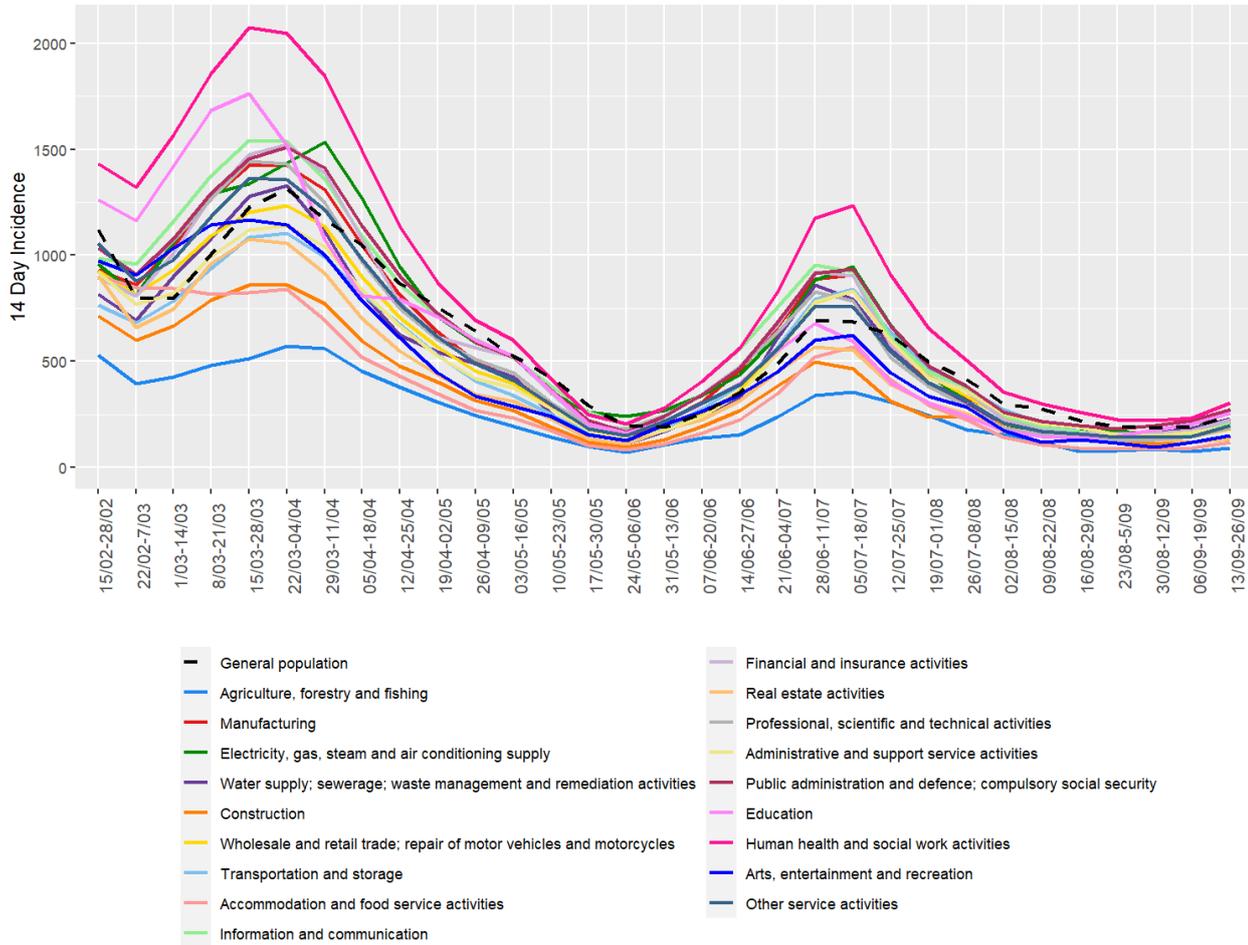


Figure 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 on 26 September 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
Human health and social work activities	Q	683168	303(290;316)	311(298;325)	214(178;257)	8.20
Electricity, gas, steam and air conditioning supply	D	21377	276(214;356)	289(223;374)		6.21
Public administration and defence; compulsory social security	O	552574	272(259;286)	272(259;286)		0.20
Education	P	656031	257(245;270)	257(245;270)	248(195;316)	4.39
<b>Working population</b>		<b>4651639</b>	<b>244(240;249)</b>	<b>244(240;249)</b>		
<b>General population</b>			<b>240</b>	<b>240</b>	<b>240</b>	
Water supply; sewerage; waste management and remediation activities	E	39130	230(187;283)	230(187;283)		5.79
Financial and insurance activities	K	159471	227(205;252)	254(227;284)	133(100;177)	22.33
Manufacturing	C	629717	212(201;224)	219(207;232)	146(119;179)	10.35
Information and communication	J	189474	209(189;231)	229(205;256)	159(129;196)	29.33
Other service activities	S	161111	198(177;221)	225(195;260)	170(143;201)	49.77
Administrative and support service activities	N	447396	192(180;205)	201(187;216)	150(125;179)	18.31
Transportation and storage	H	318617	188(174;204)	196(181;213)	112(79;158)	9.16
Professional, scientific and technical activities	M	404348	184(171;198)	221(202;242)	141(125;159)	46.64
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	851934	181(172;190)	200(190;211)	115(101;131)	22.80
Arts, entertainment and recreation	R	117219	151(130;175)	147(122;177)	160(125;204)	35.50
Construction	F	383562	146(134;159)	171(155;189)	107(92;125)	40.99
Real estate activities	L	58647	133(107;166)	191(144;253)	89(62;127)	58.23
Accommodation and food service activities	I	361017	118(107;130)	125(113;139)	90(70;115)	21.12
Agriculture, forestry and fishing	A	1e+05	90(73;111)	44(29;67)	131(103;166)	54.22

### 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 26 September 2022 above the working population average are: Human health activities (sector 86), Public administration and defence; compulsory social security (sector 84), Residential care activities (sector 87) and Education (sector 85) (Table 2 and Figure 2).

14-Days incidence at Level 2 Employees and Self-employed

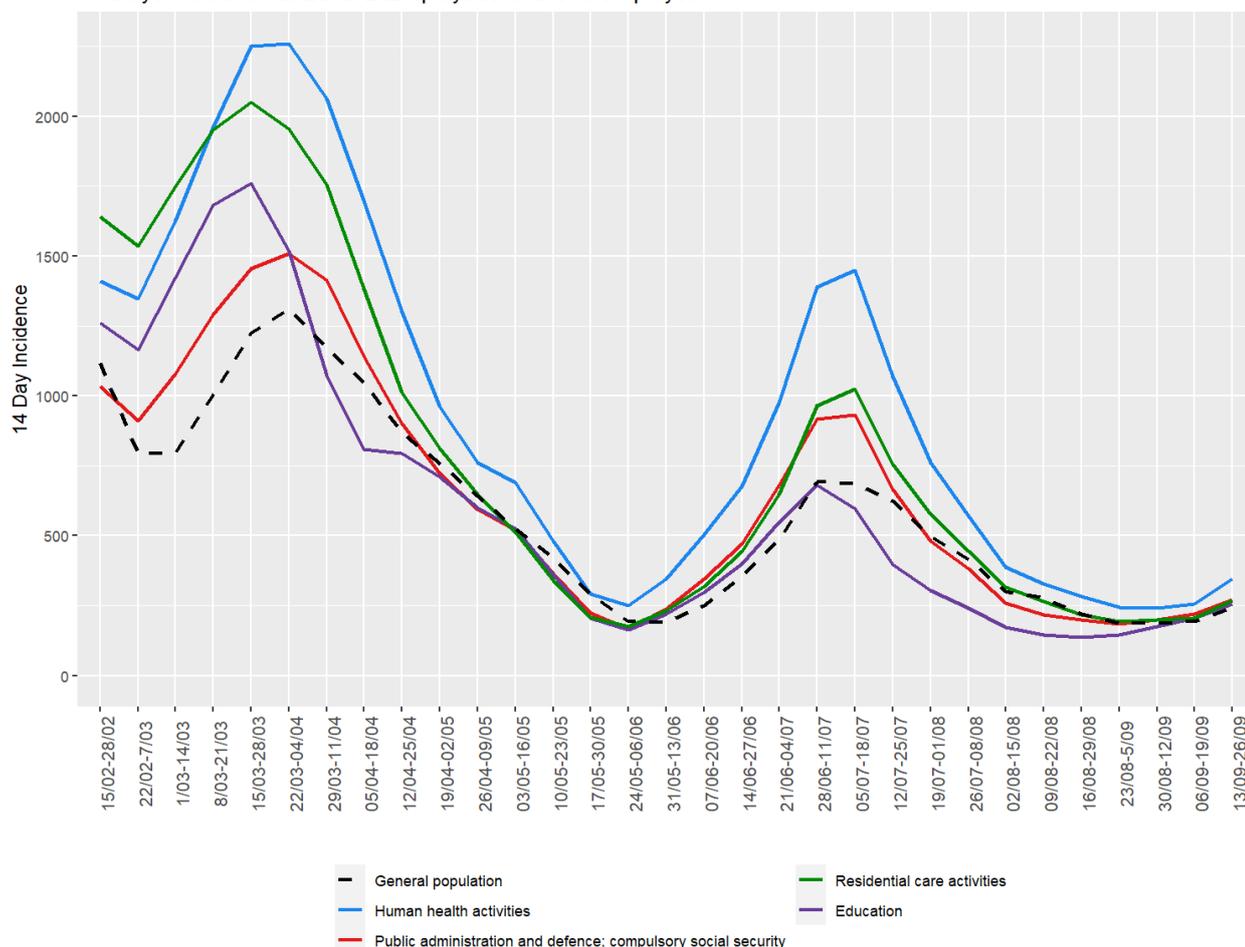


Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 on 26 September 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
Human health activities	86	324784	347(327;368)	370(348;393)	212(174;258)	14.97
Public administration and defence; compulsory social security	84	552574	272(259;286)	272(259;286)		0.20
Residential care activities	87	184387	269(246;294)	269(246;294)	304(145;636)	1.29
Education	85	656031	257(245;270)	257(245;270)	248(195;316)	4.39
<b>Working population</b>		<b>4651639</b>	<b>244(240;249)</b>	<b>244(240;249)</b>		
<b>General population</b>			<b>240</b>	<b>240</b>	<b>240</b>	

### 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 26 September 2022 significantly above the working population average are: Manufacture of bodies for motor vehicles (sector 292), Construction of other civil engineering projects (sector 429), Hospital activities (sector 861), Wired telecommunication activities (sector 611), Residential care activities for mental health (sector 872), Secondary education (sector 853), Passenger rail transport (sector 491), Social work activities without accommodation for the elderly (sector 881) and Administration of the state (sector 841) (Table 3 and Figure 3).

The incidences in primary, secondary and other education have increased substantially since the start of the school year and attains incidences higher or similar to the working and general population average. The incidence in the secondary education increased from 211 cases per 100,000 to 312 or a 48% increase since the last 14 days (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.

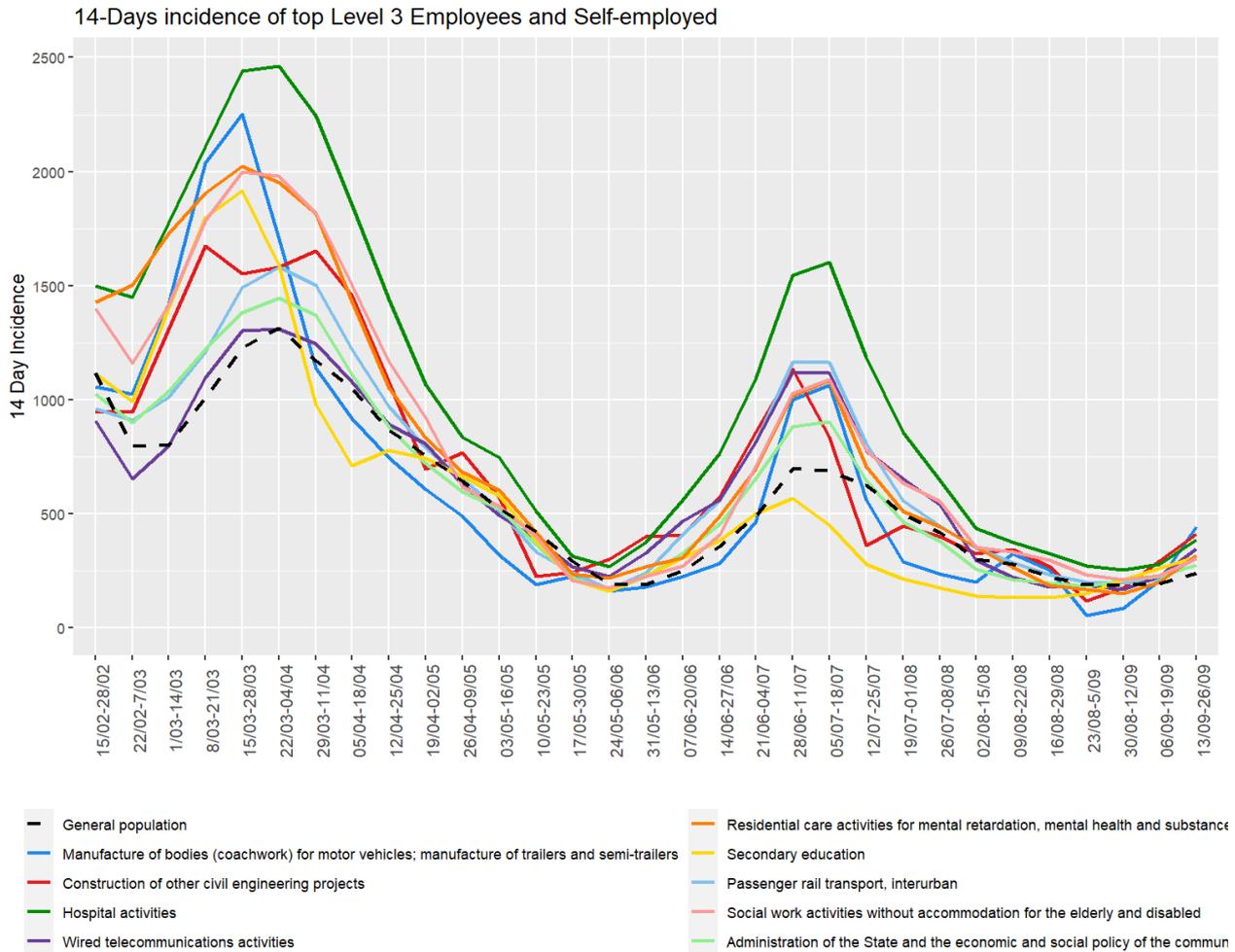


Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 in both employees and self-employed

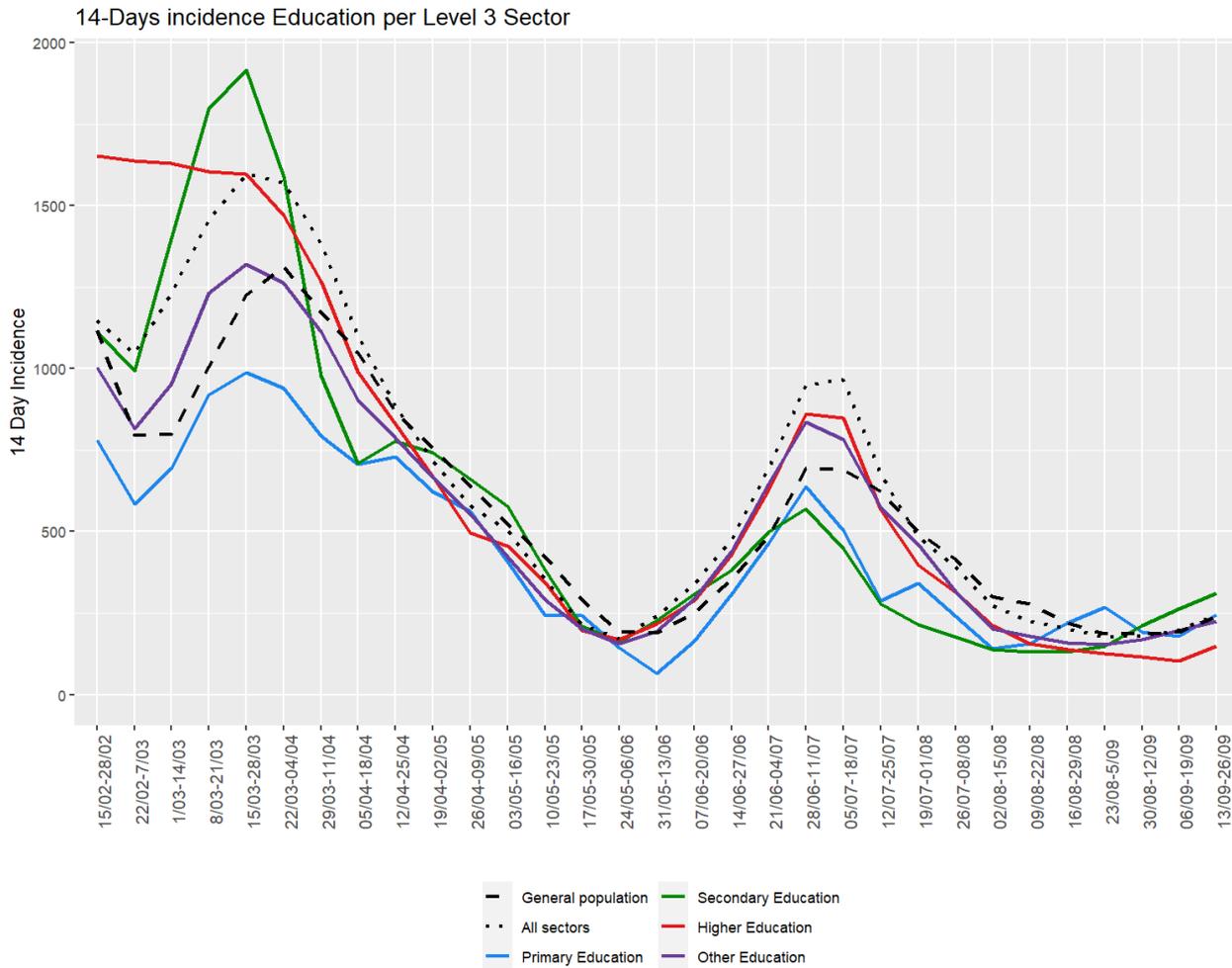


Figure 4: 14-Day incidence of COVID-19 infection in Education sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 26 September 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
Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	292	5405	444(298;662)	444(298;662)		6.44
Construction of other civil engineering projects	429	6829	410(283;593)	419(285;615)		9.20
Hospital activities	861	224156	385(360;412)	385(360;412)		0.32
Wired telecommunications activities	611	11594	345(253;470)	346(253;473)		2.68
Residential care activities for mental retardation, mental health and substance abuse	872	43574	319(270;377)	319(270;377)		1.72
Secondary education	853	407372	312(295;330)	312(295;330)		0.21
Passenger rail transport, interurban	491	28852	305(248;376)	305(248;376)		0.08
Social work activities without accommodation for the elderly and disabled	881	49013	304(259;357)	297(252;350)		1.09
Administration of the State and the economic and social policy of the community	841	378909	275(259;292)	275(259;292)		0.17
<b>Working population</b>		<b>4651639</b>	<b>244(240;249)</b>	<b>244(240;249)</b>		
<b>General population</b>			<b>240</b>	<b>240</b>	<b>240</b>	

### 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 26 September 2022 significantly higher than the working population average are: Manufacturing sectors (sector 2920, 3030), Construction of water projects (sector 4291), Hospital activities (sector 8610), Wholesale sectors (sector 4651, 4531), Wired telecommunication activities (sector 6110), General secondary education (sector 8531), Residential care activities for mental health (sector 8720), Public order and safety activities (sector 8424), Passenger rail transport (sector 4910), Social work activities without accommodation for the elderly and disabled (sector 8810) and General public administration (sector 8411) (Table 4 Figure 5).

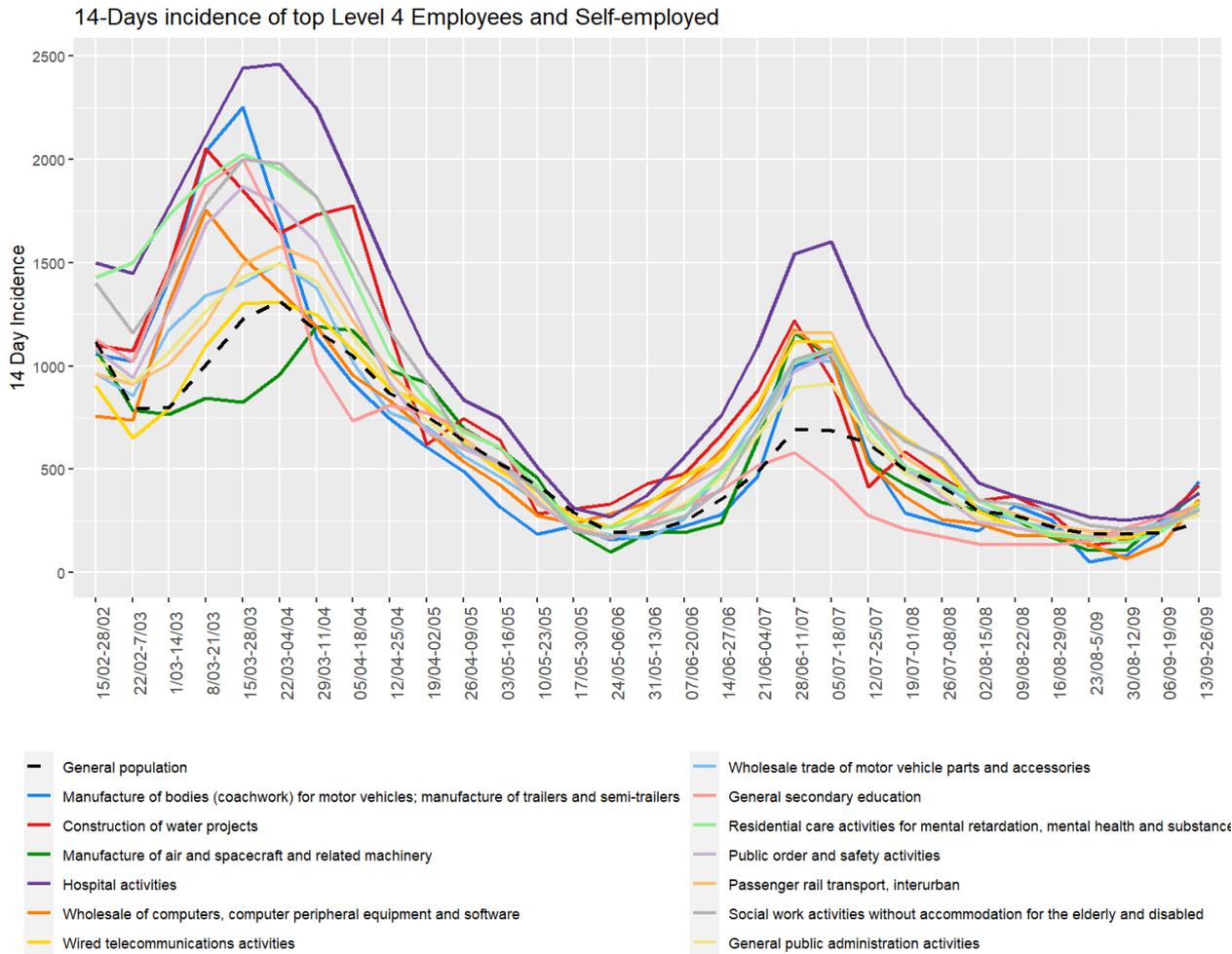


Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 26 September 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
Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	2920	5405	444(298;662)	444(298;662)		6.44
Construction of water projects	4291	4717	424(274;656)	434(277;679)		7.21
Manufacture of air and spacecraft and related machinery	3030	4639	388(245;615)	388(245;615)		2.52
Hospital activities	8610	224156	385(360;412)	385(360;412)		0.32
Wholesale of computers, computer peripheral equipment and software	4651	8732	355(250;504)	355(250;504)		13.35
Wired telecommunications activities	6110	11594	345(253;470)	346(253;473)		2.68
Wholesale trade of motor vehicle parts and accessories	4531	11607	336(246;460)	356(258;491)		10.52
General secondary education	8531	389069	319(302;337)	319(302;337)		0.17
Residential care activities for mental retardation, mental health and substance abuse	8720	43574	319(270;377)	319(270;377)		1.72
Public order and safety activities	8424	54221	308(265;358)	307(264;357)		0.18
Passenger rail transport, interurban	4910	28852	305(248;376)	305(248;376)		0.08
Social work activities without accommodation for the elderly and disabled	8810	49013	304(259;357)	297(252;350)		1.09
General public administration activities	8411	343011	279(262;297)	279(262;297)		0.12
<b>Working population</b>		<b>4651639</b>	<b>244(240;249)</b>	<b>244(240;249)</b>		
<b>General population</b>			<b>240</b>	<b>240</b>	<b>240</b>	

### 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 26 September 2022 significantly higher than the working population average are: Other legal activities (sector 69109), Manufacturing sectors (sector 29201, 30300), Activities of medical laboratories (sector 86901), General hospitals (sector 86101), General secondary education (sector 85311, 85319), Wholesale sectors (sector 46510, 45310), Wired telecommunication activities (sector 61100), Nursing activities (sector 86906), Public Centres for Social Welfare (OCMW) (sector 84115), Local Police (sector 84242), Activities of family and elderly care at home (sector 88101), Residential care activities for adults with a mental disability (sector 87202), Passenger rail transport (sector 49100) and Municipal government (sector 84114) (Table 5 and Figure 6).

14-Days incidence of top 15 Level 5 Employees and Self-employed

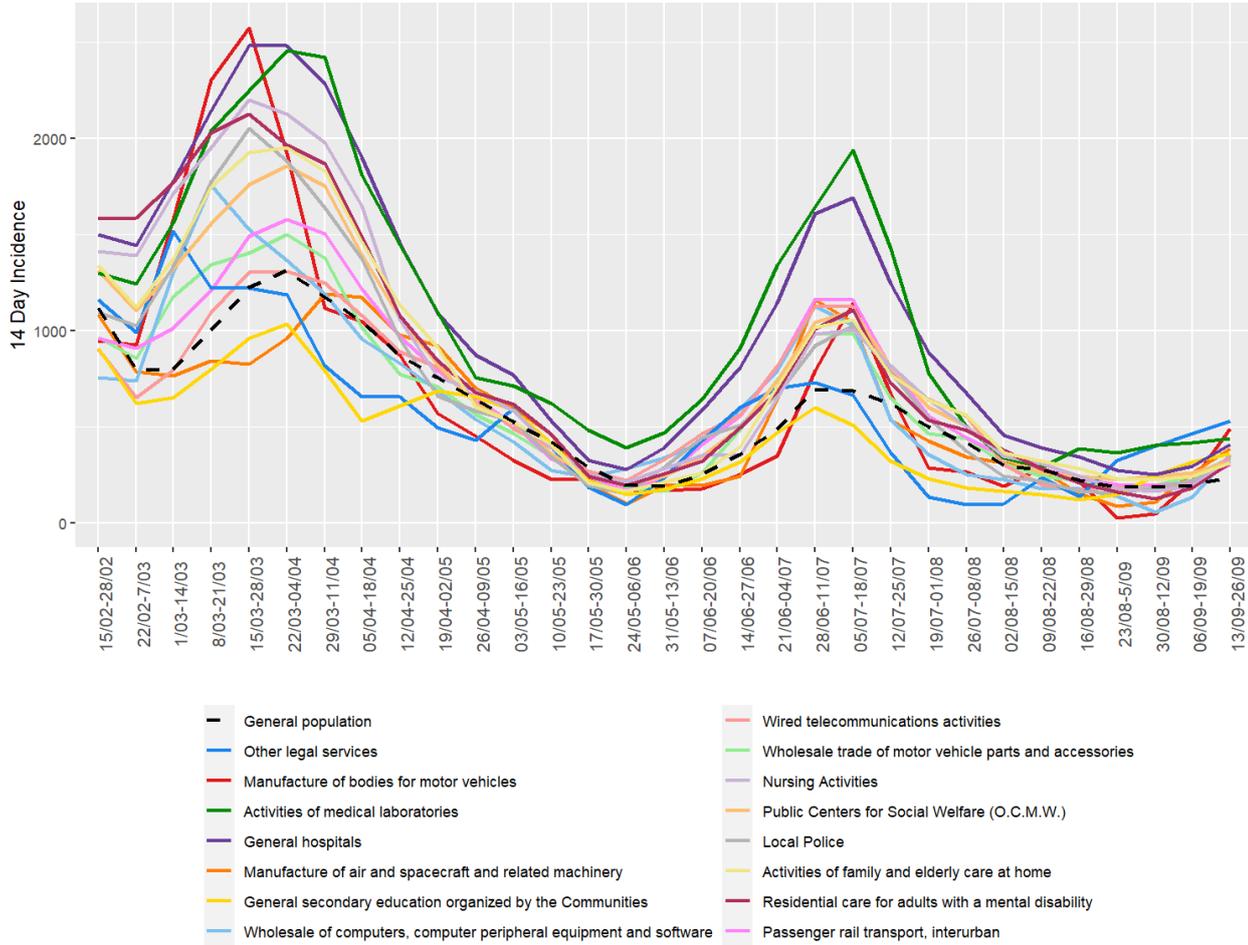


Figure 6: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 26 September 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
Other legal services	69109	3013	531(326;865)		512(284;922)	71.49
Manufacture of bodies for motor vehicles	29201	4082	490(316;758)	490(316;758)		5.42
Activities of medical laboratories	86901	6378	439(303;635)	477(327;695)		11.47
General hospitals	86101	180196	409(381;440)	409(381;440)		0.26
Manufacture of air and spacecraft and related machinery	30300	4639	388(245;615)	388(245;615)		2.52
General secondary education organized by the Communities	85311	149444	360(331;392)	360(331;392)		0.01
Wholesale of computers, computer peripheral equipment and software	46510	8732	355(250;504)	355(250;504)		13.35
Wired telecommunications activities	61100	11594	345(253;470)	346(253;473)		2.68
Wholesale trade of motor vehicle parts and accessories	45310	11607	336(246;460)	356(258;491)		10.52
Nursing Activities	86906	16564	326(250;425)	360(274;472)	94(24;375)	13.03
Public Centers for Social Welfare (O.C.M.W.)	84115	85938	320(284;360)	320(284;360)		0.16
Local Police	84242	36825	315(263;378)	315(263;378)		0.11
Activities of family and elderly care at home	88101	45048	313(265;369)	309(262;365)		0.86
Residential care for adults with a mental disability	87202	29904	311(254;381)	311(254;381)		1.56
Passenger rail transport, interurban	49100	28852	305(248;376)	305(248;376)		0.08
General secondary education	85319	210891	303(280;327)	303(280;327)		0.02
Municipal government, with the exception of the O.C.M.W.	84114	149077	271(246;299)	271(246;299)		0.13
<b>Working population</b>		<b>4651639</b>	<b>244(240;249)</b>	<b>244(240;249)</b>		
<b>General population</b>			<b>240</b>	<b>240</b>	<b>240</b>	

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

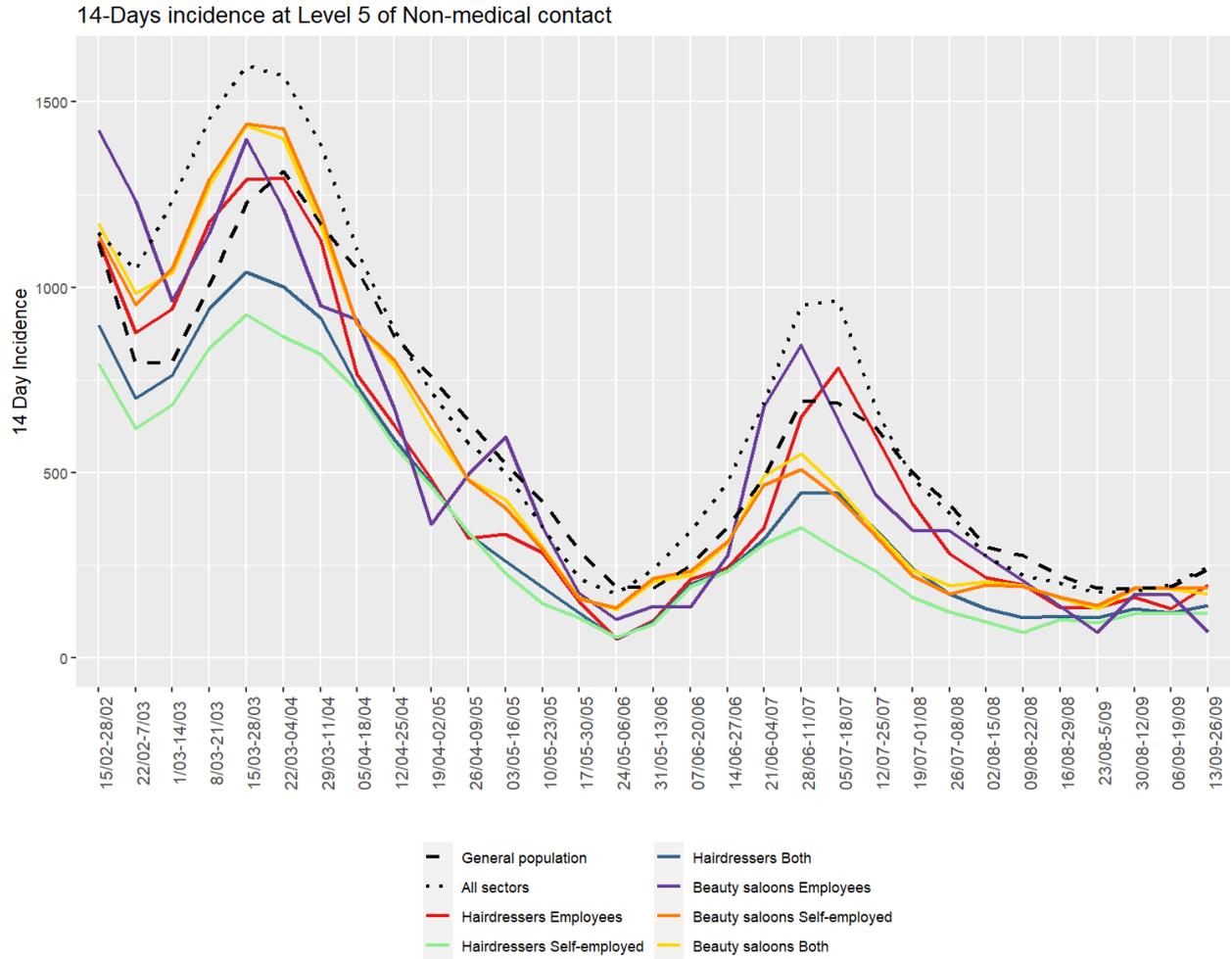


Figure 7: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

### 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), Public administration and defence (sector O) and Education (sector P) is elevated compared to the working and general population (Figure 8), which is mainly caused by increased incidences Public centres for social welfare, Public order and safety and Governmental activities for the Public administration sector, while in the Human health and social work sector it is mainly caused by Hospital activities and some care subsectors and in the Education sector mainly by Secondary education.

Although the 14-day incidence in Information and communication (sector J) and Transportation and storage (sector H) is below the working population average, Wied telecommunication activities and Passenger rail 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 a few sectors in the manufacturing and wholesale sector show an increased incidence and none in the retail sale sector (Figure 8).

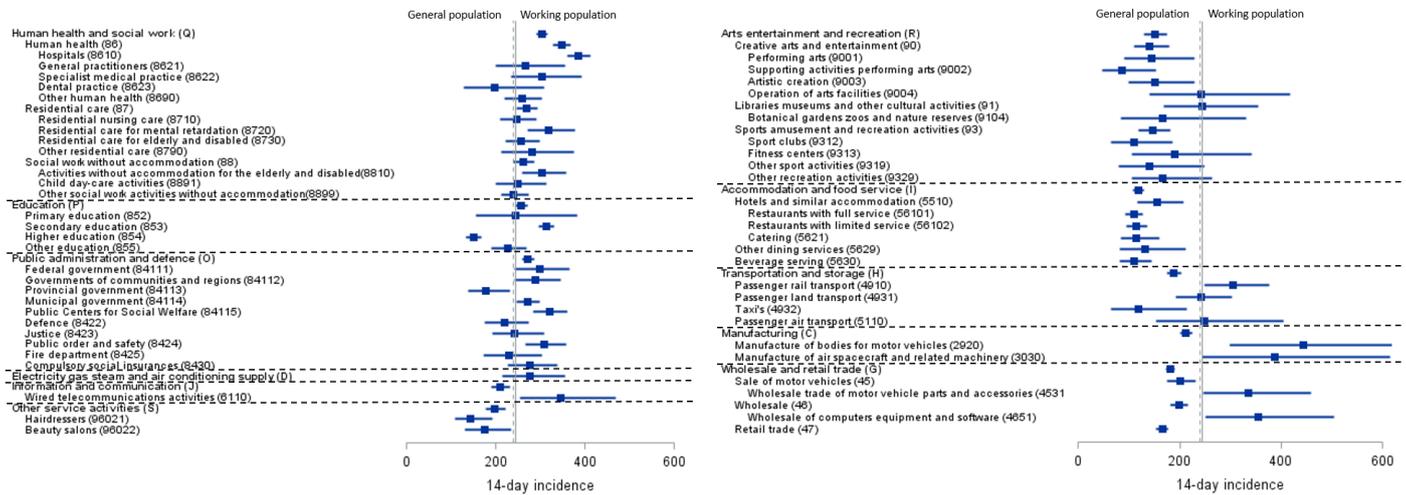


Figure 8: Forest plot of 14-Day incidence and 95% CI of selected sectors on 26 September 2022 in both employees and self-employed.

## 4 Conclusion

Despite the limitations of the data, the RSZ/ONSS data demonstrates that the 14-day COVID-19 incidences in most sectors is increasing in the last 2 weeks. The highest incidences are present in public administration, education and the health and residential care sector. The average incidence in the working population is similar to the average incidence in the general population, suggesting that infections are equally 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.

Vigilance is required in especially education, 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, social work without accommodation, public centres for social welfare, education, rail transportation and some manufacturing and wholesale sectors 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 Wired telecommunication. It would be worthwhile to evaluate the hygiene protocols and its practice in these sectors.

The incidence in non-medical contact professionals is below or equal to the working and general population average, with slightly higher incidences in beauty saloons compared to hairdressers.

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

Despite the high degree of vaccination, COVID-19 infection remains possible. Continuous monitoring of breakthrough infections, despite primo and booster vaccinations is warranted. Additional booster vaccination for high risk employees in the health and residential care, public administration, education and transportation is highly recommended.

## Acknowledgments

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