

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 (17 – 30 May 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 30 May 2022 significantly above the general population average are: Information and communication (sector J) and Human health and social work activities (sector Q) (Table 1 and Figure 1). The 14-day incidences continue to decrease in all sectors and the working population average is 26.5% below the general population average.

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

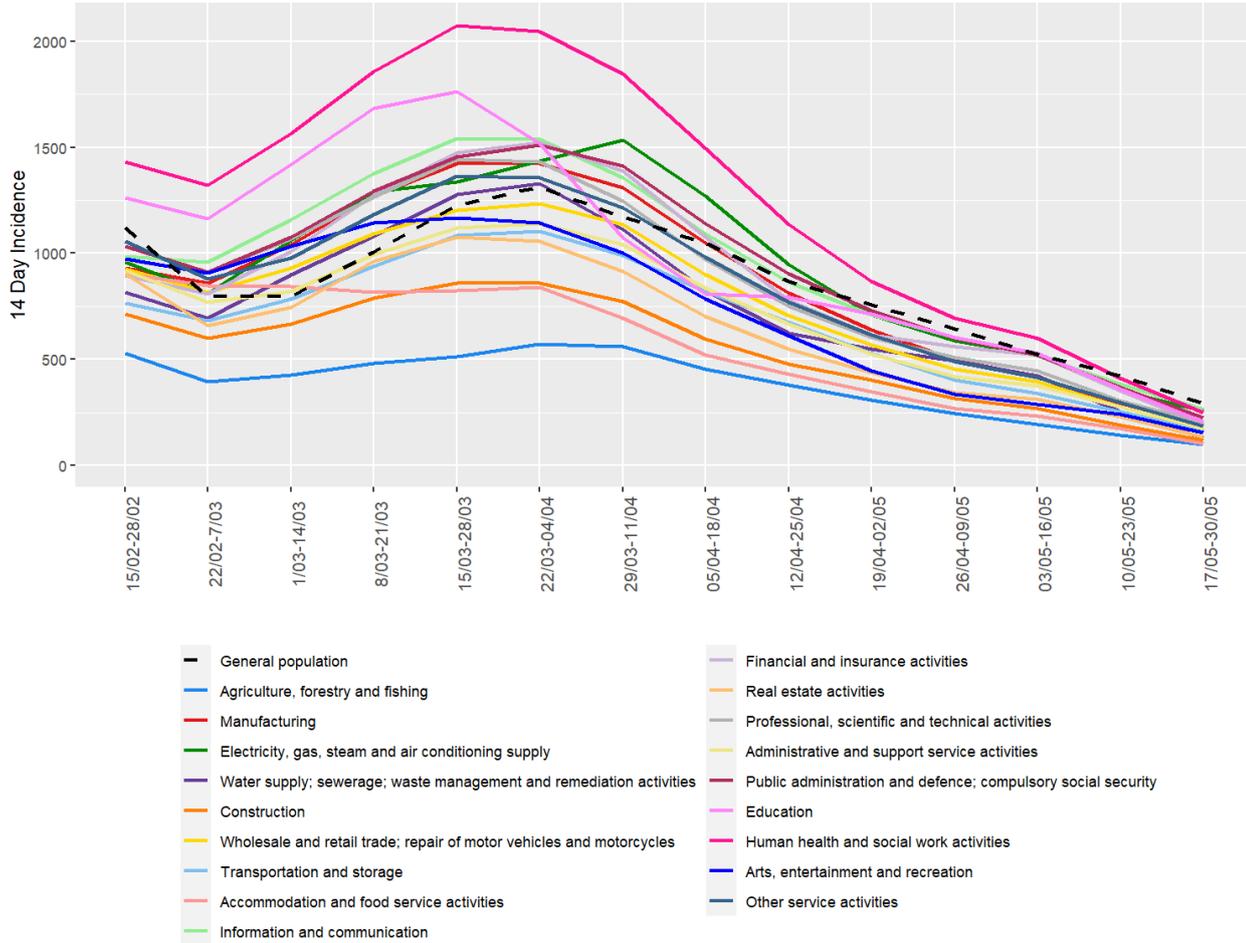


Figure 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 on 30 May 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 population			291	291	291	
Information and communication	J	186692	263(241;287)	281(254;311)	219(183;262)	29.83
Electricity, gas, steam and air conditioning supply	D	21318	258(198;336)	270(207;352)		6.23
Human health and social work activities	Q	652823	248(236;260)	251(239;264)	213(177;256)	8.43
Public administration and defence; compulsory social security	O	591111	225(213;237)	225(213;237)		0.18
Working population		4653271	214(210;218)	214(210;218)		
Education	P	763592	206(196;216)	205(195;216)	229(178;295)	3.54
Professional, scientific and technical activities	M	396500	200(187;214)	240(220;262)	155(138;174)	47.53
Financial and insurance activities	K	158763	194(174;217)	216(192;244)	119(88;161)	22.40
Other service activities	S	160000	185(165;207)	220(190;255)	148(123;178)	49.78
Administrative and support service activities	N	443429	175(163;188)	187(173;202)	119(97;146)	18.35
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	836095	169(160;178)	187(177;198)	108(94;124)	23.03
Manufacturing	C	621302	169(159;180)	174(163;185)	124(100;154)	10.50
Transportation and storage	H	308537	164(150;179)	173(158;189)	74(48;113)	9.36
Arts, entertainment and recreation	R	112821	156(135;181)	151(125;182)	165(130;210)	36.22
Real estate activities	L	58519	135(108;168)	173(128;233)	107(77;148)	58.55
Water supply; sewerage; waste management and remediation activities	E	36154	130(98;173)	133(99;178)		6.55
Construction	F	381197	117(107;128)	140(125;156)	83(70;99)	41.18
Accommodation and food service activities	I	348515	101(91;112)	109(97;122)	69(52;91)	21.48
Agriculture, forestry and fishing	A	87000	100(81;123)	89(63;127)	107(82;139)	60.80

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 30 May 2022 above the working population average are: Programming and broadcasting (sector 60), Scientific research and development (sector 72), Air transport (sector 51), Telecommunication (sector 61), Human health activities (sector 86), Manufacturing of basic pharmaceutical products (sector 21), Activities of membership organisations (sector 94) and Computer programming and consultancy (sector 62) (Table 2 and Figure 2).

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

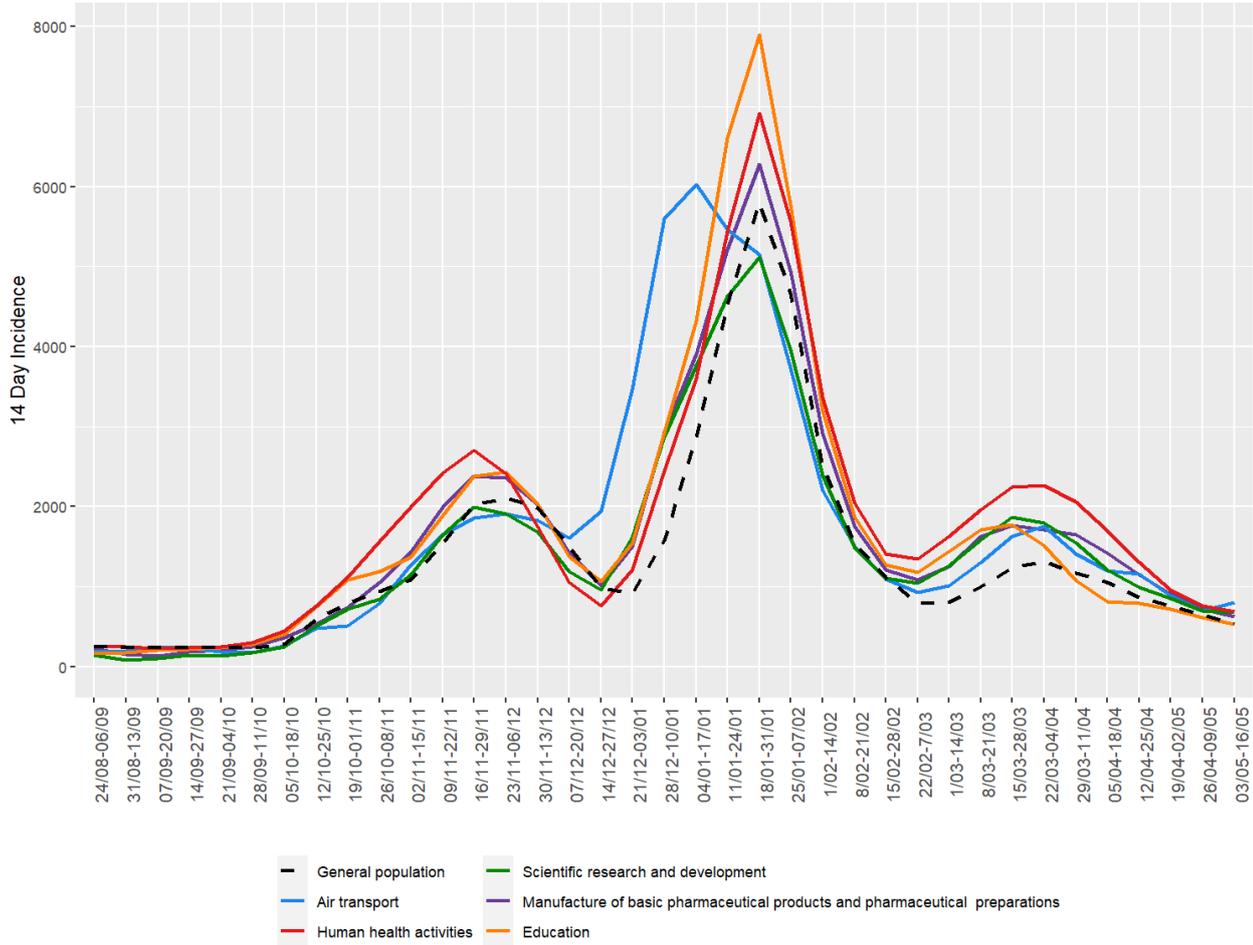


Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 on 30 May 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
Programming and broadcasting activities	60	8824	442(323;604)	453(330;622)		4.86
Scientific research and development	72	29201	363(300;439)	370(304;450)	289(138;605)	8.34
Air transport	51	6609	348(231;523)	348(231;523)		6.84
Telecommunications	61	21242	306(240;390)	309(239;399)	281(126;624)	10.11
General population			291	291	291	
Human health activities	86	313793	290(272;309)	302(282;324)	225(186;272)	15.39
Manufacture of basic pharmaceutical products and pharmaceutical preparations	21	35889	287(237;348)	288(237;350)		1.30
Activities of membership organisations	94	59160	262(224;307)	273(231;323)	207(134;321)	16.79
Computer programming, consultancy and related activities	62	114625	253(226;284)	282(247;322)	191(151;241)	32.49
Working population		4653271	214(210;218)	214(210;218)		

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 30 May 2022 significantly above the working population average are: Television programming and broadcasting (sector 602), Passenger air transport (sector 511), Research and experimental development on natural sciences and engineering (sector 721), Wireless telecommunication and computer programming and consultancy (sector 612, 620), Activities of trade unions and business, employers and professional membership organisations (sector 942, 941), Other residential care (sector 879), Hospital activities (sector 861), Compulsory social security activities (sector 843), Manufacture of pharmaceutical preparations (sector 212), Monetary intermediation (sector 641) and Other human health activities (sector 869) (Table 3 and Figure 3).

The incidences in education continue to decrease (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.

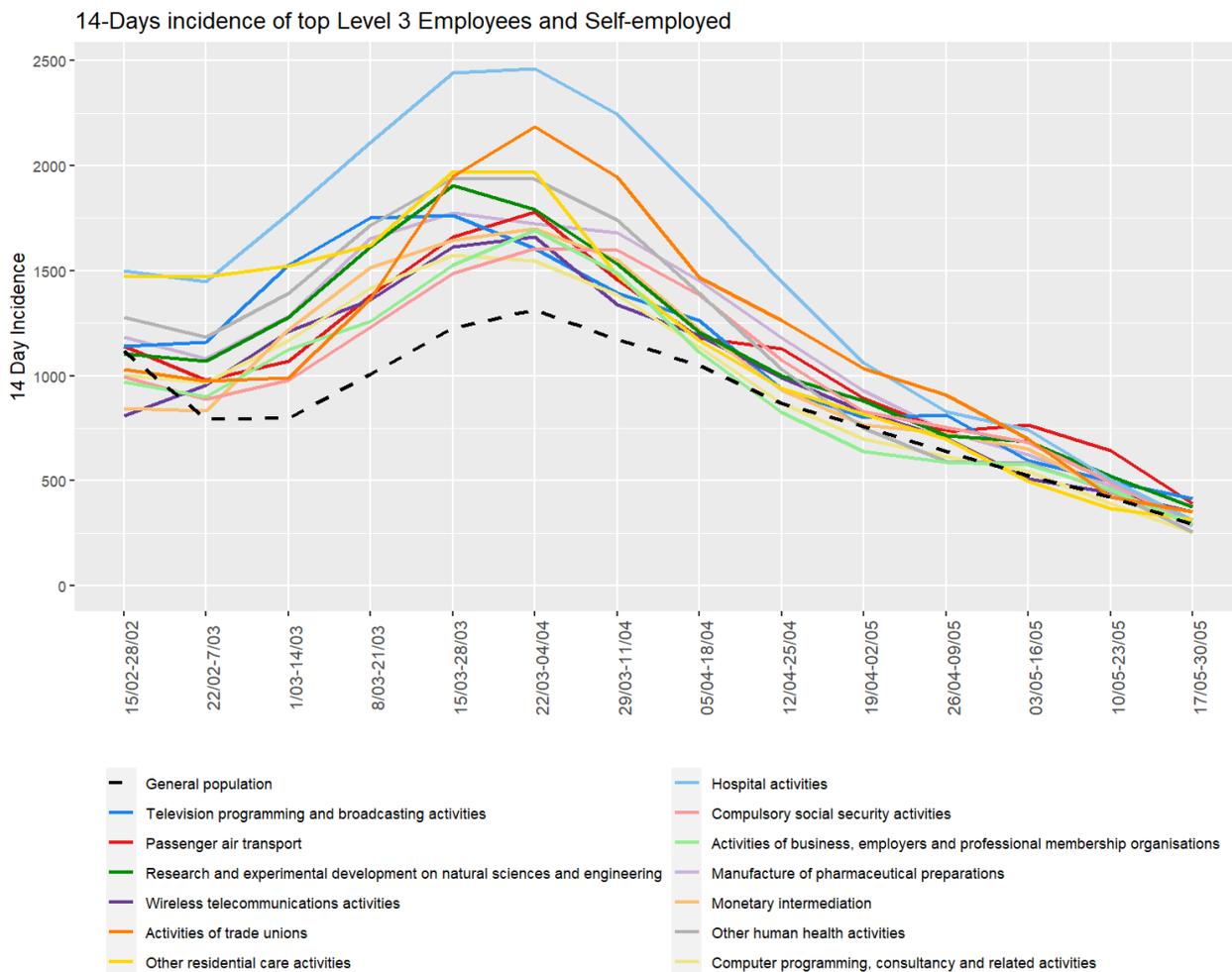


Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 in both employees and self-employed

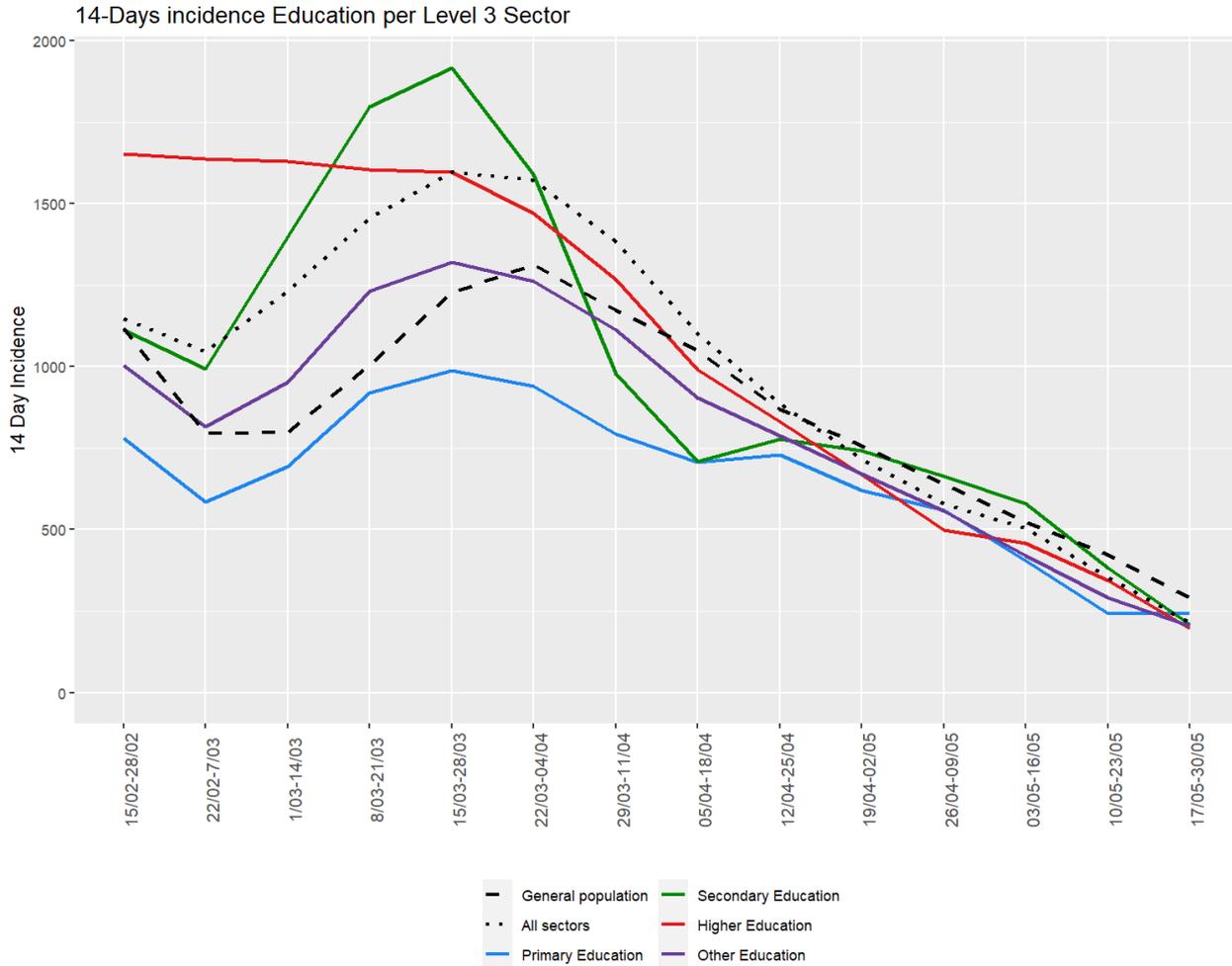


Figure 4: 14-Day incidence of COVID-19 infection in Education sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 30 May 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
Television programming and broadcasting activities	602	8173	416(297;582)	414(294;582)		2.38
Passenger air transport	511	5882	391(260;588)	391(260;588)		7.03
Research and experimental development on natural sciences and engineering	721	27851	377(311;456)	380(312;463)	335(160;701)	7.51
Wireless telecommunications activities	612	8782	353(248;502)	379(262;548)	216(70;668)	15.88
Activities of trade unions	942	5666	353(228;547)	353(228;547)		2.63
Other residential care activities	879	15723	318(241;419)	318(241;419)		3.57
Hospital activities	861	214744	312(289;336)	313(290;338)		0.33
Compulsory social security activities	843	32993	294(241;359)	294(241;359)		0.96
Activities of business, employers and professional membership organisations	941	18213	291(222;381)	305(223;417)	258(153;435)	29.92
General population			291	291	291	
Manufacture of pharmaceutical preparations	212	33803	284(233;347)	284(232;347)		0.93
Monetary intermediation	641	48450	258(217;307)	259(217;309)		1.27
Other human health activities	869	54086	257(218;303)	299(242;370)	211(162;275)	47.86
Computer programming, consultancy and related activities	620	114625	253(226;284)	282(247;322)	191(151;241)	32.49
Working population		4653271	214(210;218)	214(210;218)		

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 30 May 2022 significantly higher than the working population average are: Wholesale of solid, liquid and gaseous fuels and related products (sector 4671), Television programming and broadcastig (sector 6020), Passenger air transport (sector 5110), Other research and experimental development on natural sciences and engineering and research on biotechnology (sector 7219, 7211), Activities of extraterritorial organisations (sector 9900), Wireless telecommunication (sector 6120), Activities of trade unions (sector 9420), Other residential care (sector 8790), Hospital activities (sector 8610), Compulsory social security activities (sector 8430), Manufacture of pharmaceutical preparations (sector 2120), Computer programming activities (sector 6201) and Other human health activities (sector 8690) (Table 4 Figure 5).

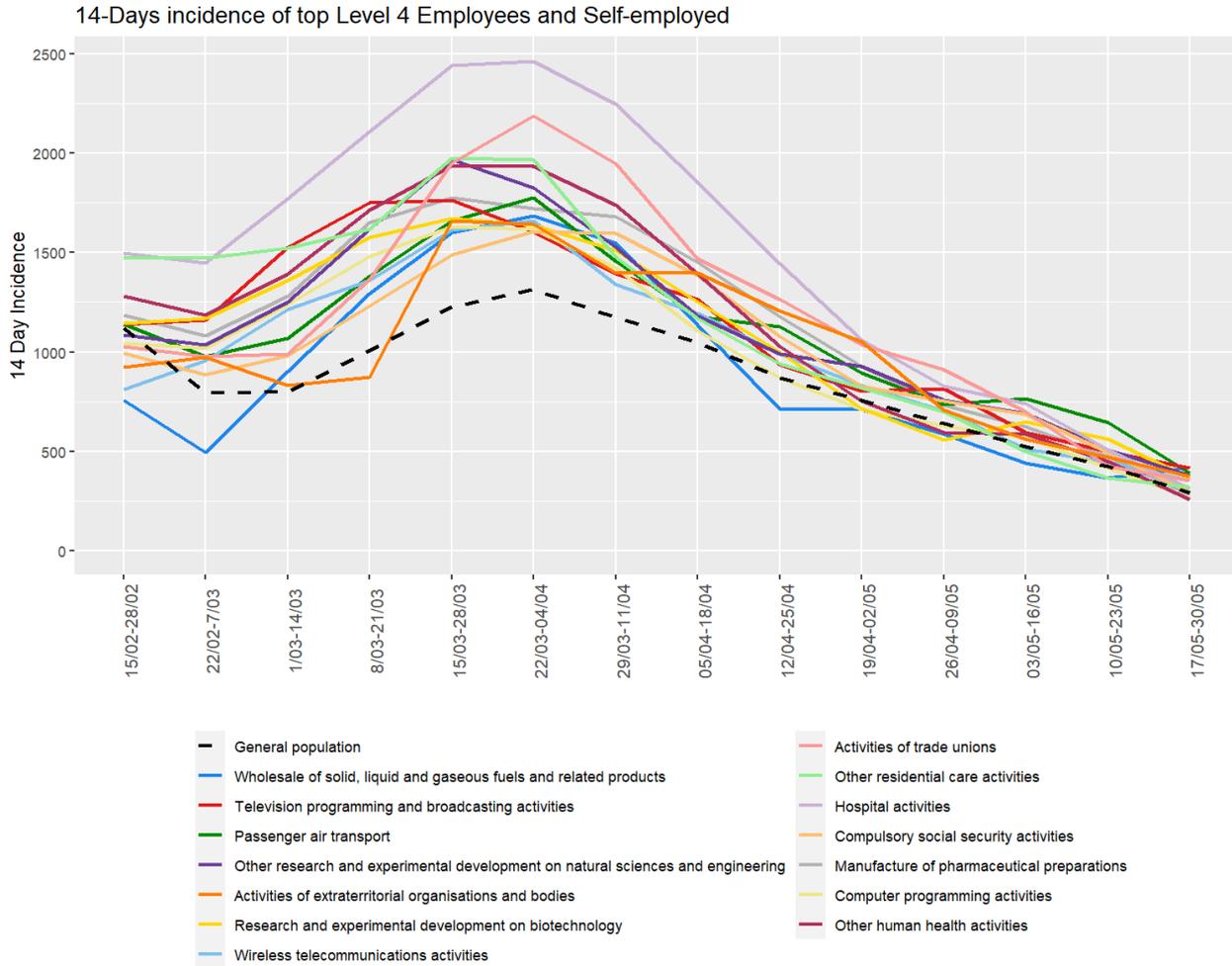


Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 30 May 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
Wholesale of solid, liquid and gaseous fuels and related products	4671	3819	419(257;683)	419(257;683)		16.66
Television programming and broadcasting activities	6020	8173	416(297;582)	414(294;582)		2.38
Passenger air transport	5110	5882	391(260;588)	391(260;588)		7.03
Other research and experimental development on natural sciences and engineering	7219	21485	377(303;468)	385(308;481)		6.86
Activities of extraterritorial organisations and bodies	9900	4000	375(226;621)	375(226;621)		0.67
Research and experimental development on biotechnology	7211	6575	365(245;544)	361(235;553)		11.56
Wireless telecommunications activities	6120	8782	353(248;502)	379(262;548)	185(125;274)	15.88
Activities of trade unions	9420	5666	353(228;547)	353(228;547)		2.63
Other residential care activities	8790	15723	318(241;419)	318(241;419)		3.57
Hospital activities	8610	214744	312(289;336)	313(290;338)		0.33
Compulsory social security activities	8430	32993	294(241;359)	294(241;359)		0.96
General population			291	291	291	
Manufacture of pharmaceutical preparations	2120	33803	284(233;347)	284(232;347)		0.93
Computer programming activities	6201	51515	264(223;312)	292(242;352)		26.52
Other human health activities	8690	54086	257(218;303)	299(242;370)	211(162;275)	47.86
Working population		4653271	214(210;218)	214(210;218)		

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 30 May 2022 significantly higher than the working population average are: Activities of medical laboratories (sector 86901), Wholesale of solid, liquid and gaseous fuels and related products (sector 46710), Television programming and broadcasting activities (sector 60200), Passenger air transport (sector 51100), Other research and experimental development on natural sciences and engineering and research in biotechnology (sector 72190, 72110), Activities of extraterritorial organisations (sector 99000), Compulsory social insurance (sector 84301), Wireless telecommunication (sector 61200), Activities of trade unions (sector 94200), General hospitals (sector 86101), Integrated youth care with housing (sector 87901), Manufacture of medicines (sector 21201), Psychiatric hospitals (sector 86104), Federal and regional government (sector 84112, 84111), Computer programming

activities (sector 62010) and General secondary education (sector 85319) (Table 5 and Figure 6).

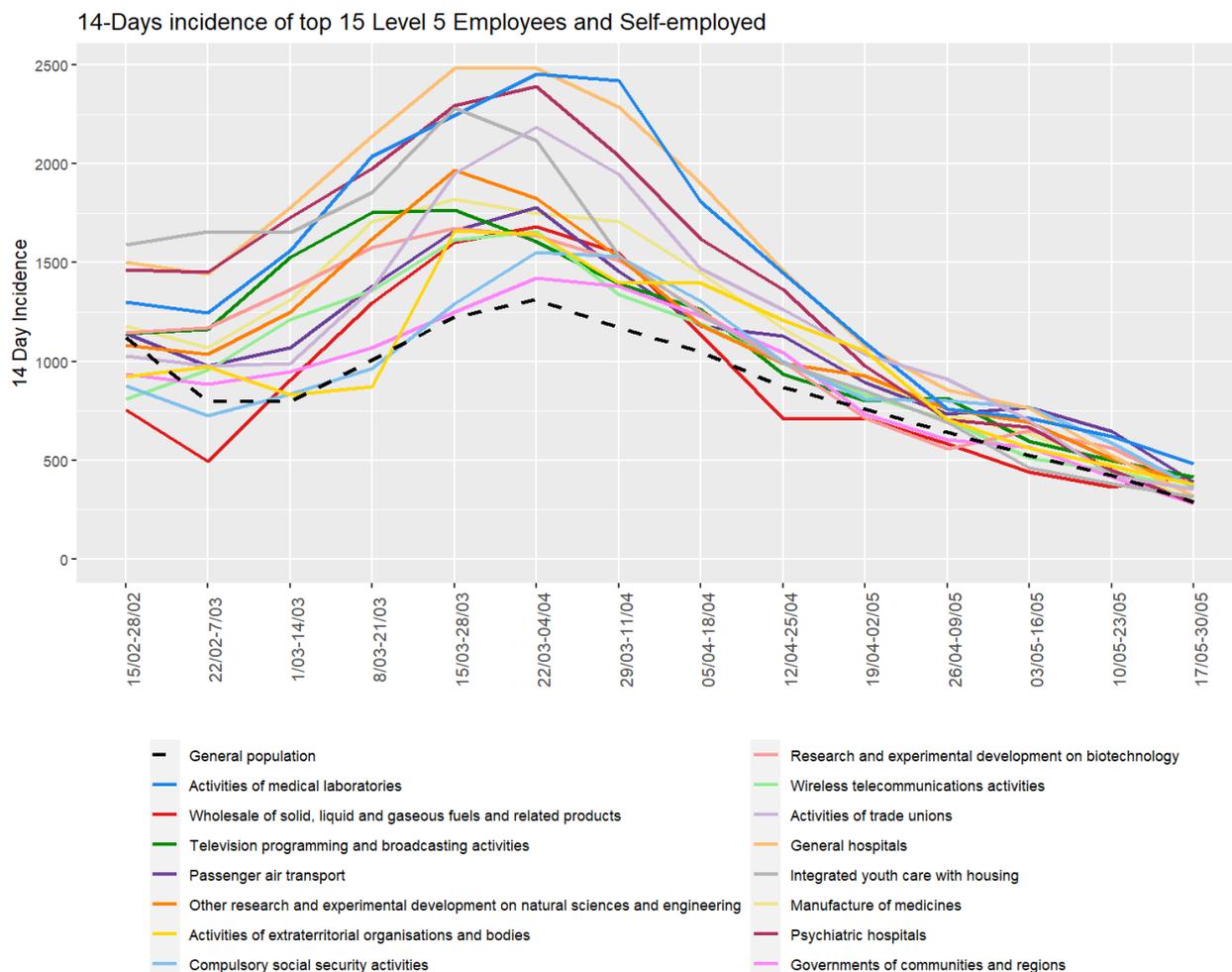


Figure 6: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 30 May 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
Activities of medical laboratories	86901	6405	484(341;687)	511(355;734)		11.34
Wholesale of solid, liquid and gaseous fuels and related products	46710	3819	419(257;683)	419(257;683)		16.66
Television programming and broadcasting activities	60200	8173	416(297;582)	414(294;582)		2.38
Passenger air transport	51100	5882	391(260;588)	391(260;588)		7.03
Other research and experimental development on natural sciences and engineering	72190	21485	377(303;468)	385(308;481)		6.86
Activities of extraterritorial organisations and bodies	99000	4000	375(226;621)	375(226;621)		0.67
Compulsory social security activities	84301	11475	366(271;495)	366(271;495)		0.56
Research and experimental development on biotechnology	72110	6575	365(245;544)	361(235;553)		11.56
Wireless telecommunications activities	61200	8782	353(248;502)	379(262;548)		15.88
Activities of trade unions	94200	5666	353(228;547)	353(228;547)		2.63
General hospitals	86101	175938	320(295;348)	320(295;348)		0.26
Integrated youth care with housing	87901	12063	315(229;433)	315(229;433)		2.89
Manufacture of medicines	21201	31959	291(238;356)	290(236;356)		0.68
General population			291	291	291	
Psychiatric hospitals	86104	32867	286(234;350)	286(234;350)		0.36
Governments of communities and regions	84112	46619	281(237;333)	281(237;333)		0.12
Federal government	84111	30000	270(217;336)	270(217;336)		0.03
Computer programming activities	62010	51515	264(223;312)	292(242;352)	185(125;274)	26.52
General secondary education	85319	211915	235(215;257)	235(215;257)		0.02
Working population		4653271	214(210;218)	214(210;218)		

Finally, when considering specifically the non-medical contact professions, we see that the incidence in the employees and self-employed are below the working and general population average. (Figure 7).

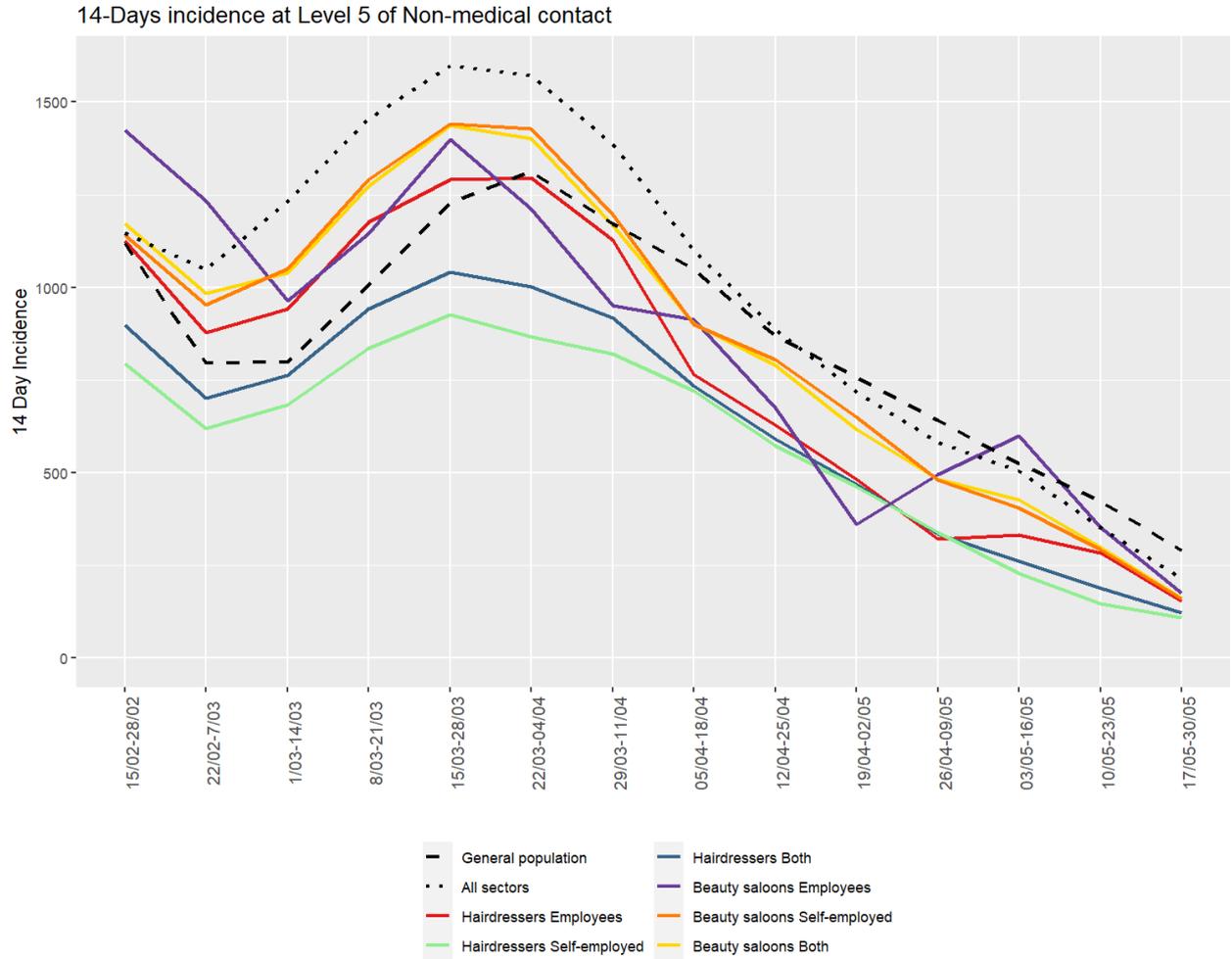


Figure 7: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

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 Information and communication (sector J) and Human health and social work sector (sector Q) is elevated compared to the working and general population (Figure 8). The increased incidence is present in several subsectors of these sectors.

Although the 14-day incidence in Education (sector P), Transportation and storage (sector H), Public administration and defence (sector O), Professional scientific and technical activities (sector M) and Other service activities (sector S) is around or below the working population average, individual subsectors show an increased incidence compared to the working population, such as General secondary education (sector 85319), Passenger Air transport (sector 5110), Federal and regional government (sector 84111, 84112), Compulsory insurance (sector 94301), Other research and developmental work in the natural sciences and research in biotechnology (sector 7219, 7211), Activities of trade unions (sector 94200) and adult associations (sector 94992).

It is encouraging that the incidence in and Arts, entertainment and recreation (sector R) and Accommodation and food service activities (sector I) is similar to or below the general 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. Only a few manufacturing and wholesale sectors show an elevated incidence above the working population average (Figure 8).

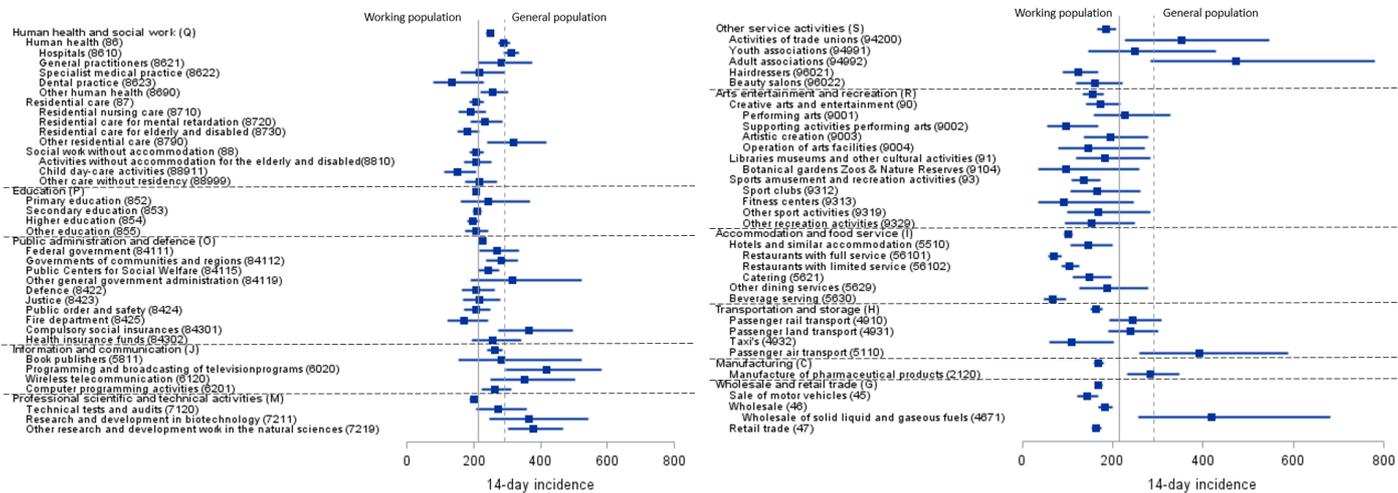


Figure 8: Forest plot of 14-Day incidence and 95% CI of selected sectors on 30 May 2022 in both employees and self-employed.

4 Conclusion

Despite the limitations of the data, the RSZ/ONSS data demonstrates a continuous decrease in the 14-day COVID-19 incidences in all sectors. The highest incidences are present in human health, television programming and broadcasting, passenger air transport, information and communication and public administration. The average incidence in the working population is 26.5% lower than the average incidence in the general population, suggesting that infections are passed less 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, social work, education, 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. Television programming and broadcasting, Passenger air transport, Human health activities, Residential care, several public administration activities, general secondary education, activities of trade unions, 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, Research and experimental development, Compulsory insurance, Activities or extraterritorial organisations, Wireless telecommunication and Computer programming activities. It would be worthwhile to evaluate the hygiene protocols and its practice in these sectors.

The incidence in non-medical contact professionals is below the general population average, with no obvious difference between employees and self-employed professionals, nor between beauty saloons and hairdressers.

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

Finally, despite the high degree of vaccination, COVID-19 infection remains possible. Continuous monitoring of breakthrough infections, despite primo and booster vaccination, and especially protection against

hospitalization, is warranted.

Acknowledgments

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