

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 detection 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 the 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, 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 students. 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 (6 April–19 April 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 those 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 2020–15 April 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 19 April 2021 above the average (Table 1 and Figure 1), from high to low incidences, are:

- Water supply, sewerage, waste management and remediation activities (sector E)
- Administrative and support service activities (sector N)
- Wholesale and retail trade (sector G)
- Transportation and storage (sector H)
- Manufacturing (sector C)
- Other service activities (sector S)
- Real estate activities (sector L)
- Construction (sector F)

It's positive to note that the 14-day incidence is decreasing for all sectors, quite substantially so for Education (sector P), that reaches incidence levels similar to the general population. The effect of vaccination shows in the Human health and social work activities (sector Q) by having the lowest incidences.

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

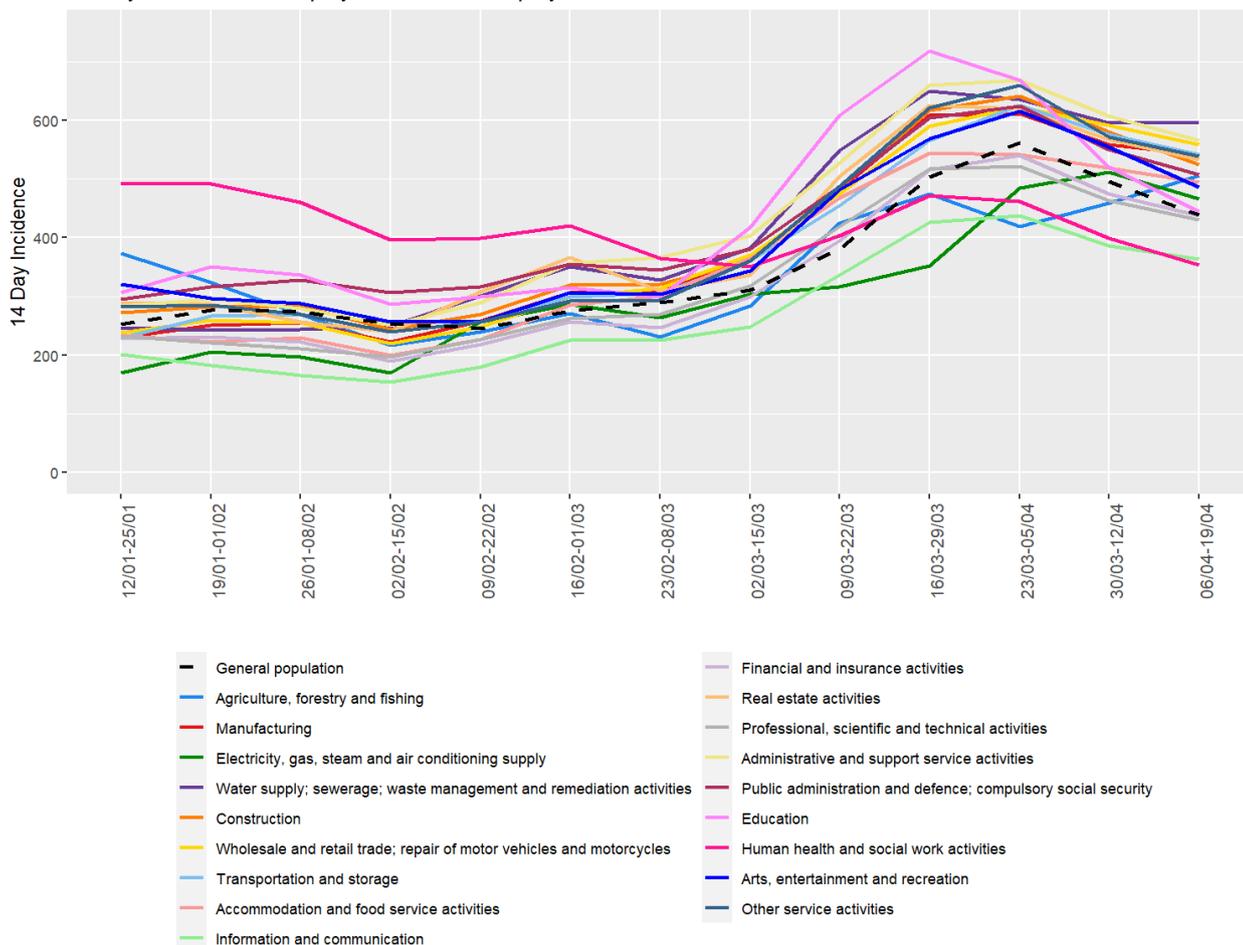


Figure 1: 14-Day incidence of COVID-19 infection of all 21 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of all 21 sectors at Level 1 on 19 April 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 |
|--|--------------|-------------------------|-------------------------------|-----------------------------|---------------------------------|-------------------------------------|
| Water supply; sewerage; waste management and remediation activities | E | 38358 | 597(525;679) | 608(533;694) | | 6.30 |
| Administrative and support service activities | N | 431979 | 566(544;589) | 591(566;617) | 453(408;503) | 18.65 |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | G | 821109 | 559(543;575) | 567(549;586) | 532(500;566) | 23.30 |
| Transportation and storage | H | 302952 | 542(516;569) | 541(514;569) | 556(476;650) | 9.48 |
| Manufacturing | C | 611645 | 541(523;560) | 546(527;566) | 495(443;553) | 10.54 |
| Other service activities | S | 158178 | 538(503;575) | 531(483;584) | 545(496;599) | 50.30 |
| Real estate activities | L | 58161 | 533(477;596) | 515(433;613) | 547(473;632) | 58.47 |
| Construction | F | 382476 | 525(503;548) | 541(512;572) | 500(466;537) | 40.80 |
| All sectors | Total | 4385000 | | 520(513;527) | | |
| Public administration and defence; compulsory social security | O | 565089 | 507(489;526) | 507(489;526) | | 0.19 |
| Agriculture, forestry and fishing | A | 83202 | 506(460;557) | 419(353;498) | 557(497;624) | 63.75 |
| Accommodation and food service activities | I | 207273 | 495(466;526) | 504(468;543) | 476(428;530) | 34.49 |
| Arts, entertainment and recreation | R | 90741 | 486(443;533) | 501(443;566) | 466(404;538) | 44.72 |
| Electricity, gas, steam and air conditioning supply | D | 22532 | 466(385;564) | 452(370;552) | | 6.03 |
| Education | P | 586292 | 445(428;462) | 445(428;463) | 449(374;538) | 4.55 |
| General population | | | 439 | 439 | 439 | |
| Financial and insurance activities | K | 160641 | 437(406;470) | 420(386;457) | 498(429;578) | 21.94 |
| Professional, scientific and technical activities | M | 384884 | 430(410;451) | 434(406;464) | 425(396;456) | 48.58 |
| Information and communication | J | 180165 | 363(336;392) | 393(360;429) | 292(250;341) | 30.65 |
| Human health and social work activities | Q | 644915 | 354(340;369) | 362(347;378) | 270(229;318) | 8.52 |

3.2 Level 2 work sector

In the sectors at level 2 with a minimum of 5,000 workers, the sectors with the highest 14-day incidences on 19 April 2021 are: Manufacturing (sector 10, 27, 23, 32, 13, 24, 14, 25), Waste collection (sector 38), Services to buildings and landscape activities (sector 81), Wholesale and retail trade (sector 45, 47), Security and investigation activities (sector 80), Other personal service activities (sector 96), Repair and installation of machinery and equipment (sector 33), Sports activities and amusement and recreation activities (sector 93), Warehousing and support activities for transportation (sector 52), Social work activities without accommodation (sector 88), Land transport and transport via pipelines (sector 49) and Activities auxiliary to financial services and

insurance activities (sector 66) (Table 2 and Figure 2). Note that in most of these sectors teleworking is not possible. Again, the Human health activities (sector 86) and Residential care activities (sector 87), have the lowest incidences, 281(263;300) respectively 288(263;315), underscoring the effectiveness of vaccination.

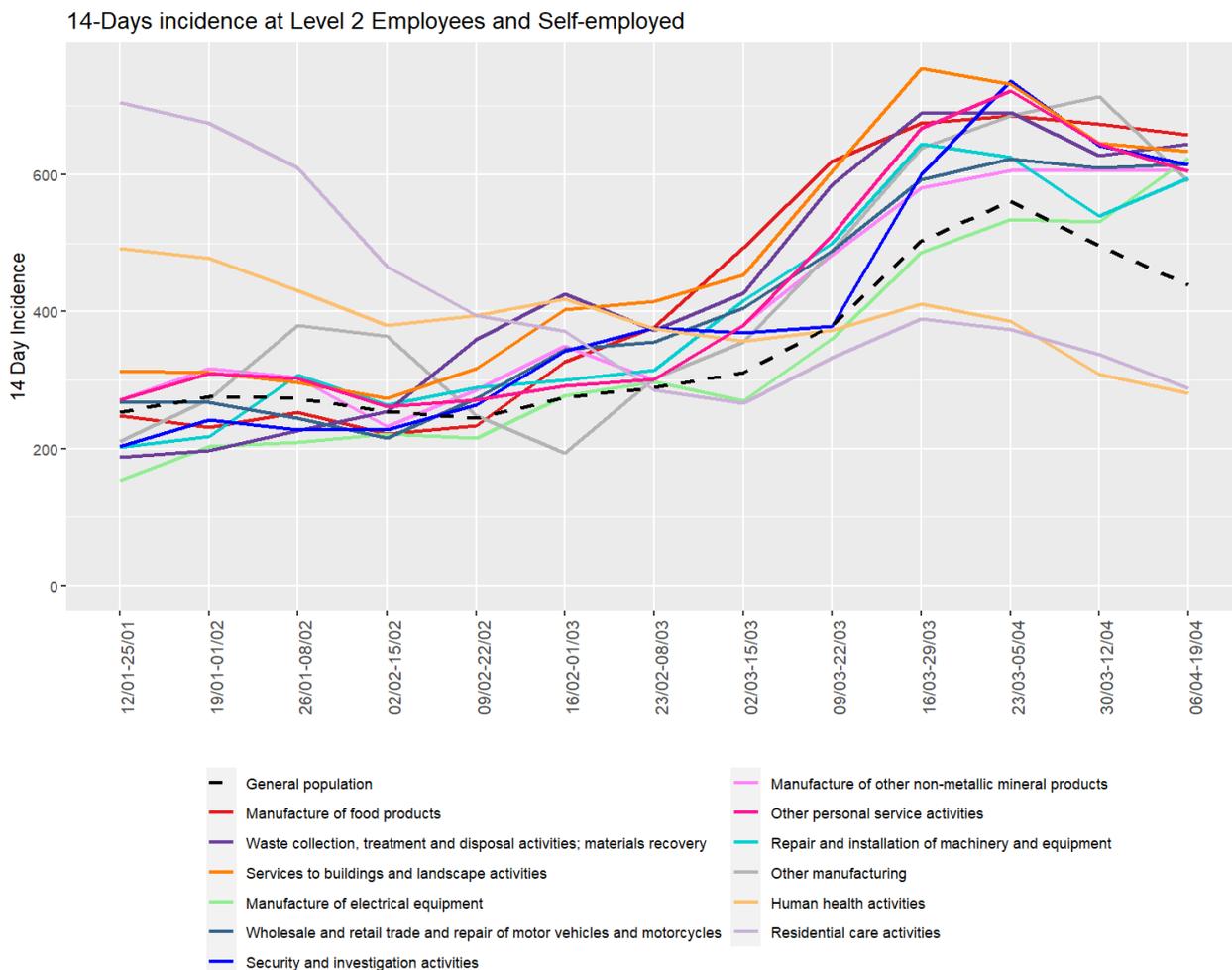


Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the steepest increase and decrease at Level 2 on 19 April 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 food products | 10 | 127052 | 658(615;704) | 658(613;706) | 663(527;833) | 8.76 |
| Waste collection, treatment and disposal activities; materials recovery | 38 | 25621 | 644(553;750) | 665(570;776) | 347(156;770) | 6.99 |
| Services to buildings and landscape activities | 81 | 233596 | 634(603;667) | 661(627;697) | 460(391;540) | 14.13 |
| Manufacture of electrical equipment | 27 | 14583 | 624(508;766) | 660(536;813) | | 8.56 |
| Wholesale and retail trade and repair of motor vehicles and motorcycles | 45 | 95455 | 616(568;668) | 625(567;689) | 597(517;690) | 32.92 |
| Security and investigation activities | 80 | 21498 | 614(518;728) | 627(528;745) | | 5.32 |
| Manufacture of other non-metallic mineral products | 23 | 33003 | 606(528;696) | 608(526;702) | 587(365;942) | 8.78 |
| Other personal service activities | 96 | 91570 | 605(557;657) | 676(588;777) | 573(517;635) | 69.91 |
| Repair and installation of machinery and equipment | 33 | 20504 | 595(498;710) | 612(497;754) | 556(398;777) | 29.98 |
| Other manufacturing | 32 | 13220 | 590(473;736) | 658(504;858) | 478(321;712) | 38.23 |
| Manufacture of textiles | 13 | 22318 | 578(487;686) | 581(484;697) | 558(331;940) | 11.26 |
| Retail trade, except of motor vehicles and motorcycles | 47 | 467073 | 574(553;596) | 591(566;617) | 519(478;564) | 23.44 |
| Manufacture of basic metals | 24 | 26573 | 572(488;670) | 573(488;673) | | 2.84 |
| Sports activities and amusement and recreation activities | 93 | 40000 | 565(496;643) | 546(454;656) | 585(487;703) | 48.89 |
| Manufacture of wearing apparel | 14 | 5206 | 557(387;800) | | 805(514;1259) | 45.47 |
| Warehousing and support activities for transportation | 52 | 89568 | 556(509;607) | 560(512;613) | 499(345;722) | 6.32 |
| Social work activities without accommodation | 88 | 170674 | 549(515;585) | 551(516;588) | 502(344;731) | 3.19 |
| Manufacture of fabricated metal products, except machinery and equipment | 25 | 73810 | 546(495;602) | 557(501;619) | 490(379;633) | 16.18 |
| Land transport and transport via pipelines | 49 | 160000 | 545(510;582) | 543(506;583) | 559(461;678) | 11.53 |
| Activities auxiliary to financial services and insurance activities | 66 | 41360 | 544(478;620) | 549(472;638) | 528(407;684) | 26.36 |
| All sectors | Total | 4385000 | | 520(513;527) | | |
| General population | | | 439 | 439 | 439 | |

3.3 Level 3 work sector

In the sectors at level 3 with a minimum of 5,000 workers, the sectors with the highest 14-day incidences on 19 April 2021 are Activities of call centres (sector 822), Waste collection (sector 381), Manufacturing sectors (sector 241, 205, 107, 103, 259, 139), Animal production, agriculture (sector 014 ,016), Processing and preserving of meat and production of meat products (sector 101), Sale of motor vehicles (sector 453, 451), Passenger rail transport, interurban (sector 491), Retail sale (sector 474, 479), Cleaning activities (sector 812), Warehousing and storage (sector 521), Amusement and recreation activities (sector 932) and Installation of industrial machinery (sector 332) (Table 3 and Figure 3). In these sectors, telework is often not possible and/or the climate-controlled environment is ideal for transmission of the virus.

Sectors that do not follow the trend in the general population in 14-day incidence are Health care activities (sector 861, 862, 869) and Residential care activities (sector 871, 872, 873) (Figure 4). This again shows the effect of the vaccination and following strict protocols.

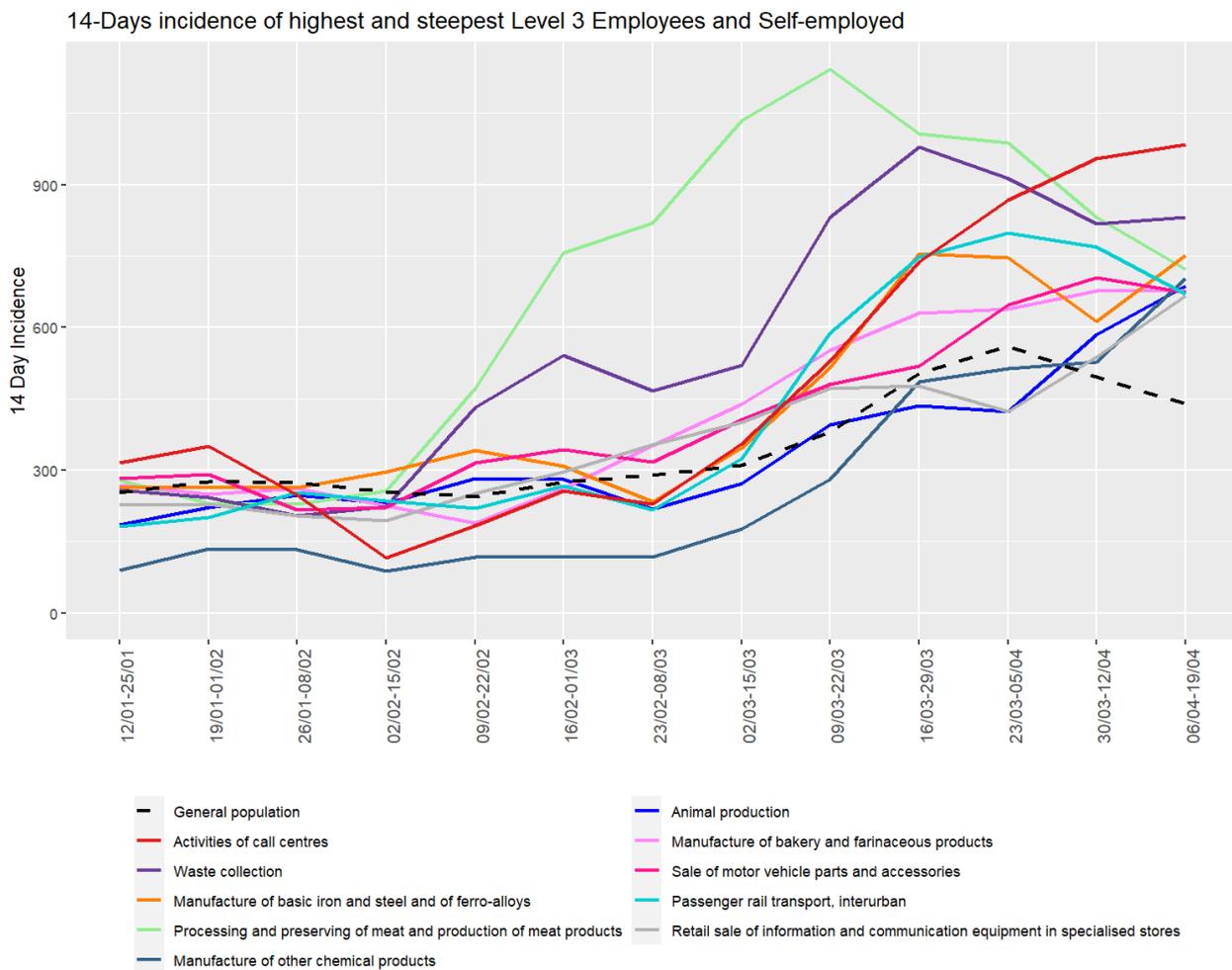


Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest and steepest incidence at Level 3 in both employees and self-employed

Decreasing 14-Days incidence of Level 3 Employees and Self-employed

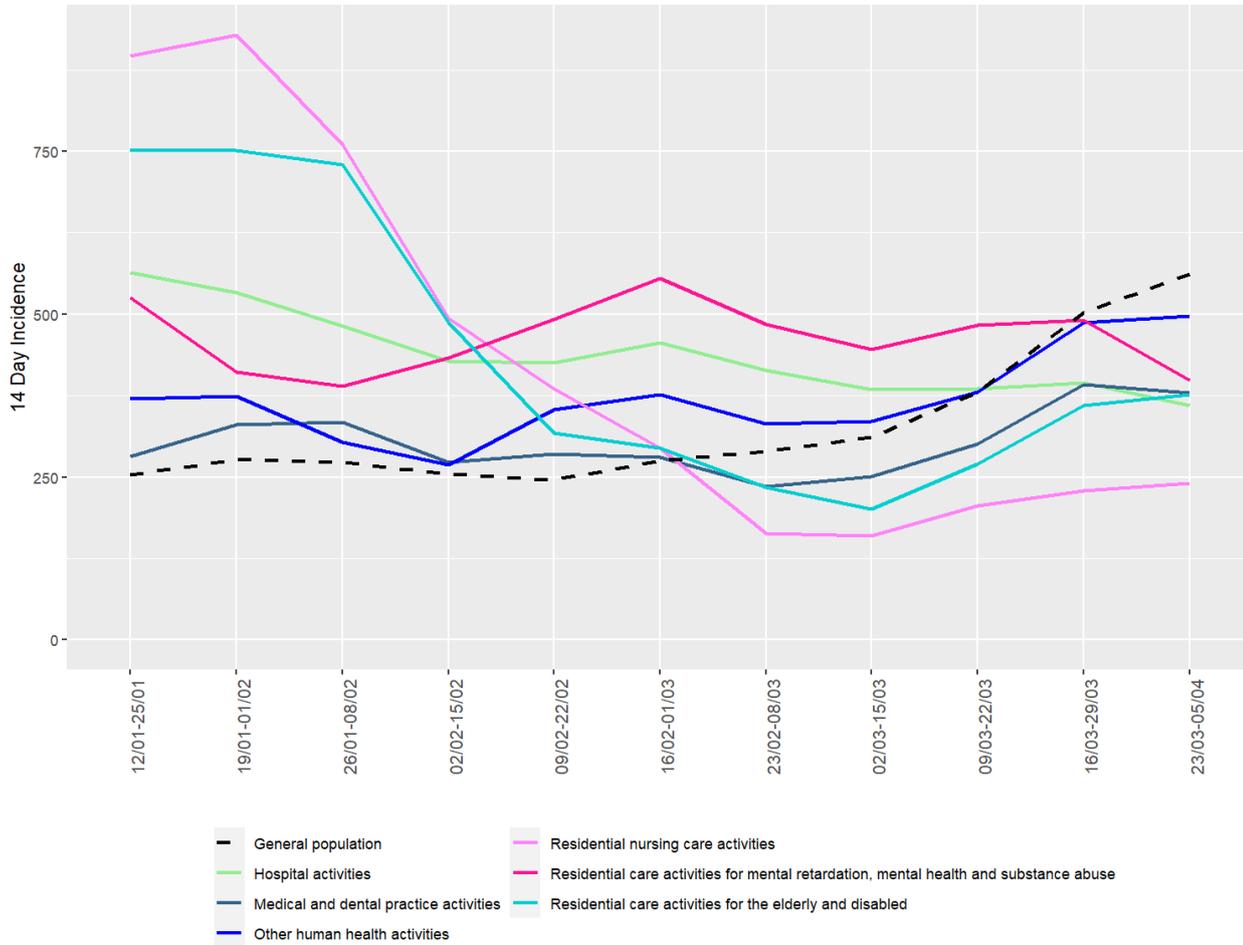


Figure 4: 14-Day incidence of COVID-19 infection in health and residential care sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 19 April 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 |
|--|--------------|-------------------------|-------------------------------|-----------------------------|---------------------------------|-------------------------------------|
| Activities of call centres | 822 | 11179 | 984(817;1185) | 984(817;1185) | | 1.90 |
| Waste collection | 381 | 10469 | 831(674;1024) | 841(680;1039) | | 3.58 |
| Manufacture of basic iron and steel and of ferro-alloys | 241 | 12101 | 752(613;923) | 760(619;934) | | 2.09 |
| Processing and preserving of meat and production of meat products | 101 | 19114 | 722(611;852) | 740(624;877) | 471(212;1044) | 6.68 |
| Manufacture of other chemical products | 205 | 6838 | 702(529;930) | 702(529;930) | | 3.38 |
| Animal production | 014 | 12373 | 687(556;849) | | 698(549;888) | 76.57 |
| Manufacture of bakery and farinaceous products | 107 | 46529 | 677(606;756) | 670(595;754) | 723(535;977) | 12.62 |
| Sale of motor vehicle parts and accessories | 453 | 15134 | 674(555;818) | 707(575;869) | 509(296;875) | 16.92 |
| Passenger rail transport, interurban | 491 | 30000 | 670(584;769) | 670(584;769) | | 0.07 |
| Retail sale of information and communication equipment in specialised stores | 474 | 8859 | 666(516;859) | | 454(286;719) | 45.15 |
| Cleaning activities | 812 | 195144 | 659(624;696) | 670(634;708) | 463(351;610) | 5.73 |
| Warehousing and storage | 521 | 35812 | 659(580;748) | 657(577;748) | 739(370;1471) | 3.04 |
| Retail trade not in stores, stalls or markets | 479 | 17530 | 656(547;787) | | 617(497;766) | 75.08 |
| Support activities to agriculture and post-harvest crop activities | 016 | 9480 | 654(510;838) | | 663(487;903) | 64.01 |
| Processing and preserving of fruit and vegetables | 103 | 15228 | 637(522;777) | 624(509;765) | | 3.13 |
| Manufacture of other fabricated metal products | 259 | 8399 | 631(482;825) | 619(464;825) | | 11.46 |
| Amusement and recreation activities | 932 | 10367 | 627(492;799) | | 748(570;980) | 67.26 |
| Sale of motor vehicles | 451 | 50400 | 625(560;698) | 614(537;702) | 649(535;787) | 31.87 |
| Manufacture of other textiles | 139 | 16346 | 624(514;757) | 621(506;761) | 650(350;1204) | 9.44 |
| Installation of industrial machinery and equipment | 332 | 6634 | 618(455;838) | 592(423;827) | | 13.51 |
| All sectors | Total | 4385000 | | 520(513;527) | | |
| General population | | | 439 | 439 | 439 | |

3.4 Level 4 work sector

In the sectors at level 4 with a minimum of 3,000 workers, the sectors with the highest 14-day incidences on 19 April 2021 are Activities of call centres (sector 8220), Manufacturing (sector 1392, 2410, 2530, 2550, 2599), Processing and preserving of meat poultry, manufacture of other food products (sector 1011, 1012, 1039, 1071, 1091), Wholesale and retail sale (sector 4532, 4799, 4631, 4633, 4777, 4754, 4649), Collection of non-hazardous waste (sector 3811) and Packaging activities (sector 8292) (Table 4 and Figure 5). In many of these sectors,

telework is not possible, workers often operate under close physical proximity or the climate-controlled environment is optimal for transmission of the virus.

Longitudinally, the 14-day incidence in the health (sector 8610, 8621, 8622, 8690) and care sectors (sector 8710, 8720, 8730) were much less affected by the third wave and are among the sectors with the lowest incidences on 19 April 2021 (Figure 6).

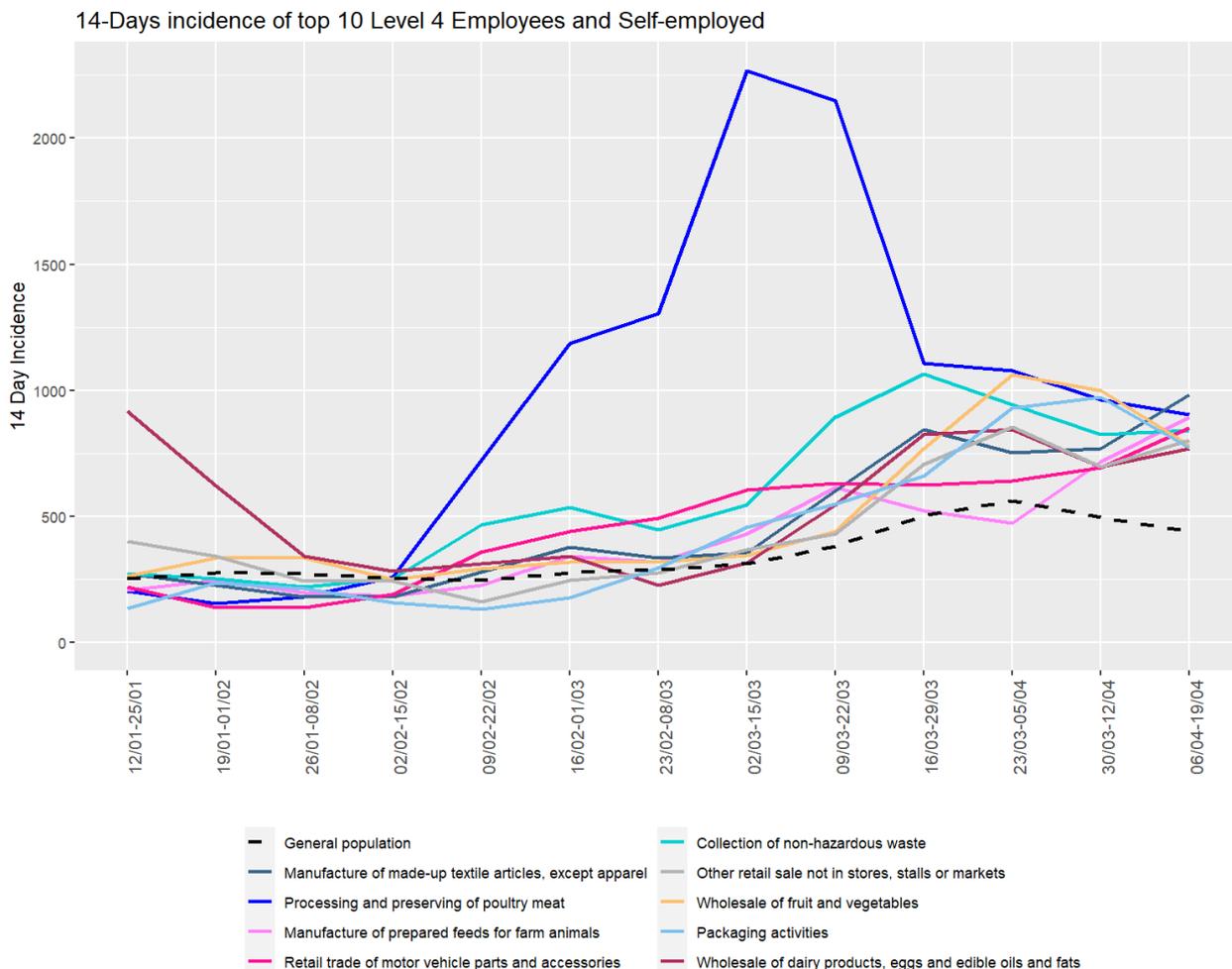


Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Decreasing 14-Days incidence of Level 4 Sectors

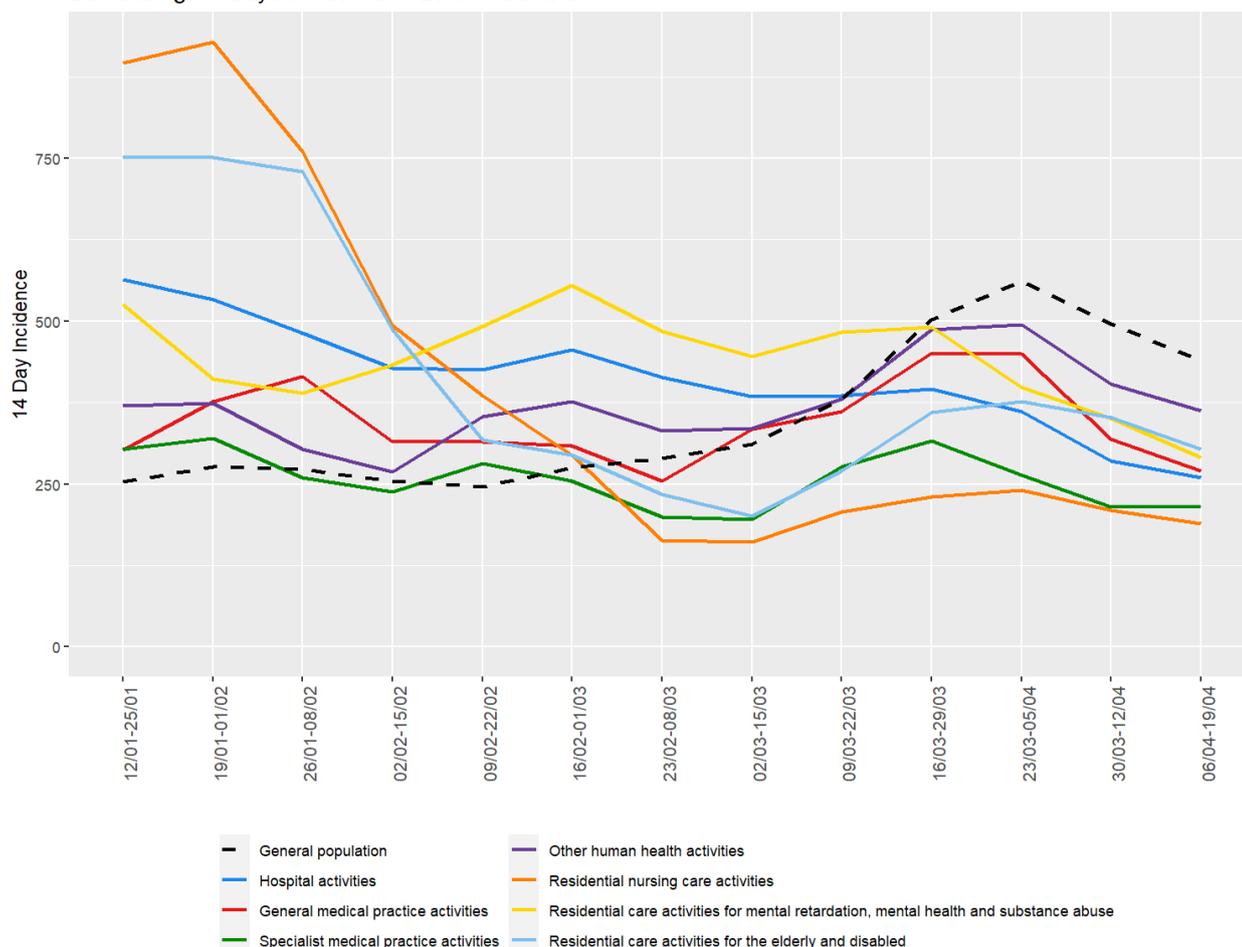


Figure 6: 14-Day incidence of COVID-19 infection in health and care sectors at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 19 April 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 |
|---|--------------|-------------------------|-------------------------------|-----------------------------|---------------------------------|-------------------------------------|
| Activities of call centres | 8220 | 11179 | 984(817;1185) | 984(817;1185) | | 1.90 |
| Manufacture of made-up textile articles, except apparel | 1392 | 4582 | 982(734;1313) | 1068(781;1458) | | 20.32 |
| Processing and preserving of poultry meat | 1012 | 4199 | 905(659;1241) | 890(643;1231) | | 3.66 |
| Manufacture of prepared feeds for farm animals | 1091 | 4479 | 893(656;1215) | 908(661;1245) | | 6.57 |
| Retail trade of motor vehicle parts and accessories | 4532 | 3760 | 851(602;1201) | | 384(173;852) | 41.71 |
| Collection of non-hazardous waste | 3811 | 9264 | 842(675;1050) | 853(682;1067) | | 3.80 |
| Other retail sale not in stores, stalls or markets | 4799 | 3870 | 801(564;1137) | | 703(472;1047) | 88.33 |
| Wholesale of fruit and vegetables | 4631 | 7682 | 781(607;1005) | 678(503;913) | | 17.49 |
| Packaging activities | 8292 | 3756 | 772(537;1109) | 744(503;1099) | | 10.57 |
| Wholesale of dairy products, eggs and edible oils and fats | 4633 | 3636 | 770(532;1113) | 735(489;1104) | | 13.97 |
| Retail sale of watches and jewellery in specialised stores | 4777 | 4036 | 768(541;1090) | | 664(394;1118) | 52.79 |
| Manufacture of basic iron and steel and of ferro-alloys | 2410 | 12101 | 752(613;923) | 760(619;934) | | 2.09 |
| Manufacture of steam generators, except central heating hot water boilers | 2530 | 3940 | 736(512;1057) | 756(522;1093) | | 5.94 |
| Processing and preserving of meat | 1011 | 7163 | 726(554;952) | 777(589;1024) | | 10.21 |
| Manufacture of bread; manufacture of fresh pastry goods and cakes | 1071 | 39172 | 725(646;814) | 721(636;817) | 753(555;1021) | 14.08 |
| Manufacture of other fabricated metal products n.e.c. | 2599 | 5594 | 715(525;973) | 691(492;970) | | 14.58 |
| Retail sale of electrical household appliances in specialised stores | 4754 | 8976 | 713(558;910) | 835(645;1081) | 325(155;680) | 24.09 |
| Wholesale of other household goods | 4649 | 14616 | 691(569;839) | 756(606;943) | 536(356;805) | 29.43 |
| Forging, pressing, stamping and roll-forming of metal; powder metallurgy | 2550 | 4810 | 686(488;963) | 690(463;1027) | | 27.67 |
| Other processing and preserving of fruit and vegetables | 1039 | 6627 | 679(507;908) | 643(474;872) | | 3.84 |
| All sectors | Total | 4385000 | | 520(513;527) | | |
| General population | | | 439 | 439 | 439 | |

3.5 Level 5 work sector

In the sectors at level 5 with a minimum of 3,000 workers, the sectors with the highest 14-day incidences on 19 April 2021 are Activities of call centres (sector 82220), Processing, production and preserving of meat, poultry and other food products (sector 10110, 10120, 10311, 10711, 10712, 10910), Wholesale and retail trade (sector 45320, 46319, 46732, 47191, 47540, 47770, 47990), Collection of non-hazardous waste (sector 38110), Packaging activities (sector 82920), Manufacturing (sector 24100, 25300), Sheltered workshops (sector 88995)

and Industrial laundries activities (sector 96011) (Table 5 and Figure 7). In many of these sectors, telework is not possible, workers often operate under close physical proximity and the climate-controlled environment is optimal for transmission of the virus.

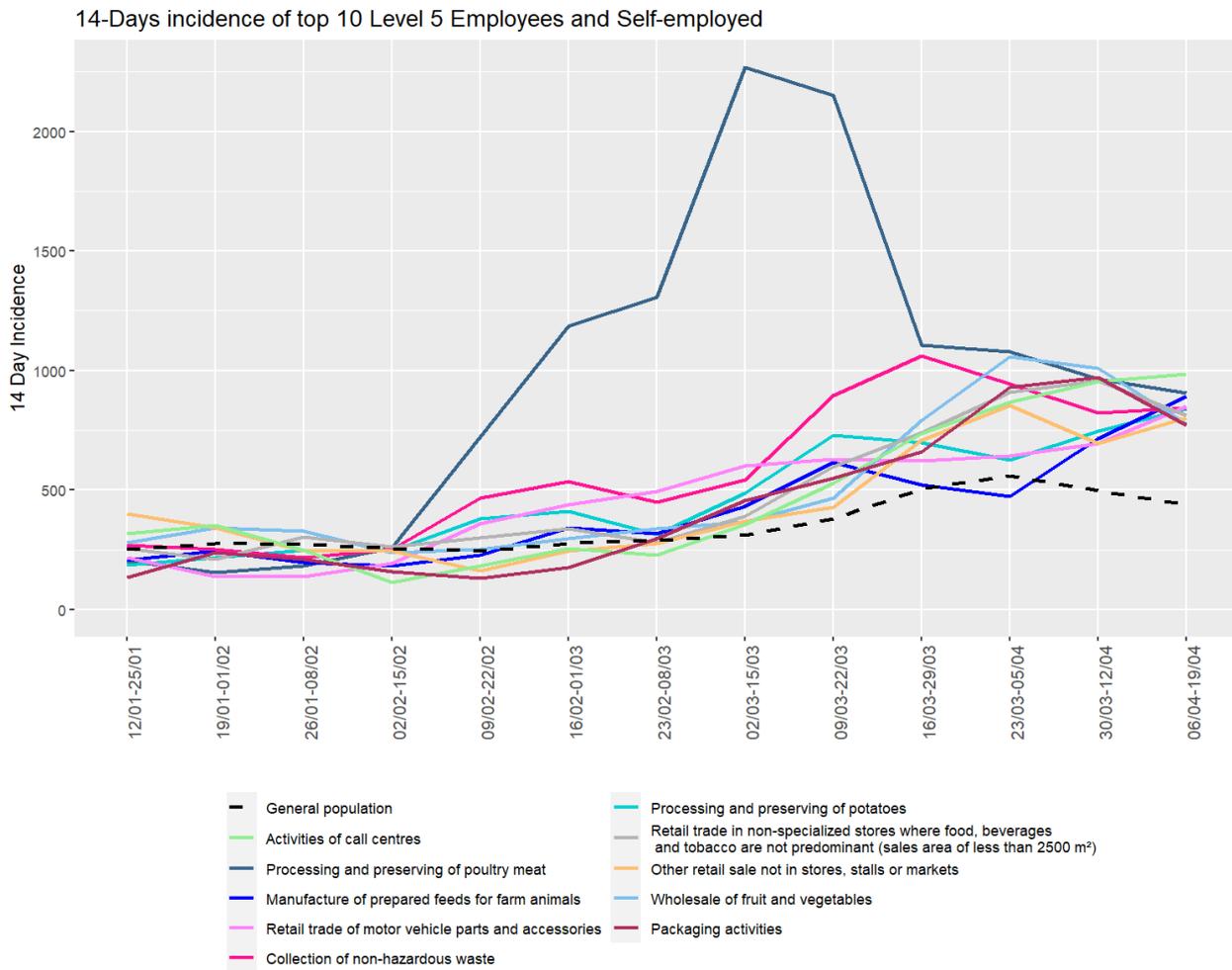


Figure 7: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 19 April 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 |
|--|--------------|-------------------------|-------------------------------|-----------------------------|---------------------------------|-------------------------------------|
| Activities of call centres | 82200 | 11179 | 984(817;1185) | 984(817;1185) | | 1.90 |
| Processing and preserving of poultry meat | 10120 | 4199 | 905(659;1241) | 890(643;1231) | | 3.66 |
| Manufacture of prepared feeds for farm animals | 10910 | 4479 | 893(656;1215) | 908(661;1245) | | 6.57 |
| Retail trade of motor vehicle parts and accessories | 45320 | 3760 | 851(602;1201) | | 384(173;852) | 41.71 |
| Collection of non-hazardous waste | 38110 | 9264 | 842(675;1050) | 853(682;1067) | | 3.80 |
| Processing and preserving of potatoes | 10311 | 3337 | 839(580;1212) | 836(574;1216) | | 3.23 |
| etail trade in non-specialized stores where food, beverages and tobacco are not predominant (sales area of less than 2500 m ²) | 47191 | 5535 | 813(608;1087) | 865(638;1173) | | 14.53 |
| Other retail sale not in stores, stalls or markets | 47990 | 3870 | 801(564;1137) | | 703(472;1047) | 88.33 |
| Wholesale of fruit and vegetables | 46319 | 7207 | 777(598;1008) | 684(504;928) | | 16.86 |
| Packaging activities | 82920 | 3756 | 772(537;1109) | 744(503;1099) | | 10.57 |
| Industrial manufacture of bread; fresh pastry goods and cakes | 10711 | 8854 | 768(606;973) | 769(601;983) | | 7.54 |
| Retail sale of watches and jewellery in specialised stores | 47770 | 4036 | 768(541;1090) | | 664(394;1118) | 52.79 |
| Wholesale of wood | 46732 | 5402 | 759(559;1029) | 794(568;1109) | | 20.79 |
| Manufacture of basic iron and steel and of ferro-alloys | 24100 | 12101 | 752(613;923) | 760(619;934) | | 2.09 |
| Manufacture of steam generators, except central heating hot water boilers | 25300 | 3940 | 736(512;1057) | 756(522;1093) | | 5.94 |
| Processing and preserving of meat | 10110 | 7163 | 726(554;952) | 777(589;1024) | | 10.21 |
| Retail sale of electrical household appliances in specialised stores | 47540 | 8976 | 713(558;910) | 705(609;815) | 748(545;1026) | 24.09 |
| Artisaal manufacture of bread; fresh pastry goods and cakes | 10712 | 30618 | 712(624;813) | 835(645;1081) | 325(155;680) | 16.81 |
| Sheltered workshops | 88995 | 47783 | 699(628;778) | 696(625;775) | | 1.07 |
| Industrial laundries activities | 96011 | 6724 | 699(526;929) | 669(493;907) | | 8.83 |
| All sectors | Total | 4385000 | | 520(513;527) | | |
| General population | | | 439 | 439 | 439 | |

Finally, when considering specifically the non-medical contact professions, such as hairdressers and beauty saloons, who were allowed to re-open on 13 February 2021 and 1 March 2021, and who were closed again on

27 March 2021, we see a decline in the 14-day incidence on 12 April 2021, similar to the decline in the general population (Figure 8).

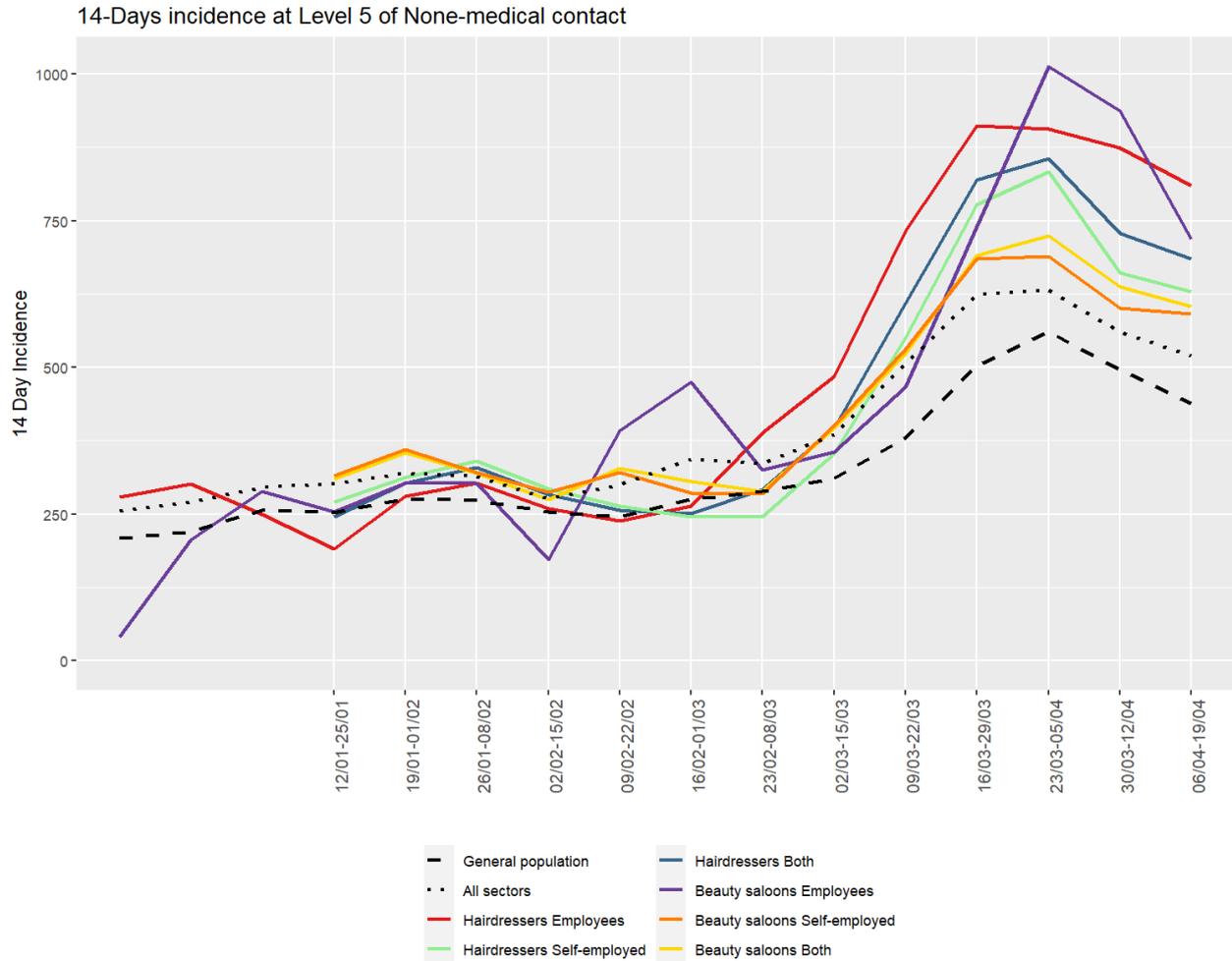


Figure 8: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

3.6 Additional analyses

3.6.1 Cross-level overview

When viewing at the 14-day incidences across NACE-BEL sectors, it is possible to understand the contribution of each sub-level sector to the higher level incidence (Figure 9). Administrative and support service activities (sector N) contains many sub-levels (sector 77-82), of which Cleaning (sector 812), Packaging (sector 8292), but especially Call centres (sector 8220) cause the sector to stand out. Similarly, Collection of non-hazardous waste (sector 3811) causes the sector Water supply, sewerage and waste management (sector E) to stand out. Transportation and storage (sector H) has an above average 14-day incidence due to Passenger rail transport (sector 4910) and passenger land transport (sector 4931), while Other service activities (sector S) has an above average 14-day incidence due to hairdressers (sector 96021), beauty salons (sector 96022) and washing and (dry)-cleaning activities (sector 9601). The pause in secondary education (sector 853) has had a clear impact and reduced the level of incidences to the incidence in the general population.

The sectors Manufacturing (sector C) and Wholesale and retail trade (sector G) are sectors with the most sublevels. This results in large differences in 14-day incidences within the sector (Figure 10). Although the food processing industry has still an increased incidence, the outbreaks in previous weeks seem to be under control.

Finally, the effect of vaccination and strict protocols in the Human health (sector 86) and Residential care (sector 87) clearly result in lower 14-day incidences than in the general population. This effect so wide-spread across Human health and social work (sector Q), that the increased 14-day incidence in Child day-care activities (sector 8891) is compensated for.

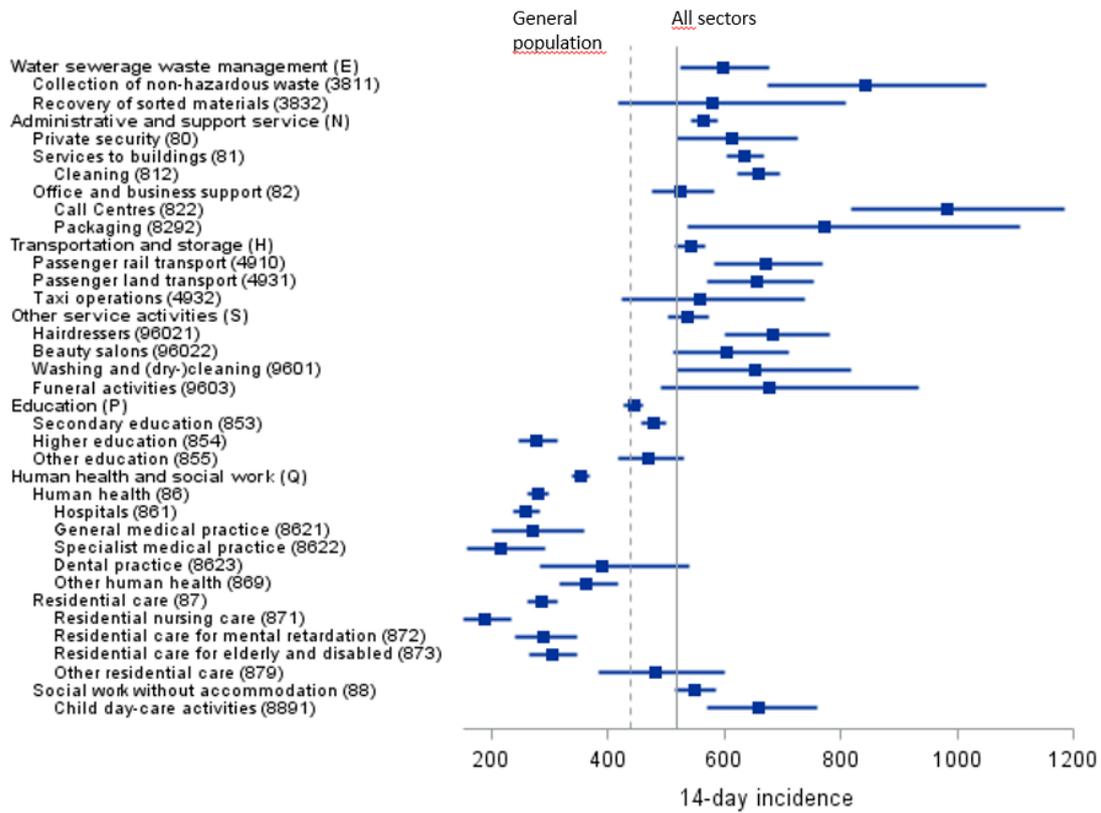


Figure 9: Forest plot of 14-Day incidence and 95% CI of selected sectors on 19 April 2021 in both employees and self-employed.

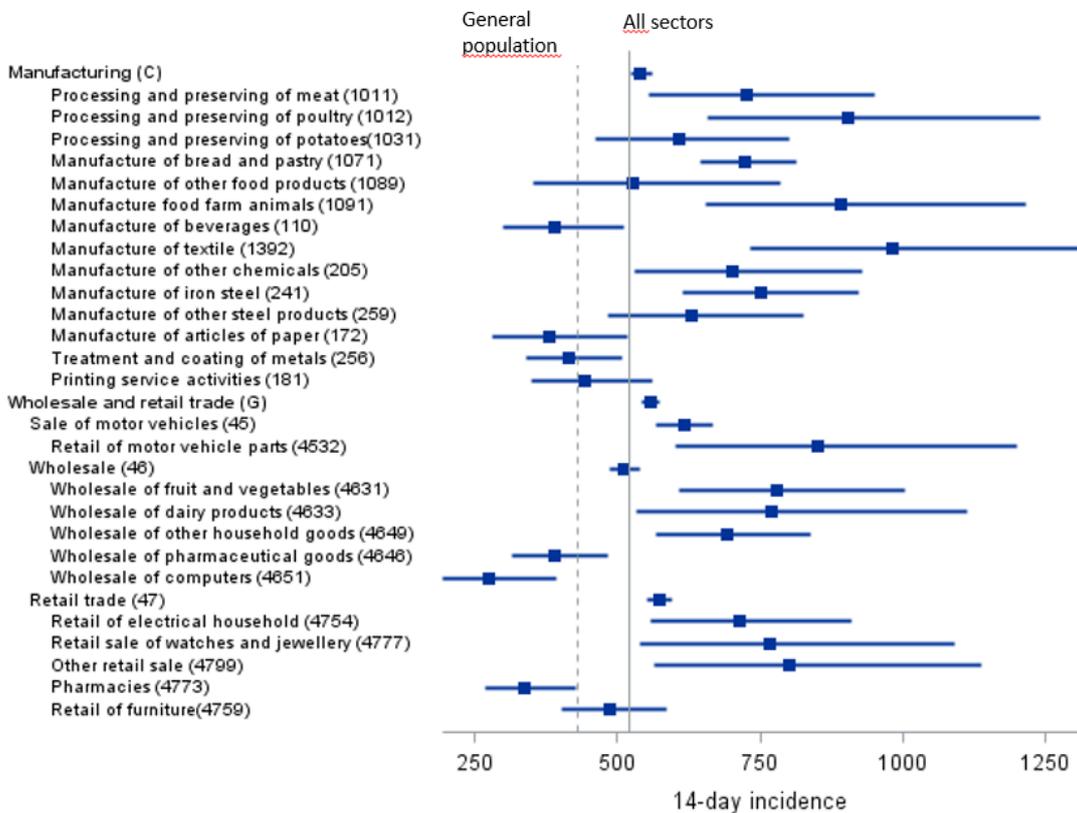


Figure 10: Forest plot of 14-Day incidence and 95% CI of selected sectors on 19 April 2021 in both employees and self-employed.

3.6.2 Vaccination

Early January 2021 vaccination for COVID-19 started in the Nursing home sector (sector 871 and 873) and beginning of February 2021 in the hospitals (sector 861). Weekly self-reported degree of vaccination among employees in these sectors can be found in www.laatjevaccineren.be. It is striking that 3–4 weeks after the majority of the nursing home employees were vaccinated the 14-day incidence in this sector declines rapidly from one of the highest 14-day incidence to well below the population average (Figure 11). The 14-day incidence among hospital employees decreases slowly, arguably to the slower update in vaccination, but the incidence in the hospitals is clearly not following the increase in the general population (Figure 11).

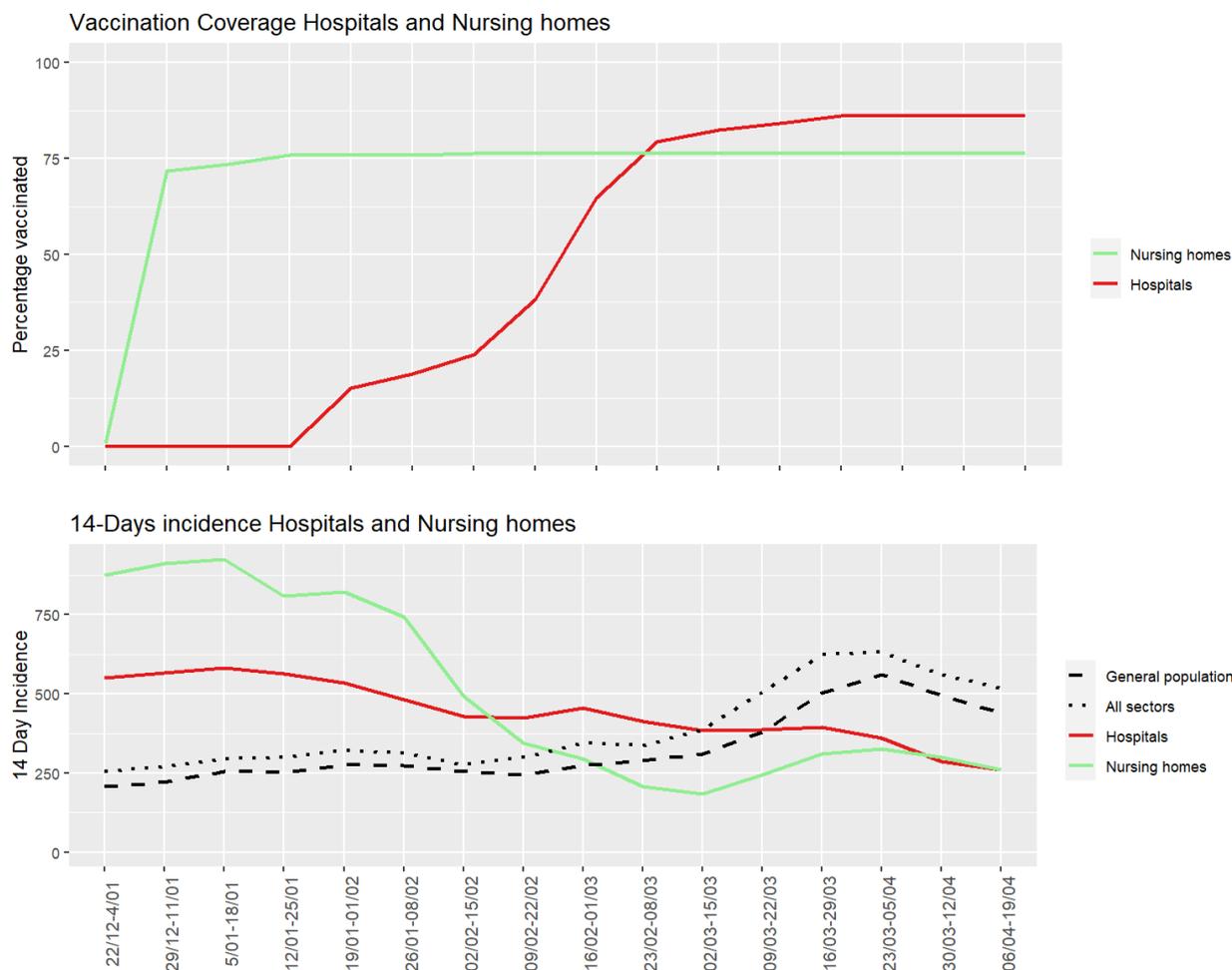


Figure 11: Evolution of vaccination coverage and 14-Day incidence of COVID-19 infection in hospital and nursing home employees. The date for the vaccination coverage is the actual status of vaccination on this date, while the 14-day incidence reflects the incidences 14 days prior to the date.

3.7 Contact tracing

In 2020–2021 about 800,000 employees are under medical surveillance of IDEWE. Among these, 15,402 COVID-19 index cases were registered between 22 July 2020 (week 30) and 15 April 2021, for whom the customer segment, region and the registration date are known for 16,060 index cases.

The 14-day incidence of index cases decreases strongly in Education, while the incidence in Public Transport decreases, but remains high compared to the other sectors (Figure 12). The decline in incidences is present in all regions (Figure 12). Two factors, mentioned above, may cause an error 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.

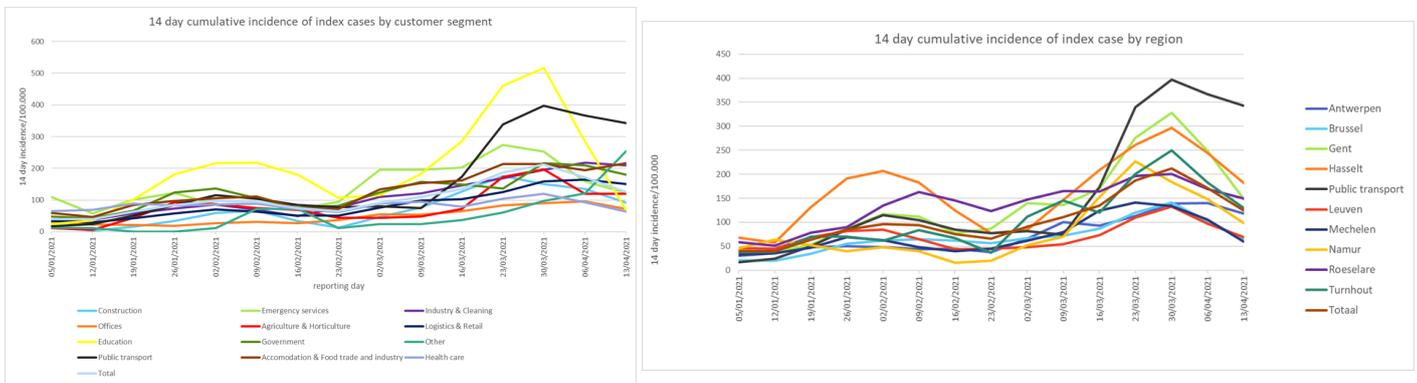


Figure 12: 14-Day incidence of index cases by segments under surveillance (left) and by region (right)

Since the establishment of the tracing app on 29 October 2020, there are 10,459 index cases of whom high-risk contacts were recorded. Of 10,360 index cases the customer segment and region is known. The mean number of high-risk contacts in segment Emergency services, Education and Transport is above 1, while in Hasselt region a higher mean number of high-risk contacts is reported in the period 29 Oct 2020–15 April 2021. (Figures 13).

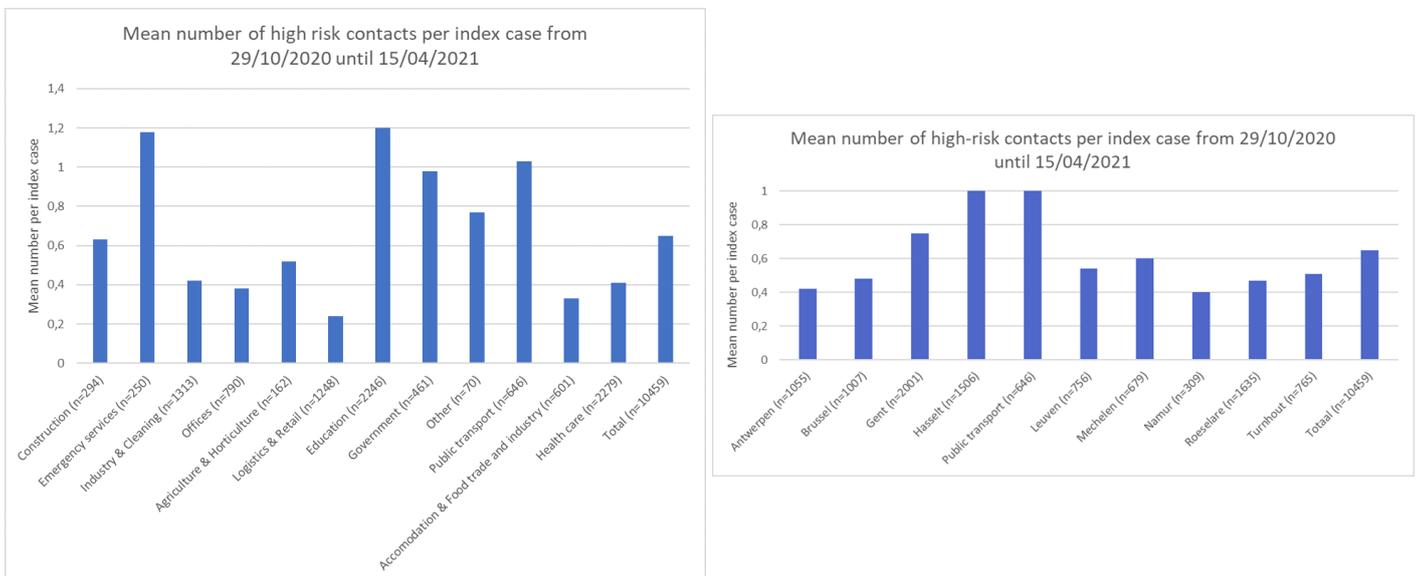


Figure 13: The mean number of high-risk contacts per index case by segments under surveillance (left) and by region (right)

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. Seventy-four 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 data, we report the percentage of index cases who had two or more high-risk contacts per four weeks.

In most segments the percentage of index cases with two or more high-risk contacts is decreasing or stable at a low level in the last period (17 March - 13 April 2021), except for the Health care segment where the number of high-risk contacts almost doubled and Emergency services, Education and Public transport where the number of high-risk contacts remain stable at a high level. (Figure 14). As the peak of COVID-19 incidence has peaked beginning of April, the high-risk contacts are still highly influenced by the pre-peak period. With increasing virus circulation an high number of high-risk contacts is to be expected in working environments with close and frequent physical proximity, such as transportation, health care, emergency services and education.

The increase in the percentage of index cases with two or more high-risk contacts has leveled off or decreased in all regions in the last period (17 March - 13 April 2021) (Figure 14), reflecting the changed behavior in the working environment.

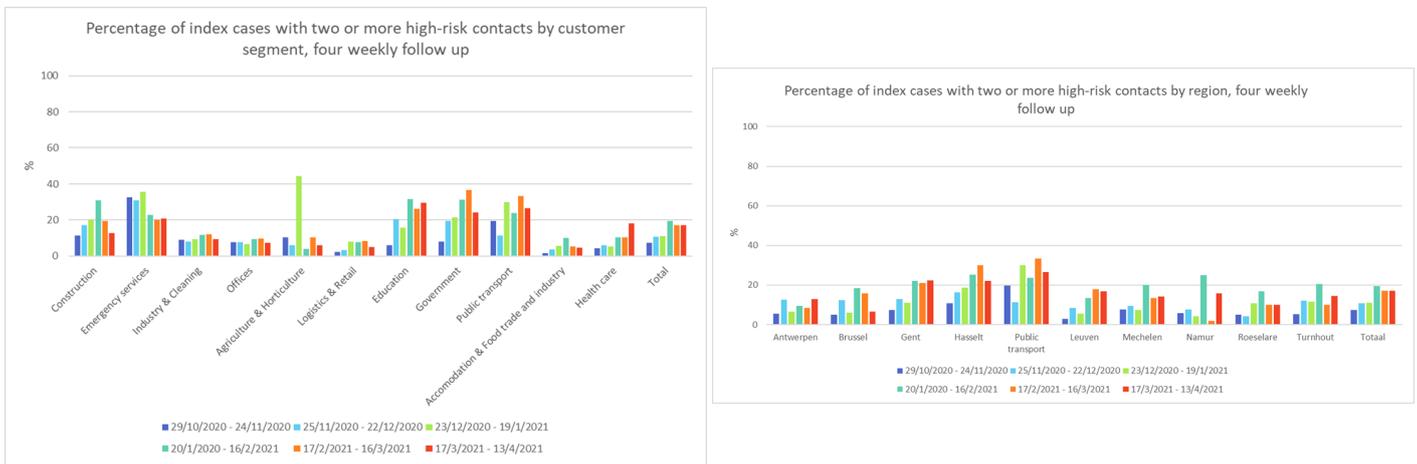


Figure 14: Four weekly percentage of index cases with two or more high-risk contacts by segments under surveillance (left) and by region (right)

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 2791 index cases we have information about perceived work relatedness of the source of infection. While 38% of the index cases does not know if the infection took place at work, 23% responded that they were certainly or probably infected at work (Figure 15 left). From 1021 (37%) 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 15 right). A majority of the index cases (60%) indicates to know the source of infection at work.

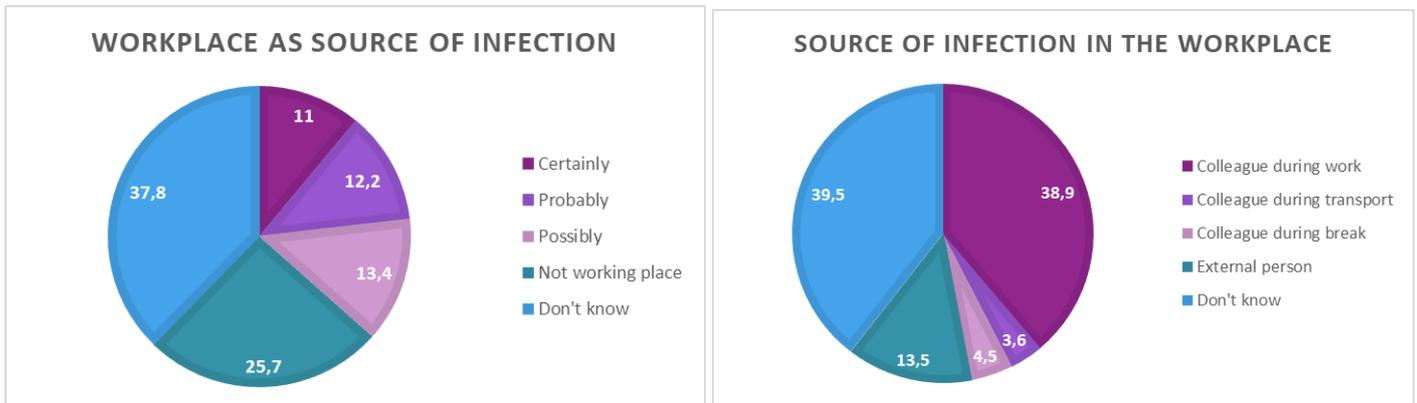


Figure 15: Distribution of the probability and source of infection at work by index case

The increase of the proportion of pupils among index cases in the education segment has clearly stopped since the school pause (Figure 16 left). 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.

Since January 2021 pupils are tested on a larger scale. 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. The majority of the index cases is aged 10 years or older (Figure 16 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 last period 31 March-13 April 2021.

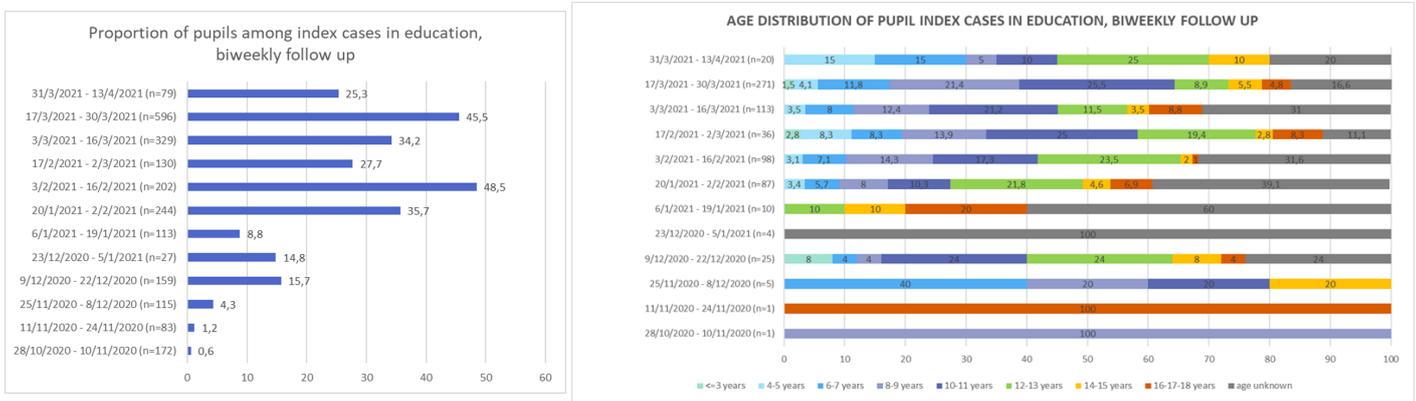


Figure 16: The evolution of index cases of pupils in school (left) and their age distribution (right).

4 Conclusion

Despite the limitations of the data, it is clear that the increase in COVID-19 incidences is halted and reversed in most sectors. Both the contact tracing as the RSZ/ONSS data demonstrate the very clear decrease of COVID-19 infections in compulsory education, arguably due to the school pause. Vigilance is still required in those sectors where telework is not possible, where workers are often exposed to close physical proximity. and where climate conditions favors transmission of the virus.

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, 11% indicated that the workplace was certainly the source of infection.

It is clear that since April 2021 in most sectors the increase in 14-day incidence is halted and reversed, in accordance with what is observed in the general population. The contact tracing shows that this pattern is observed over the entire country and that high-risk contacts have been levelled of in most regions and most segments, except in segments with close physical proximity working environments.

The large outbreaks in the food industry, sectors in processing, production and preserving of meat, poultry, other food products are under control, but vigilance is still required as the incidence remains at high levels. It has been observed since the beginning of the pandemic that the climate and other conditions in the food processing industry is ideal for the transmission of SARS-CoV-2. This sector, therefore, needs careful attention.

Similarly, employees in some manufacturing sectors need to be carefully protected, as they are often not able to telework. Especially, manufacturing of iron, steel and ferro-alloys, steam generators, textile, other metal products and forging, pressing, stamping and roll-forming of metal show the highest incidences.

Employees in wholesale and retail activities are also not able to telework and are daily confronted with multiple close contacts, resulting in higher incidences of COVID-19. Important differences in incidences exist between wholesale and retail sectors. It would be worthwhile to investigate if protocols could be improved in some sectors.

The incidence of COVID-19 in the non-medical contact professions follows the decline in the general and working population, but remains above the working population incidence.

In some sectors, the reason for the high incidences is not completely clear, for example in activities of call centres, collection of non-hazardous waste and packaging activities. Especially activities in call centres require attention, since they have shown no decrease in incidence so far. It would be worthwhile to investigate whether stricter protocols are required in these sectors. Also, attention should be given to the risks that workers are exposed to outside of work and going to work.

Finally, it is encouraging to note that at all levels the 14-day incidences in health care workers, in- and out-hospital, and residential care in elderly employees are the lowest of all sectors, well below the incidence

in the general population. This may underline the effect of vaccination on susceptibility to infection of an individual as well as a group.

Acknowledgments

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