

# 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 (19 July– 1 August 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 sector with a 14-day incidence on 1 August 2022 significantly above the working population average is Human health and social work activities (sector Q) (Table 1 and Figure 1). The 14-day incidences has reached a peak beginning of July in most sectors and continues to decrease in the last weeks. The working population average is slightly lower (3%) than the general population average.

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

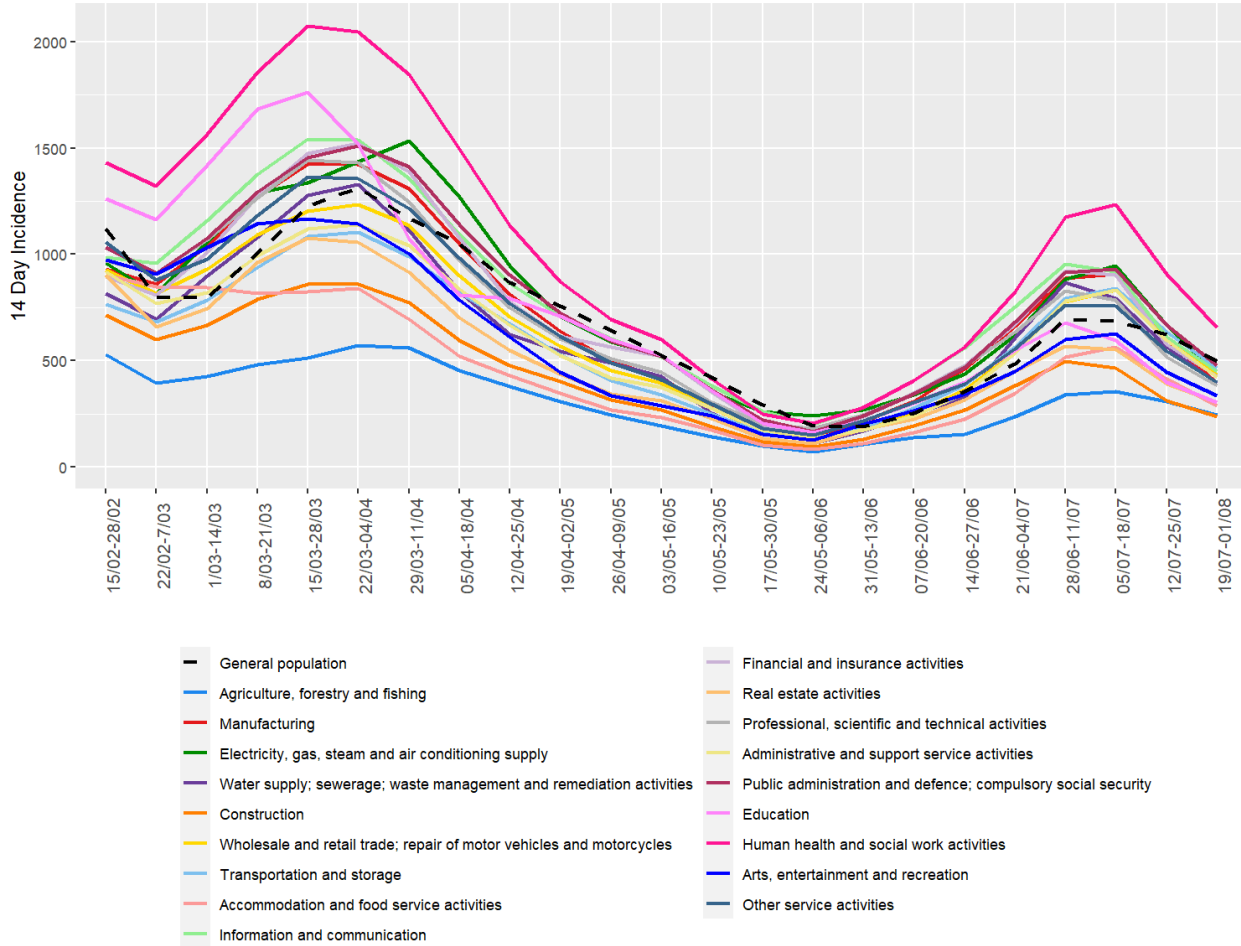


Figure 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 on 1 August 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	690061	654(635;673)	676(656;696)	387(338;443)	7.96
<b>General population</b>			<b>499</b>	<b>499</b>	<b>499</b>	
<b>Working population</b>		<b>4620661</b>	<b>484(478;490)</b>	<b>484(478;490)</b>		
Public administration and defence; compulsory social security	O	580544	478(461;496)	479(462;497)		0.18
Transportation and storage	H	319313	466(443;490)	487(462;513)	256(204;322)	9.06
Information and communication	J	187361	451(422;482)	504(467;543)	319(275;370)	29.54
Electricity, gas, steam and air conditioning supply	D	21429	434(354;532)	443(360;545)		6.16
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	862212	434(420;448)	475(459;492)	287(264;312)	22.27
Financial and insurance activities	K	160000	425(394;458)	485(448;525)	210(167;264)	22.10
Administrative and support service activities	N	450236	424(405;443)	453(432;475)	290(255;330)	18.05
Other service activities	S	162000	400(370;432)	470(426;519)	326(288;368)	49.18
Water supply; sewerage; waste management and remediation activities	E	39241	395(338;462)	412(352;483)		6.03
Manufacturing	C	634097	393(378;409)	409(393;426)	255(219;297)	10.24
Professional, scientific and technical activities	M	401832	382(363;402)	454(427;483)	299(275;325)	46.82
Arts, entertainment and recreation	R	118209	335(304;370)	374(334;419)	260(215;315)	34.55
Real estate activities	L	59539	304(263;352)	466(390;557)	181(141;233)	57.48
Education	P	617763	304(291;318)	300(286;314)	404(334;488)	4.36
Accommodation and food service activities	I	359170	289(272;307)	302(283;323)	238(205;277)	20.83
Agriculture, forestry and fishing	A	92683	246(216;280)	207(167;257)	275(234;324)	57.75
Construction	F	380169	237(222;253)	259(239;281)	204(183;228)	41.17

### 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 1 August 2022 above the working population average are: Human health and residential care activities (sector 86, 87), Air transport (sector 51), Security and investigation activities (sector 80), Telecommunications (Sector 61), Manufacturing sectors (sector 24, 20), Warehousing and support activities for transportation (sector 25) and Social work activities without accommodation (sector 88) (Table 2 and Figure 2).

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

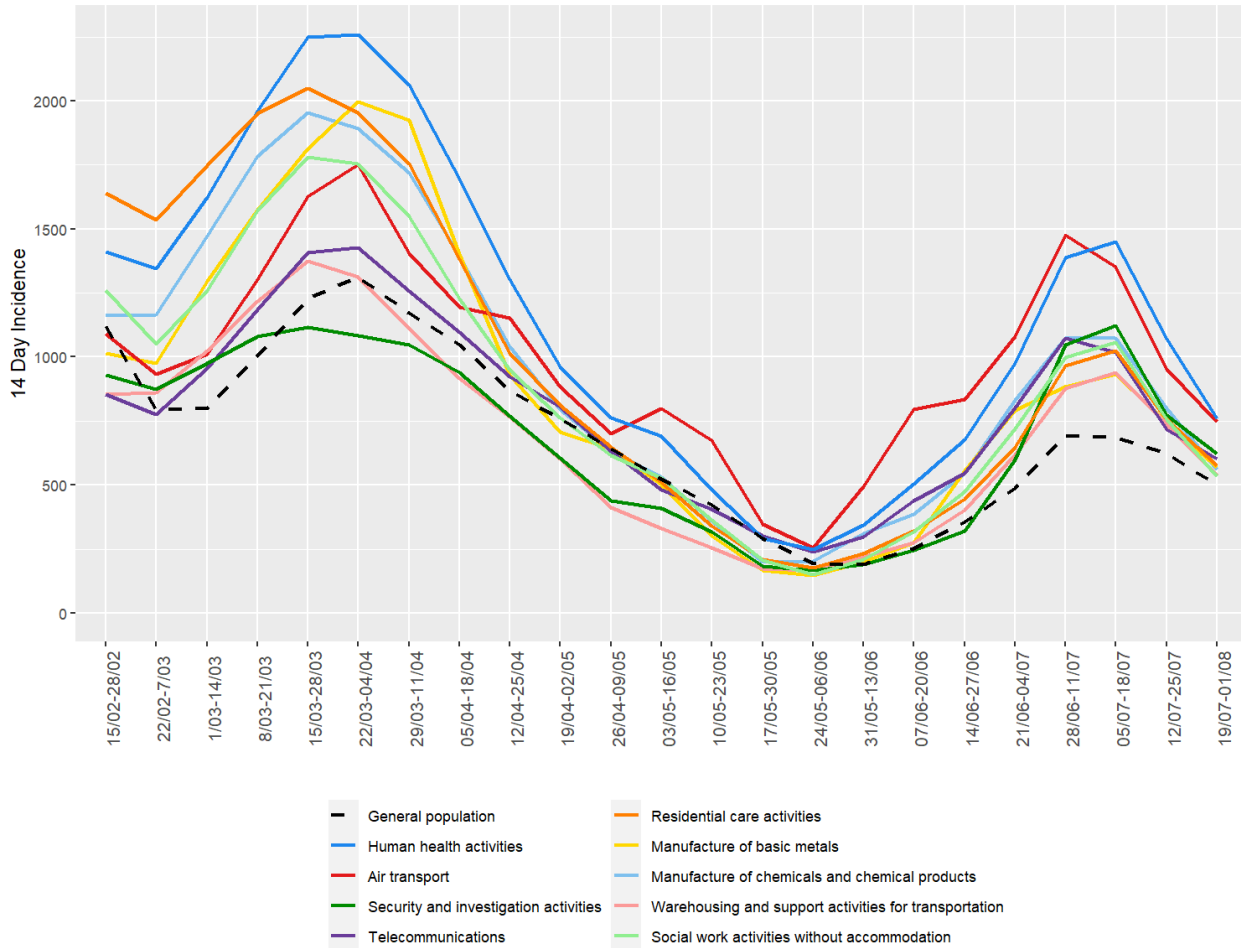


Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 on 1 August 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	330171	759(730;789)	818(785;852)	405(352;467)	14.53
Air transport	51	7239	746(572;973)	770(587;1009)		6.70
Security and investigation activities	80	22544	621(526;732)	630(532;745)		5.07
Telecommunications	61	21891	603(509;715)	638(536;759)	280(126;622)	9.76
Residential care activities	87	189391	575(542;610)	578(545;613)	304(145;636)	1.23
Manufacture of basic metals	24	26270	571(487;670)	576(490;677)		2.89
Manufacture of chemicals and chemical products	20	49376	561(499;631)	560(497;631)		2.70
Warehousing and support activities for transportation	52	100000	538(495;585)	549(504;598)	353(228;547)	5.68
Social work activities without accommodation	88	172744	532(499;567)	543(509;579)	203(112;366)	3.16
<b>General population</b>			<b>499</b>	<b>499</b>	<b>499</b>	
<b>Working population</b>		<b>4620661</b>	<b>484(478;490)</b>	<b>484(478;490)</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 1 August 2022 significantly above the working population average are: Hospital activities and other human health activities (sector 861, 869), Manufacturing sectors (sector 241, 201), Passenger air transport (sector 511), Wired telecommunication (sector 611), Private security activities (sector 801), Social work activities without accommodation for elderly and disabled (sector 881), Residential care activities (sector 879, 871, 873) and Warehousing and storage (sector 521) (Table 3 and Figure 3).

The incidences in the higher education follow the decrease in incidence of the working population average (Figure 4), while the incidence in the primary and secondary education decreases earlier, well below the population averages. 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.

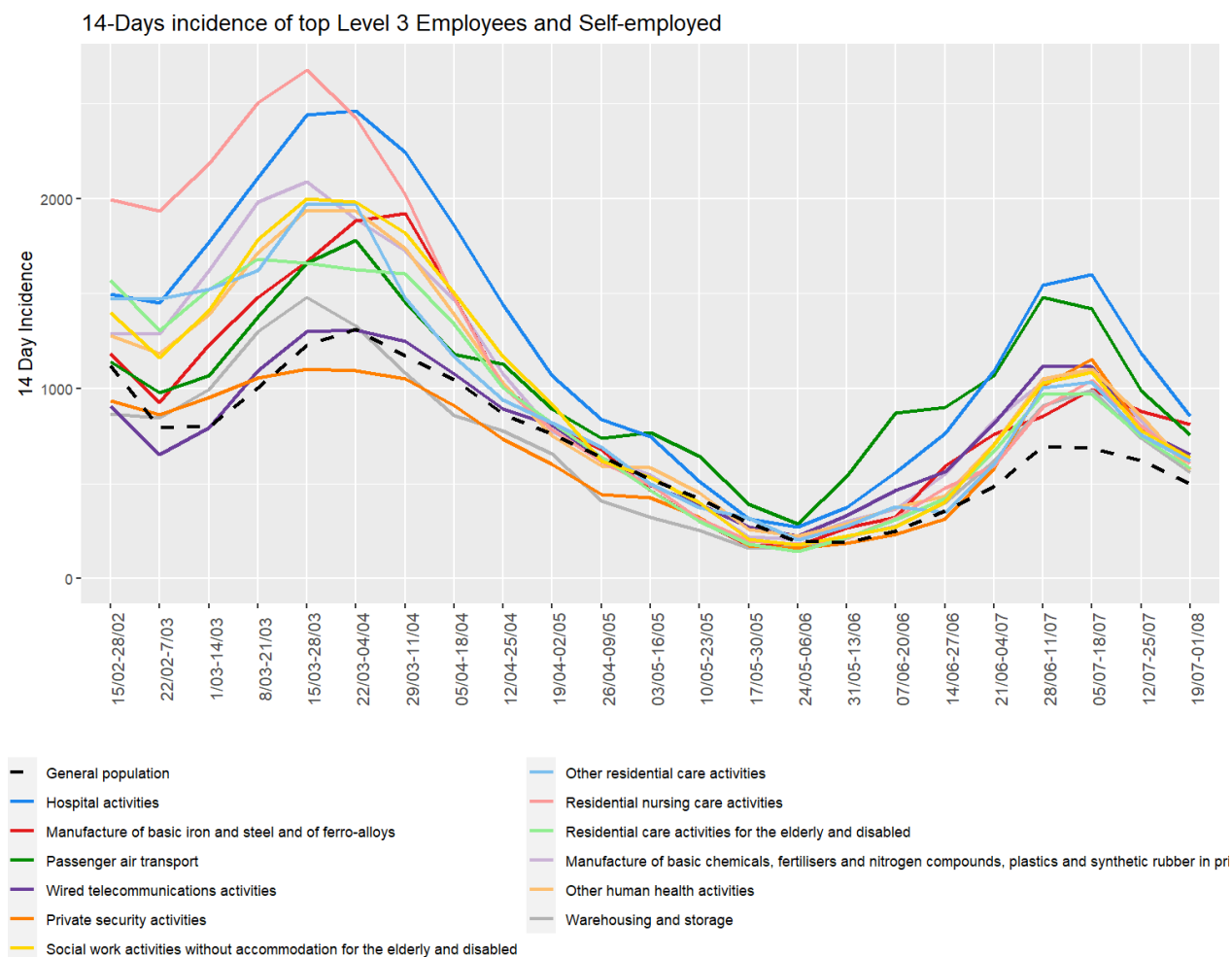


Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 in both employees and self-employed

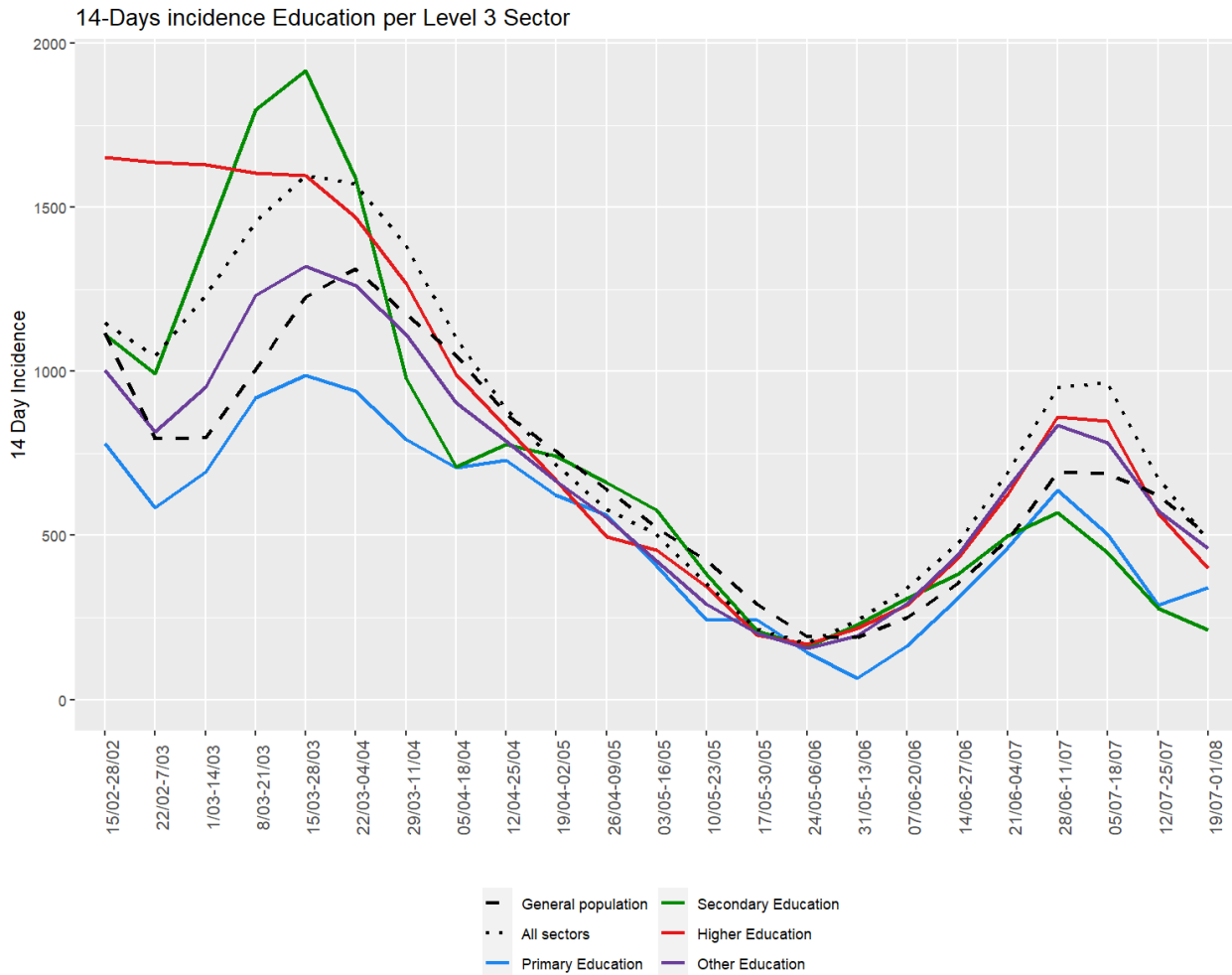


Figure 4: 14-Day incidence of COVID-19 infection in Education sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 1 August 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
Hospital activities	861	229322	856(819;895)	858(821;897)		0.31
Manufacture of basic iron and steel and of ferro-alloys	241	12177	813(668;989)	813(668;989)		2.02
Passenger air transport	511	6481	756(572;999)	779(586;1035)		6.89
Wired telecommunications activities	611	11810	652(522;814)	652(520;817)		2.61
Private security activities	801	21069	636(537;753)	651(550;771)		3.10
Social work activities without accommodation for the elderly and disabled	881	49211	634(568;708)	639(572;714)		1.08
Other residential care activities	879	16963	619(511;749)	617(508;749)		3.42
Residential nursing care activities	871	56198	605(544;673)	608(547;676)		0.71
Residential care activities for the elderly and disabled	873	71256	581(528;640)	587(533;646)		1.24
Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	201	30192	573(494;665)	575(495;668)		1.52
Other human health activities	869	54991	571(511;638)	709(619;812)	413(342;499)	46.96
Warehousing and storage	521	38600	557(487;636)	565(494;646)	276(89;852)	2.81
<b>General population</b>			<b>499</b>	<b>499</b>	<b>499</b>	
<b>Working population</b>		<b>4620661</b>	<b>484(478;490)</b>	<b>484(478;490)</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 1 August 2022 significantly higher than the working population average are: Hospital and other human health activities (sector 8610, 8690), Manufacturing sectors (sector 2042, 2410), Other human resources provision (sector 7830), Passenger air transport and service activities to air transportation (sector 5110, 5223), Retail sale of cosmetics (sector 4775), Wired telecommunication (sector 6110), Private security activities (sector 8010), Social work activities without accommodation (sector 8810, 8899), General medical practice activities (sector 8621), Residential care activities (sector 8790, 8710, 8730) and Warehousing and storage (sector 5210) (Table 4 Figure 5).

14-Days incidence of top Level 4 Employees and Self-employed

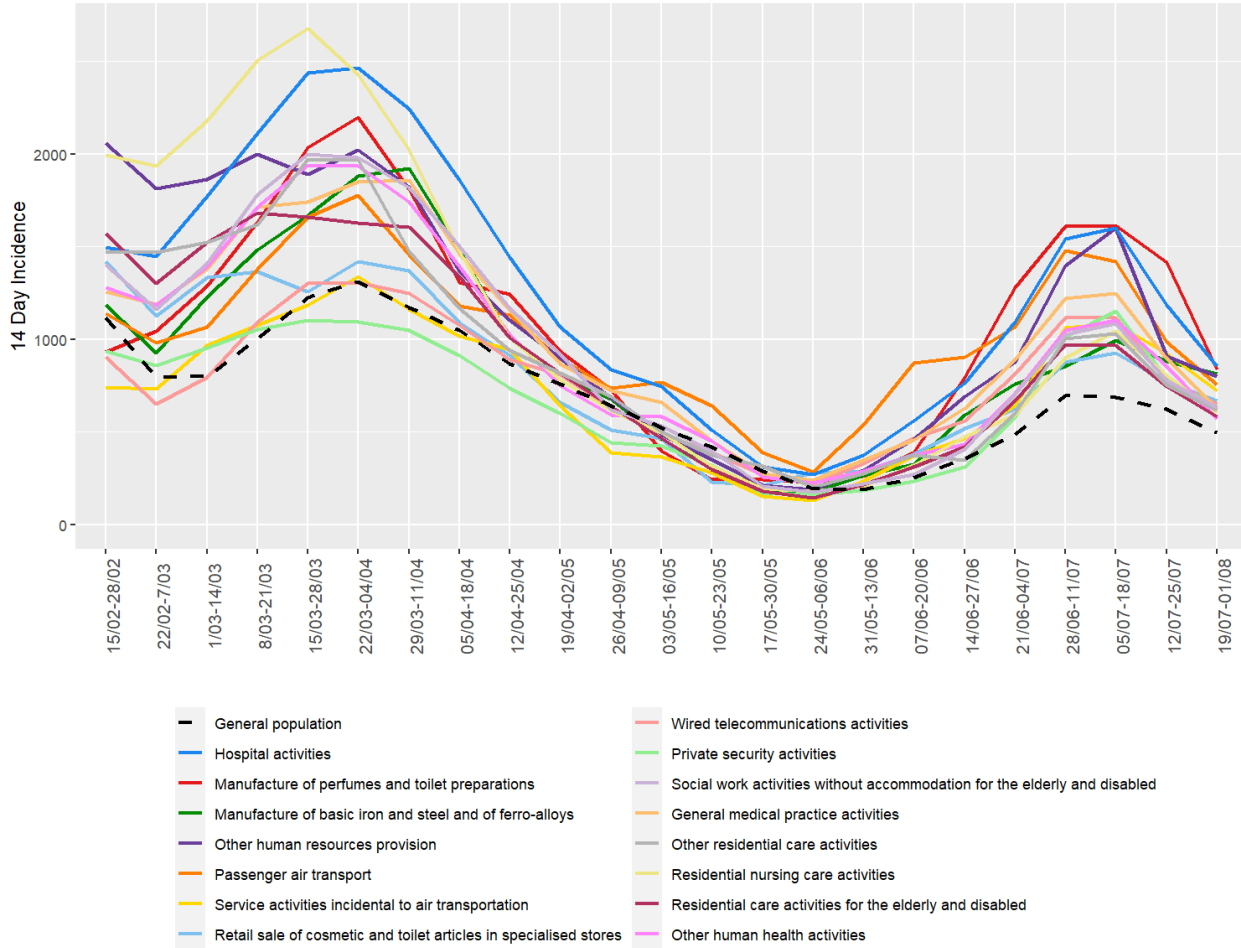


Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 1 August 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
Hospital activities	8610	229322	856(819;895)	858(821;897)		0.31
Manufacture of perfumes and toilet preparations	2042	3465	837(582;1202)	776(525;1146)		6.99
Manufacture of basic iron and steel and of ferro-alloys	2410	12177	813(668;989)	813(668;989)		2.02
Other human resources provision	7830	4744	801(583;1099)	748(529;1056)		9.82
Passenger air transport	5110	6481	756(572;999)	779(586;1035)		6.89
Service activities incidental to air transportation	5223	7884	723(558;936)	733(563;954)		4.87
Retail sale of cosmetic and toilet articles in specialised stores	4775	9281	668(521;856)	719(550;940)	471(245;903)	20.43
Wired telecommunications activities	6110	11810	652(522;814)	652(520;817)		2.61
Private security activities	8010	21069	636(537;753)	651(550;771)		3.10
Social work activities without accommodation for the elderly and disabled	8810	49211	634(568;708)	639(572;714)		1.08
General medical practice activities	8621	17460	630(523;759)	671(545;826)	506(333;767)	25.35
Other residential care activities	8790	16963	619(511;749)	617(508;749)		3.42
Residential nursing care activities	8710	56198	605(544;673)	608(547;676)		0.71
Residential care activities for the elderly and disabled	8730	71256	581(528;640)	587(533;646)		1.24
Other human health activities	8690	54991	571(511;638)	709(619;812)	413(342;499)	46.96
Warehousing and storage	5210	38600	557(487;636)	565(494;646)		2.81
Other social work activities without accommodation n.e.c.	8899	93820	534(489;583)	545(499;595)	237(119;473)	3.60
<b>General population</b>			<b>499</b>	<b>499</b>	<b>499</b>	
<b>Working population</b>		<b>4620661</b>	<b>484(478;490)</b>	<b>484(478;490)</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 1 August 2022 significantly higher than the working population average are: General and psychiatric hospitals (sector 86101, 86104), Activities of medical laboratories (sector 86901), Manufacturing sectors (sector 20420, 24110), Other human resources provision (sector 78300), Passenger air transport and services to air transportation (sector 51100, 52230), Retail sale of cosmetics (sector 47750), Wired telecommunication (sector 61100), Activities of family and elderly care at home (sector 88101), Private security activities (sector 80100), Nursing activities (sector 86906), General medical practice activities (sector 86210), Integrated youth care with housing



(sector 87901), Rest homes for the elderly and rest and care homes (sector 87301, 87101), Public Centres for Social Welfare (OCMW) (sector 84115), Other social work activities without accommodation (sector 88999) and Warehousing and storage (sector 52100) (Table 5 and Figure 6).

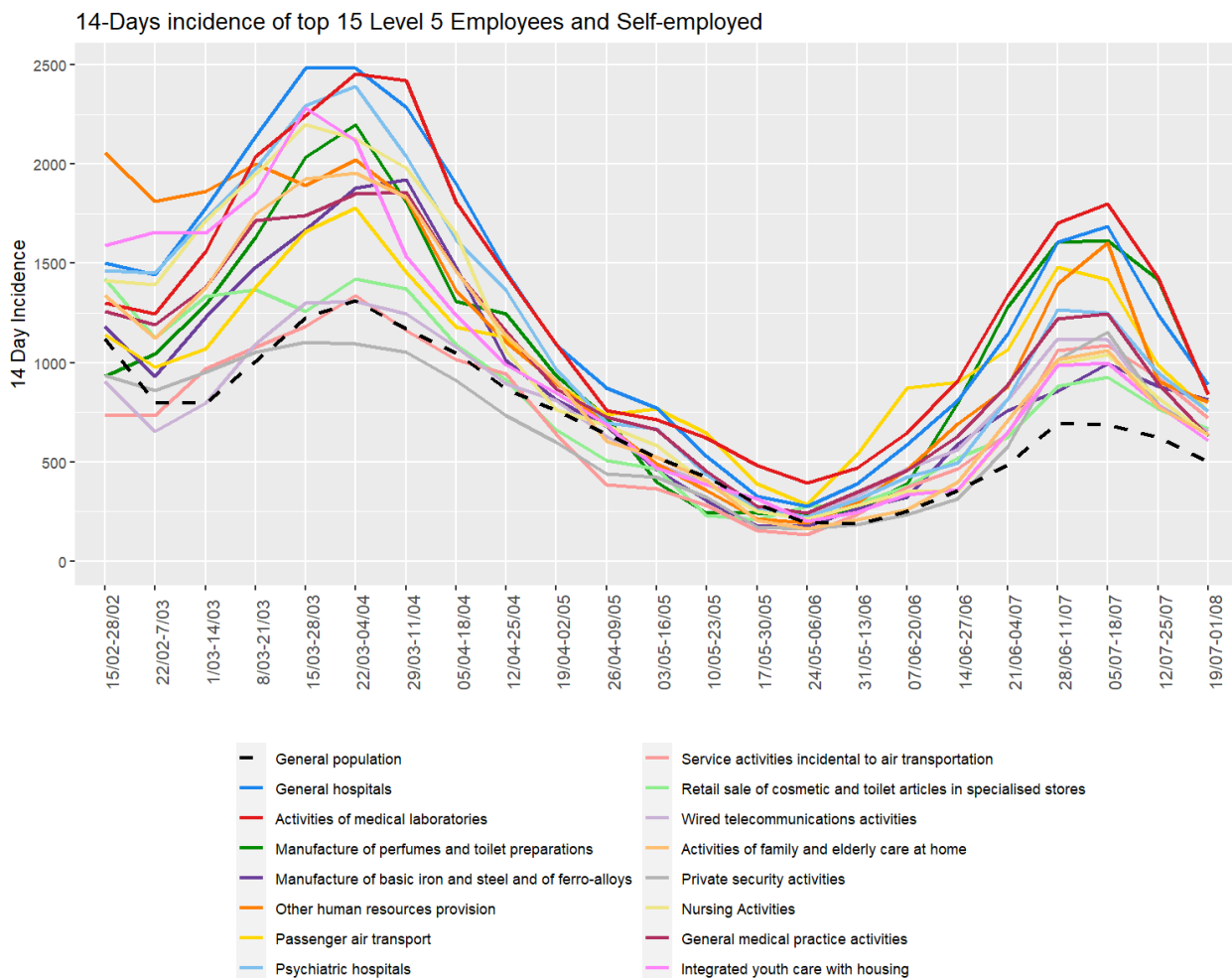


Figure 6: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 1 August 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
General hospitals	86101	183540	887(845;931)	887(845;931)		0.25
Activities of medical laboratories	86901	5847	838(634;1107)	838(634;1107)		10.96
Manufacture of perfumes and toilet preparations	20420	3465	837(582;1202)	776(525;1146)		6.99
Manufacture of basic iron and steel and of ferro-alloys	24100	12177	813(668;989)	813(668;989)		2.02
Other human resources provision	78300	4744	801(583;1099)	748(529;1056)		9.82
Passenger air transport	51100	6481	756(572;999)	779(586;1035)		6.89
Psychiatric hospitals	86104	38228	756(674;848)	756(674;848)		0.31
Service activities incidental to air transportation	52230	7884	723(558;936)	733(563;954)		4.87
Retail sale of cosmetic and toilet articles in specialised stores	47750	9281	668(521;856)	719(550;940)	471(245;903)	20.43
Wired telecommunications activities	61100	11810	652(522;814)	652(520;817)		2.61
Activities of family and elderly care at home	88101	45055	637(568;715)	640(570;718)		0.85
Private security activities	80100	21069	636(537;753)	651(550;771)		3.10
Nursing Activities	86906	16877	634(525;766)	699(577;847)	186(70;495)	12.71
General medical practice activities	86210	17460	630(523;759)	671(545;826)	506(333;767)	25.35
Integrated youth care with housing	87901	13015	607(487;756)	600(479;751)		2.74
Rest homes for the elderly (ROB)	87301	61056	606(547;671)	606(547;671)		1.03
Rest and care homes (RVT)	87101	56126	604(543;672)	606(545;674)		0.68
Public Centers for Social Welfare (O.C.M.W.)	84115	88442	597(548;650)	597(548;650)		0.15
Other social work activities without accommodation n.e.c.	88999	36577	596(522;680)	619(541;708)	278(133;582)	6.92
Warehousing and storage	52100	38600	557(487;636)	565(494;646)		2.81
<b>General population</b>			<b>499</b>		<b>499</b>	
<b>Working population</b>		<b>4620661</b>	<b>484(478;490)</b>	<b>484(478;490)</b>		

Finally, when considering specifically the non-medical contact professions, we see that the incidence in the employees of hairdressers is higher compared to the self-employed, while it the reverse in the beauty saloons.

While 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).

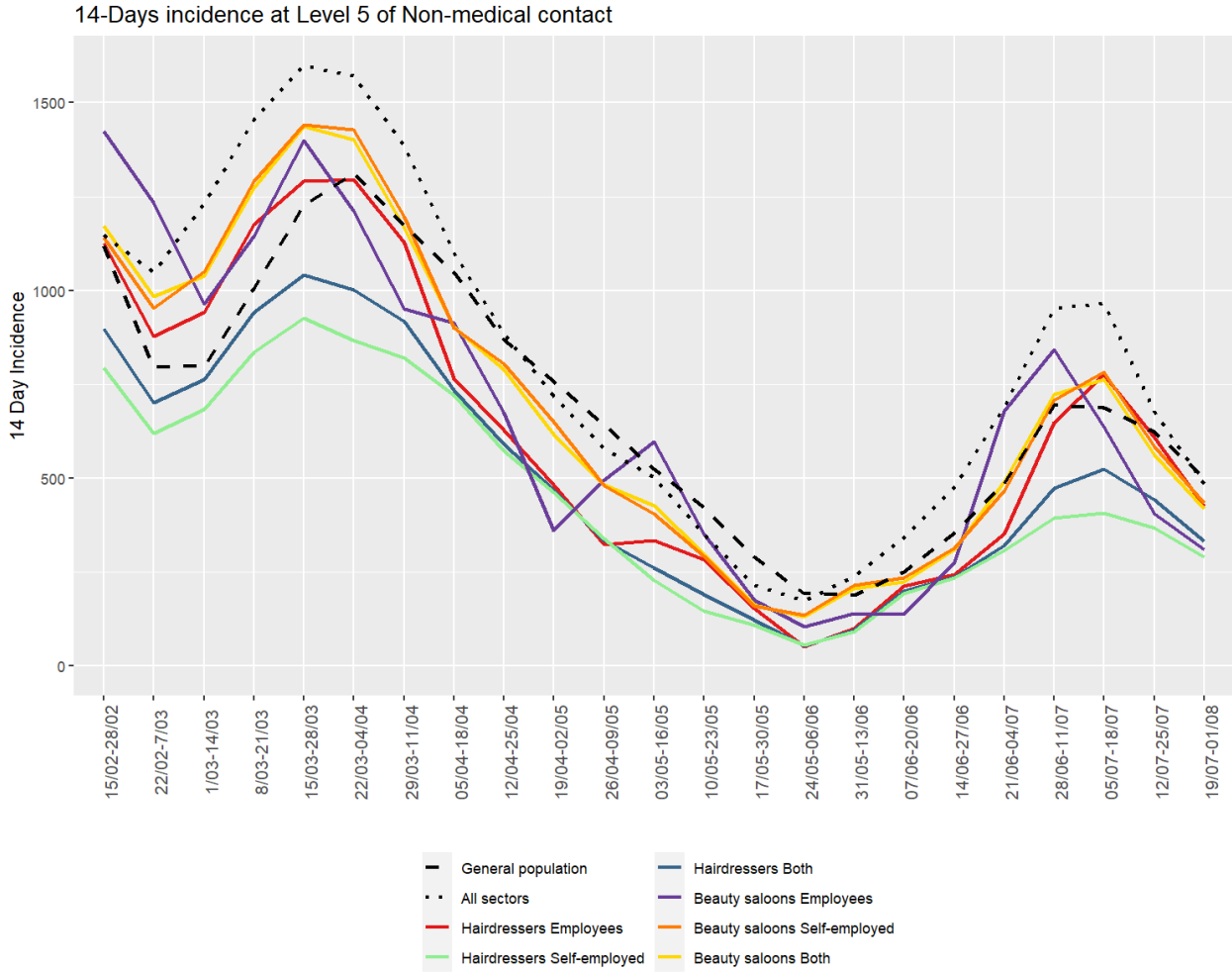


Figure 7: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

### 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) is elevated compared to the working and general population (Figure 8), which is mainly caused by the hospitals, general practitioners, residential care and social work without accommodation subsectors.

Although the 14-day incidence in Public administration and defence (sector O), Information and communication (sector J), Administration and support service activities (sector N) and Transportation and storage (sector H) is around or below the working population average, individual subsectors show an increased incidence compared to the working population, such as Passenger air transport and services to air transportation (sector 5110, 5223), Other human resources provision (sector 7830), Private security activities (sector 8010), Warehousing and storage (sector 5210), OCMW (sector 84115) and Wired telecommunication (sector 6110).

It is encouraging that the incidence in Other service activities (sector S), Accommodation and food service activities (sector I), Arts, entertainment and recreation (sector R) and Education (sector P) 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 retail sectors show an increased incidence and none in the

wholesale sector (Figure 8).

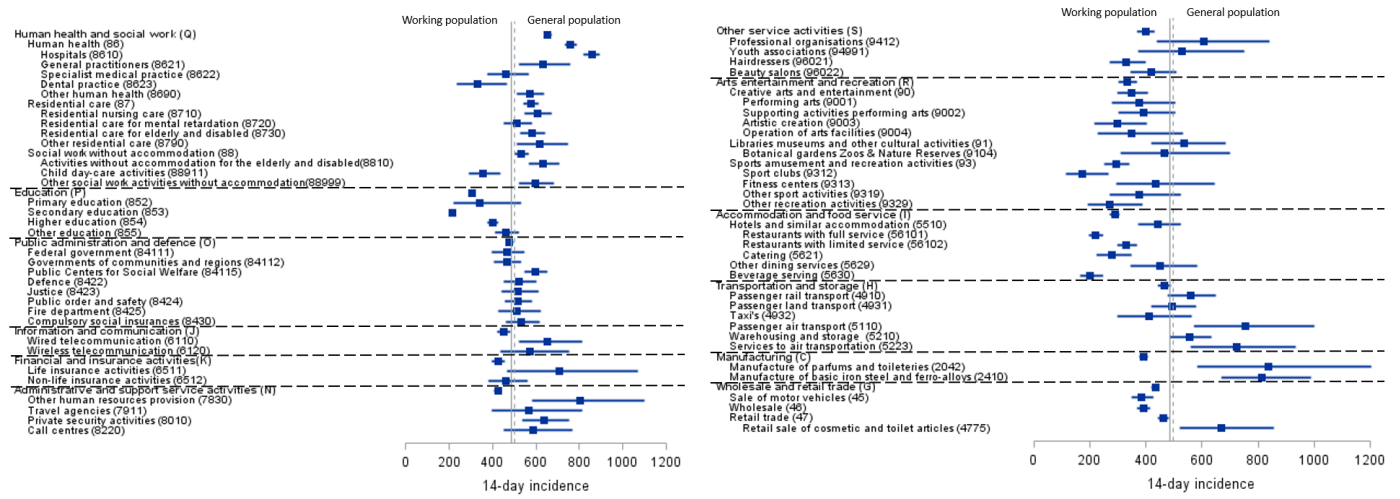


Figure 8: Forest plot of 14-Day incidence and 95% CI of selected sectors on 1 August 2022 in both employees and self-employed.

## 4 Conclusion

Despite the limitations of the data, the RSZ/ONSS data demonstrates a decrease in the 14-day COVID-19 incidences in all sectors. The highest incidences are still present in the health and residential care sector and passenger air transport and services to air transportation. The average incidence in the working population is slightly lower (3%) than 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 human health, residential care, social work, passenger air transport 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. Passenger air transport and service to air transportation, Hospital activities, General practitioners, residential care, human resources provision, social work without accommodation, public centres for social welfare and some manufacturing 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 Activities of medical laboratories, wired telecommunications activities, Private security activities and Warehousing and storage. 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 employees of beauty saloons compared to hairdressers.

It is encouraging to note that employees in accommodation and food services, education, arts, entertainment and recreation, other service activities and wholesale 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 vaccination, is warranted and additional booster vaccination for high risk employees in the health and residential care sector should be considered.

## **Acknowledgments**

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