

Monitoring Belgian COVID-19 infections in work sectors in 2021

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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. Two sources of information on infection in work sectors will be used in this report: the RSZ/ONSS data and the contact tracing data.

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.

1.2 Contact tracing

For companies affiliated with IDEWE, COVID-19 positive tested employees are reported to IDEWE starting from 22 July 2020. Of these index cases, contact tracing is performed of high and low-risk contact within the company. Subsequently, appropriate measures are taken within the company and by high-risk contacts to limit spread of the infection. Since 11 March 2021, index cases are asked about the work relatedness of their infection. At the start of the contact tracing, data were registered in a shared Excel file. From 29 October 2020 onwards, a ‘tracing application’ was used to register all notifications of index cases in companies under medical surveillance of IDEWE. Note that high and low-risk contacts are registered only for contacts in the company, contacts at home or in leisure time are not registered.

An index case can be any person present in the company. It can be an employee, but also an interim worker, an intern, etc. Importantly, for schools, the index case can also be a student. Of the index cases the employer information is retrieved via the INSZ number by IDEWE. Information of the employer is subsequently grouped by region and by customer segments. Although some customer segments are similar to the NACE code sectors, this is not true in general. IDEWE considers 10 customer segments based on the NACE codes of the companies, but these segments resemble only partially level 1 and 2. The segment classification is based on similarities in the needs of IDEWE’s customers and in the services IDEWE provides for them.

The incidences in the RSZ/ONSS sectors may differ from those in the contact tracing customer segments due to two aspects:

1. The RSZ/ONSS data concerns all employees and self-employed workers, while the contact tracing data concerns only companies under surveillance.
2. Similar named sectors and customer segments may contain different companies.

For instance, the NACE sector ‘education’ contains only information on positive cases among employees, while the contact tracing data also contain pupils. In schools, a considerable amount of index cases were pupils, especially since the onset of increased testing of children in January 2021. Finally, the contact tracing for the education segment is performed by regionally organised Student Guidance Centres (SGC). The organisation of the contact tracing by the SGC can vary from centre to centre and often only index cases with high-risk contacts are reported to IDEWE.

IDEWE has 9 regional offices that cover the surrounding areas and that are called after the city where they are located. Most Belgian provinces have one regional office, except Antwerp that is served by the regions Antwerpen, Mechelen and Turnhout, and Namur that serves all of Wallonia. The sole exception is Public transport. Companies belonging to this segment are not regionally divided.

Note that some larger companies have organised contact tracing by their internal prevention service. Data of these companies are however not included in this analysis, causing an underestimation of index cases in general. For some segments this underestimation might be more important than for others.

2 Methodology

2.1 RSZ/ONSS data

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 (2–15 November 2021) 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.

2.2 Contact tracing

In addition to the comparison of the 14-day incidence of index cases between customer segments under surveillance, also the 14-day incidence of index cases between regions are compared. The reported day is the last day of the 14-day period.

Since its initiation on 29 October 2020, the tracing application registers in a standardized manner, besides information on incidences, also information on high-risk and low-risk contacts of index cases. Per segment and per region, the mean number of high-risk contacts by the index case over the entire study period (29 October 2020–11 November 2021) and the four-weekly percentage of index cases with two or more high risk contacts are evaluated.

There might be an underreporting of high-risk contacts because the number of contacts for an index case is set equal to 0 by default by the application. For index cases, who for example could not be contacted or who refused to answer, the number of high and low-risk contacts is reported 0, which may not coincide with reality. The incidences reported by contact tracing depend on the testing willingness in sectors and accuracy in reporting high-risk contact.

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 21 sectors at level 1, the sectors with a 14-day incidence on 15 November 2021 significantly above the working population average are Electricity, gas, steam and air conditioning supply (sector D), Human health and social work activities (sector Q), Education (sector P), and Other service activities (sector S) (Table 1 and Figure 1). The sharp increase in incidences continues in all sectors, with a sharper increase in the Electricity, gas, steam and air conditioning supply sector.

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

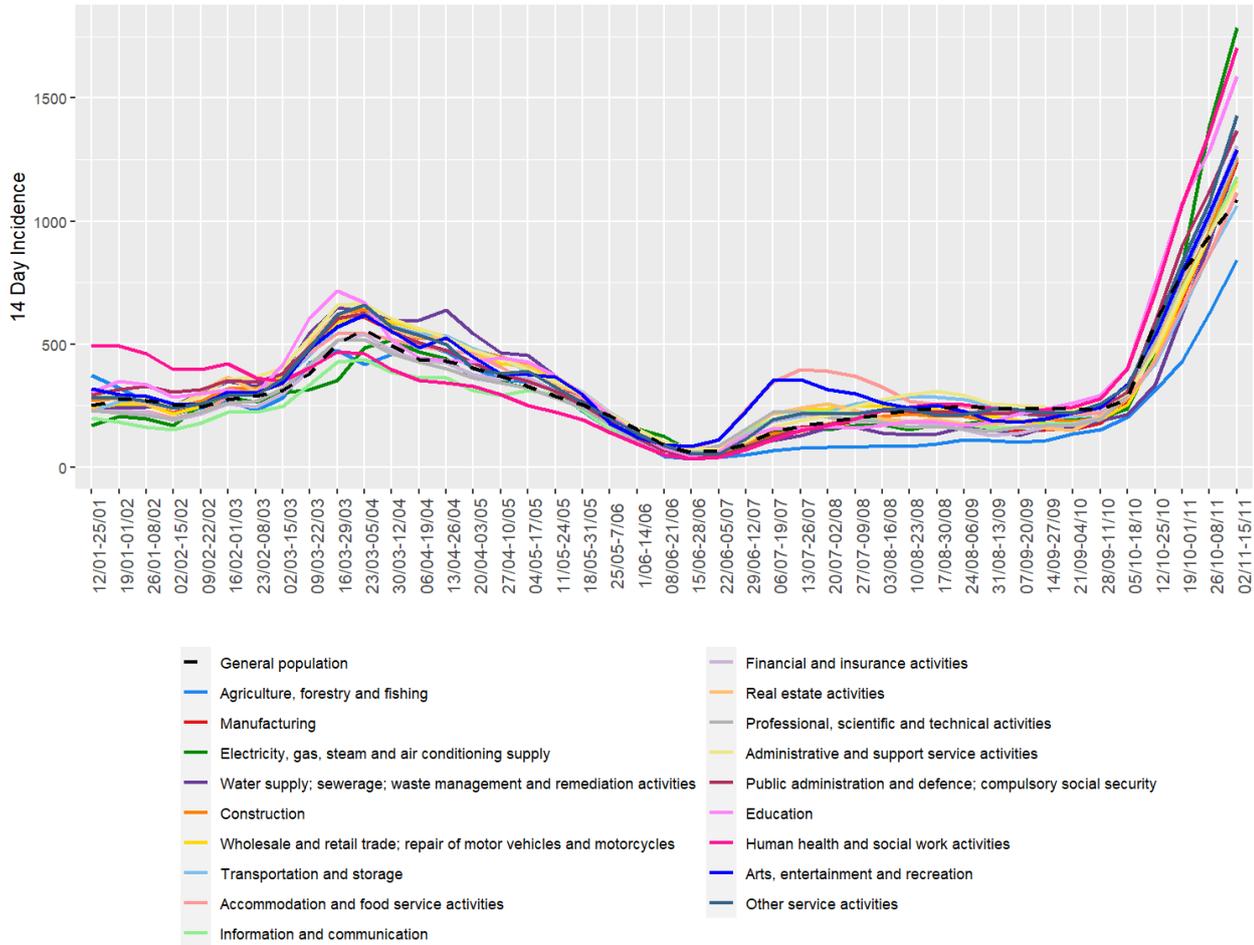


Figure 1: 14-Day incidence of COVID-19 infection of all 21 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of all 21 sectors at Level 1 on 15 November 2021

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
Electricity, gas, steam and air conditioning supply	D	19474	1787(1610;1983)	1785(1602;1988)		6.80
Human health and social work activities	Q	593838	1704(1671;1737)	1707(1673;1742)	1674(1569;1786)	9.29
Education	P	609824	1588(1557;1620)	1583(1551;1615)	1693(1544;1857)	4.41
Other service activities	S	160812	1429(1372;1488)	1323(1247;1403)	1540(1456;1629)	49.64
Working population		4173251	1372(1361;1383)	1372(1361;1383)		
Public administration and defence; compulsory social security	O	210373	1369(1320;1420)	1367(1318;1418)		0.50
Financial and insurance activities	K	159755	1307(1252;1364)	1314(1252;1379)	1280(1168;1403)	22.23
Arts, entertainment and recreation	R	109612	1290(1225;1359)	1209(1131;1293)	1431(1319;1552)	37.53
Real estate activities	L	58677	1285(1197;1379)	1292(1159;1440)	1279(1165;1405)	58.45
Water supply; sewerage; waste management and remediation activities	E	24525	1264(1132;1412)	1286(1146;1443)		9.70
Professional, scientific and technical activities	M	394695	1263(1229;1298)	1206(1160;1254)	1328(1277;1381)	47.70
Construction	F	382803	1256(1221;1292)	1218(1174;1264)	1313(1257;1371)	41.06
Manufacturing	C	624960	1242(1215;1270)	1235(1206;1264)	1301(1216;1392)	10.43
Information and communication	J	183912	1181(1133;1231)	1150(1093;1210)	1255(1165;1352)	30.26
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	845751	1165(1142;1188)	1155(1129;1181)	1202(1154;1252)	22.80
Administrative and support service activities	N	442845	1146(1115;1178)	1091(1058;1125)	1396(1317;1480)	18.35
Accommodation and food service activities	I	328290	1117(1082;1154)	1076(1037;1117)	1265(1185;1350)	22.68
General population			1086	1086	1086	
Transportation and storage	H	313534	1064(1029;1101)	1060(1023;1098)	1099(984;1227)	9.24
Agriculture, forestry and fishing	A	89442	843(785;905)	570(498;652)	1034(951;1124)	60.37

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 15 November 2021 significantly higher than the working population average are: Human health and residential care activities (sector 86, 87), Electricity, gas, steam and air conditioning supply (sector 35), Social work without accommodation (sector 88), Education (sector 85), Other personal service activities (sector 96) (Table 2 and Figure 2).

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

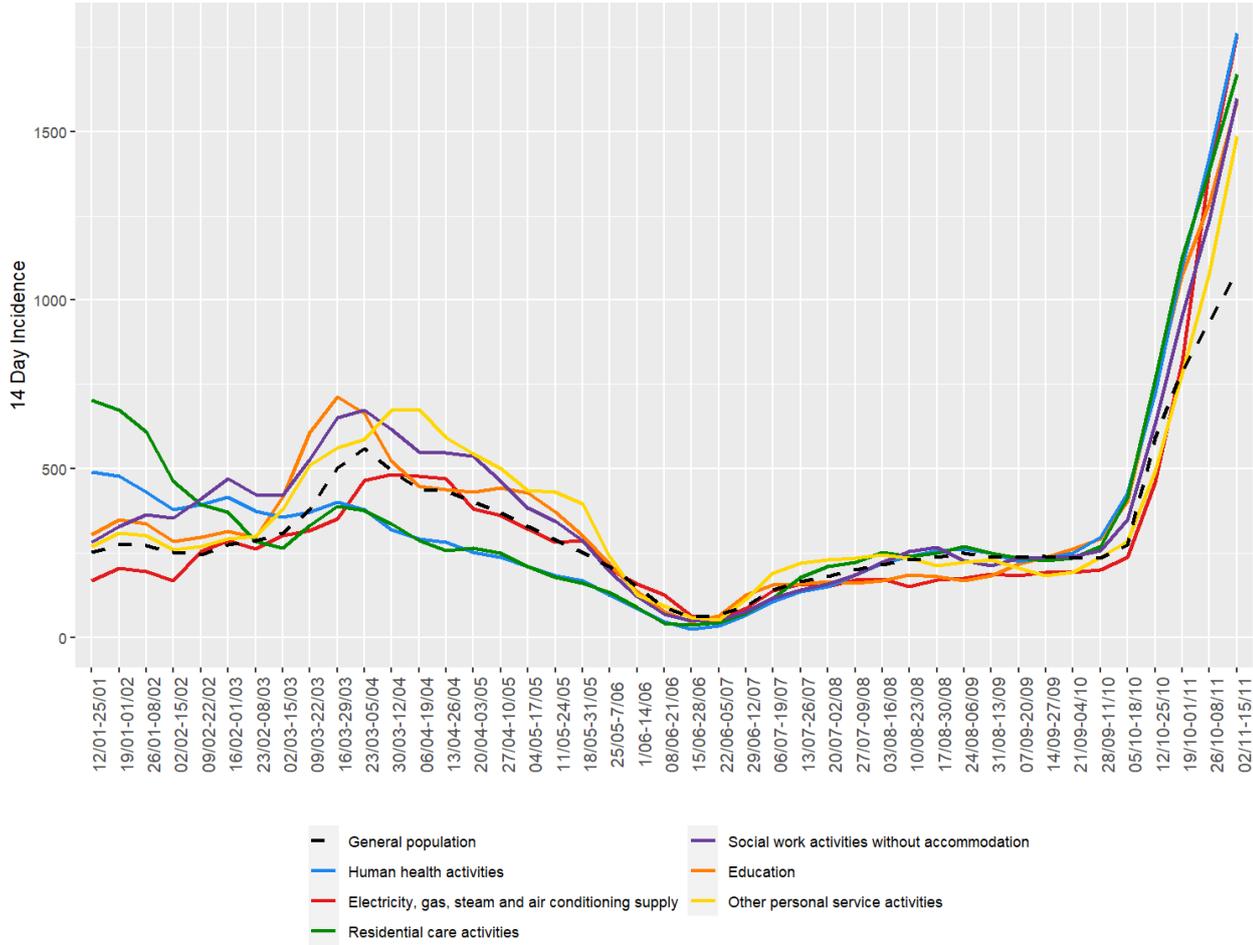


Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 on 15 November 2021

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	268045	1790(1740;1841)	1818(1763;1875)	1659(1548;1778)	17.96
Electricity, gas, steam and air conditioning supply	35	19474	1787(1610;1983)	1785(1602;1988)		6.80
Residential care activities	87	157690	1671(1609;1735)	1675(1612;1740)	1389(984;1958)	1.49
Social work activities without accommodation	88	169004	1597(1538;1658)	1591(1531;1653)	1787(1467;2176)	3.23
Education	85	609824	1588(1557;1620)	1583(1551;1615)	1693(1544;1857)	4.41
Other personal service activities	96	93876	1486(1411;1565)	1253(1135;1383)	1600(1505;1701)	68.33
Working population		4173251	1372(1361;1383)	1372(1361;1383)		
General population			1086	1086	1086	

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 15 November 2021 significantly higher than the working population average are: Residential care (sector 872, 879, 871), Social work activities without accommodation (sector 881, 889), Health care (sector 869, 861, 862), Electric power generation, transmission and distribution (sector 351), Education (sector 853, 855) (Figure 4) and Other personal service activities (sector 960) (Table 3 and Figure 3).

14-Days incidence of highest and steepest Level 3 Employees and Self-employed

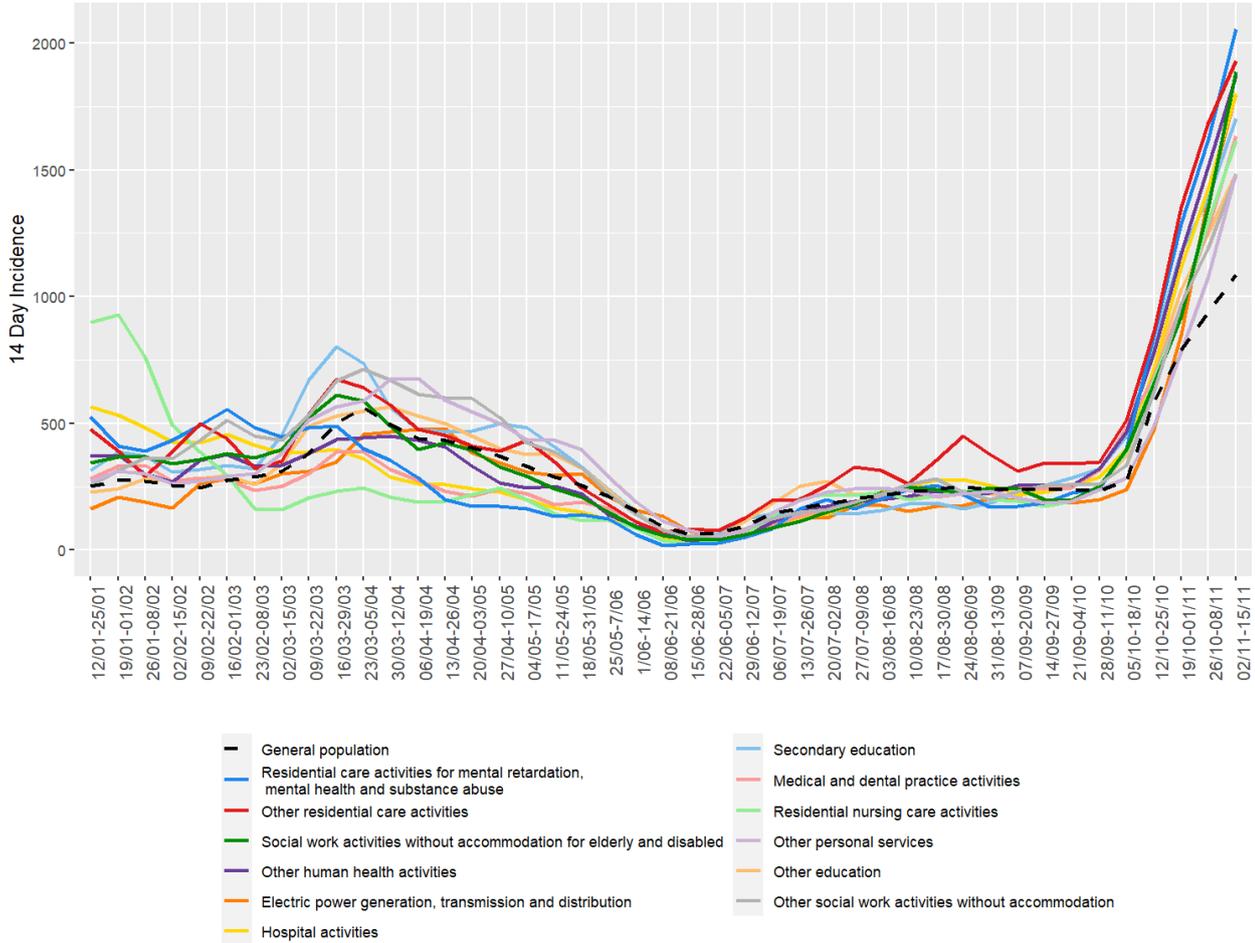


Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 in both employees and self-employed

14-Days incidence Education per Level 3 Sector

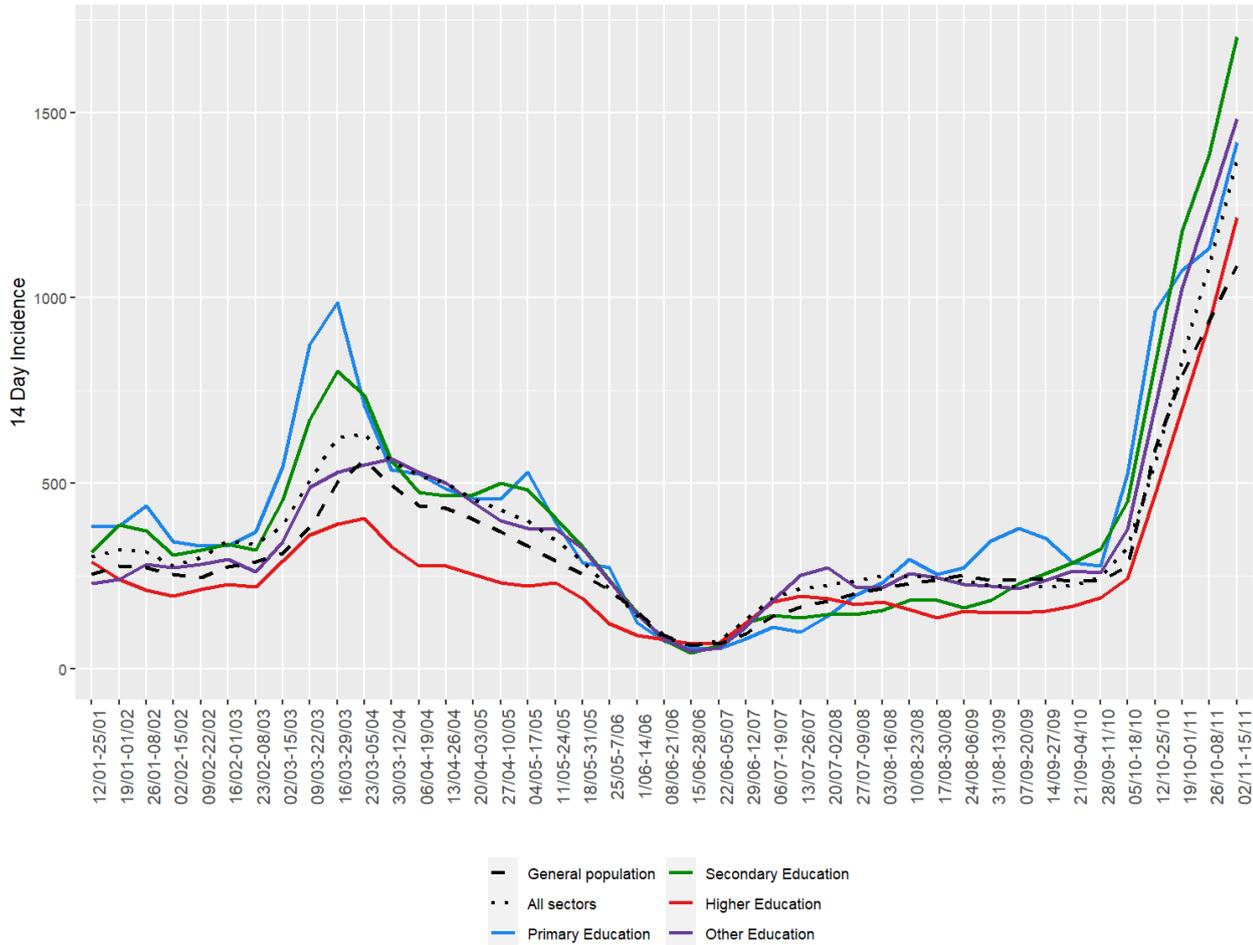


Figure 4: 14-Day incidence of COVID-19 infection in Education sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 15 November 2021

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
Residential care activities for mental retardation, mental health and substance abuse	872	41918	2054(1923;2194)	2058(1925;2200)		1.81
Other residential care activities	879	16321	1930(1730;2153)	1950(1745;2178)		3.57
Social work activities without accommodation for the elderly and disabled	881	48941	1888(1771;2012)	1886(1769;2011)		1.09
Other human health activities	869	54545	1870(1760;1987)	1868(1718;2031)	1873(1714;2046)	47.49
Electric power generation, transmission and distribution	351	18247	1803(1620;2007)	1808(1618;2019)	1729(1130;2637)	6.67
Hospital activities	861	168795	1801(1739;1866)	1804(1741;1869)		0.42
Secondary education	853	428462	1704(1666;1743)	1704(1666;1743)		0.20
Medical and dental practice activities	862	45527	1632(1520;1753)	1848(1685;2026)	1392(1244;1557)	48.10
Residential nursing care activities	871	34201	1614(1486;1753)	1618(1489;1758)		1.18
Other personal service activities	960	93876	1486(1411;1565)	1253(1135;1383)	1600(1505;1701)	68.33
Other education	855	55660	1484(1387;1588)	1320(1200;1452)	1702(1546;1874)	43.70
Other social work activities without accommodation	889	120149	1479(1412;1549)	1467(1399;1538)	1744(1417;2144)	4.23
Working population		4173251	1372(1361;1383)	1372(1361;1383)		
General population			1086	1086	1086	

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 15 November 2021 significantly higher than the working population average are: Child day-care (sector 8891), Manufacture sectors (sector 1920, 2443), Residential care (sector 8720, 8790, 8710), Health care (sector 8621, 8690, 8610, 8622), Distribution of electricity (sector 3513), Education (sector 8551, 8531), Social work activities without accommodation for the elderly and disabled (sector 8810), Wholesale of solid, liquid and gaseous fuels and related products (sector 4671), Fitness facilities (sector 9313), Other human resources provision (sector 7830), Hairdressing and other beauty treatment (sector 9602) and Public order and safety activities (sector 8424) (Table 4 and Figure 5).

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

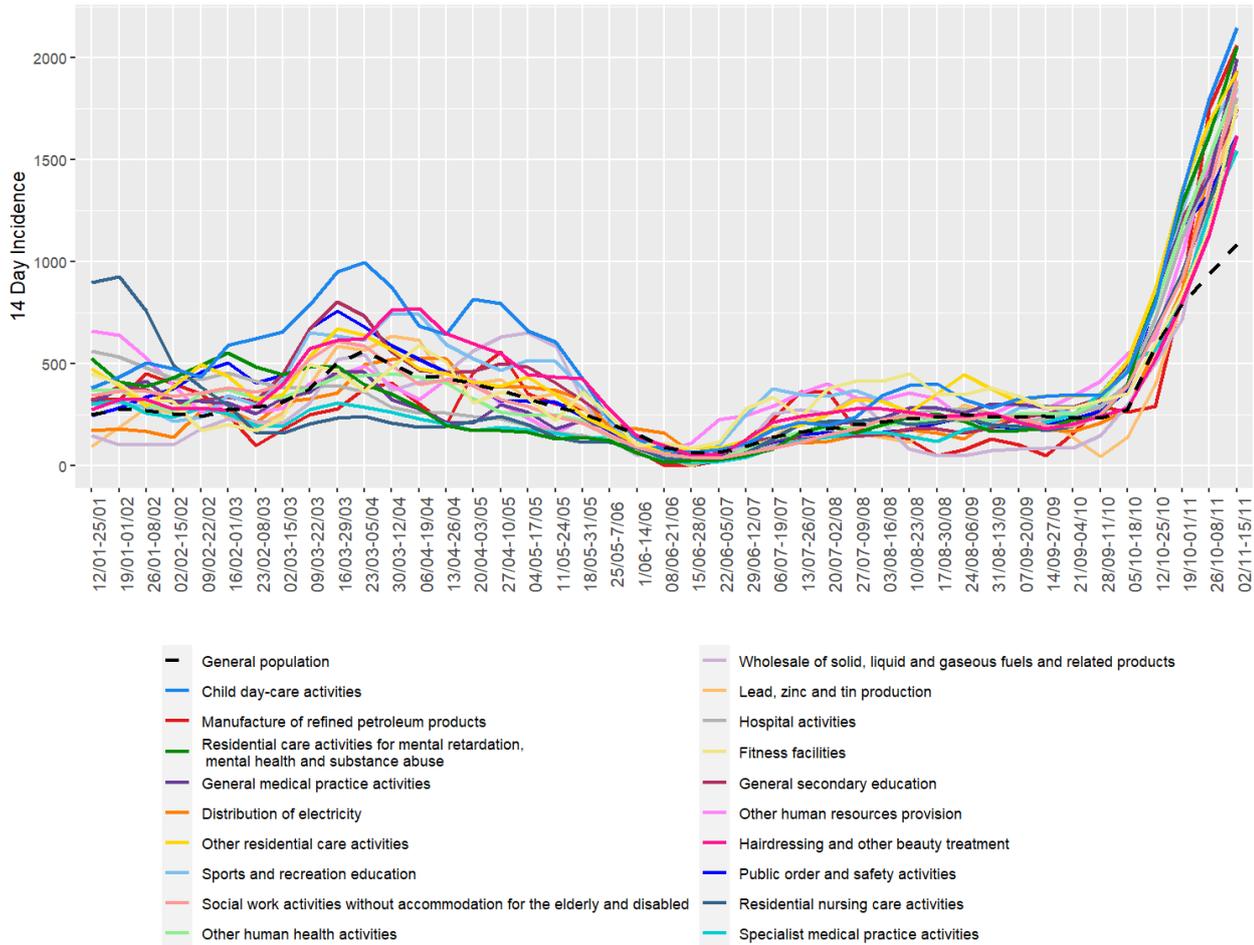


Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 15 November 2021

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
Child day-care activities	8891	28399	2148(1986;2323)	2135(1968;2316)	2349(1740;3163)	6.35
Manufacture of refined petroleum products	1920	3738	2060(1651;2568)	2060(1651;2568)		1.03
Residential care activities for mental retardation, mental health and substance abuse	8720	41918	2054(1923;2194)	2058(1925;2200)		1.81
General medical practice activities	8621	17084	1996(1797;2217)	2002(1773;2260)	1978(1604;2437)	25.99
Distribution of electricity	3513	8828	1937(1669;2246)	1900(1634;2208)		1.05
Other residential care activities	8790	16321	1930(1730;2153)	1950(1745;2178)		3.57
Sports and recreation education	8551	9947	1890(1640;2177)		2007(1733;2324)	88.22
Social work activities without accommodation for the elderly and disabled	8810	48941	1888(1771;2012)	1886(1769;2011)		1.09
Other human health activities	8690	54545	1870(1760;1987)	1868(1718;2031)	1873(1714;2046)	47.49
Wholesale of solid, liquid and gaseous fuels and related products	4671	4644	1852(1502;2282)	1803(1429;2273)		16.42
Lead, zinc and tin production	2443	4314	1808(1450;2252)	1797(1440;2241)		0.70
Hospital activities	8610	168795	1801(1739;1866)	1804(1741;1869)		0.42
Fitness facilities	9313	5486	1768(1451;2153)	1797(1435;2248)		24.52
General secondary education	8531	403831	1749(1709;1790)	1749(1709;1790)		0.16
Other human resources provision	7830	4654	1719(1383;2135)	1672(1325;2108)		10.02
Hairdressing and other beauty treatment	9602	56049	1620(1519;1728)	1559(1361;1786)	1639(1523;1764)	78.22
Public order and safety activities	8424	17171	1619(1441;1819)	1619(1441;1819)		0.56
Residential nursing care activities	8710	34201	1614(1486;1753)	1618(1489;1758)		1.18
Specialist medical practice activities	8622	19017	1546(1380;1732)	2032(1688;2444)	1352(1171;1560)	71.88
Working population		4173251	1372(1361;1383)	1372(1361;1383)		
General population			1086	1086	1086	

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 15 November 2021 significantly higher than the working population average are: Mental health activities (sector 87201, 86904, 87202), Nurseries and crèches (sector 88911), Secondary education (sector 85319, 85311), Other human health care (sector 86901, 86909, 86906, 86905), Manufacture sectors (sector 19200, 24430), General medical practice (sector 86210), Integrated youth care with housing (sector 87901), Distribution of electricity (sector 35130), Sports and recreation education (sector 85510), Care at home and other social services (sector 88101, 88999), Hospital activities (sector 86103, 86101, 86104), Wholesale of solid, liquid and gaseous fuels (sector

46710), Activities of football clubs (sector 93121), Beauty care (sector 96022), Youth work associations (sector 94991), Auditors and banking agents and brokers (sector 69203, 66191), Fitness centers (sector 93130), Other human resources provision (sector 78300), Other personal services (sector 96099), Federal police (sector 84241), Rest and care homes (sector 87101) and Specialist medical practice activities (sector 86220) (Table 5 and Figure 6).

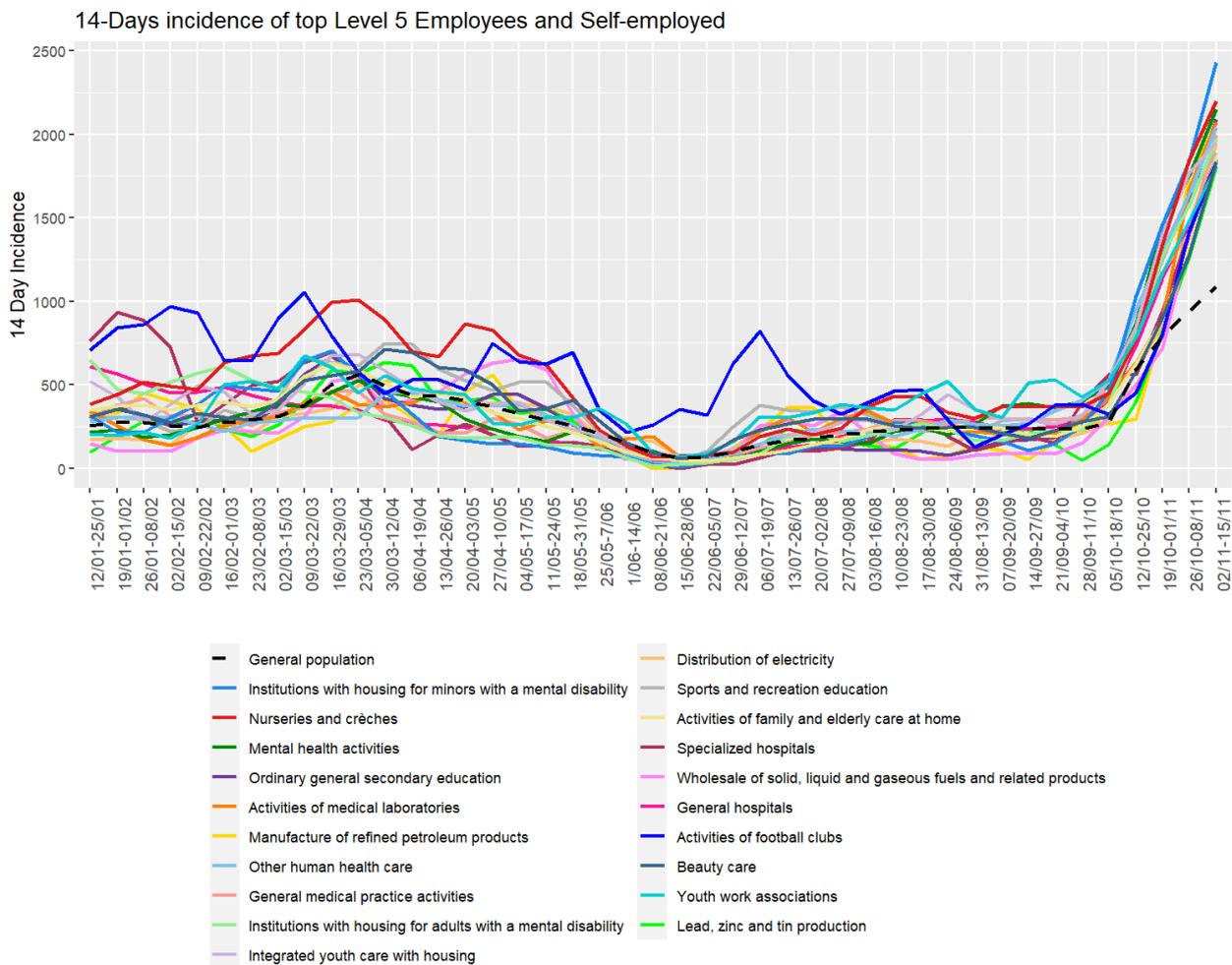


Figure 6: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 15 November 2021

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
Institutions with housing for minors with a mental disability	87201	9009	2431(2132;2770)	2431(2132;2770)		1.26
Nurseries and crèches	88911	24864	2200(2025;2390)	2194(2013;2390)	2289(1663;3143)	6.56
Mental health activities	86904	6937	2148(1832;2517)	2151(1708;2706)	2145(1721;2670)	53.50
Ordinary general secondary education	85319	207358	2093(2032;2156)	2093(2032;2156)		0.02
Activities of medical laboratories	86901	6654	2074(1758;2446)	2125(1787;2525)		10.88
Manufacture of refined petroleum products	19200	3738	2060(1651;2568)	2060(1651;2568)		1.03
Other human health care	86909	11106	2044(1797;2324)		2063(1806;2356)	93.10
General medical practice activities	86210	17084	1996(1797;2217)	2002(1773;2260)	1978(1604;2437)	25.99
Institutions with housing for adults with a mental disability	87202	27595	1975(1817;2146)	1987(1828;2160)		1.70
Integrated youth care with housing	87901	12590	1954(1726;2211)	1978(1746;2240)		2.86
Distribution of electricity	35130	8828	1937(1669;2246)	1900(1634;2208)		1.05
Sports and recreation education	85510	9947	1890(1640;2177)		2007(1733;2324)	88.22
Activities of family and elderly care at home	88101	45064	1864(1743;1993)	1860(1739;1990)		0.85
Specialized hospitals	86103	4619	1862(1510;2295)	1862(1510;2295)		1.49
Wholesale of solid, liquid and gaseous fuels and related products	46710	4644	1852(1502;2282)	1803(1429;2273)		16.42
General hospitals	86101	130468	1838(1767;1912)	1841(1769;1916)		0.35
Activities of football clubs	93121	5607	1837(1517;2224)	1649(1298;2094)	2307(1676;3168)	29.04
Beauty care	96022	24087	1835(1673;2012)		1869(1695;2060)	89.49
Youth work associations	94991	5188	1812(1483;2213)	1837(1491;2261)		8.79
Lead, zinc and tin production	24430	4314	1808(1450;2252)	1797(1440;2241)		0.70
Auditors	69203	4123	1795(1432;2249)	1795(1387;2320)		23.04
Fitness centers	93130	5486	1768(1451;2153)	1797(1435;2248)		24.52
Nursing Activities	86906	16638	1743(1555;1953)	1732(1532;1958)	1819(1332;2480)	12.95
Outpatient rehabilitation activities	86905	10836	1735(1506;1999)		1564(1323;1849)	80.14
Other human resources provision	78300	4654	1719(1383;2135)	1672(1325;2108)		10.02
Other personal services	96099	6635	1673(1391;2011)		1725(1432;2077)	95.37
Psychiatric hospitals	86104	32690	1658(1525;1802)	1658(1525;1803)		0.36
Banking agents and brokers	66191	10900	1633(1411;1889)	1677(1412;1991)	1530(1161;2013)	30.24
Federal Police	84241	17109	1619(1440;1819)	1619(1440;1819)		0.00
Rest and care homes	87101	34181	1612(1484;1751)	1619(1490;1759)		1.13
Specialist medical practice activities	86220	19017	1546(1380;1732)	2032(1688;2444)	1352(1171;1560)	71.88
Other social services without housing	88999	36225	1510(1389;1641)	1507(1382;1643)	1549(1134;2113)	7.00
Ordinary general secondary education organized by the Communities	85311	160647	1484(1426;1544)	1483(1425;1543)		0.01
Working population		4173251	1372(1361;1383)	1372(1361;1383)		
General population			1086	1086	1086	

Finally, when considering specifically the non-medical contact professions, such as hairdressers and beauty saloons, we see a that the incidence in non-medical contact professions employees and self-employed follow the increasing trend (Figure 7).

14-Days incidence at Level 5 of Non-medical contact

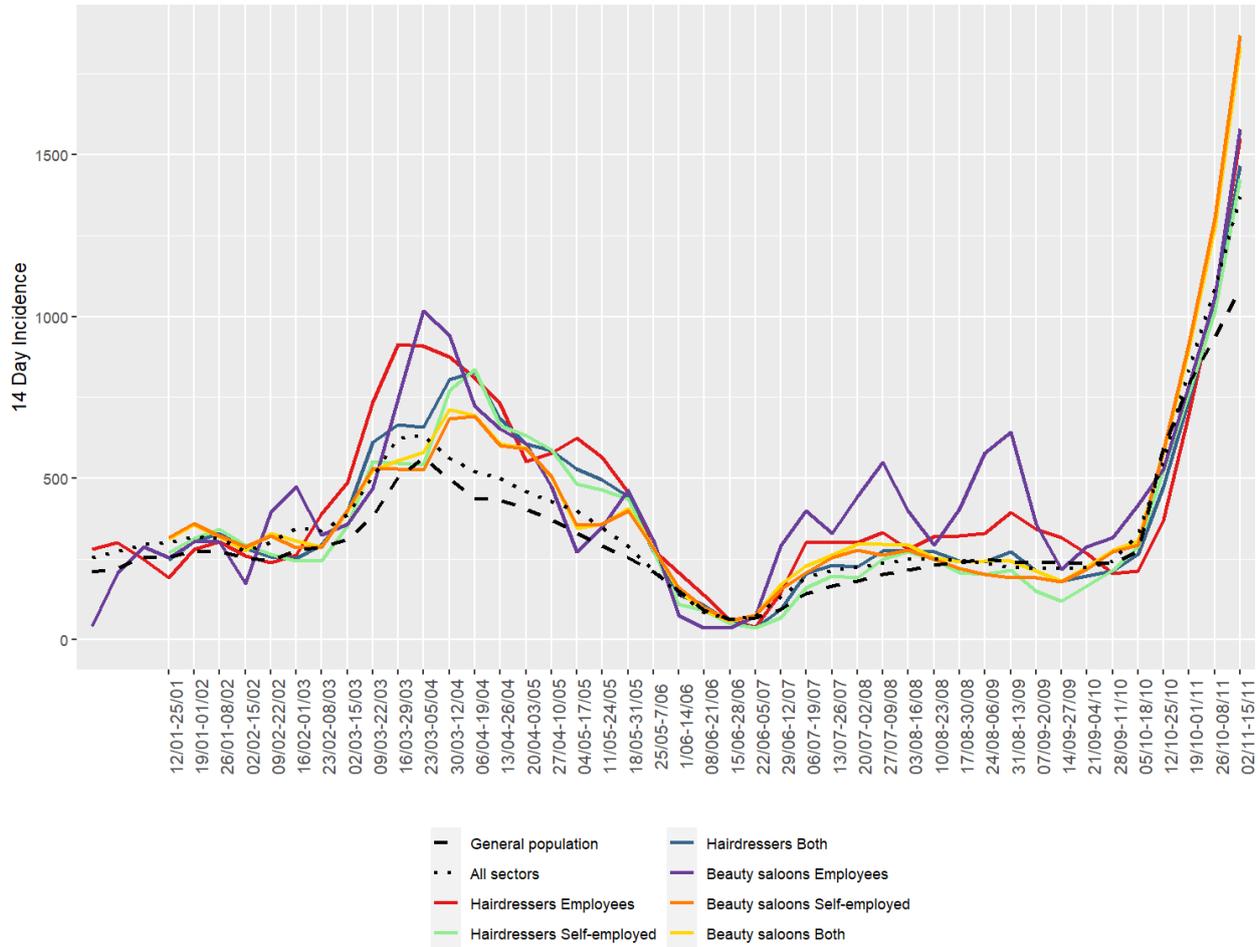


Figure 7: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

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 Electricity, gas, steam and air conditioning supply (sector D), Human health and social work sector (sector Q), Education (sector P) and Other service activities (sector S) are markedly elevated compared to the working and general population (Figure 8).

In the Human health and social work sector (sector Q) elevated incidences are present in almost all subsectors of Human health (sector 86) and Residential care (Sector 87), social work without accomodation (sector 88). In Education, secondary education and other education show elevated incidences, while in Other service activities, Youth work associations (sector 94991), Beauty salons (sector 96022) and Other personal service (sector 96099) are responsible for the increased incidences.

Although the 14-day incidence in Public administration and Defence (sector O) and Arts, entertainment and recreation (sector R) is around the working population average, individual subsectors show an increased incidence. Public order and safety (sector 8424), Fitness centers (sector 9313) and Activities of football clubs (sector 93121) show increased incidences compared to the working population.

The incidence in Transportation and storage (sector H) and Accommodation and food service activities (sector I) is significantly below the working population average and similar to the general population incidence, although Beverage serving (sector 5630) and and other dining services (sector 5628) are doing worse then hotels and restaurants.

The sectors Manufacturing (sector C) and Wholesale and retail trade (sector G) are sectors with the highest number of sublevels. In all manufacturing sectors the incidence is below or close to the working and popu-

lation average, except for the manufacture of refined petroleum products (sector 1920), Lead, since and tin production (sector 2443) and manufacture of office and store furniture (sector 3101). In all subsectors of Sale of motor vehicles (sector 45) Wholesale (sector 46) and Retail sale (sector 47), the incidence is similar or below the working population average, except for the Wholesale of solid, liquid and gaseous fuels (sector 4671) and Retail sale in medical and orthopedic articles (sector 4774) (Figure 8).

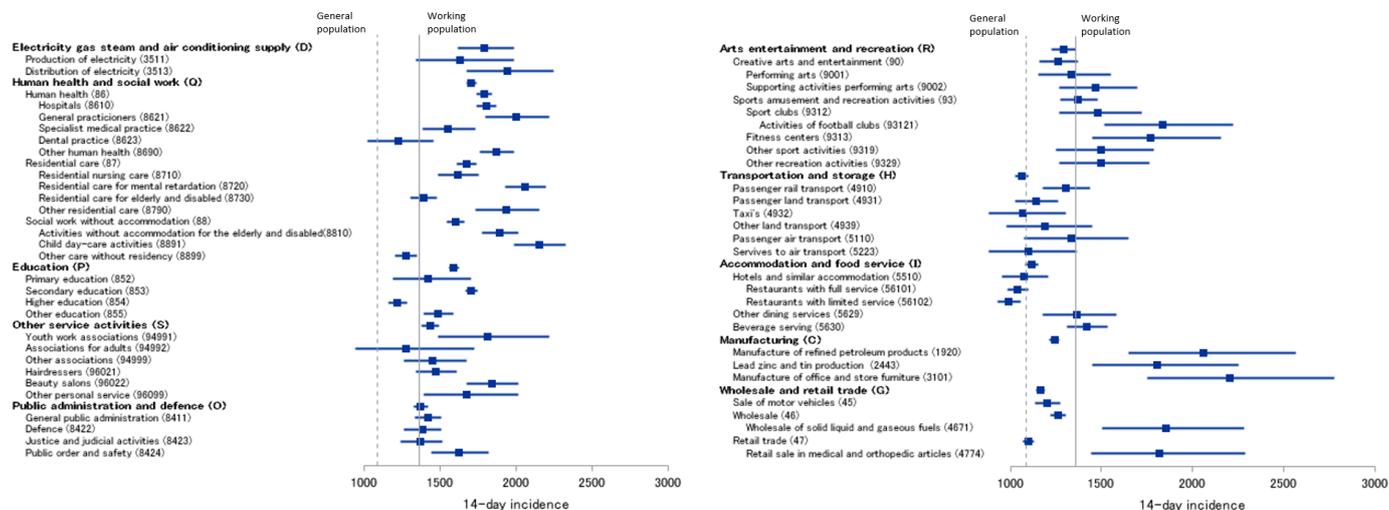


Figure 8: Forest plot of 14-Day incidence and 95% CI of selected sectors on 4 October 2021 in both employees and self-employed.

3.7 Contact tracing

In 2020–2021 about 800,000 employees are under medical surveillance of IDEWE. Among these, 26,795 COVID-19 index cases were registered between 22 July 2020 (week 30) and 11 November 2021, for whom the customer segment, region and the registration date are known for 26,479 index cases.

Since October the 14-day incidence is rising rapidly to 310 in 14 days per 100.000 on 9 November (Figure 9). The increase is highest in the education segment, which reached a peak on 2 November (861 index cases per 100,000) and is present in all regions. The regions with the highest incidences are Turnhout (502 cases per 100,000) and Hasselt (465 cases per 100,000). Incidences are also high in Emergency (568 cases per 100,000) and Government (452 cases per 100,000) segments.

Note that two factors, mentioned above, may cause bias in the figures: employees of some large companies are not included and beside employees, external persons are also registered as an index case. Especially students and pupils may influence the figures of Education.

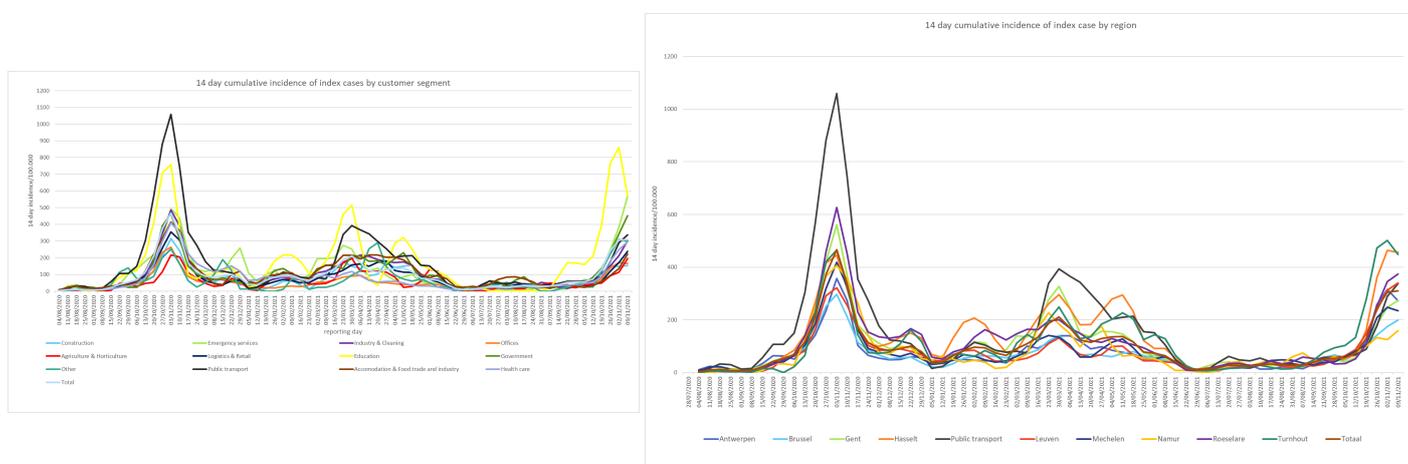


Figure 9: 14-Day incidence of index cases by segments under surveillance (left) and by region (right)

Since the establishment of the tracing app on 29 October 2020, there are 20,537 index cases of whom high-risk contacts were recorded. Of 20,374 index cases, the customer segment and region is known. The mean number of high-risk contacts in segment Education, Emergency services, Government and Public Transport

and Government is above 1, while in the Hasselt region a higher mean number of high-risk contacts is reported in the period 29 October 2020–11 November 2021 (Figures 10).

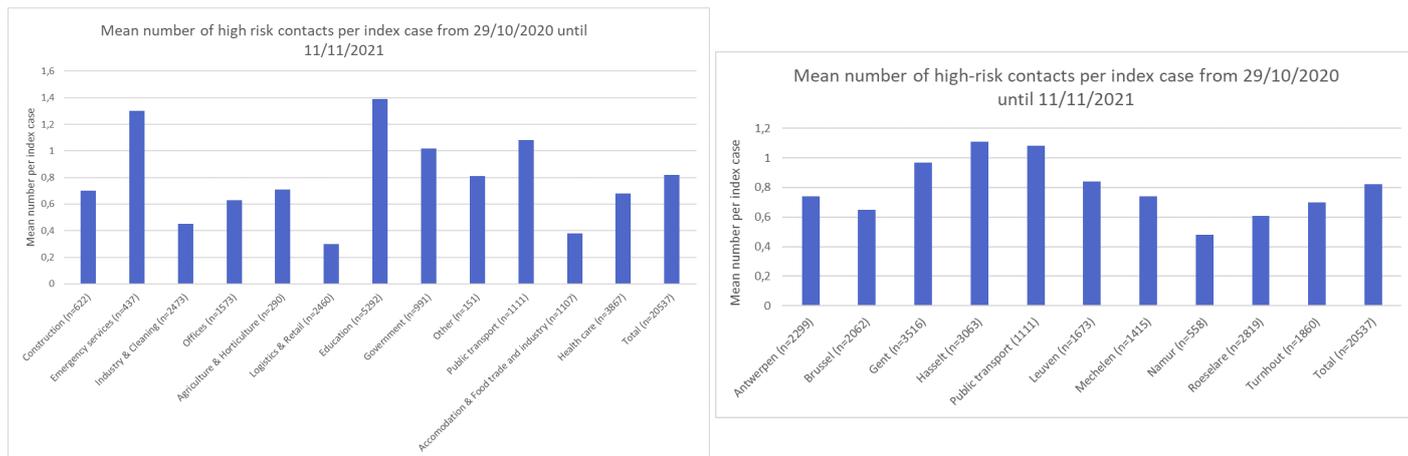


Figure 10: The mean number of high-risk contacts per index case by segments under surveillance (left) and by region (right)

The number of high-risk contacts per index case varies from 0 to 62, with more than 99% being lower than 10 high-risk contacts. Sixty-nine percent had 0 high risk contacts. A sole high number of high-risk contact for an index will influence the mean number for a segment importantly, especially when groups are small. To avoid extremely high numbers of contacts influencing results, we report the percentage of index cases who had two or more high-risk contacts per four weeks.

The percentage of index cases with two or more high-risk contacts is seems to decline slightly in most segments and regions in the most recent period (27 October– 11 November 2021), although the most recent period only concerns a 2 week period. (Figure 11).

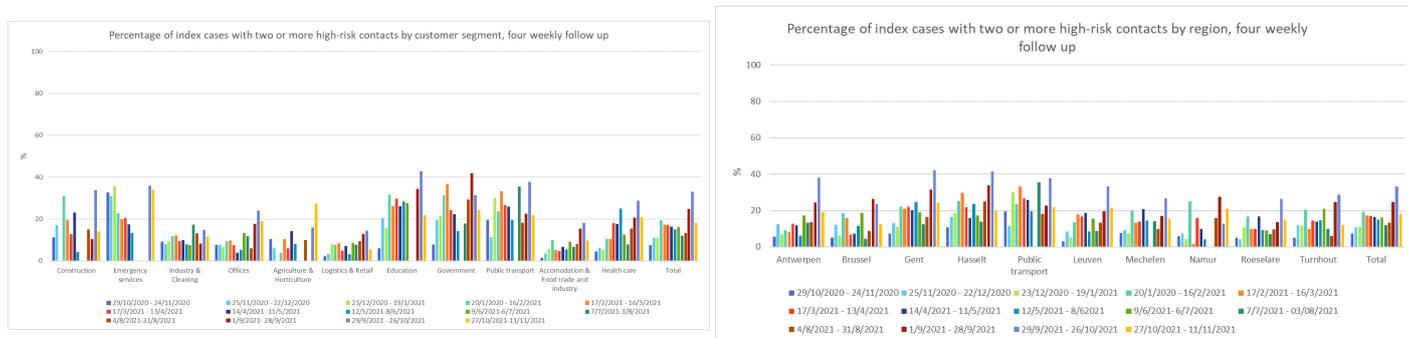


Figure 11: Four weekly percentage of index cases with two or more high-risk contacts by segments under surveillance (left) and by region (right)

Since 11 March 2021, index cases are asked if they contracted COVID-19 during work and if they did, which were the circumstances or the source of the infection. Note that pupils and other external index cases were left out of the following analyses.

From 11,206 index cases, we have information about perceived work relatedness of the source of infection. While 40% of the index cases does not know whether the infection took place at work, 18% responded that they were certainly or probably infected at work (Figure 12 left). From 3,195 (29%) of the index cases that answered they were certainly, probably, or possibly infected at work, further information was obtained on how the infection took place (Figure 12 right). A majority of the index cases (62%) indicates to know the source of infection at work.

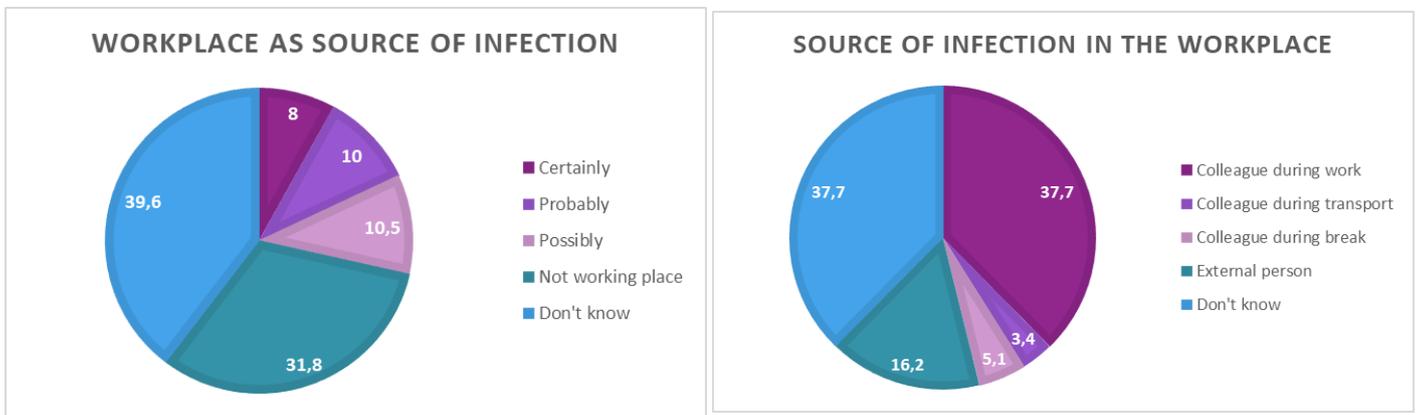


Figure 12: Distribution of the probability and source of infection at work by index case

In the education segment only 24% of the cases are attributable to pupils in the last 2 weeks (Figure 13 left). During the school year, approximately 40% of index cases in education are pupils. Since the last 2 weeks include a school holiday, the percentage of pupils is lower. The interpretation of these data should be undertaken, however, with caution. Index cases in schools, both pupils and teachers, are reported to IDEWE by CLBs and schools in order to reach high-risk contacts among teachers and provide them with prescriptions for PCR tests and quarantine. The working method is, however, not the same for all CLBs and schools and therefore notification of index cases may differ between CLBs and regions. Moreover, index cases with only low risk contacts are often not reported to our service, because they do not need prescriptions for tests or quarantine. This might lead to an underestimation of index cases among pupils and teachers. Note that pupils are tested on a larger scale since January 2021.

Since the tracing app came in use, the social security number of most index cases is registered. Age is calculated from the social security number and is available for most index cases. In contrast to the previous school year 2020, the majority of the index cases (80%) in school year 2021 is aged under 12 years (and unvaccinated) (Figure 13 right). Note that some type of schools might be over- or underrepresented in comparison to the Belgian school landscape, as a result of which the proportion of age groups might not be representative for the Belgian school population. Before 20 January 2021, biweekly numbers of cases are too small to allow for an interpretation, as well as the period 31 March–13 April 2021 and 9 June–6 July 2021.

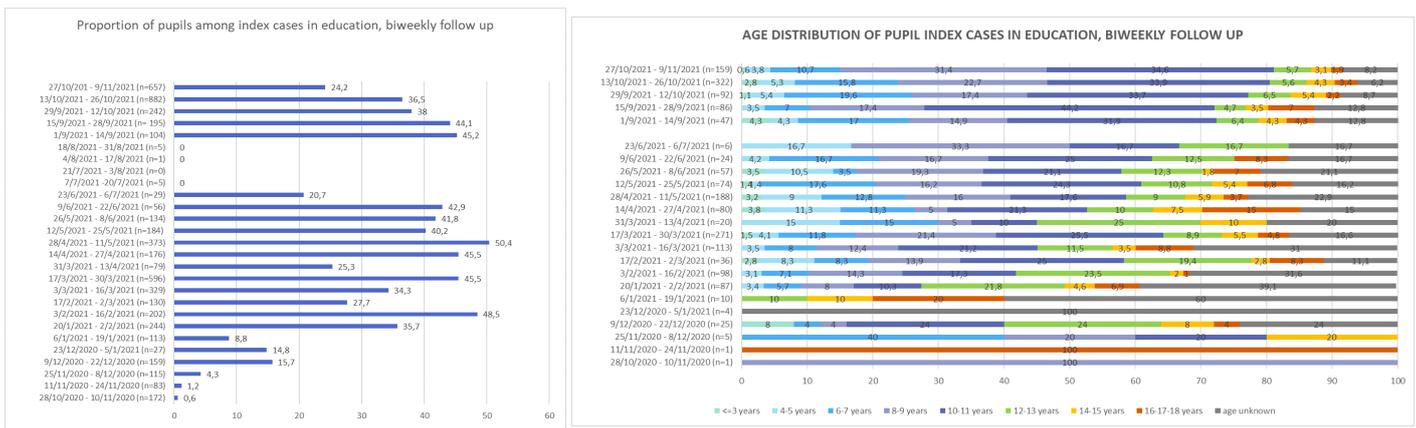


Figure 13: The evolution of index cases of pupils in school (left) and their age distribution (right).

Since 7 June 2021, the vaccination status of index cases is registered, with the type of vaccine if applicable. Because of the large number of index cases since October 2021, it is no longer possible to check the vaccination status of index cases in Vaccinnet. Therefore, self-reported vaccination data are reported and vaccine-effectiveness is no longer calculated, as self-reported data are incomplete and possibly incorrect.

From 5,832 adult index cases we had information about their vaccination status: 4,641 were partially or completely vaccinated (2,980 Cominarty, 854 Vaxzevria, 239 Moderna and 318 Johnson % Johnson and 240 did not know the type of vaccine.) (Figure 14 left). With a vaccination coverage in the working population of 85% since September 2021 (data derived from Sciensano), it is important to evaluate these breakthrough index

cases. Vaccination coverage of the population changed rapidly from June until September and is reaching a plateau since that time. The amount of index cases who received only one dose or who became infected within 15 days after their last vaccination dose made up the majority of vaccinated cases until August 2021 and drops to 1% in October 2021. As a consequence most index cases are expected to be fully vaccinated (Figure 14 left).

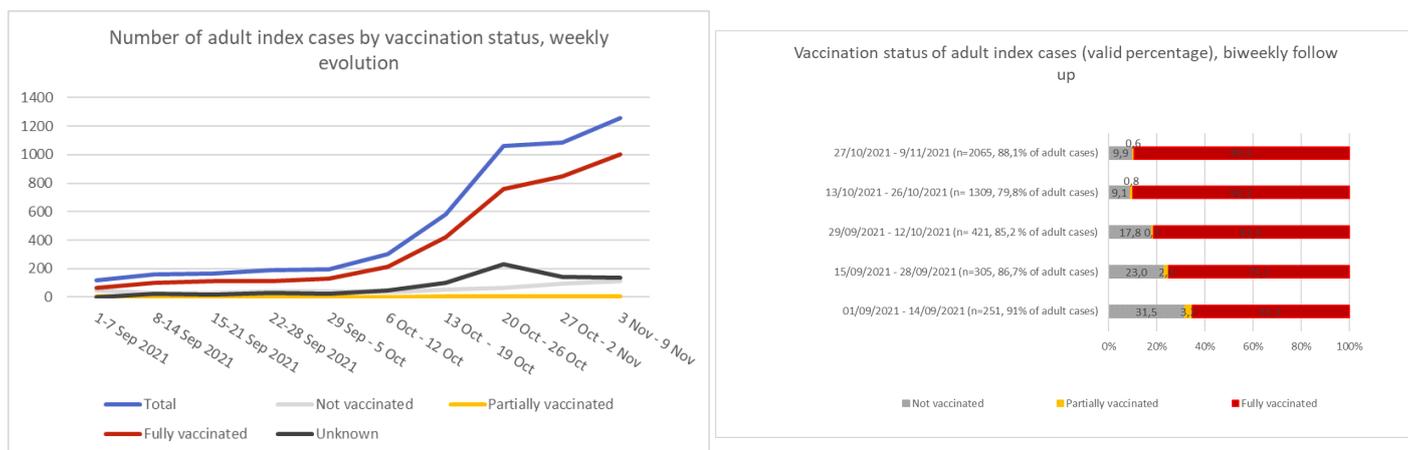


Figure 14: The weekly evolution of index cases and their vaccination status (left) and biweekly evolution of the self-reported vaccination status of index cases (right).

4 Conclusion

Despite the limitations of the data, both the contact tracing as the RSZ/ONSS data demonstrates a continues sharp increase of the 14-day COVID-19 incidences in most sectors, well above the incidences seen in the March-May wave in 2021. The highest incidences are present in education and health care and residential care. The average incidence in working population is again higher than the average incidence in the general population, suggesting that infections are now relatively more passed on among adults instead of children. Vigilance is required in sectors with close contact to young children, and in those sectors where workers are exposed to high-risk close physical proximity, and where climate conditions are difficult to control.

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 shows that in the index cases, where this information was available, 8% indicated that the workplace was certainly the source of infection.

It is clear that in most sectors at level 1 the 14-day incidence follows the sharply increasing pattern that is observed in the working population. The contact tracing shows a larger increase in incidences in the education segment since the start of the school year and a drop in incidence during the school holiday, due to the presence of cases in children in the contact tracing, while the RSZ data concerns only employees.

With an increased circulation of the delta variant of concern of SARS-CoV-2, it is important to carefully monitor incidence of COVID-19 in the sectors with high-risk, multiple close physical proximity, especially with younger, not yet vaccinated individuals. Youth work associations, Other associations, Primary and secondary education, Nurseries and crèches, Health care and Residential care sectors, all show higher incidences and require careful attention. Especially in the context of increased high-risk contacts, as shown by the contact tracing.

In sectors with multiple close physical proximity under increasing circulation of SARS-CoC-2 it may be worthwhile to re-evaluate hygiene protocols, as incidences are increased compared to the working population average in Public order and safety, Fitness facilities, Activities of football clubs, Beauty care, Other personal services and Other human resources provision.

For some sectors the reason for the higher incidences is not immediately obvious, such as Distribution of electricity, Manufacture of re

nified petroleum products, Lead, zinc and tin production, Auditors, Banking agents and brokers, Wholesale of solid, liquid and gaseous fuels and related products and Retail sale in medical and orthopedic articles. It

would be worthwhile to evaluate the hygiene protocols and its practice in these sectors.

It is encouraging to note that employees in most manufacturing, retail and wholesale sectors are well protected, as they are often not able to telework. Also, the hygiene protocols in Transportation (sector H) and accomodation and food service (sector I) seem to protect employees sufficiently under current increased circulation of SARS-CoV-2.

Finally, despite the high degree of vaccination, COVID-19 infection remains possible. Continuous monitoring of breakthrough infections and especially protection against hospitalization is warranted. With the relaxation of mitigation measures, the percentage of index cases with two or more high-risk contacts increased since September to the highest level of 33% by the end of October. The last two weeks, however, this figure dropped to 18%, a level comparable to the situation since the beginning of 2021.

Acknowledgments

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