

# 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 (30 November–13 December 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 2020–9 December 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 20 sectors at level 1, the sectors with a 14-day incidence on 13 December 2021 significantly above the working population average are Education (sector P) and Electricity, gas, steam and air conditioning supply (sector D) (Table [1](#) and Figure [1](#)). The increase in incidences have stopped in all sectors and incidences are rapidly declining.

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

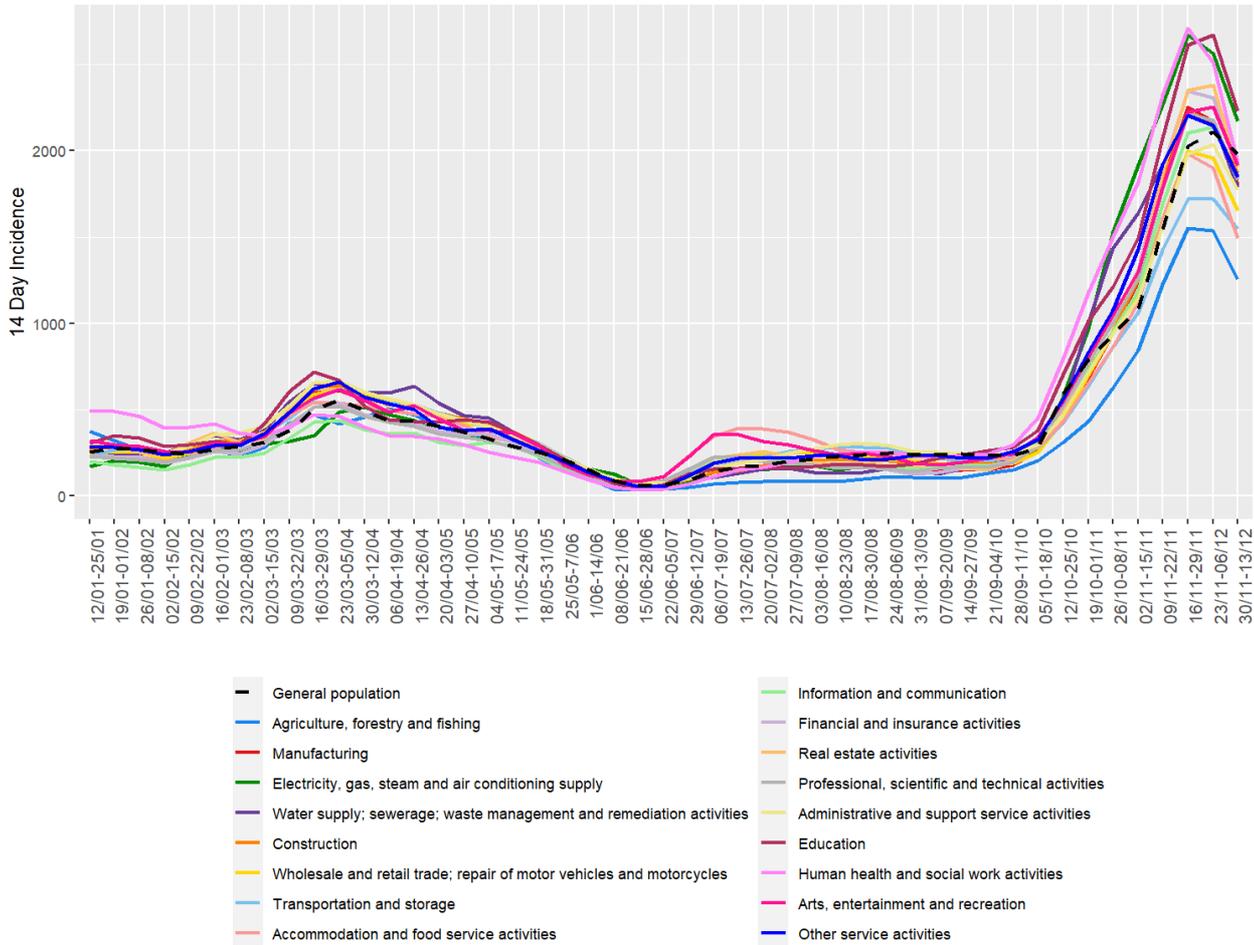


Figure 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 on 13 December 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
Education	P	653321	2228(2192;2264)	2231(2195;2268)	2159(1990;2342)	4.13
Electricity, gas, steam and air conditioning supply	D	19502	2169(1974;2383)	2167(1965;2389)		6.79
<b>General population</b>			<b>1980</b>	<b>1980</b>	<b>1980</b>	
<b>Working population</b>	<b>Total</b>	<b>4202418</b>	<b>1944(1931;1957)</b>	<b>1944(1931;1957)</b>		
Human health and social work activities	Q	594620	1933(1898;1968)	1953(1916;1990)	1728(1621;1842)	9.29
Financial and insurance activities	K	159740	1920(1854;1988)	1882(1808;1959)	2055(1912;2208)	22.23
Arts, entertainment and recreation	R	105115	1916(1835;2001)	1843(1743;1949)	2035(1901;2178)	39.37
Real estate activities	L	58552	1906(1798;2020)	1933(1769;2112)	1886(1746;2037)	58.63
Construction	F	381944	1872(1829;1915)	1910(1855;1967)	1815(1749;1883)	41.14
Information and communication	J	184387	1851(1790;1914)	1806(1735;1880)	1960(1847;2080)	30.19
Other service activities	S	160921	1845(1780;1912)	1849(1759;1943)	1840(1748;1937)	49.67
Professional, scientific and technical activities	M	395474	1834(1793;1876)	1786(1730;1844)	1888(1827;1951)	47.62
Manufacturing	C	626981	1805(1772;1838)	1810(1775;1845)	1762(1663;1867)	10.39
Water supply; sewerage; waste management and remediation activities	E	25419	1790(1634;1960)	1783(1620;1962)		9.35
Administrative and support service activities	N	444257	1776(1738;1815)	1754(1712;1797)	1880(1788;1977)	18.33
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	844559	1654(1627;1681)	1672(1641;1703)	1590(1534;1648)	22.83
Transportation and storage	H	317282	1545(1503;1589)	1555(1511;1601)	1446(1314;1591)	9.15
Accommodation and food service activities	I	309237	1494(1452;1537)	1456(1409;1505)	1621(1530;1717)	24.16
Agriculture, forestry and fishing	A	83121	1256(1183;1334)	904(804;1017)	1460(1361;1566)	64.37

### 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 13 December 2021 significantly higher than the working population average are: Education (sector 85), Social work without accommodation (sector 88) and Electricity, gas, steam and air conditioning supply (sector 35). (Table 2 and Figure 2).

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

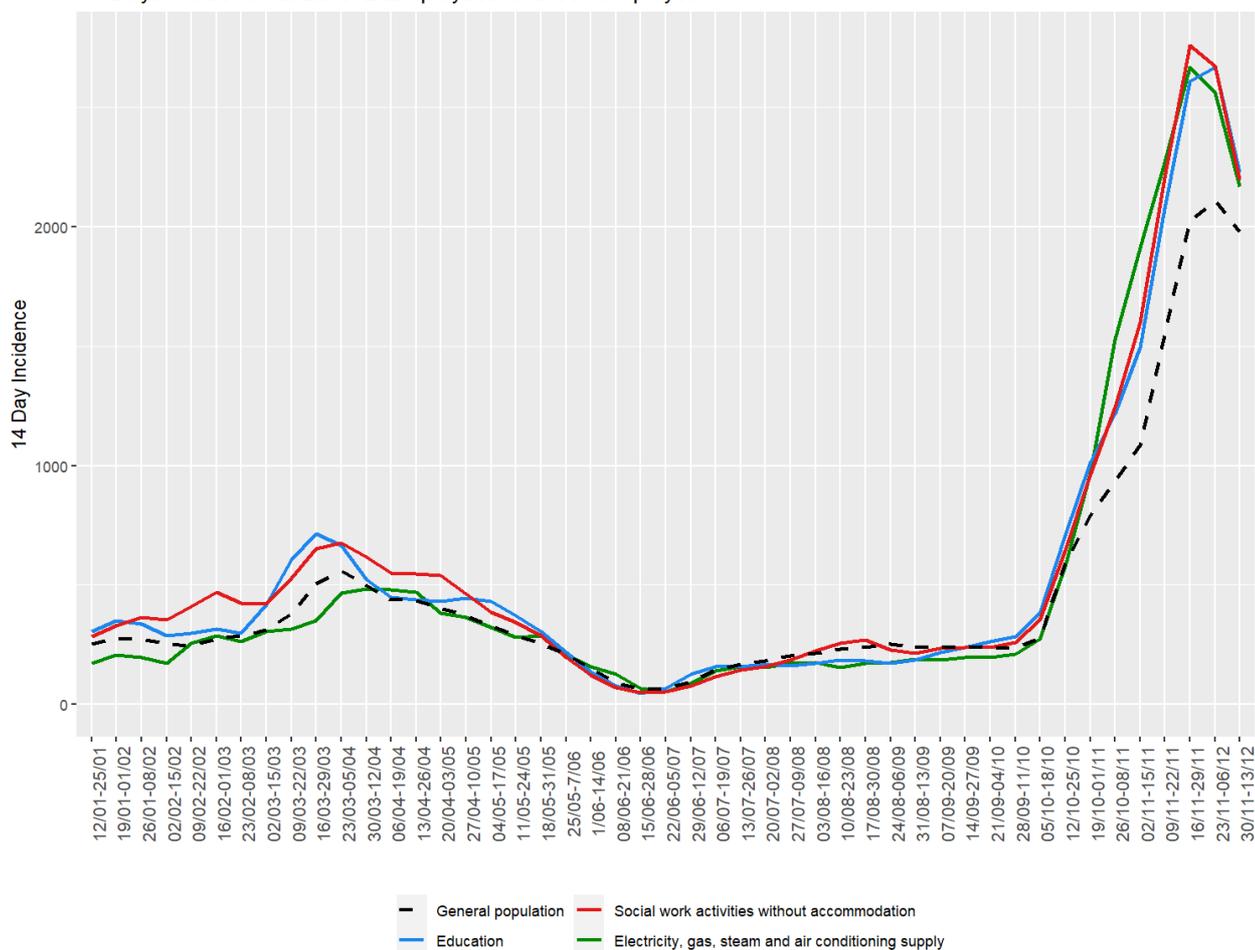


Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 on 13 December 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
Education	85	653321	2228(2192;2264)	2231(2195;2268)	2159(1990;2342)	4.127049
Social work activities without accommodation	88	169049	2197(2128;2268)	2192(2122;2264)	2358(1986;2797)	3.232241
Electricity, gas, steam and air conditioning supply	35	19502	2169(1974;2383)	2167(1965;2389)		6.791075
<b>General population</b>			<b>1980</b>	<b>1980</b>	<b>1980</b>	
<b>Working population</b>	<b>Total</b>	<b>4202418</b>	<b>1944(1931;1957)</b>	<b>1944(1931;1957)</b>		

### 3.3 Level 3 work sector

In the sectors at level 3 with a minimum of 5,000 workers, the sectors with a 14-day incidence on 13 December 2021 significantly higher than the working population average are: Manufacture (sector 292, 283, 204), Residential care (sector 872, 879), Education (sector 853, 852) (Figure 4), Services to the community (sector 842), Social work activities without accommodation (sector 881, 889), Health care (sector 869) and Electric power generation, transmission and distribution (sector 351) (Table 3 and Figure 3).

14-Days incidence of top 15 Level 3 Employees and Self-employed

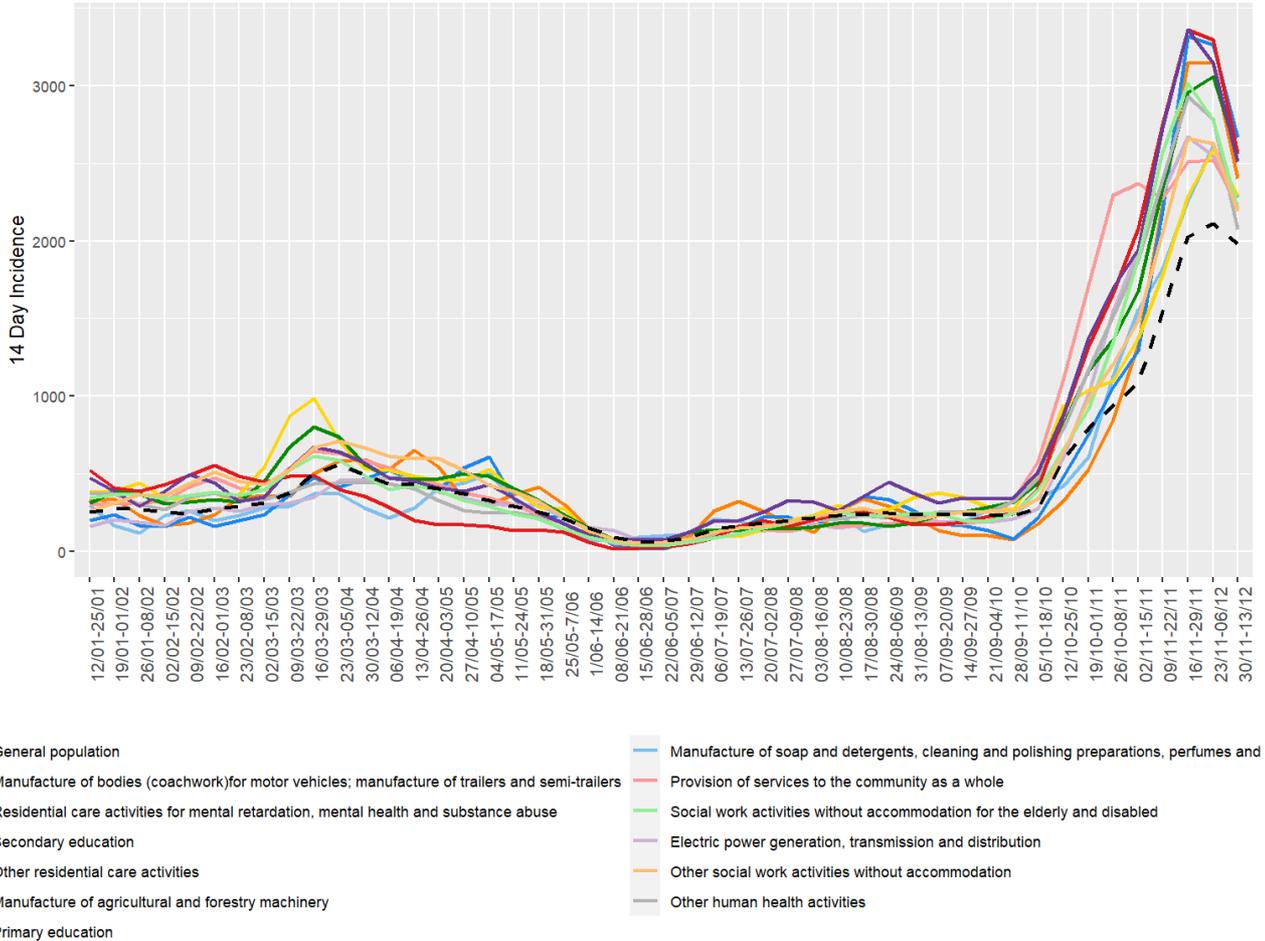


Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 in both employees and self-employed

14-Days incidence Education per Level 3 Sector

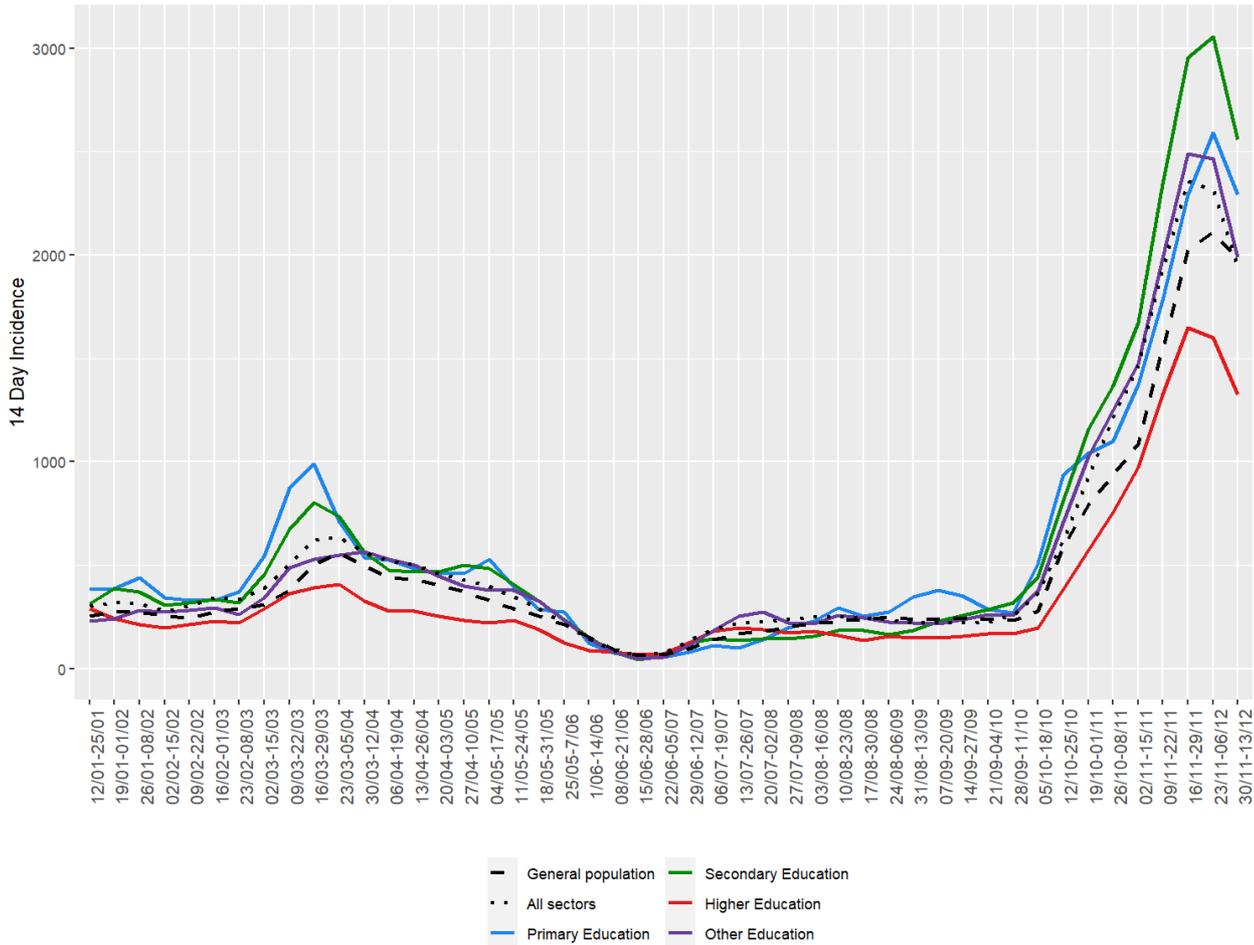


Figure 4: 14-Day incidence of COVID-19 infection in Education sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 13 December 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
Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	292	5898	2662(2281;3105)	2677(2283;3137)		6.24
Residential care activities for mental retardation, mental health and substance abuse	872	42027	2565(2418;2721)	2585(2436;2743)		1.80
Secondary education	853	439312	2559(2513;2606)	2561(2515;2608)		0.19
Other residential care activities	879	16368	2511(2282;2762)	2489(2257;2744)		3.56
Manufacture of agricultural and forestry machinery	283	6958	2400(2065;2787)	2455(2110;2855)		4.00
Primary education	852	8548	2293(1996;2633)	2316(2005;2674)		8.62
Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	204	6977	2279(1954;2657)	2160(1833;2544)		7.10
Provision of services to the community as a whole	842	82469	2236(2137;2339)	2239(2140;2342)		0.18
Social work activities without accommodation for the elderly and disabled	881	49071	2207(2081;2341)	2225(2097;2360)		1.09
Electric power generation, transmission and distribution	351	18277	2205(2002;2428)	2216(2006;2448)	2057(1394;3026)	6.66
Other social work activities without accommodation	889	120082	2191(2110;2275)	2178(2095;2264)	2476(2082;2943)	4.23
Other human health activities	869	54756	2071(1955;2194)	2118(1959;2290)	2017(1852;2196)	47.30
<b>General population</b>			<b>1980</b>	<b>1980</b>	<b>1980</b>	
<b>Working population</b>	<b>Total</b>	<b>4202418</b>	<b>1944(1931;1957)</b>	<b>1944(1931;1957)</b>		

### 3.4 Level 4 work sector

In the sectors at level 4 with a minimum of 3,000 workers, the sectors with a 14-day incidence on 13 December 2021 significantly higher than the working population average are: Child day-care (sector 8891), Manufacture sectors (sector 2042, 2920, 1089, 2830, 2443), Education (sector 8531, 8520), Residential care (sector 8720, 8790), Wholesale sectors (sector 4663, 4671), Fitness facilities (sector 9313), Distribution of electricity (sector 3513), Social work activities without accommodation for the elderly and disabled (sector 8810) and Other human health care (sector 8690) (Table 4 and Figure 5).

14-Days incidence of top 15 Level 4 Employees and Self-employed

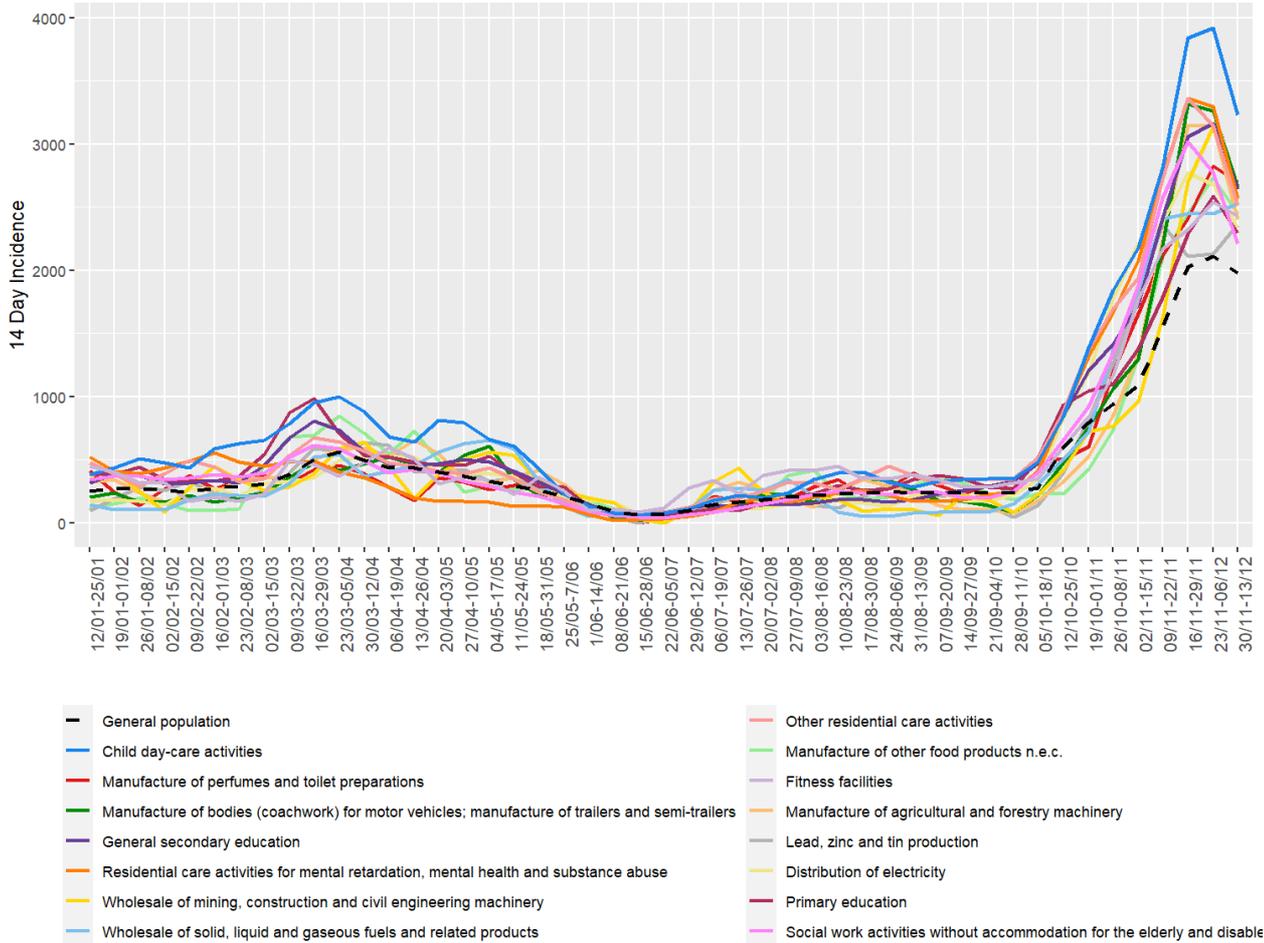


Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 13 December 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	28014	3227(3026;3440)	3253(3045;3475)	2853(2175;3735)	6.43
Manufacture of perfumes and toilet preparations	2042	3516	2702(2215;3293)	2597(2104;3201)		6.92
Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	2920	5898	2662(2281;3105)	2677(2283;3137)		6.24
General secondary education	8531	411301	2637(2588;2686)	2638(2589;2687)		0.16
Residential care activities for mental retardation, mental health and substance abuse	8720	42027	2565(2418;2721)	2585(2436;2743)		1.80
Wholesale of mining, construction and civil engineering machinery	4663	3636	2558(2092;3125)	2560(2069;3164)		10.85
Wholesale of solid, liquid and gaseous fuels and related products	4671	4664	2530(2116;3022)	2536(2087;3079)		16.34
Other residential care activities	8790	16368	2511(2282;2762)	2489(2257;2744)		3.56
Manufacture of other food products n.e.c.	1089	4816	2450(2049;2927)	2608(2175;3125)		9.21
Fitness facilities	9313	5471	2431(2055;2874)	2406(1982;2919)		24.56
Manufacture of agricultural and forestry machinery	2830	6958	2400(2065;2787)	2455(2110;2855)		4.00
Lead, zinc and tin production	2443	4320	2361(1948;2859)	2354(1941;2853)		0.69
Distribution of electricity	3513	8858	2337(2042;2673)	2350(2053;2689)		1.05
Primary education	8520	8548	2293(1996;2633)	2316(2005;2674)		8.62
Social work activities without accommodation for the elderly and disabled	8810	49071	2207(2081;2341)	2225(2097;2360)		1.09
Other human health activities	8690	54756	2071(1955;2194)	2118(1959;2290)	2017(1852;2196)	47.30
<b>General population</b>			<b>1980</b>	<b>1980</b>	<b>1980</b>	
<b>Working population</b>	<b>Total</b>	<b>4202418</b>	<b>1944(1931;1957)</b>	<b>1944(1931;1957)</b>		

### 3.5 Level 5 work sector

In the sectors at level 5 with a minimum of 3,000 workers, the sectors with a 14-day incidence on 13 December 2021 significantly higher than the working population average are: Nurseries and crèches (sector 88911), Secondary education (sector 85319, 85311, 85204), Manufacture sectors (sector 29201, 20140, 10890, 28300, 24430), Mental health activities (sector 87201, 87202, 86904), Wholesale activities (sector 46630, 46710, 46741), Integrated youth care with housing (sector 87901), Youth work associations (sector 94991), Fitness facilities (sector 93130), Performing arts by artistic ensembles (sector 90012), Distribution of electricity (sector 35130) and Activities of family and elderly care at home (sector 88101) (Table 5 and Figure 6).

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

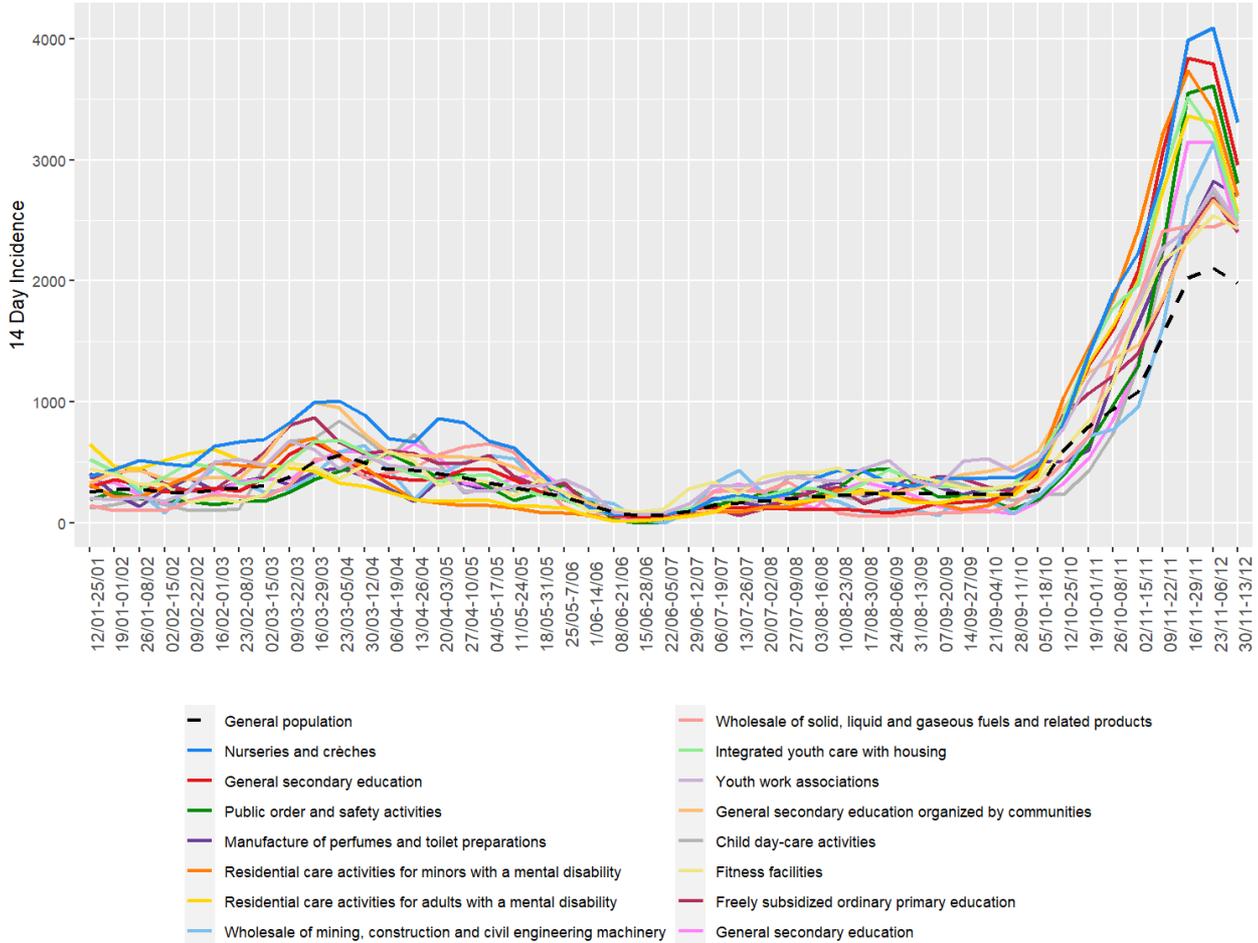


Figure 6: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 13 December 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
Nurseries and crèches	88911	24592	3310(3094;3541)	3343(3118;3583)	2844(2137;3776)	6.63
General secondary education	85319	208974	2953(2881;3026)	2953(2881;3026)		0.02
Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	29201	4354	2802(2351;3336)	2838(2373;3391)		5.30
Manufacture of perfumes and toilet preparations	20420	3516	2702(2215;3293)	2597(2104;3201)		6.92
Residential care activities for minors with a mental disability	87201	9044	2698(2383;3053)	2698(2383;3053)		1.26
Residential care activities for adults with a mental disability	87202	27635	2562(2382;2755)	2577(2395;2772)		1.70
Wholesale of mining, construction and civil engineering machinery	46630	3636	2558(2092;3125)	2560(2069;3164)		10.85
Wholesale of solid, liquid and gaseous fuels and related products	46710	4664	2530(2116;3022)	2536(2087;3079)		16.34
Integrated youth care with housing	87901	12605	2507(2248;2795)	2474(2213;2765)		2.86
Youth work associations	94991	5155	2483(2092;2945)	2466(2060;2950)		8.87
General secondary education organized by communities	85311	162885	2468(2394;2544)	2468(2394;2544)		0.01
Manufacture of other food products n.e.c.	10890	4816	2450(2049;2927)	2608(2175;3125)		9.21
Fitness facilities	93130	5471	2431(2055;2874)	2406(1982;2919)		24.56
Freely subsidized ordinary primary education	85204	6816	2406(2068;2798)	2408(2054;2821)		9.28
Manufacture of agricultural and forestry machinery	28300	6958	2400(2065;2787)	2455(2110;2855)		4.00
Mental health activities	86904	6949	2389(2055;2776)	2658(2162;3264)	2145(1721;2670)	53.45
Wholesale of hardware	46741	4439	2388(1978;2881)	2260(1833;2784)		14.27
Lead, zinc and tin production	24430	4320	2361(1948;2859)	2354(1941;2853)		0.69
Performing arts by artistic ensembles	90012	7073	2347(2019;2727)	2162(1818;2569)		18.53
Distribution of electricity	35130	8858	2337(2042;2673)	2350(2053;2689)		1.05
Activities of family and elderly care at home	88101	45155	2219(2087;2359)	2231(2098;2372)		0.85
<b>Working population</b>	<b>Total</b>	<b>4202418</b>	<b>1944(1931;1957)</b>	<b>1944(1931;1957)</b>		
<b>General population</b>			<b>1980</b>	<b>1980</b>	<b>1980</b>	

Finally, when considering specifically the non-medical contact professions, we see that the incidence in beauty saloons is higher than the working population average, while the incidence in the hairdressers is significantly below the working population average (Figure 7).

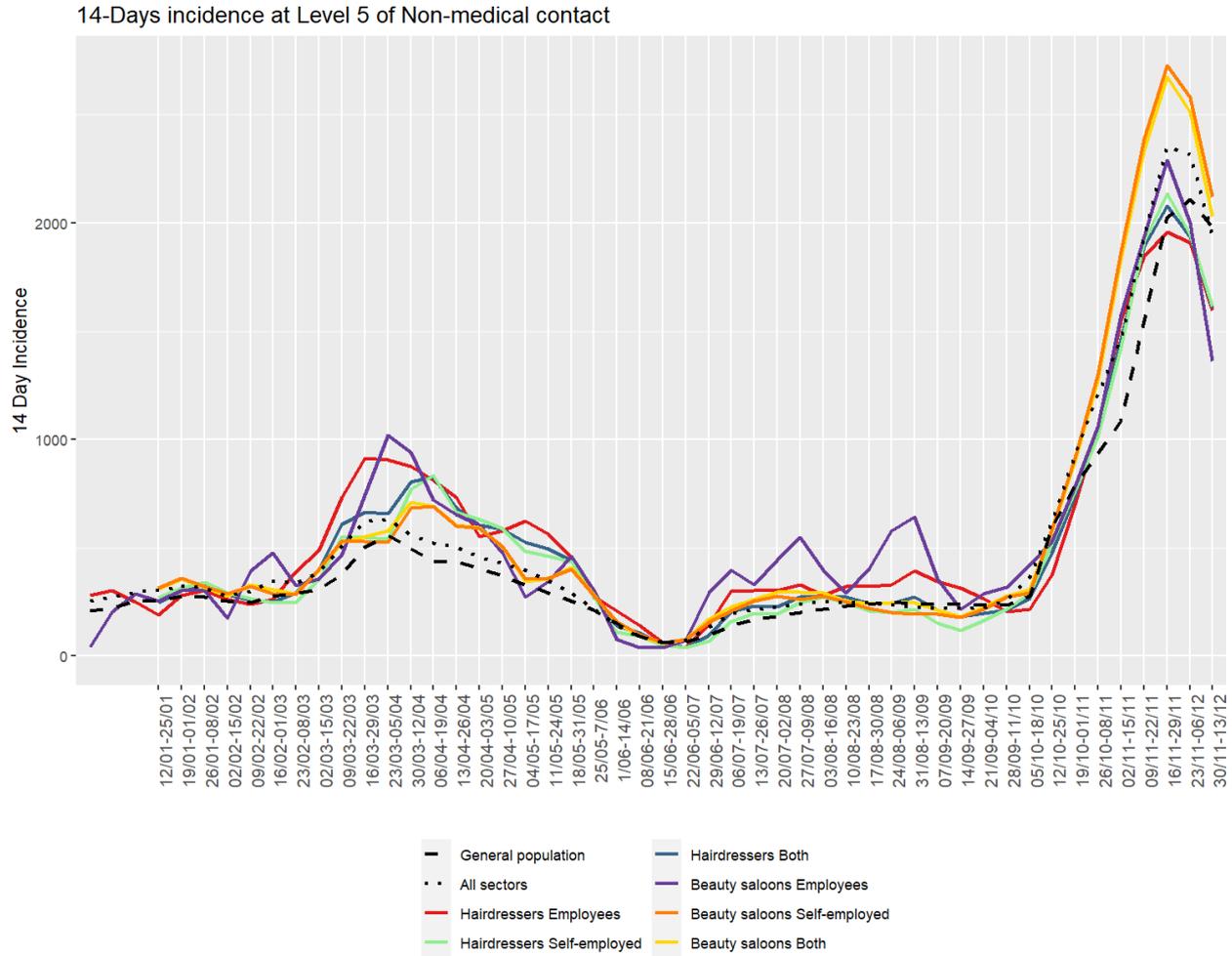


Figure 7: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

### 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 Education (sector P) and Electricity, gas, steam and air conditioning supply (sector D) are markedly elevated compared to the working and general population (Figure 8). In Education, it's mainly primary and secondary education that show elevated incidences.

Although the 14-day incidence in Human health and social work sector (sector Q) and Other service activities (sector S) and Arts, entertainment and recreation (sector R) is around the working population average, individual subsectors show an increased incidence. Residential care for mental retardation and other residential care (Sector 8720, 8790) and social work without accomodation (sector 8810, 8891) Youth work associations (sector 94991), Performing arts by artistic ensembles (sector 90012) and Fitness centres (sector 9313) all 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 below or equal to the general population incidence.

The sectors Manufacturing (sector C) and Wholesale and retail trade (sector G) are sectors with the highest number of sublevels. In most manufacturing and trade sectors the incidence is below or close to the working and population average, except for a few sectors (Figure 8).

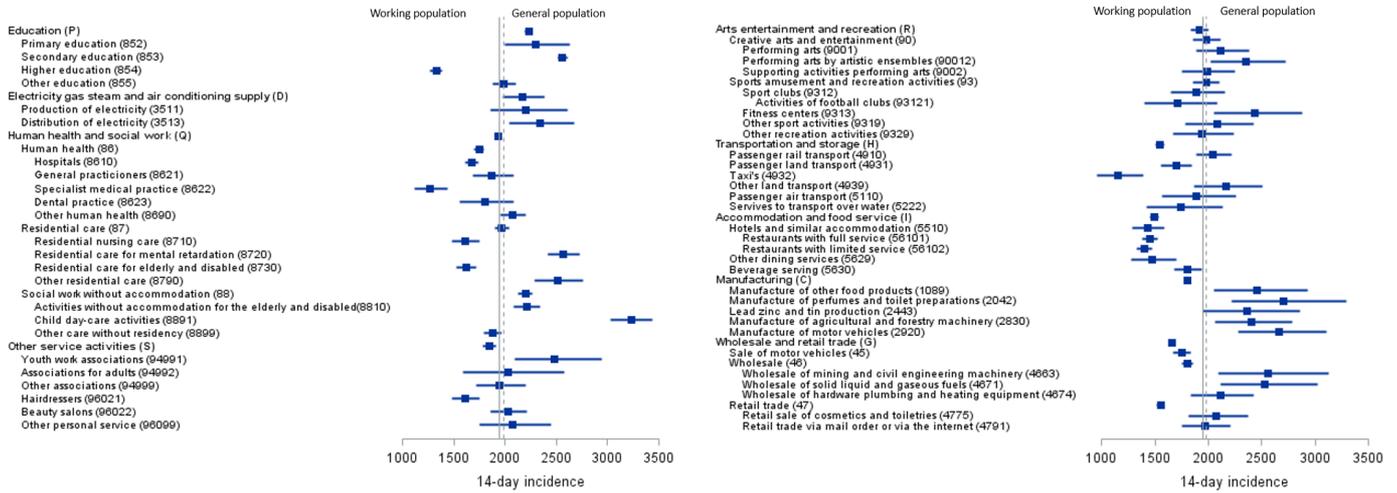


Figure 8: Forest plot of 14-Day incidence and 95% CI of selected sectors on 4 October 2021 in both employees and self-employed.

### 3.7 Contact tracing

In 2020–2021 about 800,000 employees are under medical surveillance of IDEWE. Among these, 37,264 COVID-19 index cases were registered between 22 July 2020 (week 30) and 9 December 2021, for whom the customer segment, region and the registration date are known for 36,872 index cases.

Between 17 November–1st December, there were more than 3000 index cases per week, with a peak on 30 November of 735 per 100.000 in 14 days (Figure 9). In comparison, the highest incidence in the fall 2020 (3 November) was 467 per 100.000 in 14 days. Since December 1st, the index cases are declining to 667 per 100.000 in 14 days on 7 December. The incidence was highest in Education with 2076 index cases per 100.000 in 14 days at its peak, and in Emergency services (1195 per 100.000 in 14 days). Also for these segments, the decline has started. The regions with the highest incidences are still Turnhout and Hasselt (Figure 9).

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.

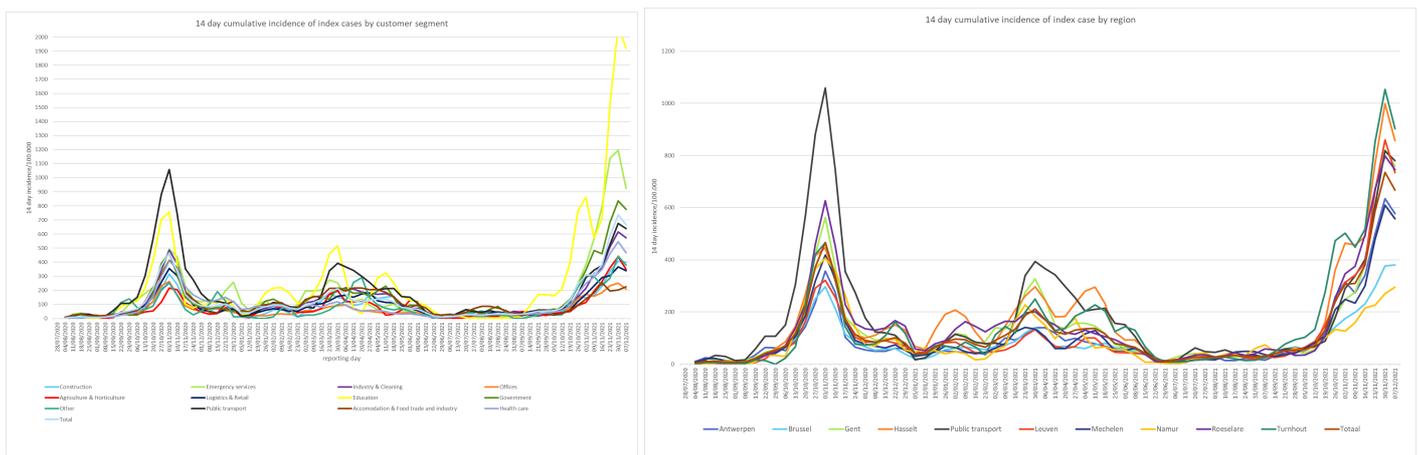


Figure 9: 14-Day incidence of index cases by segments under surveillance (left) and by region (right)

Since the establishment of the tracing app on 29 October 2020, there are 30,616 index cases of whom high-risk contacts were recorded. Of 30,383 index cases, the customer segment and region is known. The mean number of high-risk contacts in segment Education, Emergency services and Public Transport is above 1, while in the Hasselt region a higher mean number of high-risk contacts is reported in the period 29 October 2020–9 December 2021 (Figures 10).

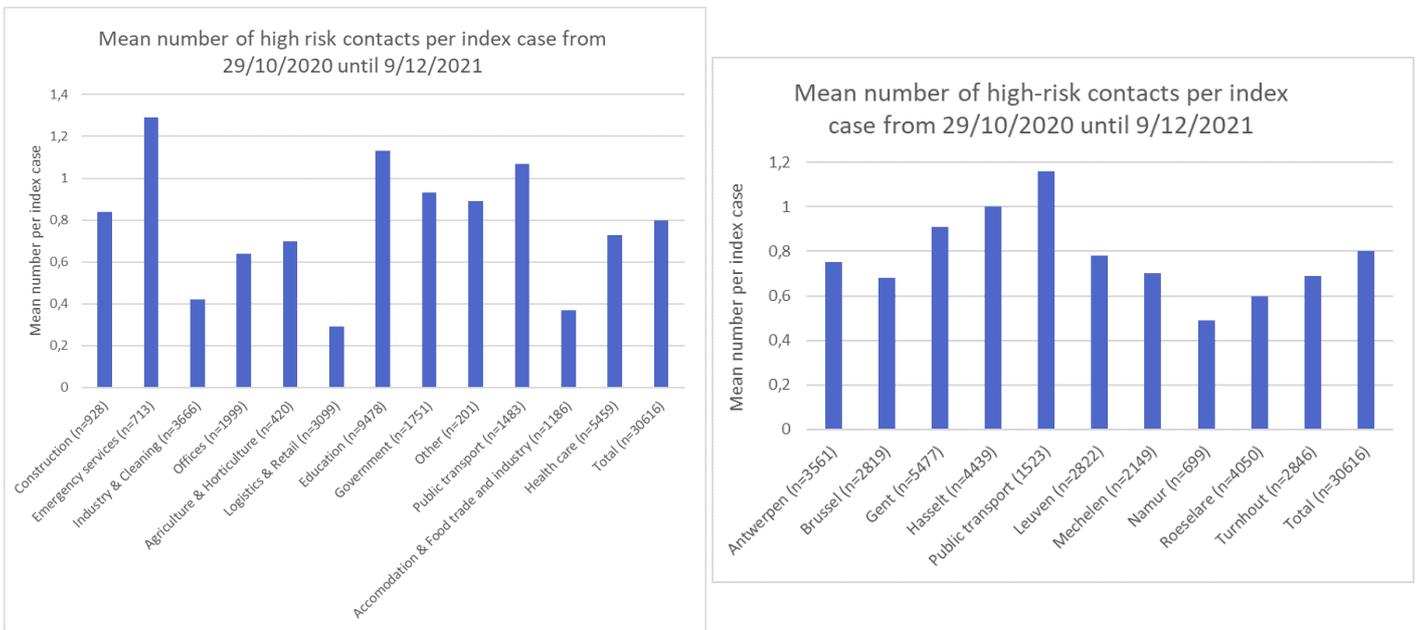


Figure 10: The mean number of high-risk contacts per index case by segments under surveillance (left) and by region (right)

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 increased since September to the highest level measured, 33%, by the end of October. The last six weeks this figure dropped to 15%, a level comparable to the situation of the first nine months of 2021, reflecting the changed behavior on the work floor after the stricter mitigation measures (Figure 11).

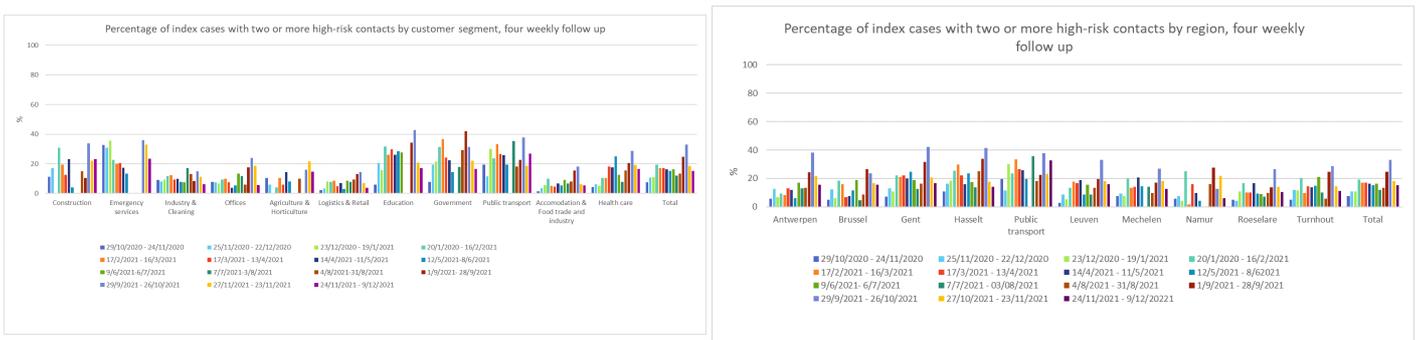


Figure 11: Four weekly percentage of index cases with two or more high-risk contacts by segments under surveillance (left) and by region (right)

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 19,471 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, 16% responded that they were certainly or probably infected at work (Figure 12 left). From 5,073 (26%) 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.

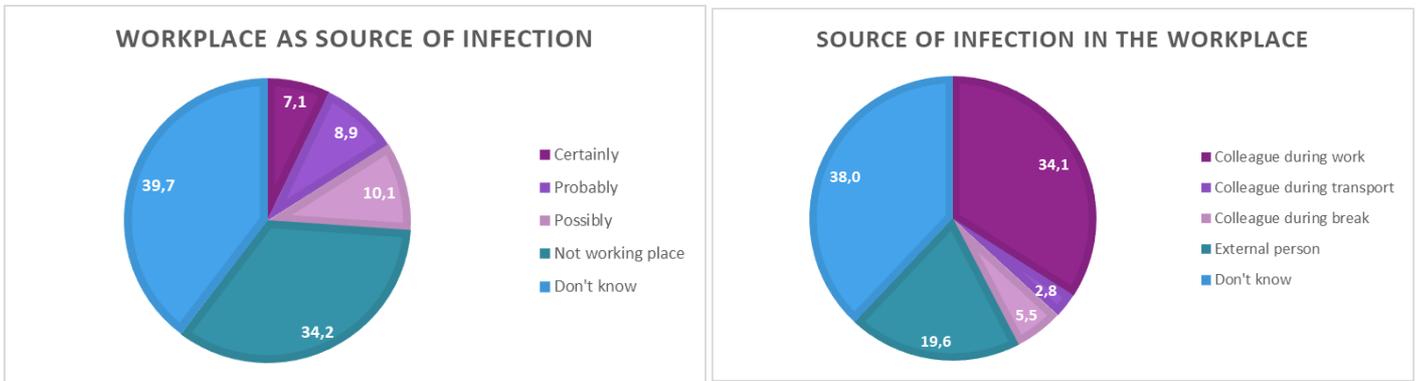


Figure 12: Distribution of the probability and source of infection at work by index case

The proportion of index cases in the Education segment that are attributed to pupils was around 40% during the schoolyear, and is now about 25%. (Figure 13 left). This means that the epidemic is high among teachers. 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.

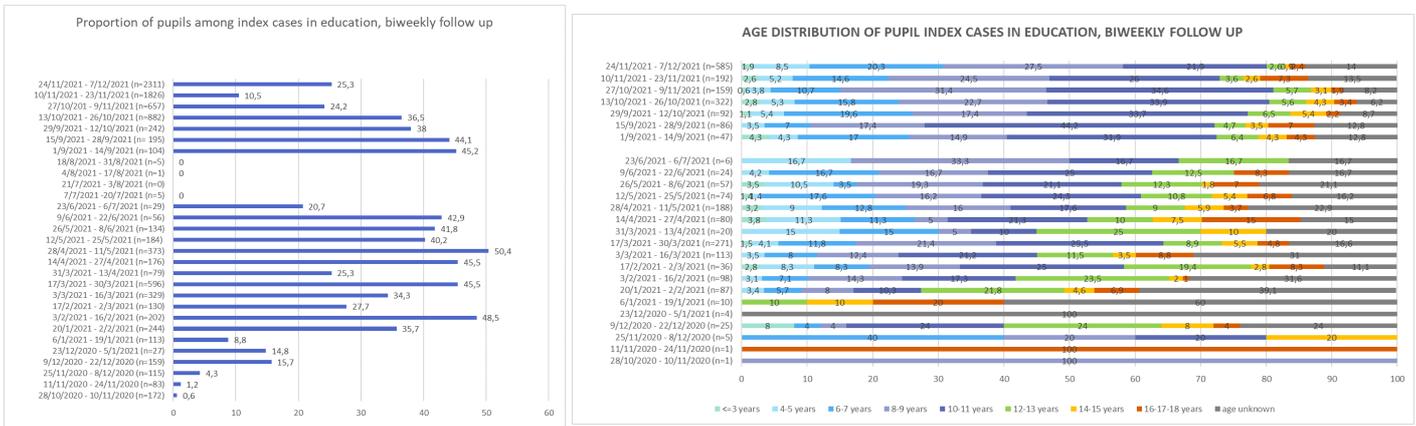


Figure 13: The evolution of index cases of pupils in school (left) and their age distribution (right).

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 13,885 adult index cases we had information about their vaccination status: 11,984 were partially or completely vaccinated (7,827 Cominarty, 1,954 Vaxzevria, 619 Moderna and 753 Johnson % Johnson did not know the type of vaccine.) (Figure 14 left). With a vaccination coverage in the working population of 86% 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 right).

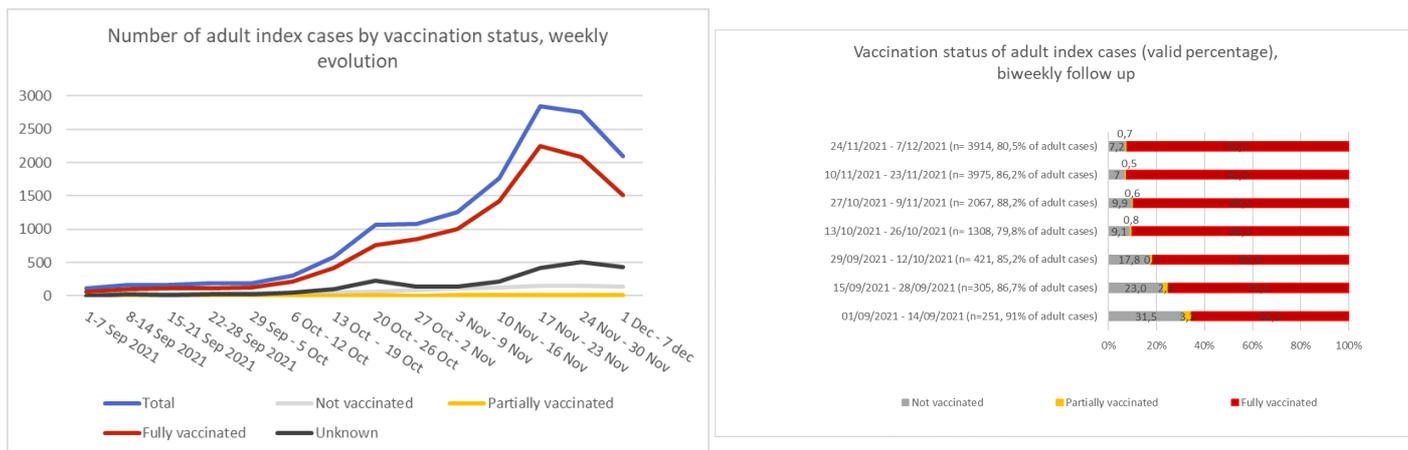


Figure 14: The weekly evolution of index cases and their vaccination status (left) and biweekly evolution of the self-reported vaccination status of index cases (right).

## 4 Conclusion

Despite the limitations of the data, both the contact tracing as the RSZ/ONSS data demonstrate to initiating decline of the 14-day COVID-19 incidences in most sectors, reflecting the effect of the stricter mitigation measures and booster vaccination effort. The highest incidences are still present in education, while the incidence in health care and residential care is declining. The average incidence in the working population is very similar to the average incidence in the general population, suggesting that infections are equally passed on among adults and children. Vigilance is still 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, 7% indicated that the workplace was certainly the source of infection.

It is clear that in most sectors at level 1 the 14-day incidence start to decline sharply to an incidence similar to the working population. The contact tracing shows a larger increase in incidences in the education segment, 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 omicron variant of concern of SARS-CoV-2, it is important to carefully monitor the incidence of COVID-19 in all sectors, especially sectors with high-risk, multiple close physical proximity, and with close proximity with younger, not yet vaccinated individuals. Nurseries and crèches, Primary and secondary education and some Residential care sectors, still show the highest incidences and require careful attention.

Although most sectors with multiple close physical proximity show incidences close to the working population average, some sectors show an increased incidence, such as Performing arts by artistic ensembles and fitness centres.

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

accommodation and food service (sector I) seem to protect employees sufficiently.

Finally, despite the high degree of vaccination, COVID-19 infection remains possible. Continuous monitoring of breakthrough infections and especially protection against hospitalization is warranted. It is good to note that the last six weeks, the percentage of index cases with two or more high-risk contacts is decreasing, especially under an upcoming more contagious omicron variant of concern.

## **Acknowledgments**

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