

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 (16–29 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 2020–25 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 29 November 2021 significantly above the working population average are Education (sector P), Human health and social work activities (sector Q) and Electricity, gas, steam and air conditioning supply (sector D) (Table 1 and Figure 1). The sharp increase in incidences continues in all sectors and many sectors reach the highest incidences levels since the start of collecting work sector related incidence levels in September 2020.

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

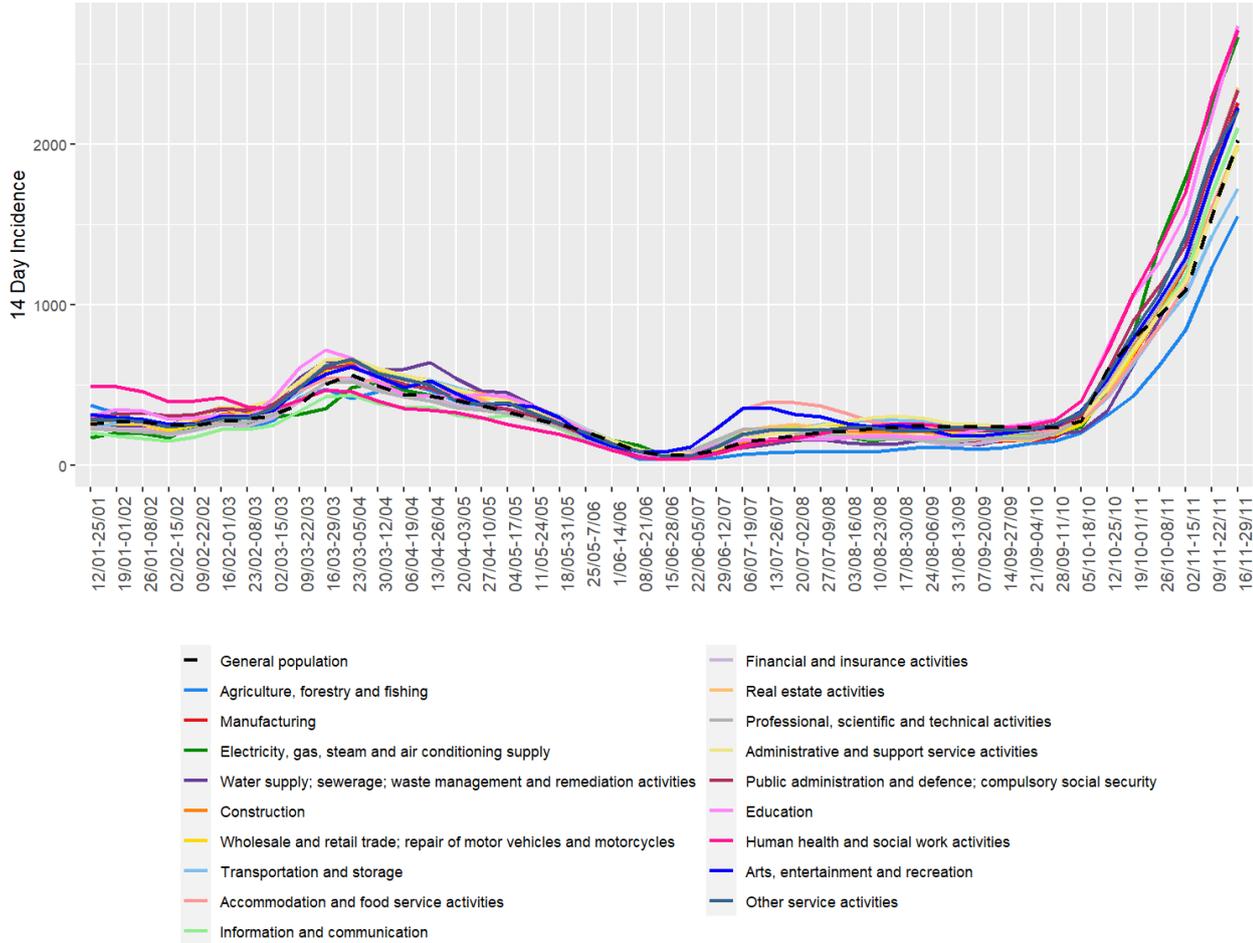


Figure 1: 14-Day incidence of COVID-19 infection of all 21 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of all 21 sectors at Level 1 on 29 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
Education	P	620445	2739(2699;2780)	2738(2697;2780)	2762(2570;2968)	4.34
Human health and social work activities	Q	591851	2712(2671;2754)	2720(2677;2764)	2628(2496;2767)	9.33
Electricity, gas, steam and air conditioning supply	D	19423	2667(2450;2903)	2635(2411;2879)		6.82
Working population		4172562	2369(2354;2384)	2369(2354;2384)		
Real estate activities	L	58511	2350(2230;2476)	2244(2067;2436)	2428(2269;2598)	58.68
Financial and insurance activities	K	159438	2347(2274;2422)	2284(2202;2369)	2571(2411;2742)	22.28
Public administration and defence; compulsory social security	O	210047	2339(2275;2405)	2338(2274;2404)		0.50
Manufacturing	C	624291	2256(2219;2293)	2260(2221;2299)	2217(2106;2334)	10.45
Arts, entertainment and recreation	R	106870	2227(2140;2317)	1989(1886;2098)	2626(2474;2788)	38.92
Construction	F	381961	2223(2177;2270)	2297(2236;2359)	2112(2041;2185)	41.15
Professional, scientific and technical activities	M	394412	2219(2173;2265)	2204(2142;2268)	2235(2169;2303)	47.72
Water supply; sewerage; waste management and remediation activities	E	24470	2215(2038;2407)	2158(1975;2358)		9.74
Other service activities	S	160607	2206(2135;2279)	2045(1951;2144)	2375(2271;2484)	49.77
Information and communication	J	183738	2103(2038;2170)	2070(1994;2149)	2181(2062;2307)	30.28
General population			2025	2025	2025	
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	844606	1993(1963;2023)	2001(1967;2035)	1967(1905;2031)	22.86
Administrative and support service activities	N	443239	1982(1941;2023)	1924(1880;1969)	2251(2150;2357)	18.34
Accommodation and food service activities	I	321132	1978(1930;2027)	1939(1886;1994)	2116(2012;2225)	23.22
Transportation and storage	H	315380	1723(1678;1769)	1726(1679;1774)	1692(1549;1848)	9.19
Agriculture, forestry and fishing	A	84893	1549(1468;1634)	1062(956;1180)	1848(1736;1967)	63.11

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 29 November 2021 significantly higher than the working population average are: Social work without accommodation (sector 88), Education (sector 85), Manufacture (sector 31, 28, 20), Human health and residential care activities (sector 86, 87) 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

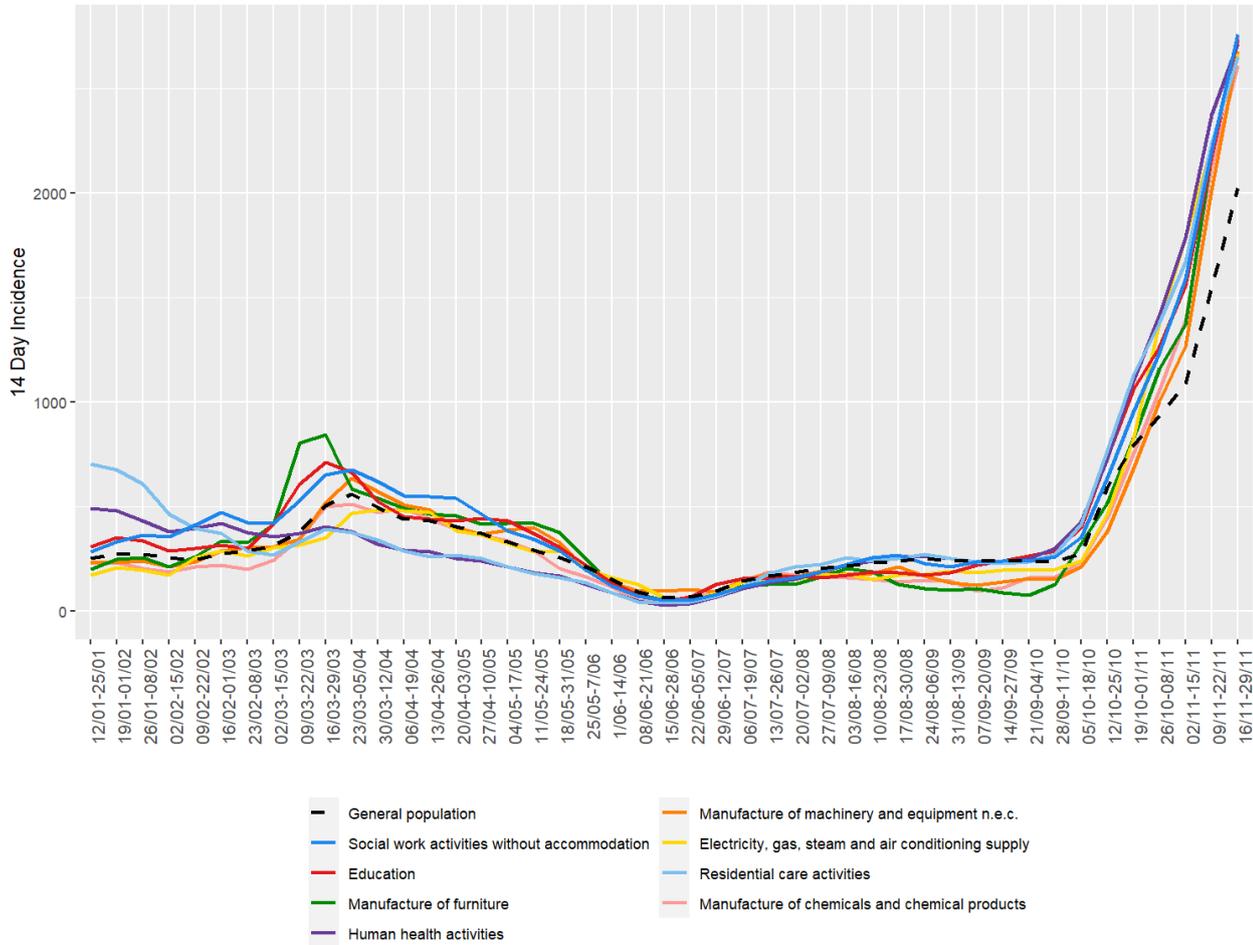


Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 on 29 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
Social work activities without accommodation	88	168598	2761(2684;2840)	2746(2668;2826)	3206(2769;3709)	3.25
Education	85	620445	2739(2699;2780)	2738(2697;2780)	2762(2570;2968)	4.34
Manufacture of furniture	31	14839	2736(2485;3011)	2914(2616;3245)	2222(1800;2740)	25.88
Human health activities	86	267698	2715(2654;2777)	2747(2680;2816)	2565(2426;2712)	18.00
Manufacture of machinery and equipment n.e.c.	28	37300	2681(2522;2850)	2660(2495;2835)	2927(2369;3611)	7.72
Electricity, gas, steam and air conditioning supply	35	19423	2667(2450;2903)	2635(2411;2879)		6.82
Residential care activities	87	156863	2652(2574;2733)	2653(2574;2734)	2605(2028;3341)	1.50
Manufacture of chemicals and chemical products	20	47818	2612(2473;2759)	2610(2469;2759)		2.80
Working population		4172562	2369(2354;2384)	2369(2354;2384)		
General population			2025	2025	2025	

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 29 November 2021 significantly higher than the working population average are: Residential care (sector 872, 879, 871), Manufacture (sector 292, 283, 281, 201, 310, 241, 282, 251), Social work activities without accommodation (sector 881, 889), Education (sector 853, 855) (Figure 4), Health care (sector 869, 861), Beverage servicing activities (sector 563), Electric power generation, transmission and distribution (sector 351), Financial service activities (sector 661, 642) and Services to the community (sector 842) (Table 3 and Figure 3).

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

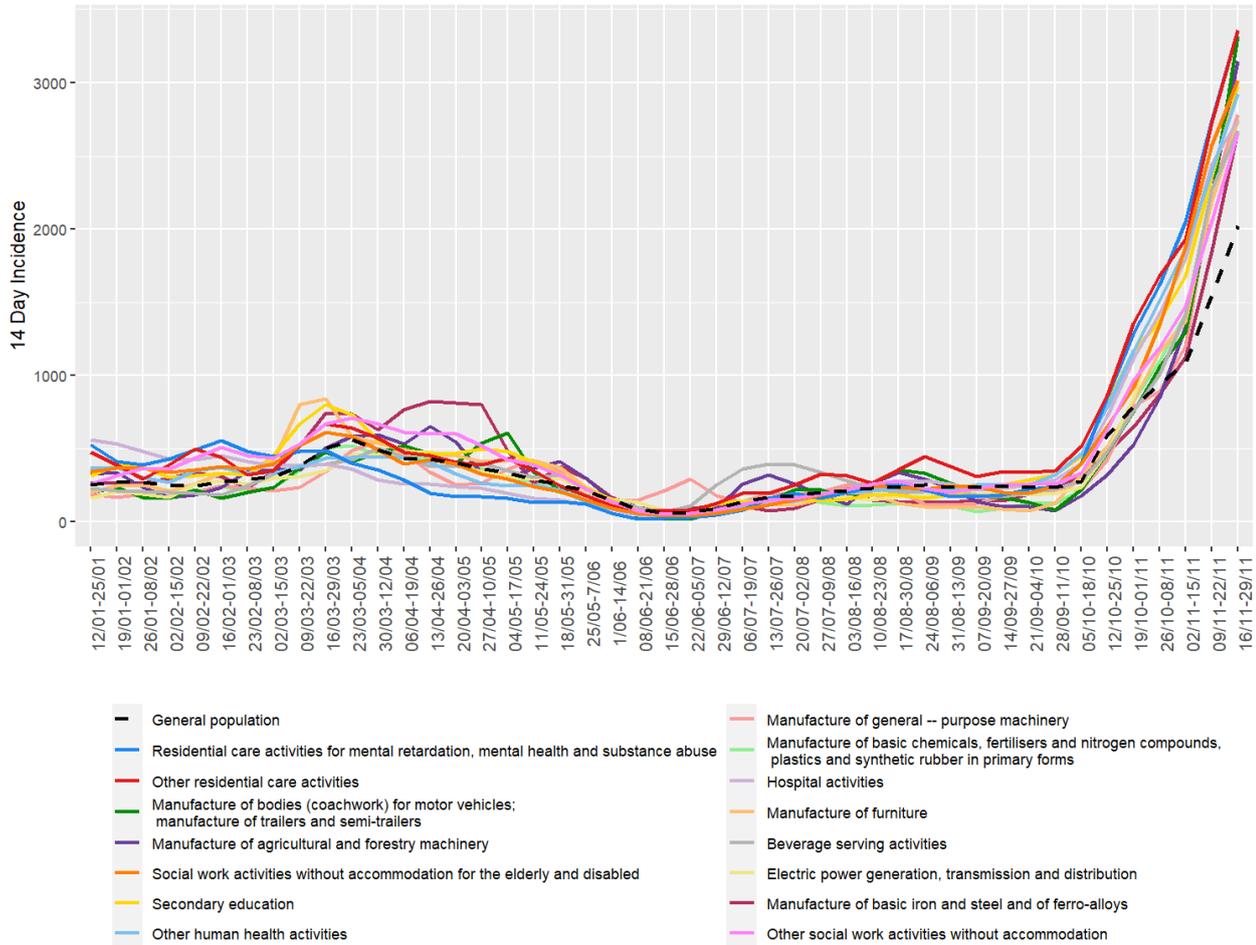


Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 in both employees and self-employed

14-Days incidence Education per Level 3 Sector

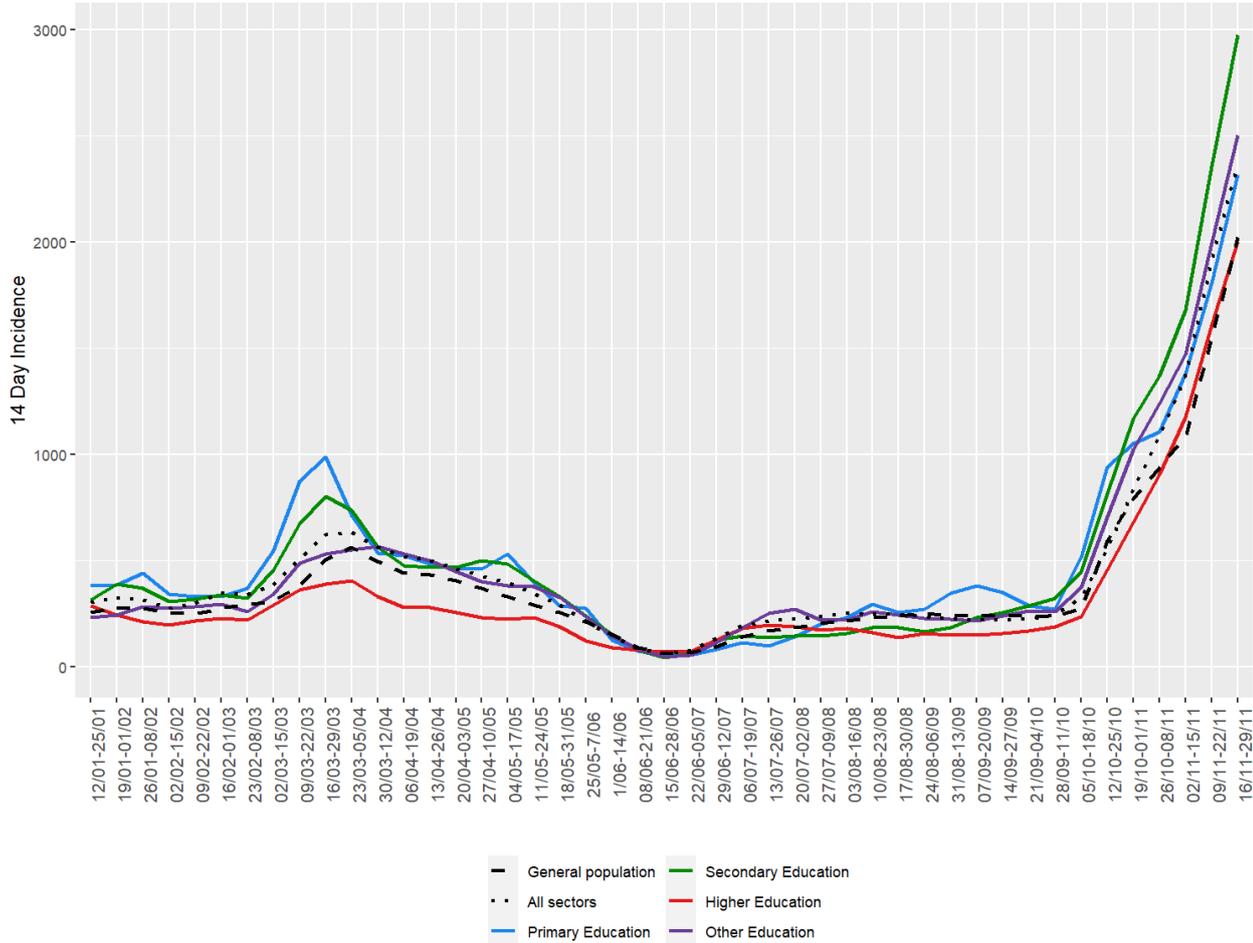


Figure 4: 14-Day incidence of COVID-19 infection in Education sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 29 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	41803	3361(3192;3538)	3362(3192;3541)		1.81
Other residential care activities	879	16275	3361(3095;3649)	3402(3130;3697)		3.59
Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	292	5877	3318(2889;3808)	3322(2880;3829)		6.27
Manufacture of agricultural and forestry machinery	283	6927	3147(2761;3585)	3114(2722;3560)		4.03
Social work activities without accommodation for the elderly and disabled	881	48972	3016(2868;3171)	3016(2867;3172)		1.09
Secondary education	853	434162	2977(2927;3028)	2978(2928;3029)		0.20
Other human health activities	869	54527	2927(2789;3072)	2882(2695;3081)	2978(2777;3193)	47.52
Manufacture of general – purpose machinery	281	9192	2785(2468;3142)	2707(2388;3067)		3.98
Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	201	29033	2752(2570;2947)	2751(2568;2947)		1.59
Hospital activities	861	168452	2745(2668;2824)	2749(2672;2828)		0.42
Manufacture of furniture	310	14839	2736(2485;3011)	2914(2616;3245)	2222(1800;2740)	25.88
Beverage serving activities	563	41832	2675(2525;2834)	2685(2489;2896)	2662(2433;2911)	42.48
Electric power generation, transmission and distribution	351	18202	2670(2446;2914)	2637(2406;2889)	3128(2284;4270)	6.69
Manufacture of basic iron and steel and of ferro-alloys	241	12177	2669(2397;2971)	2683(2408;2989)		2.07
Other social work activities without accommodation	889	119774	2655(2565;2748)	2632(2541;2726)	3170(2721;3691)	4.25
Manufacture of other general-purpose machinery	282	12976	2651(2388;2942)	2658(2379;2969)	2595(1902;3532)	11.62
Activities auxiliary to financial services, except insurance and pension funding	661	18863	2603(2385;2840)	2560(2312;2834)	2728(2303;3229)	25.61
Manufacture of structural metal products	251	27389	2585(2404;2780)	2609(2407;2827)	2485(2096;2944)	19.20
Residential nursing care activities	871	33958	2562(2399;2736)	2563(2399;2738)		1.20
Activities of holding companies	642	39481	2543(2392;2703)	2358(2129;2611)	2660(2464;2871)	61.51
Provision of services to the community as a whole	842	82144	2509(2404;2618)	2508(2403;2617)		0.19
Other education	855	56265	2506(2380;2638)	2316(2158;2486)	2764(2564;2980)	43.23
Working population		4172562	2369(2354;2384)	2369(2354;2384)		
General population			2025	2025	2025	

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 29 November 2021 significantly higher than the working population average are: Child day-care (sector 8891), Residential care (sector 8720, 8790, 8710), Manufacture sectors (sector 2920, 2830, 2013, 2016, 2512, 2410, 2014), Education (sector 8531, 8551), Other human resources provision (sector 7830), Social work activities without accommodation for the elderly and disabled (sector 8810), Health care (sector 8690, 8610, 8621), Other sport

activities (sector 9319), Distribution of electricity (sector 3513), Wholesale of hardware (sector 4674), Beverage service activities (sector 5630), Defence activities (sector 8422), Financial services and holding companies (sector 6619, 6420) and Joinery installation (sector 4332) (Table 4 and Figure 5).

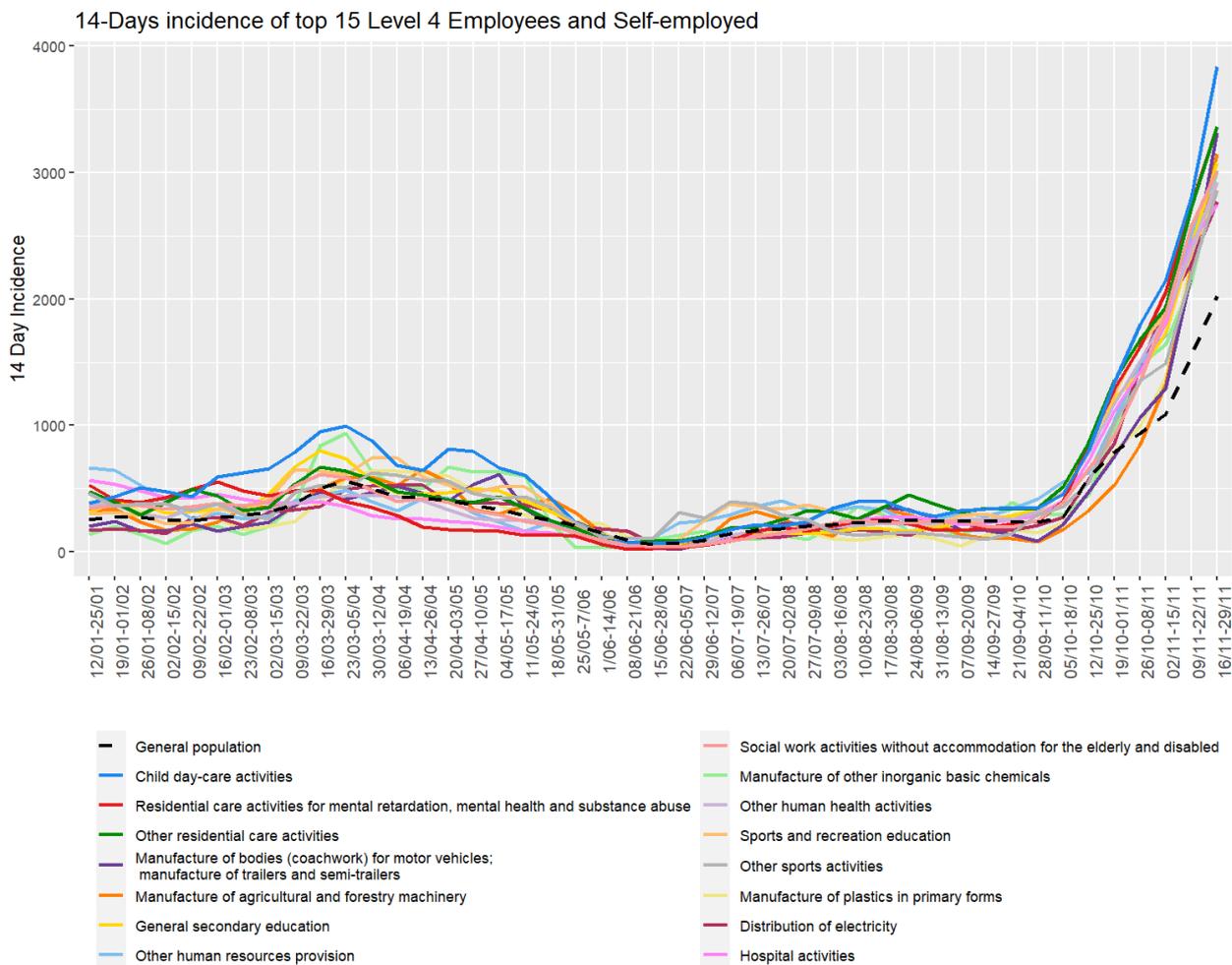


Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 29 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	28073	3840(3621;4071)	3827(3602;4066)	4027(3208;5044)	6.45
Residential care activities for mental retardation, mental health and substance abuse	8720	41803	3361(3192;3538)	3362(3192;3541)		1.81
Other residential care activities	8790	16275	3361(3095;3649)	3402(3130;3697)		3.59
Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	2920	5877	3318(2889;3808)	3322(2880;3829)		6.27
Manufacture of agricultural and forestry machinery	2830	6927	3147(2761;3585)	3114(2722;3560)		4.03
General secondary education	8531	407377	3077(3024;3130)	3078(3025;3132)		0.16
Other human resources provision	7830	4672	3018(2564;3549)	3091(2609;3659)		10.00
Social work activities without accommodation for the elderly and disabled	8810	48972	3016(2868;3171)	3016(2867;3172)		1.09
Manufacture of other inorganic basic chemicals	2013	3120	3013(2468;3674)	2985(2437;3652)		2.28
Other human health activities	8690	54527	2927(2789;3072)	2882(2695;3081)	2978(2777;3193)	47.52
Sports and recreation education	8551	9856	2922(2607;3274)		2925(2591;3300)	89.88
Other sports activities	9319	7856	2864(2517;3257)	2762(2278;3346)	2953(2482;3510)	55.01
Manufacture of plastics in primary forms	2016	8912	2850(2524;3217)	2848(2520;3217)		1.51
Distribution of electricity	3513	8809	2770(2447;3134)	2754(2430;3119)		1.06
Hospital activities	8610	168452	2745(2668;2824)	2749(2672;2828)		0.42
Wholesale of hardware, plumbing and heating equipment and supplies	4674	9409	2742(2431;3092)	2792(2458;3170)		12.10
Manufacture of doors and windows of metal	2512	9779	2710(2406;3051)	2638(2318;3000)		12.81
Beverage serving activities	5630	41832	2675(2525;2834)	2685(2489;2896)	2662(2433;2911)	42.48
Manufacture of basic iron and steel and of ferro-alloys	2410	12177	2669(2397;2971)	2683(2408;2989)		2.07
Manufacture of other organic basic chemicals	2014	12759	2657(2392;2951)	2654(2388;2949)		1.08
Defence activities	8422	34682	2644(2480;2818)	2644(2480;2818)		0.00
Other activities auxiliary to financial services, except insurance and pension funding	6619	18361	2636(2414;2878)	2587(2334;2867)	2780(2346;3292)	25.63
Joinery installation	4332	44029	2621(2476;2774)	2669(2470;2884)	2567(2360;2792)	47.83
General medical practice activities	8621	17083	2599(2371;2849)	2560(2300;2849)	2714(2271;3241)	26.02
Residential nursing care activities	8710	33958	2562(2399;2736)	2563(2399;2738)		1.20
Activities of holding companies	6420	39481	2543(2392;2703)	2358(2129;2611)	2660(2464;2871)	61.51
Working population		4172562	2369(2354;2384)	2369(2354;2384)		
General population			2025	2025	2025	

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 29 November 2021 significantly higher than the working population average are: Nurseries and crèches (sector 88911), Secondary education (sector 85319), Mental health activities (sector 87201, 87202, 86104), Manufacture sectors (sector 29201, 28300, 20160, 31091, 25120, 24100, 20140), Integrated youth care with housing (sector 87901), Banking agents, brokers and activities of holding companies (sector 66191, 64200), Wholesale of ironware (sector 46741), Other human health care (sector 86905, 86906, 86909, 86905), Other human resources provision (sector 78300), Other sport activities (sector 93199), Activities of family and elderly care at home (sector 88101), Construction (sector 41203, 43320), Sports, recreation and other education (sector 85510, 85599), Activities of graphic designers (sector 74103), Distribution of electricity (sector 35130), General hospitals (sector 86101), Beauty care (sector 96022), Defence activities (sector 84220), Cafes and bars (sector 56301), General medical practice (sector 86210) and Rest and care homes (sector 87101) (Table 5 and Figure 6).

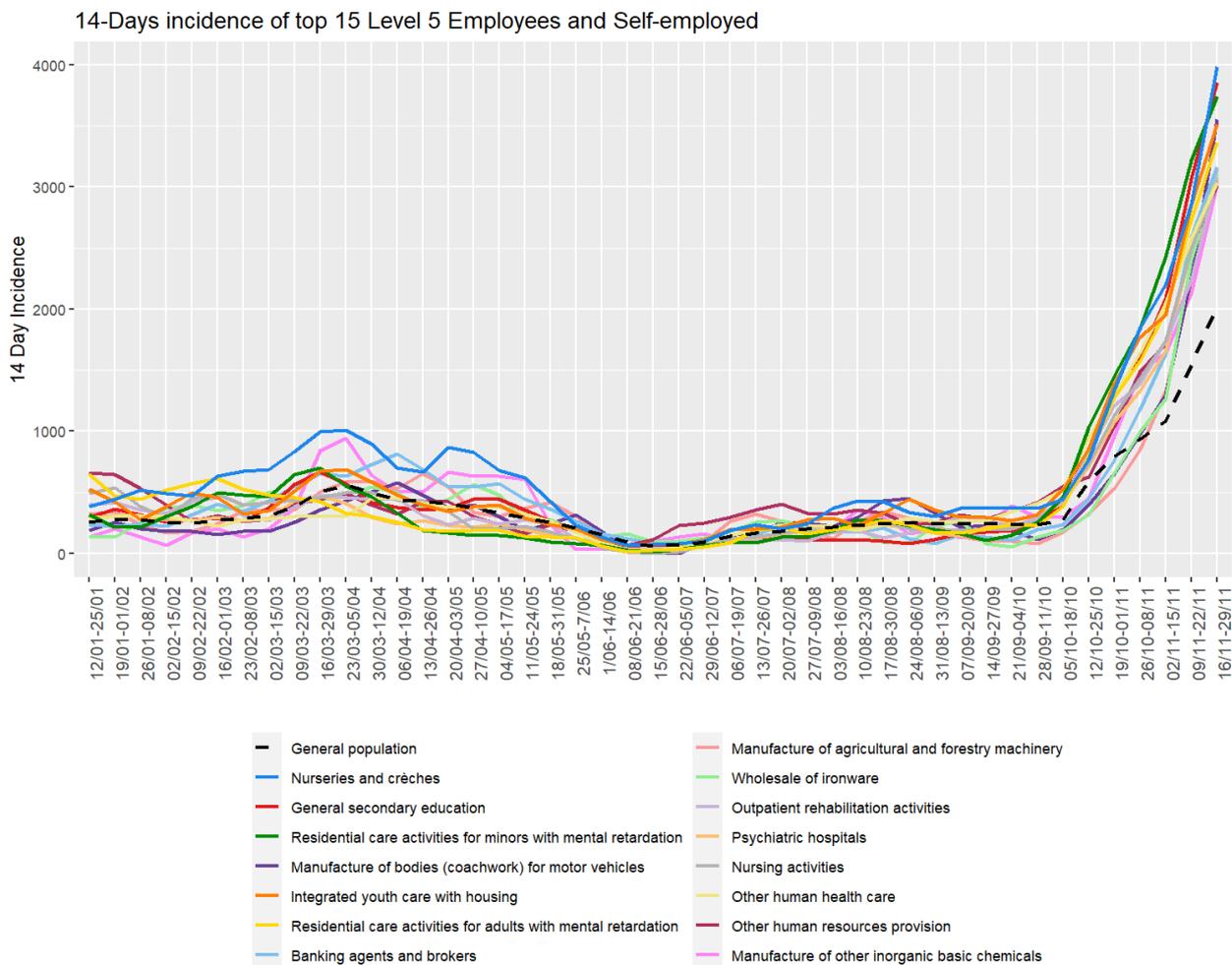


Figure 6: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 29 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
Nurseries and crèches	88911	24642	3985(3748;4237)	2260(1826;2794)	4329(3439;5437)	6.65
General secondary education	85319	207836	3854(3772;3938)	2754(2430;3119)		0.02
Residential care activities for minors with mental retardation	87201	9001	3744(3371;4157)	2638(2318;3000)		1.27
Manufacture of bodies (coachwork) for motor vehicles	29201	4337	3551(3040;4145)	3129(2621;3732)		5.34
Integrated youth care with housing	87901	12543	3516(3208;3853)	2560(2300;2849)		2.87
Residential care activities for adults with mental retardation	87202	27519	3365(3158;3585)	2565(2401;2740)		1.71
Banking agents and brokers	66191	10879	3162(2849;3508)	2985(2437;3652)	3242(2687;3907)	30.32
Manufacture of agricultural and forestry machinery	28300	6927	3147(2761;3585)	3353(3145;3574)		4.03
Wholesale of ironware	46741	4436	3111(2639;3665)	3059(2877;3252)		14.31
Outpatient rehabilitation activities	86905	10830	3084(2775;3427)		3011(2671;3393)	80.20
Psychiatric hospitals	86104	32582	3060(2878;3253)	2670(2464;2893)		0.37
Nursing activities	86906	16552	3051(2800;3324)	2654(2388;2949)	3216(2548;4052)	13.04
Other human health care	86909	11104	3035(2732;3371)		3031(2717;3380)	93.18
Other human resources provision	78300	4672	3018(2564;3549)	2939(2470;3494)		10.00
Manufacture of other inorganic basic chemicals	20130	3120	3013(2468;3674)	3961(3717;4221)		2.28
Other sport activities	93199	4925	2985(2545;3499)		3164(2622;3814)	69.89
Activities of family and elderly care at home	88101	45074	2984(2831;3145)	2358(2129;2611)		0.85
General construction of other non-residential buildings	41203	13787	2981(2710;3278)	3091(2609;3659)	2494(1884;3294)	14.00
Sports and recreation education	85510	9856	2922(2607;3274)		2925(2591;3300)	89.88
Manufacture of plastics in primary forms	20160	8912	2850(2524;3217)	3744(3371;4157)		1.51
Activities of graphic designers	74103	6023	2806(2418;3255)		2994(2554;3507)	82.77
Distribution of electricity	35130	8809	2770(2447;3134)	3114(2722;3560)		1.06
Manufacture of home furniture	31091	6252	2767(2388;3204)	3128(2760;3544)	2409(1825;3173)	32.61
General hospitals	86101	130369	2710(2623;2800)	2683(2408;2989)		0.35
Manufacture of doors and windows of metal	25120	9779	2710(2406;3051)	3587(3271;3932)		12.81
Beauty care	96022	24075	2675(2479;2887)		2726(2515;2954)	89.53
Manufacture of basic iron and steel and of ferro-alloys	24100	12177	2669(2397;2971)	3630(3099;4248)		2.07
Manufacture of other organic basic chemicals	20140	12759	2657(2392;2951)	3854(3772;3938)		1.08
Defence activities	84220	34682	2644(2480;2818)	2848(2520;3217)		0.00
Cafes and Bars	56301	38380	2642(2486;2807)	3026(2758;3319)	2605(2374;2858)	44.12
Other education	85599	13263	2639(2379;2926)	2714(2627;2804)	2784(2473;3133)	72.61
Joinery installation	43320	44029	2621(2476;2774)	3060(2765;3386)	2567(2360;2792)	47.83
General medical practice activities	86210	17083	2599(2371;2849)	2669(2470;2884)	2714(2271;3241)	26.02
Rest and care homes	87101	33918	2565(2402;2739)	2644(2480;2818)		1.15
Activities of holding companies	64200	39481	2543(2392;2703)	2994(2840;3156)	2660(2464;2871)	61.51
Working population		4172562	2369(2354;2384)	2369(2354;2384)		
General population			2025	2025	2025	

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

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

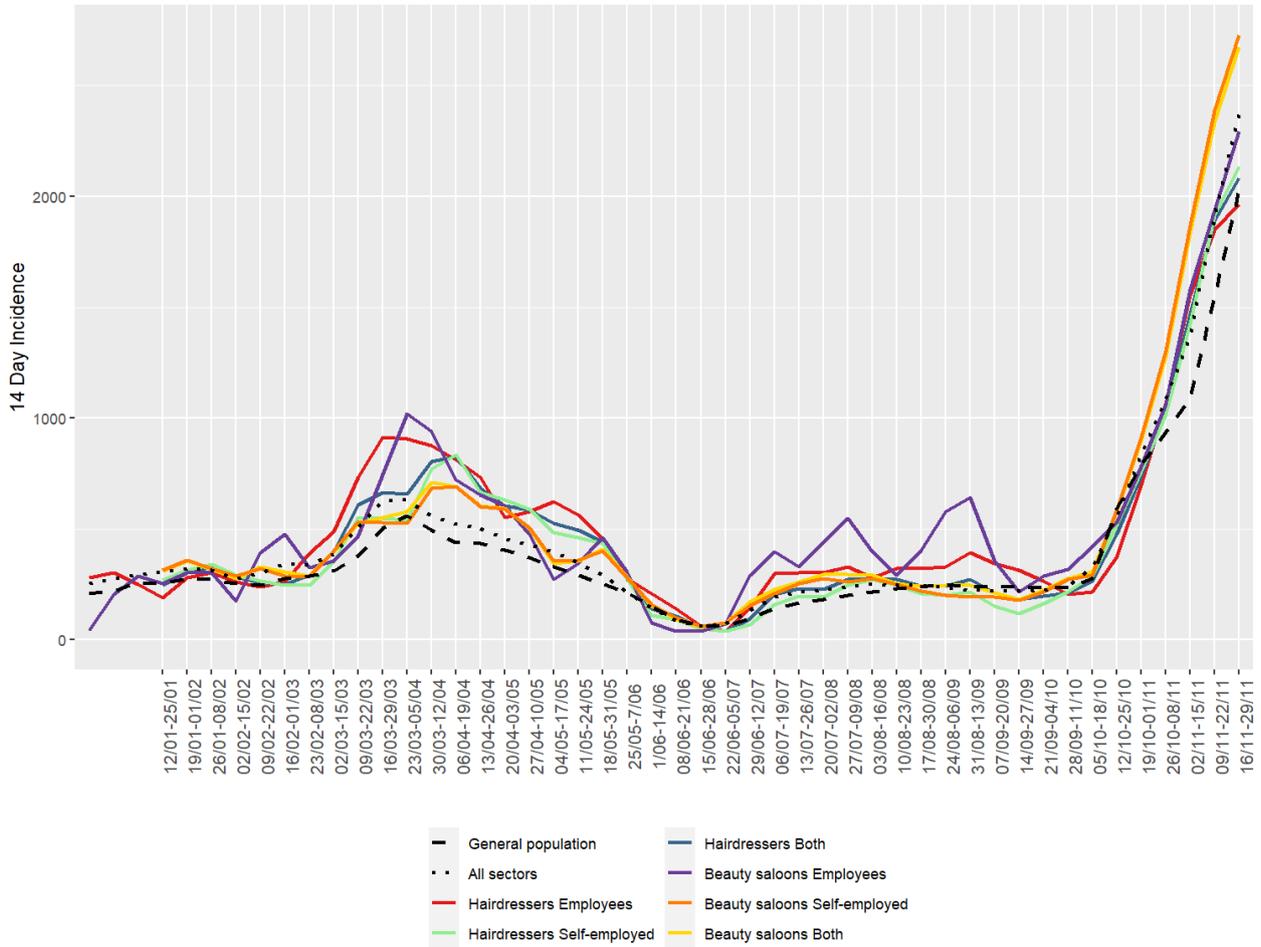


Figure 7: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

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

In Education, secondary education and other education show elevated incidences, while in the Human health and social work sector (sector Q) elevated incidences are present in almost all subsectors of Human health (sector 86), Residential care (Sector 87) and social work without accomodation (sector 88).

Although the 14-day incidence in and Other service activities (sector S), 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. Beauty salons (sector 96022), Other personal service (sector 96099), Defence (sector 8422), Public order and safety (sector 8424) and other Sport activities (sector 9319) 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 general population incidence, although Beverage serving activities (sector 5630) show an incidence well above the working population average.

The sectors Manufacturing (sector C) and Wholesale and retail trade (sector G) are sectors with the highest number of sublevels. In most manufacturing sectors the incidence is below or close to the working and population average, except for the 8 sectors. 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 hardware, plumbing and heating equipment (sector 4674) and Retail sale in medical and orthopedic articles (sector 4774) (Figure 8).

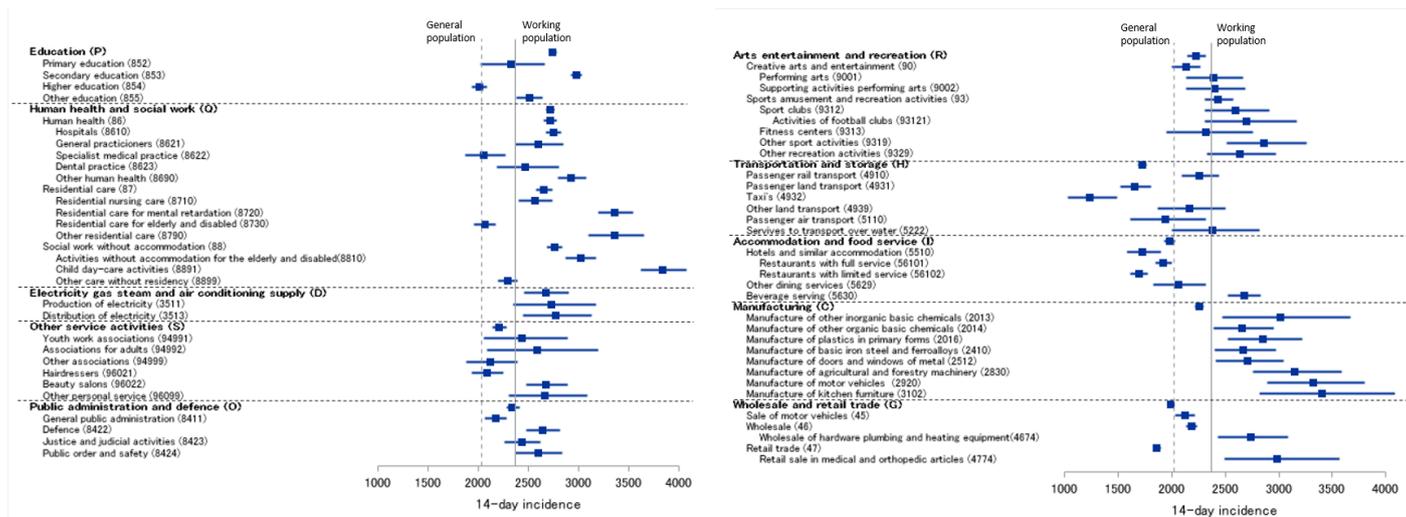


Figure 8: Forest plot of 14-Day incidence and 95% CI of selected sectors on 4 October 2021 in both employees and self-employed.

3.7 Contact tracing

In 2020–2021 about 800,000 employees are under medical surveillance of IDEWE. Among these, 31,870 COVID-19 index cases were registered between 22 July 2020 (week 30) and 25 November 2021, for whom the customer segment, region and the registration date are known for 31,515 index cases.

Between 17–24 November there were 3008 index cases in one week, the highest since contact tracing (Figure 9). The last two weeks the incidence continues to rise rapidly to 586 per 100.000, again the highest since contact tracing started in July 2020. This increase is highest in Education (1518 per 100.000 in 14 days) and in Emergency services (1138 per 100.000 in 14 days) and is present in all regions, but less pronounced in Brussel and Namur. The regions with the highest incidences are Turnhout and Hasselt.

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.

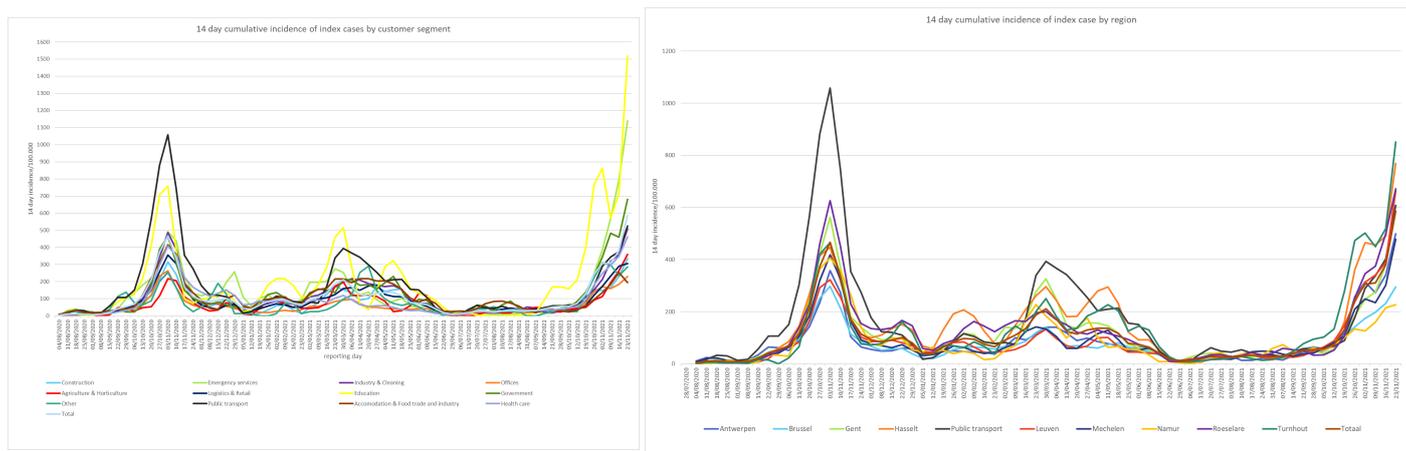


Figure 9: 14-Day incidence of index cases by segments under surveillance (left) and by region (right)

Since the establishment of the tracing app on 29 October 2020, there are 25,481 index cases of whom high-risk contacts were recorded. Of 25,281 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 2020–25 November 2021 (Figures 10).

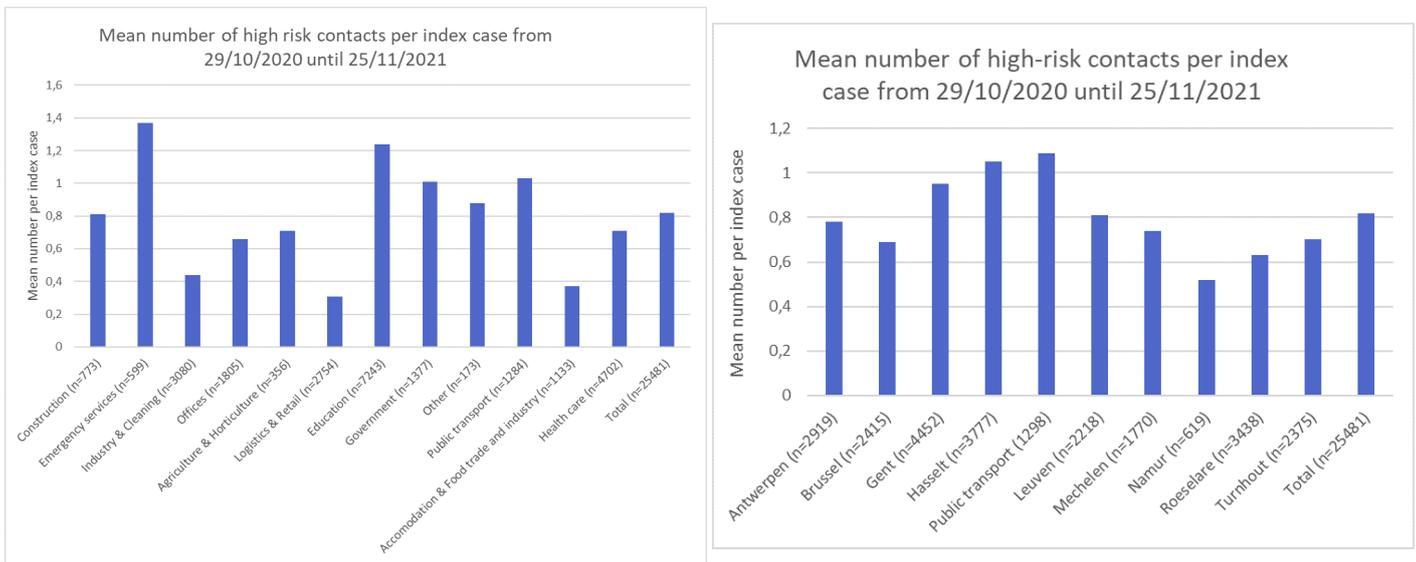


Figure 10: The mean number of high-risk contacts per index case by segments under surveillance (left) and by region (right)

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 declined in most segments and regions in the most recent period (27 October– 23 November 2021), reflecting the changed behavior on the work floor after the strict mitigation measures (Figure 11).

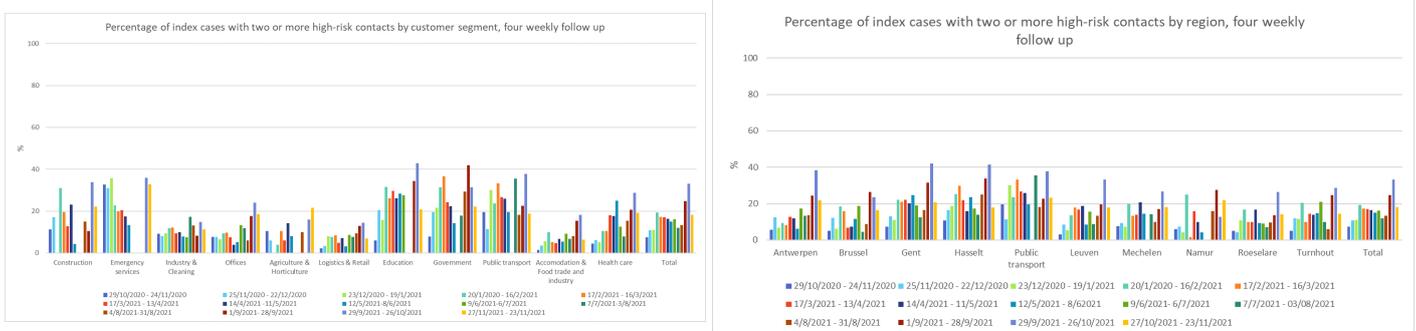


Figure 11: Four weekly percentage of index cases with two or more high-risk contacts by segments under surveillance (left) and by region (right)

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 15,445 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 2,520 (16%) 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 (61%) indicates to know the source of infection at work.

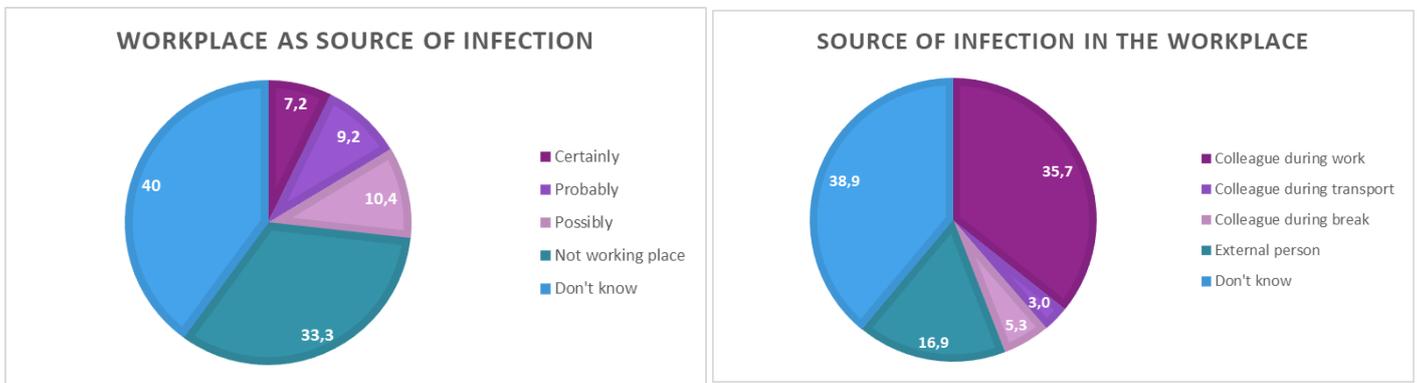


Figure 12: Distribution of the probability and source of infection at work by index case

The proportion of index cases in the Education segment that are attributed to pupils was around 40% during the schoolyear, but is falling to 10.5% in the last 2 weeks (Figure 13 left). This means that the epidemic is rising sharply 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 (73%) 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.

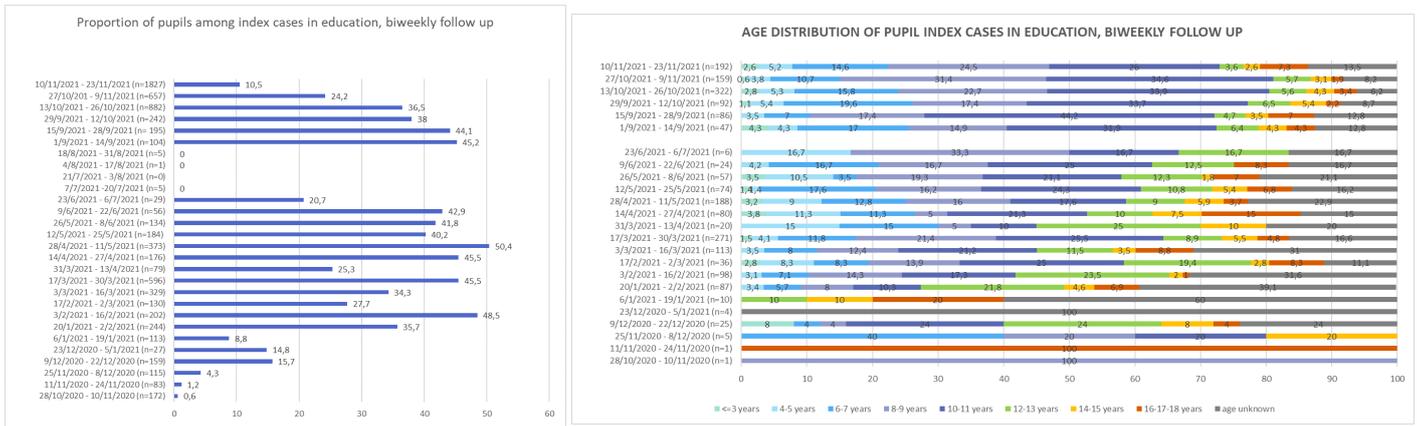


Figure 13: The evolution of index cases of pupils in school (left) and their age distribution (right).

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 9,999 adult index cases we had information about their vaccination status: 8,472 were partially or completely vaccinated (5,503 Cominarty, 1,479 Vaxzevria, 437 Moderna and 540 Johnson % Johnson and 513 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 left).

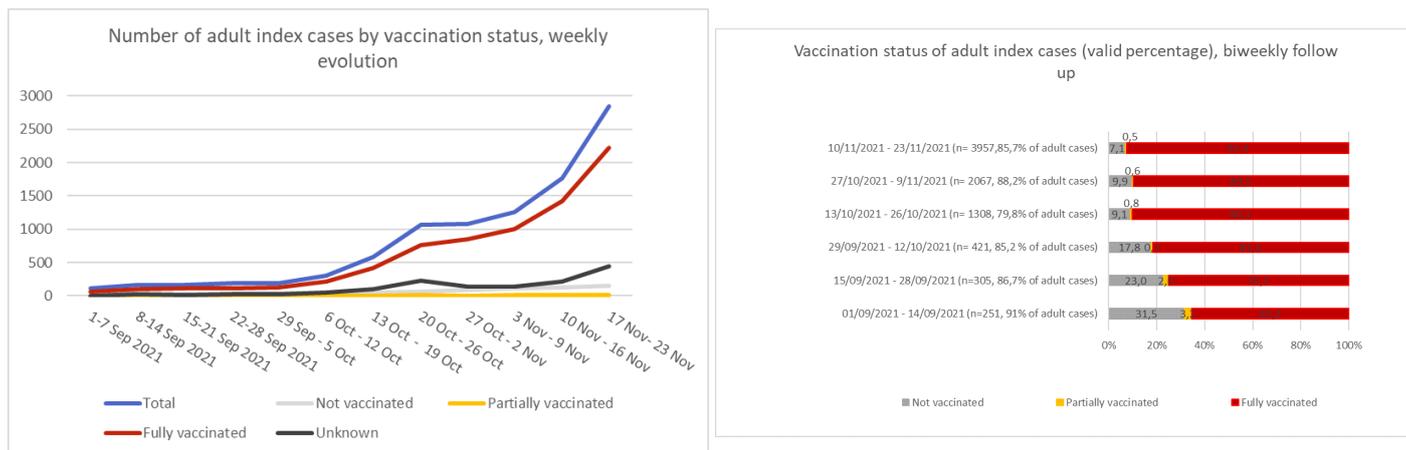


Figure 14: The weekly evolution of index cases and their vaccination status (left) and biweekly evolution of the self-reported vaccination status of index cases (right).

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 since the collection of the RSZ and contact tracing data. The highest incidences are present in education and health care and residential care. The average incidence in working population is higher than the average incidence in the general population, suggesting that infections are relatively more passed on among adults instead of children, which may be reflected in the relative low percentage of index cases in pupils in the contact tracing in education. 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, 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 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. Nurseries and crèches, Primary and secondary education, 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-CoV-2 it may be worthwhile to re-evaluate hygiene protocols, as incidences are increased compared to the working population average in Defence, Public order and safety, Beauty care, Sport activities and Beverage servicing facilities.

For some sectors the reason for the higher incidences is not immediately obvious, such as Distribution of electricity, some Manufacture sectors, Banking agents and brokers, Activities of graphic designers, some construction sectors and activities of holding companies. 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 pro-

tected, 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, except for the cafes and bars.

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 two weeks, the percentage of index cases with two or more high-risk contacts is decreasing.

Acknowledgments

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