

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 (18 April – 2 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 sector with a 14-day incidence on 2 May 2022 significantly above the working and general population average is 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 below the general population average.

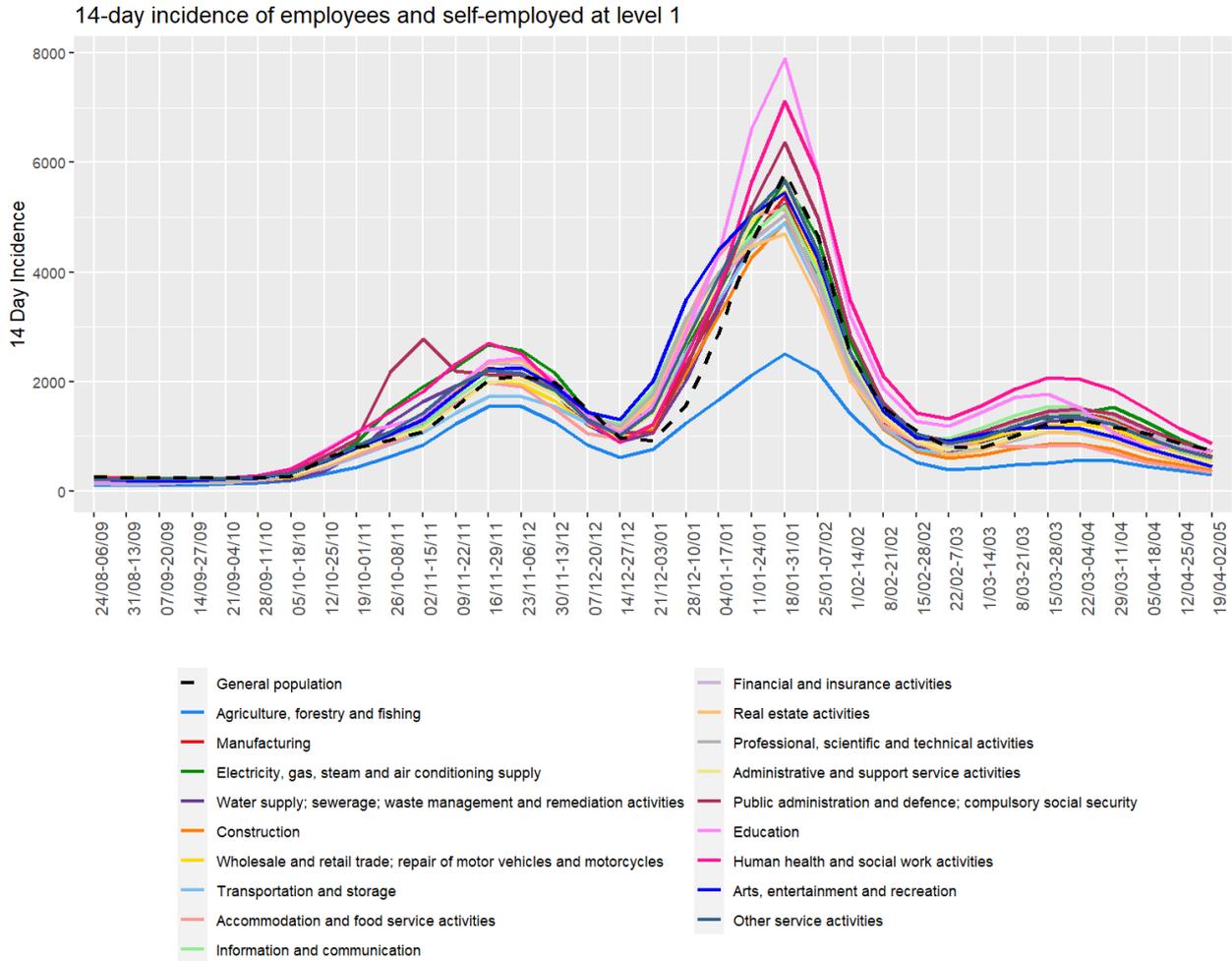


Figure 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 on 2 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
Human health and social work activities	Q	661450	869(847;892)	896(873;920)	562(502;629)	8.35
General population			758	758	758	
Public administration and defence; compulsory social security	O	598214	728(707;750)	728(707;750)		0.18
Working population		4664206	718(710;726)	718(710;726)		
Education	P	757762	715(696;734)	718(699;738)	623(535;726)	3.57
Information and communication	J	187183	710(673;749)	777(731;826)	548(489;614)	29.68
Electricity, gas, steam and air conditioning supply	D	21439	709(605;831)	716(608;842)		6.17
Manufacturing	C	625078	638(619;658)	668(647;690)	373(329;423)	10.41
Financial and insurance activities	K	159837	615(578;655)	684(640;731)	374(315;443)	22.24
Other service activities	S	161138	615(578;654)	670(617;728)	557(507;612)	49.56
Professional, scientific and technical activities	M	397190	605(581;630)	725(690;762)	469(439;501)	47.38
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	844444	567(551;583)	631(612;650)	346(320;374)	22.84
Water supply; sewerage; waste management and remediation activities	E	36545	550(479;631)	570(496;656)		6.50
Transportation and storage	H	310816	527(502;553)	546(519;574)	340(279;415)	9.32
Administrative and support service activities	N	442476	525(504;547)	553(529;578)	395(354;441)	18.33
Arts, entertainment and recreation	R	113483	445(408;485)	443(398;494)	448(387;518)	36.06
Real estate activities	L	58810	437(387;494)	512(431;609)	382(322;454)	58.34
Construction	F	384328	402(382;423)	474(447;503)	295(269;323)	40.97
Accommodation and food service activities	I	337752	347(328;367)	373(351;397)	247(213;286)	21.91
Agriculture, forestry and fishing	A	84740	308(273;348)	232(185;291)	354(307;409)	62.33

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 2 May 2022 above the general population average are: Health and care sector (sector 86, 87), Manufacturing (sector 21, 20), Scientific research and development (sector 72) and Social work activities without accommodation (sector 88) (Table 2 and Figure 2).

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

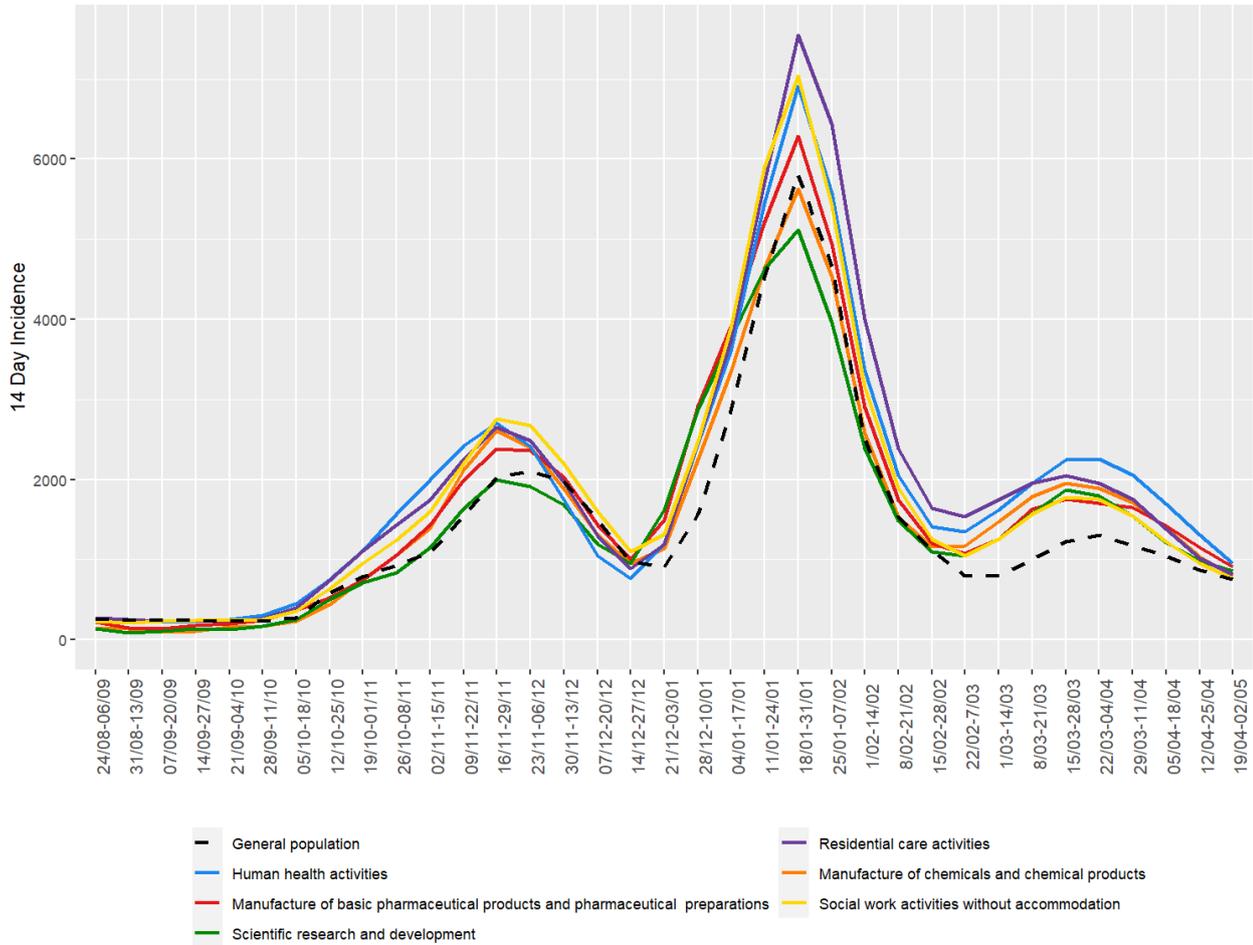


Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 on 2 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
Human health activities	86	316701	958(925;993)	1026(989;1065)	568(504;640)	15.23
Manufacture of basic pharmaceutical products and pharmaceutical preparations	21	35722	907(814;1011)	910(816;1015)		1.30
Scientific research and development	72	29206	856(757;968)	907(800;1028)	289(138;605)	8.31
Residential care activities	87	175553	814(773;857)	815(774;858)	739(460;1186)	1.34
Manufacture of chemicals and chemical products	20	48176	795(719;878)	809(732;894)		2.78
Social work activities without accommodation	88	170302	761(721;803)	769(728;812)	516(357;746)	3.21
General population			758	758	758	
Working population		4664206	718(710;726)	718(710;726)		

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 2 May 2022 significantly above the working population average are: Hospital activities (sector 861), Activities of trade unions (sector 942), Manufacturing sectors (sector 212, 291), Social work activities without accommodation for the elderly and disabled (sector 881), Research and experimental development on natural sciences and engineering (sector 721), Residential care activities (sector 872, 873), Compulsory social security activities (sector 843) and Secondary education (sector 853) (Table 3 and Figure 3).

The last 4 weeks the incidences in education is decreasing, except in secondary education (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.

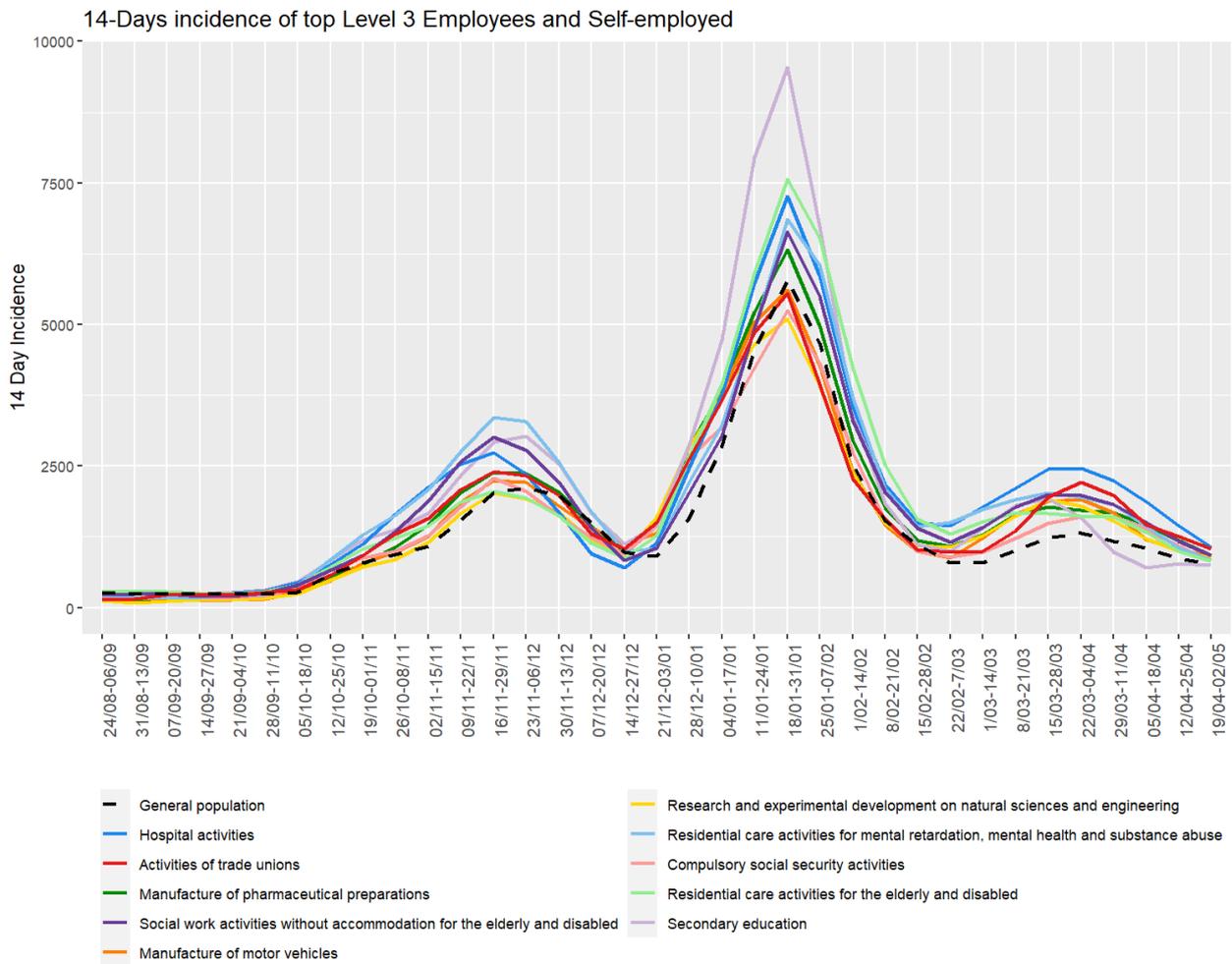


Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 in both employees and self-employed

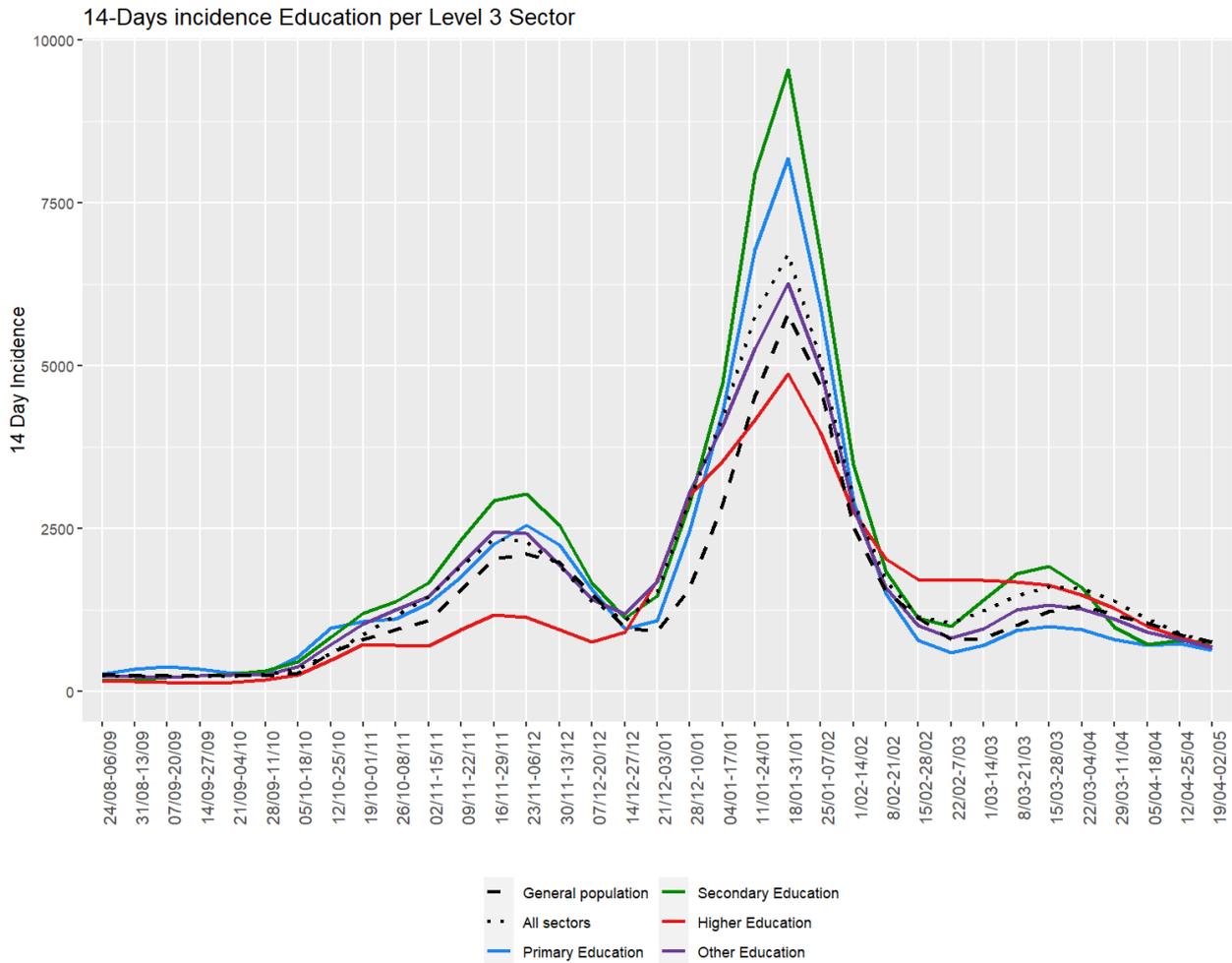


Figure 4: 14-Day incidence of COVID-19 infection in Education sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 2 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
Hospital activities	861	217342	1061(1019;1105)	1061(1019;1105)		0.33
Activities of trade unions	942	5712	1033(801;1331)	1033(801;1331)		2.60
Manufacture of pharmaceutical preparations	212	33693	926(829;1034)	932(834;1041)		0.94
Social work activities without accommodation for the elderly and disabled	881	49024	922(841;1011)	926(845;1015)		1.09
Manufacture of motor vehicles	291	20556	900(780;1039)	901(780;1040)		0.66
Research and experimental development on natural sciences and engineering	721	27955	880(777;997)	924(814;1048)	335(160;701)	7.48
Residential care activities for mental retardation, mental health and substance abuse	872	42977	833(751;923)	841(758;933)		1.76
Compulsory social security activities	843	33816	828(737;930)	827(735;930)		0.94
Residential care activities for the elderly and disabled	873	69816	815(751;884)	812(748;882)		1.27
General population			758	758	758	
Secondary education	853	458546	743(719;768)	744(720;769)		0.19
Working population		4664206	718(710;726)	718(710;726)		

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 2 May 2022 significantly higher than the working population average are: Hospital activities (sector 8610), Activities of extraterritorial organisations and bodies (sector 9900), Activities of trade unions (sector 9420), Manufacturing activities (sector 2611, 2120, 2910), Activities of religious organisations (sector 9491), Other research and experimental development on natural sciences and engineering (sector 7219), Social work activities without accommodation for the elderly and disabled (sector 8810), Justice and judicial activities (sector 8423), General medical practice activities (sector 8621), Residential care (sector 8720, 8730), Compulsory social security activities (sector 8430) and General secondary education (sector 8531) (Table 4 Figure 5).

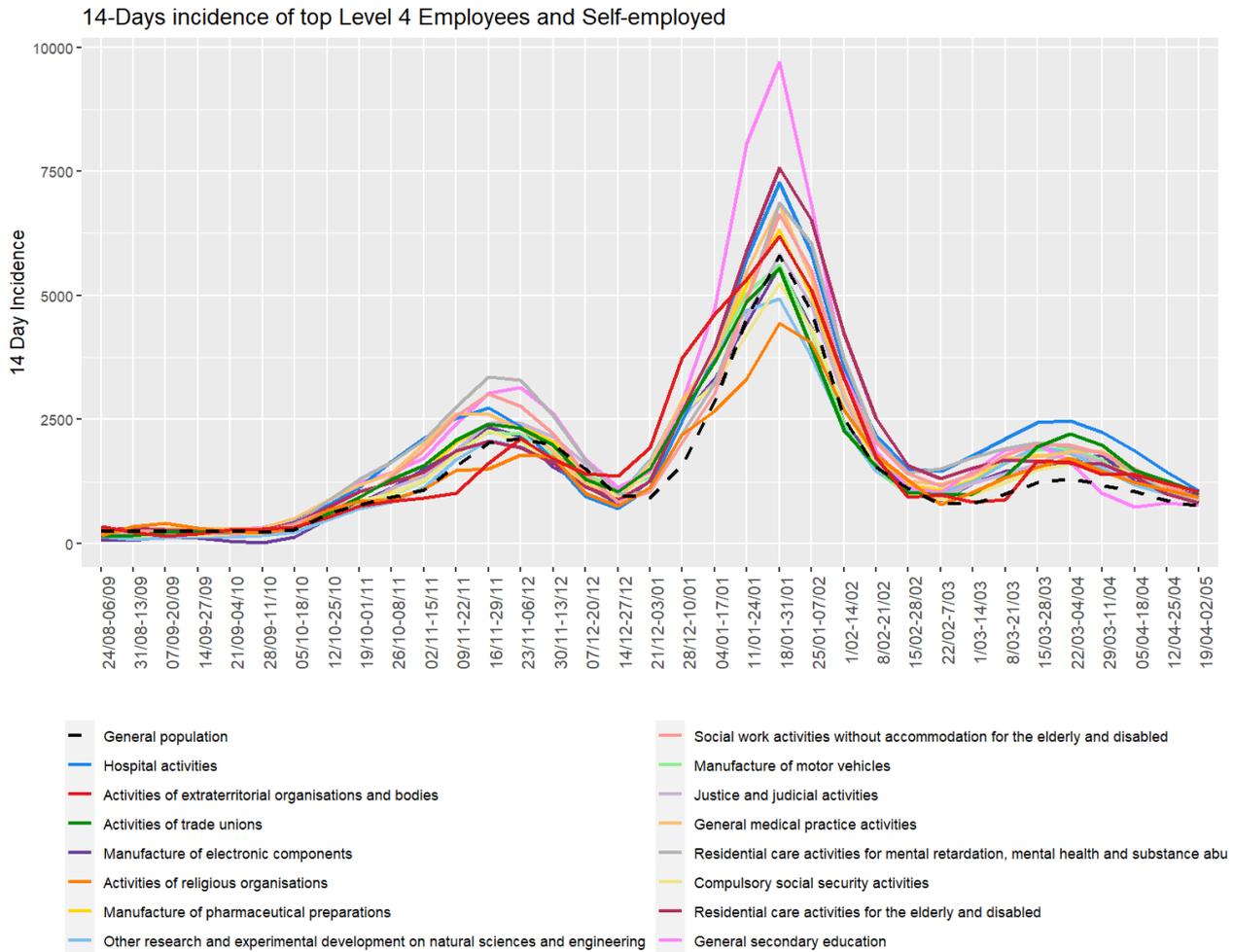


Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 2 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
Hospital activities	8610	217342	1061(1019;1105)	1061(1019;1105)		0.33
Activities of extraterritorial organisations and bodies	9900	4084	1053(782;1417)	1035(766;1398)		0.66
Activities of trade unions	9420	5712	1033(801;1331)	1033(801;1331)		2.60
Manufacture of electronic components	2611	4868	986(744;1306)	1019(766;1354)		5.27
Activities of religious organisations	9491	6930	938(736;1194)	984(769;1258)		8.45
Manufacture of pharmaceutical preparations	2120	33693	926(829;1034)	932(834;1041)		0.94
Other research and experimental development on natural sciences and engineering	7219	21490	926(806;1063)	969(842;1115)		6.83
Social work activities without accommodation for the elderly and disabled	8810	49024	922(841;1011)	926(845;1015)		1.09
Manufacture of motor vehicles	2910	20556	900(780;1039)	901(780;1040)		0.66
Justice and judicial activities	8423	27477	888(784;1006)	888(784;1006)		0.11
General medical practice activities	8621	17166	868(740;1018)	959(804;1143)	598(407;877)	25.92
Residential care activities for mental retardation, mental health and substance abuse	8720	42977	833(751;923)	841(758;933)		1.76
Compulsory social security activities	8430	33816	828(737;930)	827(735;930)		0.94
Residential care activities for the elderly and disabled	8730	69816	815(751;884)	812(748;882)		1.27
General secondary education	8531	426873	774(748;801)	775(749;802)		0.15
General population			758	758	758	
Working population		4664206	718(710;726)	718(710;726)		

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 2 May 2022 significantly higher than the working population average are: Serviceflats for the elderly (sector 87302), Activities of medical laboratories (sector 86901), Hospitals (sector 86101, 86104), Wholesale of sanitary ware (sector 46736), Activities of extraterritorial organisations and bodies (sector 99000), Activities of trade unions (sector 94200), Manufacturing activities (sector 26110, 21201, 29100), Activities of religious organisations (sector 94910), Regular general secondary education (sector 85319), Other research and experimental development on natural sciences and engineering (sector 72190), Activities of family and elderly care at home (sector 88101), Penal institutions (sector 84232), Federal government (sector 84111), General medical practice activities (sector 86210), Health insurance funds (sector 84302), Residential care activities for adults with mental health issues

(sector 87202) and Public Centers for Social Welfare (sector 84115) (Table 5 and Figure 6).

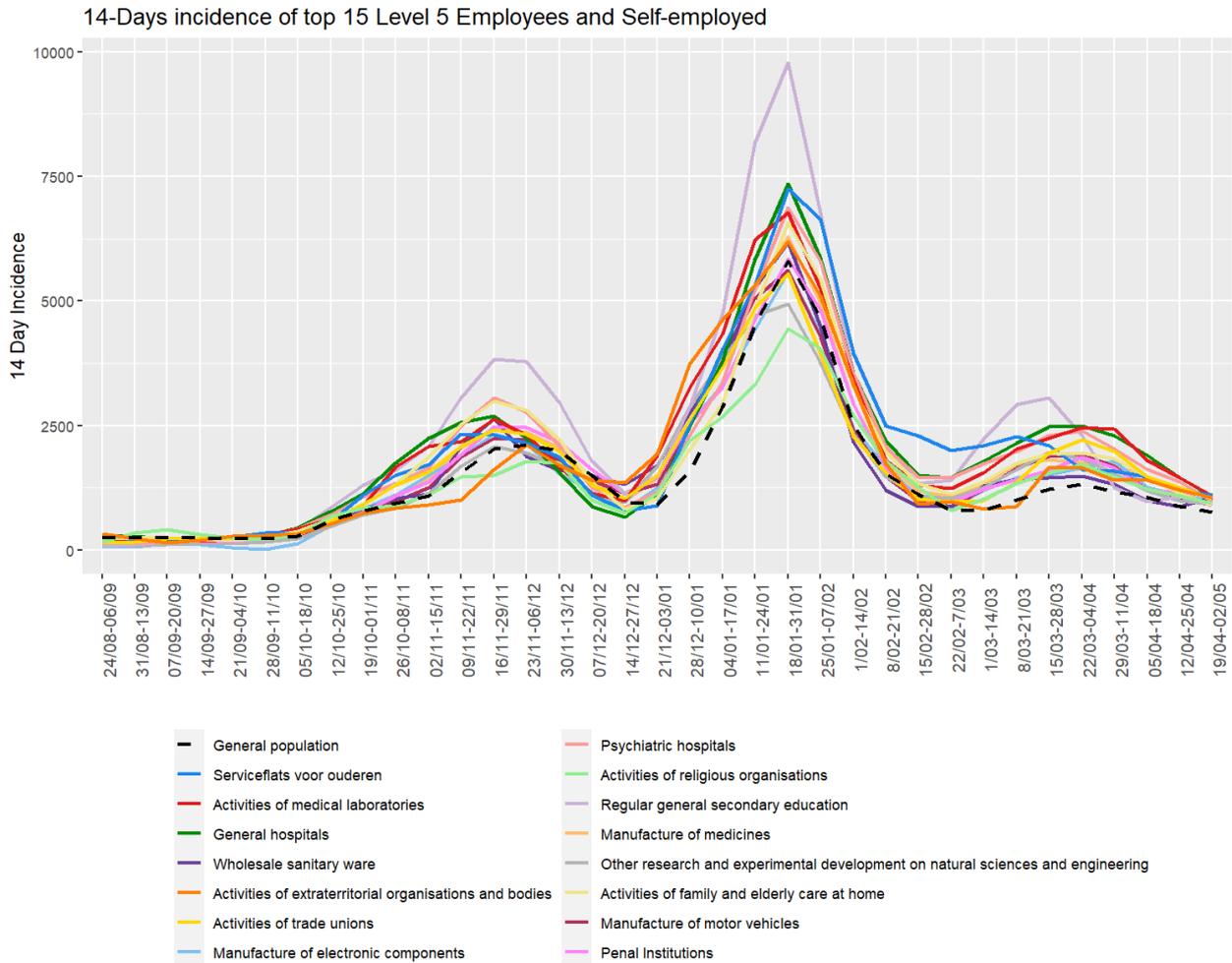


Figure 6: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 2 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
Serviceflats for the elderly	87302	6551	1099(873;1382)	1103(874;1392)		3.15
Activities of medical laboratories	86901	6496	1093(867;1377)	1074(838;1375)		11.19
General hospitals	86101	178406	1079(1032;1128)	1080(1033;1129)		0.26
Wholesale sanitary ware	46736	3311	1057(760;1469)	1093(782;1526)		6.08
Activities of extraterritorial organisations and bodies	99000	4084	1053(782;1417)	1035(766;1398)		0.66
Activities of trade unions	94200	5712	1033(801;1331)	1033(801;1331)		2.60
Manufacture of electronic components	26110	4868	986(744;1306)	1019(766;1354)		5.27
Psychiatric hospitals	86104	33299	979(879;1091)	979(879;1091)		0.36
Activities of religious organisations	94910	6930	938(736;1194)	984(769;1258)		8.45
Regular general secondary education	85319	211625	929(889;971)	929(889;971)		0.02
Manufacture of medicines	21201	31823	927(827;1038)	930(830;1042)		0.68
Other research and experimental development on natural sciences and engineering	72190	21490	926(806;1063)	969(842;1115)		6.83
Activities of family and elderly care at home	88101	45077	914(830;1006)	915(831;1008)		0.85
Manufacture of motor vehicles	29100	20556	900(780;1039)	901(780;1040)		0.66
Penal Institutions	84232	26629	890(784;1010)	890(784;1010)		0.00
Federal government	84111	30361	886(787;998)	886(787;998)		0.03
General medical practice activities	86210	17166	868(740;1018)	959(804;1143)	598(407;877)	25.92
Health insurance funds	84302	18288	853(730;997)	848(725;992)		0.75
Residential care activities for adults with mental health issues	87202	29181	843(744;955)	853(753;966)		1.61
Public Centers for Social Welfare (O.C.M.W.)	84115	91294	827(770;888)	827(770;888)		0.15
General population			758	758	758	
Working population		4664206	718(710;726)	718(710;726)		

Finally, when considering specifically the non-medical contact professions, we see that the incidence in the employees is close to the incidence in the self-employed. Additionally, the average incidence for both the beauty saloons and hairdressers is below the general population average. (Figure 7).

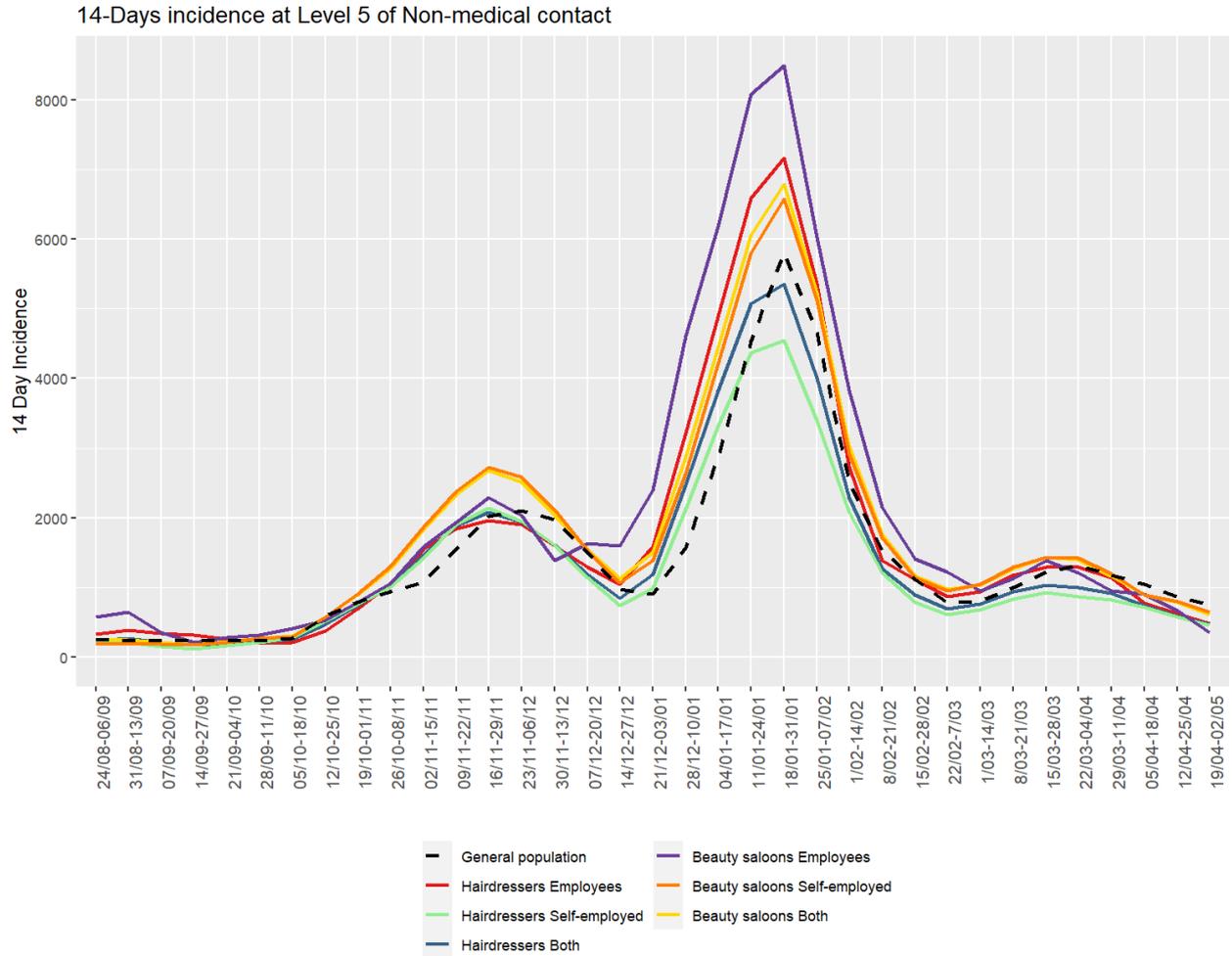


Figure 7: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

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). The increased incidence is broadly present in both the human health sector and is the highest in hospitals and general practitioners.

Although the 14-day incidence in 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 Federal government (sector 84111), Public Centers for Social Welfare (sector 84115), Justice activities (sector 8423), Health insurance funds (sector 94302), Other research and developmental work in the natural sciences (sector 7219) and Activities of trade unions (sector 9420).

It is encouraging that the incidence in Education (sector P), Arts, entertainment and recreation (sector R), Accommodation and food service activities (sector I) and Transportation and storage (sector H) is similar to or below the general population average, although the 14-day incidence in the passenger rail and air transport employees is increased compared to the other passenger transport employees.

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).

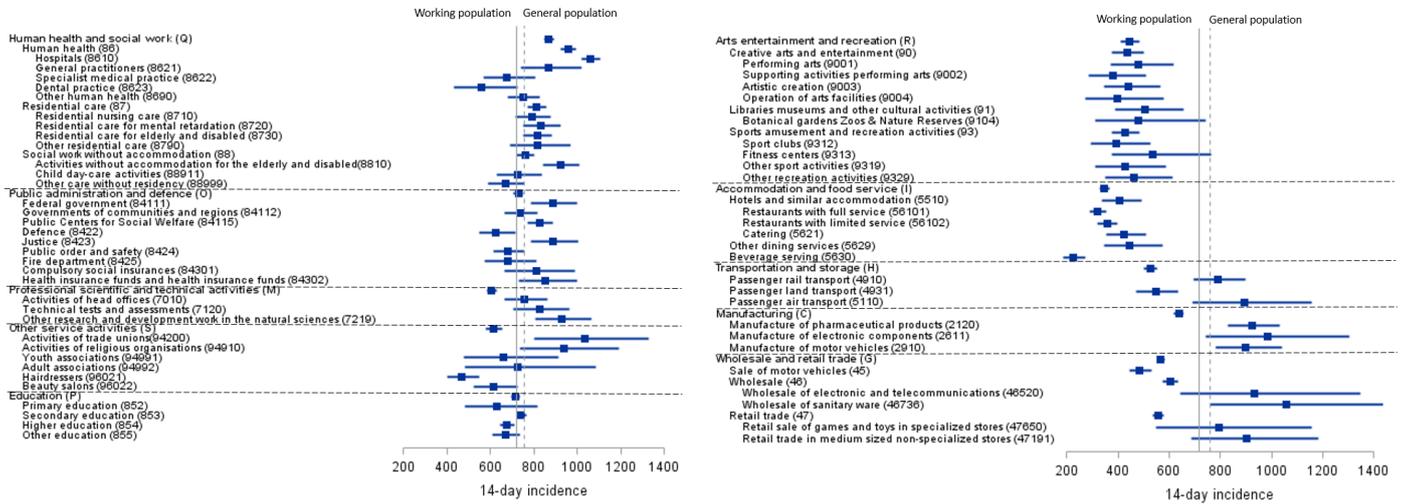


Figure 8: Forest plot of 14-Day incidence and 95% CI of selected sectors on 2 May 2022 in both employees and self-employed.

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 present in human health, residential care, public administration, associations and manufacturing. The average incidence in the working population is close and slightly lower than the average incidence in the general population, suggesting that infections are equally passed among adults and 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, public administration associations and manufacturing 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. Several manufacturing sectors, Human health activities, Residential care, several public administration activities, activities of trade unions, activities of extraterritorial organisations and bodies and activities of religious organisations 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 Other research and experimental development on natural sciences and engineering and health insurance funds. 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 education, accommodation and food services, transportation, arts entertainment and recreation and most 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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