

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 (14 –27 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 2020–23 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 27 December 2021 significantly above the working population average are Arts, entertainment and recreation (sector R), Information and communication (sector J) and Professional, scientific and technical activities (sector M) (Table 1 and Figure 1). The 14-day incidences continue to decline, although the decline is less in the last week.

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

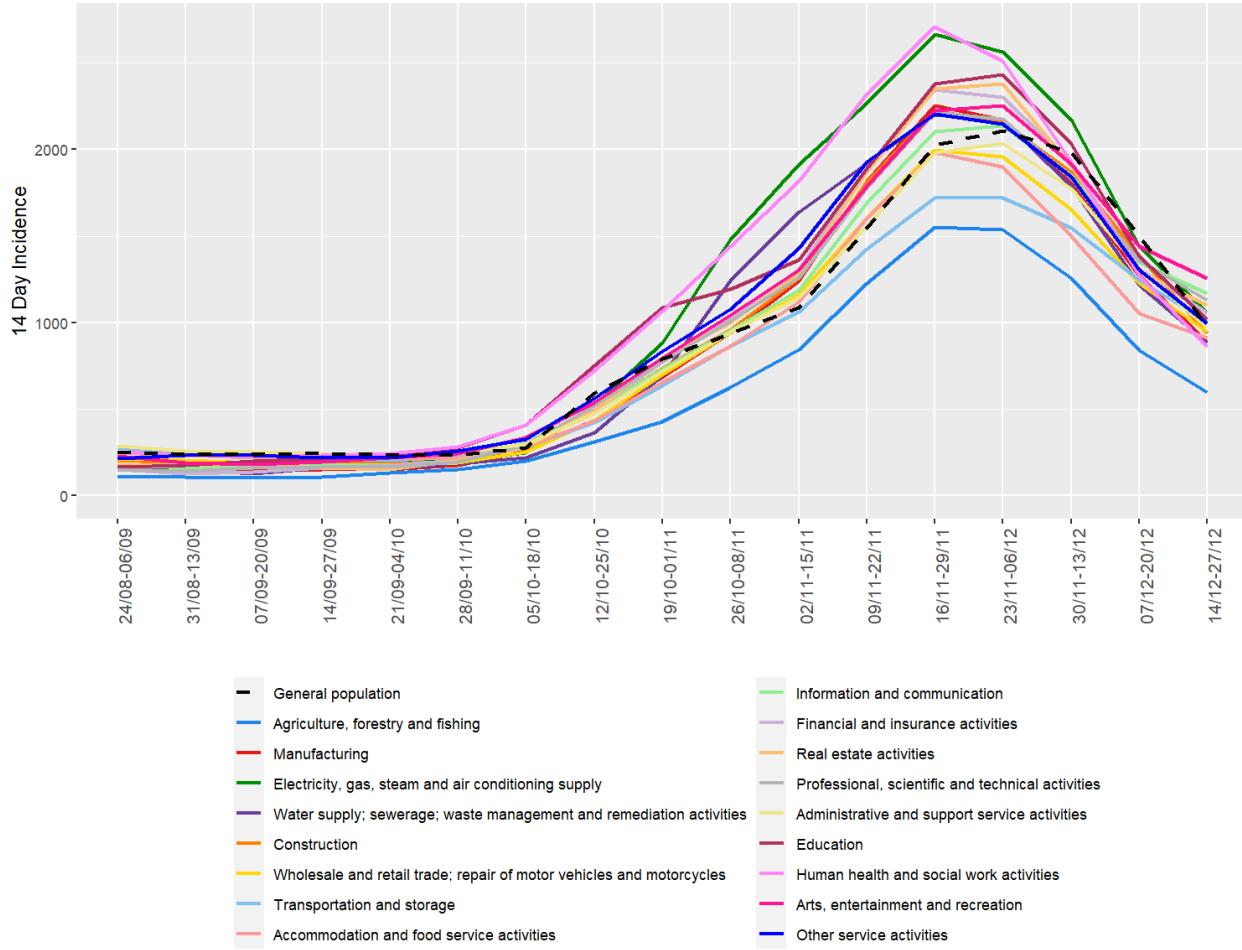


Figure 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 in both employees and self-employed workers

Table 1: 14-Day incidence of COVID-19 infection of 20 sectors at Level 1 on 27 December 2021

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI)	Incidence (95%CI)	Incidence (95%CI)	Percentage of self-employed workers
Arts, entertainment and recreation	R	102072	1255(1189;1325)	1371(1283;1465)	1073(976;1179)	40.45
Information and communication	J	183761	1170(1122;1220)	1164(1107;1224)	1183(1095;1277)	30.28
Professional, scientific and technical activities	M	394523	1132(1099;1165)	1147(1102;1194)	1115(1068;1164)	47.76
Real estate activities	L	58492	1101(1020;1189)	1154(1028;1295)	1063(959;1178)	58.71
Financial and insurance activities	K	159585	1059(1010;1110)	1086(1030;1145)	962(865;1069)	22.28
Electricity, gas, steam and air conditioning supply	D	19489	1057(923;1211)	1051(913;1210)		6.80
Working population		4232373	1041(1031;1051)	1041(1031;1051)		
Education	P	716306	1018(995;1042)	1011(988;1035)	1192(1067;1331)	3.78
Transportation and storage	H	315308	1006(972;1041)	1008(972;1045)	982(874;1103)	9.21
Other service activities	S	160524	993(946;1043)	1045(978;1117)	938(873;1008)	49.80
General population		979	979	979		
Administrative and support service activities	N	442225	971(943;1000)	974(943;1006)	958(892;1028)	18.43
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	845723	947(927;968)	965(942;989)	882(841;925)	22.73
Construction	F	381176	935(905;966)	967(928;1008)	888(842;936)	41.26
Accommodation and food service activities	I	297262	913(879;948)	945(906;986)	808(745;877)	24.79
Manufacturing	C	626517	890(867;914)	891(867;916)	885(816;960)	10.43
Water supply; sewerage; waste management and remediation activities	E	25452	884(776;1007)	892(779;1022)		9.33
Human health and social work activities	Q	595238	861(838;885)	867(843;892)	795(723;874)	9.27
Agriculture, forestry and fishing	A	81208	596(545;651)	433(363;516)	685(618;759)	66.05

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 27 December 2021 significantly higher than the working population average are: Air transport (sector 51), Motion picture, video and television activities (sector 59, 60), Creative, arts and entertainment activities (sector 90), Office activities (sector 62, 69, 70, 71) and Activities of membership organisations (sector 94) (Table 2 and Figure 2).

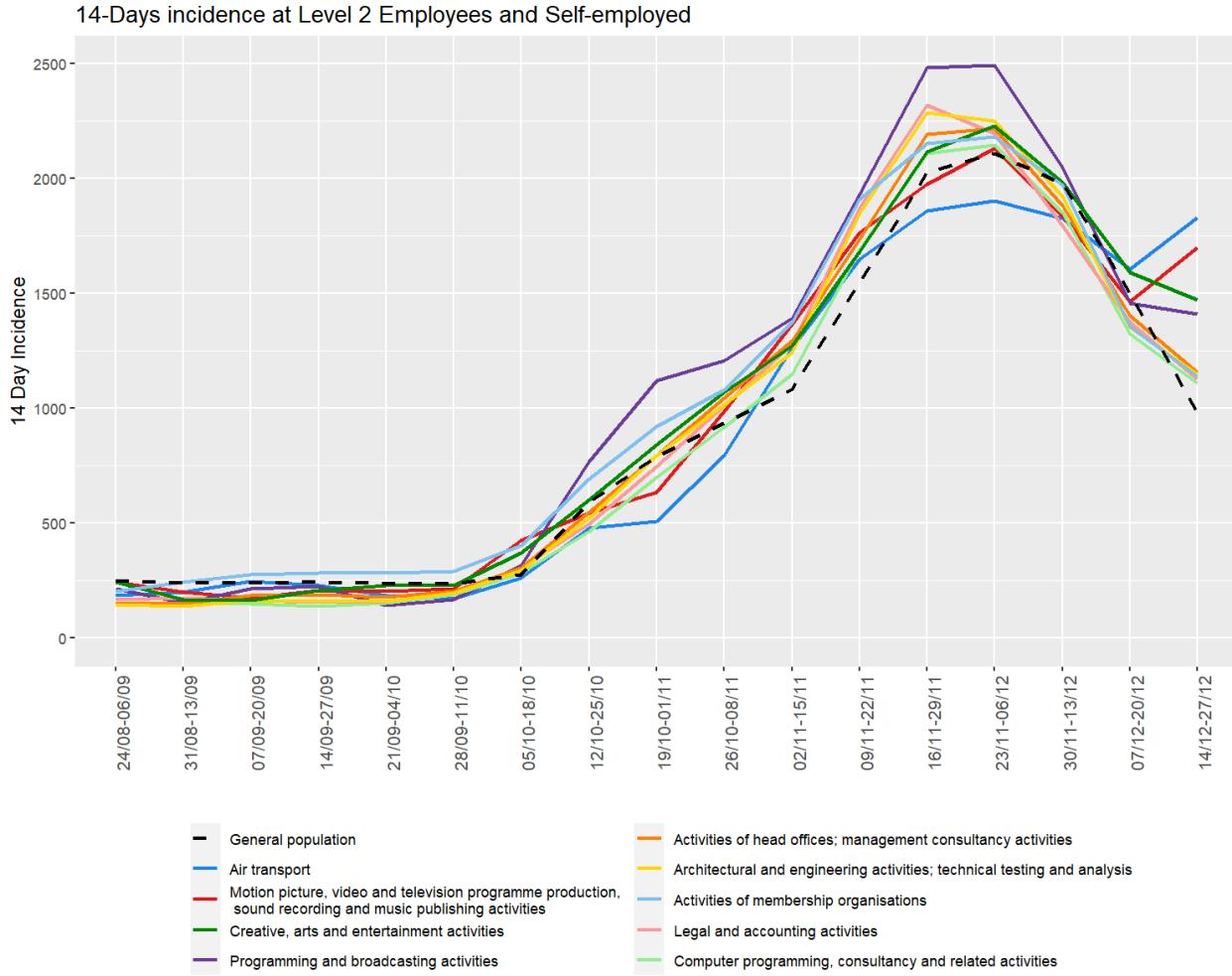


Figure 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 in both employees and self-employed workers

Table 2: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 2 on 27 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
Air transport	51	6667	1830(1535;2181)	1860(1551;2228)		42.39
Motion picture, video and television programme production, sound recording and music publishing activities	59	14874	1701(1505;1922)	1883(1624;2182)	1407(1132;1748)	40.44
Creative, arts and entertainment activities	90	43750	1472(1363;1589)	1772(1613;1947)	1104(967;1260)	47.09
Programming and broadcasting activities	60	8582	1410(1181;1682)	1459(1220;1743)		5.01
Activities of head offices; management consultancy activities	70	137543	1156(1101;1214)	1236(1151;1327)	1092(1021;1168)	55.96
Architectural and engineering activities; technical testing and analysis	71	89227	1151(1083;1223)	1106(1021;1198)	1217(1109;1336)	40.54
Activities of membership organisations	94	58911	1139(1056;1228)	1179(1087;1278)	938(764;1151)	16.87
Legal and accounting activities	69	77394	1128(1056;1205)	1156(1058;1263)	1094(991;1208)	46.29
Computer programming, consultancy and related activities	62	111733	1108(1048;1171)	1078(1007;1154)	1170(1065;1285)	33.39
Working population		4232373	1041(1031;1051)	1041(1031;1051)		
General population			979	979	979	

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 27 December 2021 significantly higher than the working population average are: Passenger transport (sector 511, 491), Motion picture, television and broadcasting (sector 591, 602), Combined facilities support activities (sector 811), Creative, arts and entertainment (sector 900), Wireless telecommunication (sector 612), Organisation of conventions and trade shows (sector 823), Financial services, management consultancy, architectural, engineering and computer activities (sector 649, 702, 711, 620), Design activities (sector 741), Residential care (sector 879), Sports activities (sector 931), Other membership organisations (sector 949), Social work activities without accommodation (sector 889), Services to the community (sector 842) and Education (sector 853, 852) (Figure 4) (Table 3 and Figure 3).

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

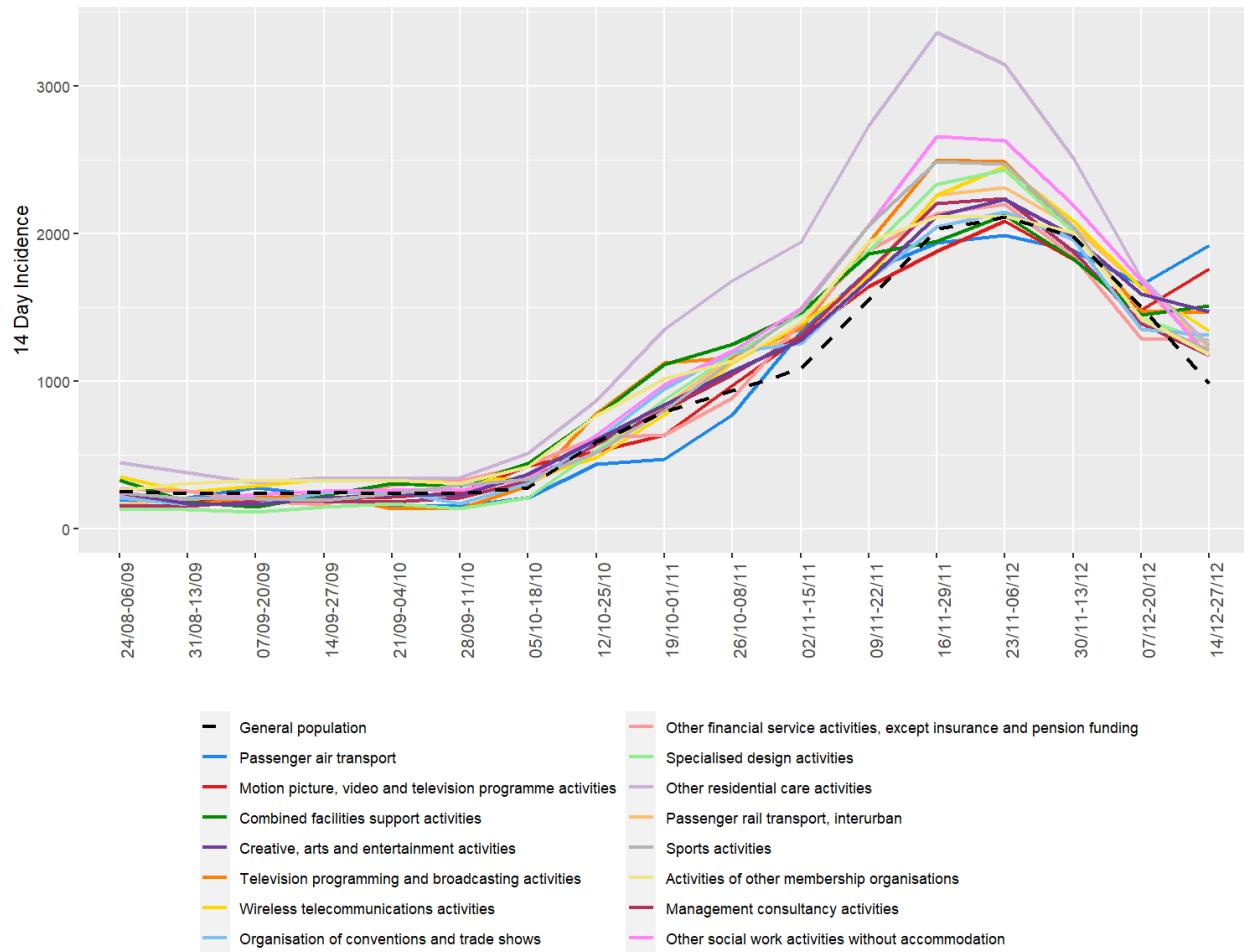


Figure 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 in both employees and self-employed

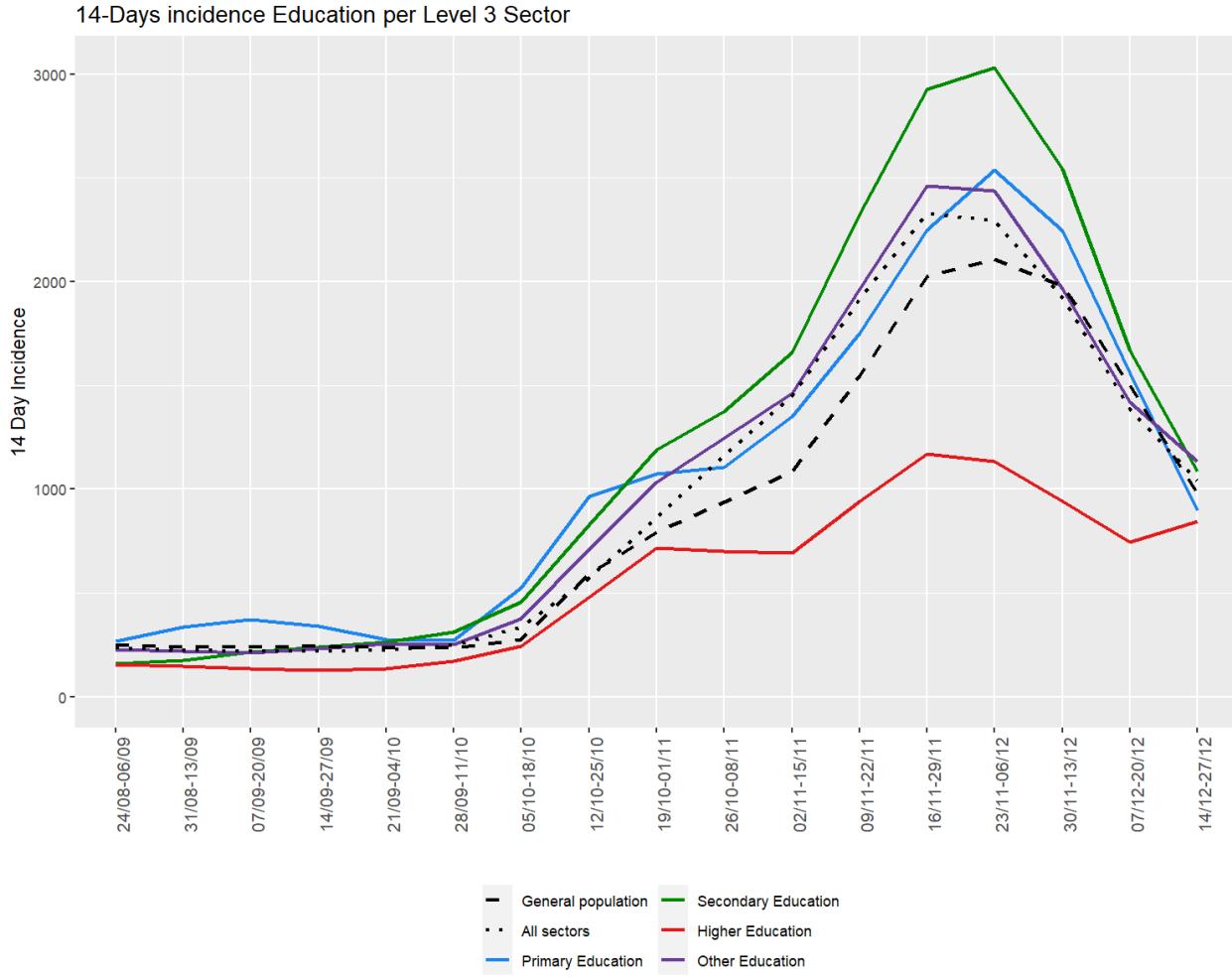


Figure 4: 14-Day incidence of COVID-19 infection in Education sectors at Level 3 in both employees and self-employed

Table 3: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 3 on 27 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
Passenger air transport	511	5941	1919(1600;2301)	1882(1617;2190)		7.52
Motion picture, video and television programme activities	591	13197	1758(1547;1997)	1772(1613;1947)	1516(1197;1918)	36.13
Combined facilities support activities	811	6093	1510(1232;1849)		1124(700;1801)	24.80
Creative, arts and entertainment activities	900	43750	1472(1363;1589)	1086(1056;1117)	1104(967;1260)	47.09
Television programming and broadcasting activities	602	7918	1465(1223;1755)	1476(1230;1771)		2.46
Wireless telecommunications activities	612	8725	1341(1120;1605)	1345(1079;1676)	1365(872;2130)	16.01
Organisation of conventions and trade shows	823	9244	1309(1096;1562)		1146(883;1486)	53.71
Other financial service activities, except insurance and pension funding	649	7439	1277(1045;1559)	1325(1212;1448)	1037(646;1662)	22.13
Specialised design activities	741	11769	1266(1079;1485)		1296(1089;1542)	82.51
Other residential care activities	879	16358	1241(1082;1423)	1141(1071;1216)		3.57
Passenger rail transport, interurban	491	29191	1223(1103;1356)	1965(1630;2368)		0.08
Sports activities	931	34160	1209(1098;1331)	1078(1007;1154)	1215(1039;1421)	38.24
Activities of other membership organisations	949	35309	1181(1073;1299)	1065(960;1181)	987(740;1315)	13.64
Management consultancy activities	702	109694	1176(1114;1242)	1242(1081;1427)	1103(1030;1181)	67.58
Other social work activities without accommodation	889	119966	1162(1103;1224)	1102(1000;1214)	1209(942;1551)	4.24
Architectural and engineering activities and related technical consultancy	711	70787	1157(1081;1238)	1223(1103;1356)	1215(1104;1337)	48.87
Provision of services to the community as a whole	842	82209	1141(1071;1216)	1211(1094;1340)		0.18
Other education	855	57357	1135(1052;1225)	1160(1100;1224)	1234(1102;1382)	42.60
Computer programming, consultancy and related activities	620	111733	1108(1048;1171)	1337(1098;1627)	1170(1065;1285)	33.39
Secondary education	853	441713	1086(1056;1117)	1205(1067;1360)		0.19
Working population		4232373	1041(1031;1051)	1041(1031;1051)		
General population			979	979	979	

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 27 December 2021 significantly higher than the working population average are: Passenger transport and services (sector 5110, 5223, 4910), Arts (sector 9001, 9002, 9003, 9004), Motion picture, television and broadcasting (sector 5911, 6020), Child day-care (sector 8891), Combined facilities support activities (sector 8110), Water supply (sector 3600), Sports activities (sector 9312, 9319), Public relations (sector 7021), Wholesale of perfume and

cosmetics (sector 4645), Wireless telecommunication (sector 6120), Manufacture of air and spacecraft machinery (sector 3030), Activities of membership organisations (sector 9499, 9411), Organisation of conventions and trade shows (sector 8230), Architectural activities (sector 7111), Education (sector 8551, 8531), Specialized designers (sector 7410), Residential care (sector 8790), Post and mail order retail (sector 4791) and Non-life insurance, computer and management consultancy (sector 6512, 6202, 7022) (Table 4 and Figure 5).

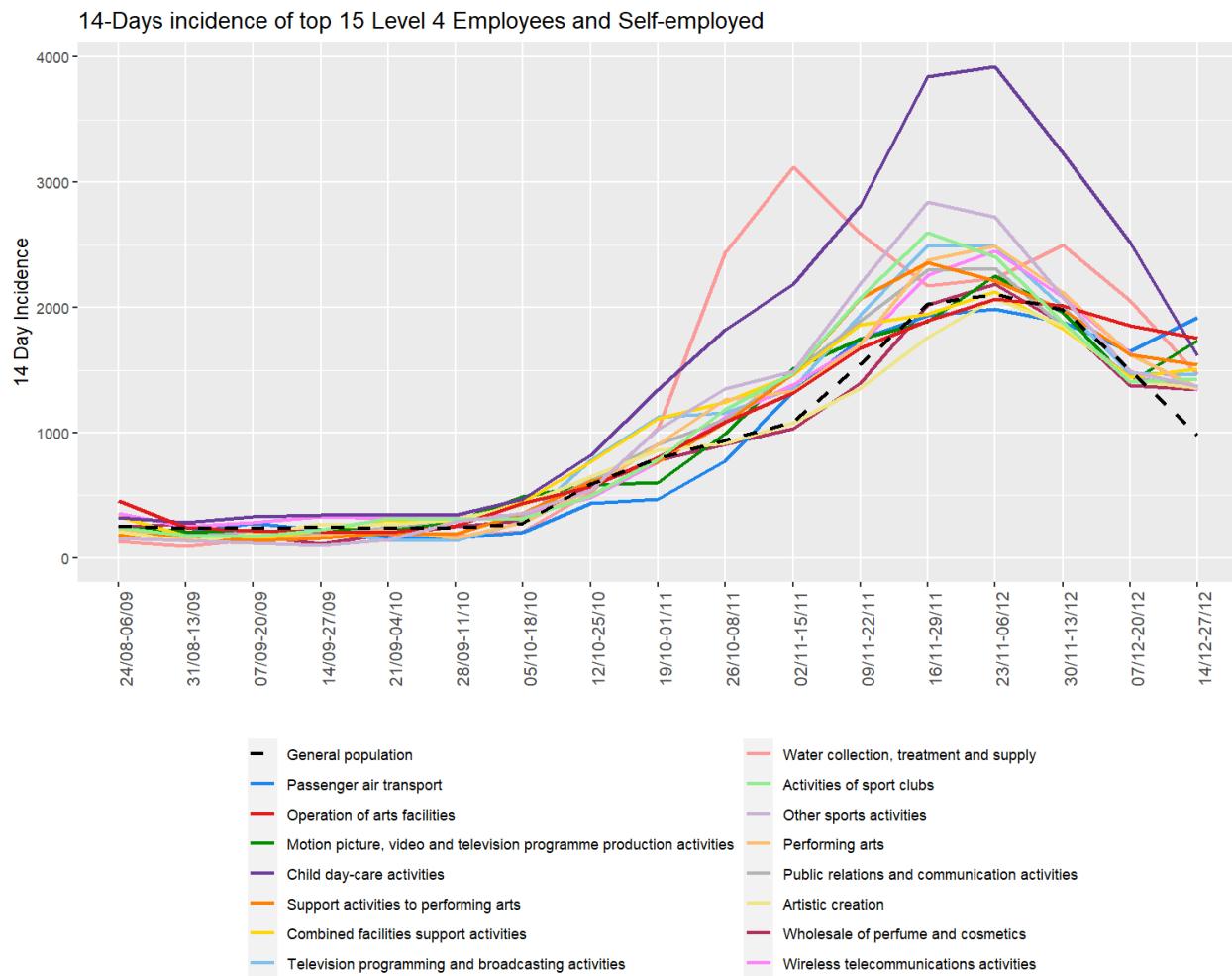


Figure 5: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 in both employees and self-employed

Table 4: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 4 on 27 December 2021

DESCRIPTION	NACE-code	Total number of workers	Incidence (95%CI)	Incidence (95%CI)	Incidence (95%CI)	Percentage of self-employed workers
Passenger air transport	5110	5941	1919(1600;2301)	1965(1630;2368)		7.52
Operation of arts facilities	9004	6268	1755(1458;2111)	1872(1535;2281)		18.67
Motion picture, video and television programme production activities	5911	8415	1735(1477;2037)	1839(1505;2246)	1575(1202;2061)	40.74
Child day-care activities	8891	27898	1613(1472;1768)	1624(1478;1785)	1454(992;2127)	6.47
Support activities to performing arts	9002	11364	1540(1329;1784)	1975(1618;2409)	1221(982;1518)	59.41
Combined facilities support activities	8110	6093	1510(1232;1849)	1637(1307;2048)	1124(700;1801)	24.80
Television programming and broadcasting activities	6020	7918	1465(1223;1755)	1476(1230;1771)		2.46
Water collection, treatment and supply	3600	3352	1462(1107;1929)	1504(1135;1990)		4.81
Activities of sport clubs	9312	10847	1429(1222;1670)	1559(1281;1897)	1249(965;1616)	42.76
Other sports activities	9319	7653	1372(1134;1659)	1187(875;1608)	1524(1195;1942)	55.56
Performing arts	9001	12308	1365(1174;1586)	1788(1475;2166)	999(786;1270)	55.78
Public relations and communication activities	7021	16789	1358(1194;1545)	1308(1019;1678)	1377(1184;1601)	72.46
Artistic creation	9003	14580	1358(1182;1559)	1585(1340;1874)	1045(819;1333)	42.57
Wholesale of perfume and cosmetics	4645	4468	1343(1044;1726)	1392(1062;1822)		16.48
Wireless telecommunications activities	6120	8725	1341(1120;1605)	1337(1098;1627)		16.01
Manufacture of air and spacecraft and related machinery	3030	4944	1335(1050;1696)	1335(1050;1696)		2.38
Activities of other membership organisations n.e.c.	9499	27286	1334(1205;1477)	1374(1232;1532)	1105(826;1477)	15.12
Service activities incidental to air transportation	5223	7175	1324(1084;1616)	1281(1039;1578)		5.37
Organisation of conventions and trade shows	8230	9244	1309(1096;1562)	1493(1172;1900)	1146(883;1486)	53.71
Architectural activities	7111	27523	1308(1180;1449)	1315(1018;1697)	1307(1168;1462)	84.75
Working population		4232373	1041(1031;1051)	1041(1031;1051)		
General population			979	979	979	

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 27 December 2021 significantly higher than the working population average are: Passenger transport and services (sector 51100, 52230, 49100), Arts (sector 90021, 90012, 90032, 90042), Child day-care (sector 88911), Manufacture (sector 10311, 30300), Combined facilities support activities (sector 8110), Non-life insurance, computer and management consultancy (sector 65121, 62020, 70220), Sports activities (sector 93121, 93199), Education (sector 85326, 85510, 85311, 85319), Motion picture, television and broadcasting (sector 60200, 59113), Water supply (sector 36000), Architectural activities (sector 71111), Public relations and communication (sector 70210), Wholesale (sector 46450, 46349), Wireless telecommunication (sector 61200) Activities of membership organisations (sector 94110), Organisation of conventions and trade shows (sector 82300), Post and mail order retail (sector 47910), Other social services without accomodation (sector 88999) and Lawyers (sector 69101) (Table 5 and Figure 6).

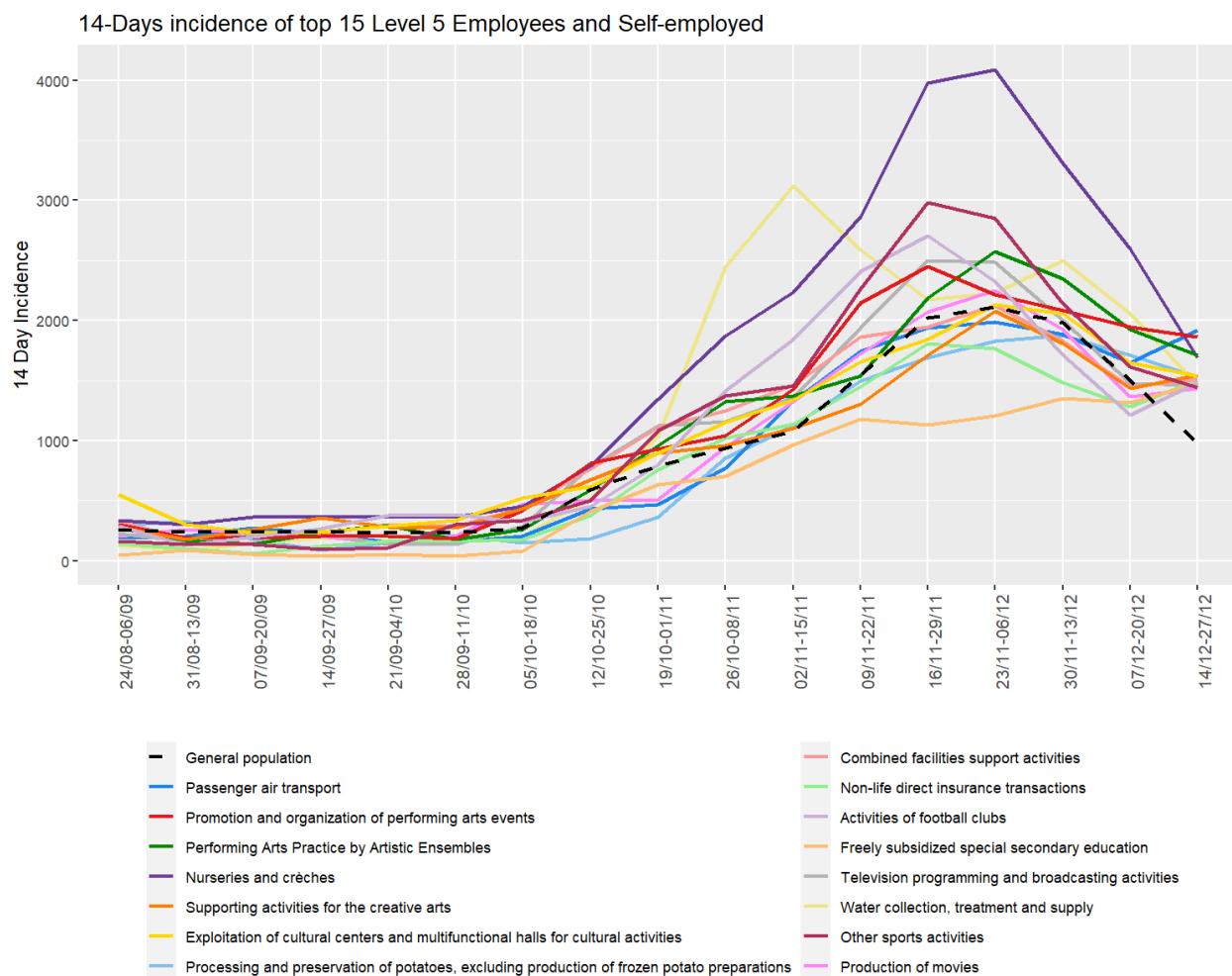


Figure 6: 14-Day incidence of COVID-19 infection in sectors with the highest incidence at Level 5 in both employees and self-employed

Table 5: 14-Day incidence of COVID-19 infection of sectors with the highest incidence at Level 5 on 27 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
Passenger air transport	51100	5941	1919(1600;2301)	1965(1630;2368)		7.52
Promotion and organization of performing arts events	90021	4936	1864(1522;2281)		1134(779;1649)	49.83
Performing Arts Practice by Artistic Ensembles	90012	6655	1713(1428;2054)	1793(1472;2183)		19.81
Nurseries and crèches	88911	24556	1690(1536;1859)	1705(1545;1881)	1484(997;2204)	6.65
Supporting activities for the creative arts	90032	9391	1544(1313;1814)	1586(1337;1880)		12.97
Exploitation of cultural centers and multifunctional halls for cultural activities	90042	3766	1540(1192;1987)	1665(1264;2190)		20.67
Processing and preservation of potatoes, excluding production of frozen potato preparations	10311	3460	1532(1172;2000)	1462(1107;1929)		3.17
Combined facilities support activities	81100	6093	1510(1232;1849)	1637(1307;2048)	1124(700;1801)	24.80
Non-life direct insurance transactions	65121	5063	1501(1200;1875)	1533(1222;1921)		4.66
Activities of football clubs	93121	5533	1482(1195;1836)	1603(1254;2047)	1184(756;1849)	29.61
Freely subsidized special secondary education	85326	8881	1475(1244;1748)	1475(1244;1748)		0.68
Television programming and broadcasting activities	60200	7918	1465(1223;1755)	1476(1230;1771)		2.46
Water collection, treatment and supply	36000	3352	1462(1107;1929)	1504(1135;1990)		4.81
Other sports activities	93199	4719	1441(1138;1824)		1671(1288;2165)	71.08
Production of movies	59113	3212	1432(1074;1907)		1072(667;1718)	50.08
Architectural activities	71111	20980	1368(1219;1534)	1410(1070;1856)	1359(1197;1542)	83.67
Public relations and communication activities	70210	16789	1358(1194;1545)	1308(1019;1678)	1377(1184;1601)	72.46
Wholesale of perfume and cosmetics	46450	4468	1343(1044;1726)	1392(1062;1822)		16.48
Wireless telecommunications activities	61200	8725	1341(1120;1605)	1337(1098;1627)		16.01
Manufacture of air and spacecraft and related machinery	30300	4944	1335(1050;1696)	1335(1050;1696)		2.38
Working population		4232373	1041(1031;1051)	1041(1031;1051)		
General population			979	979	979	

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).

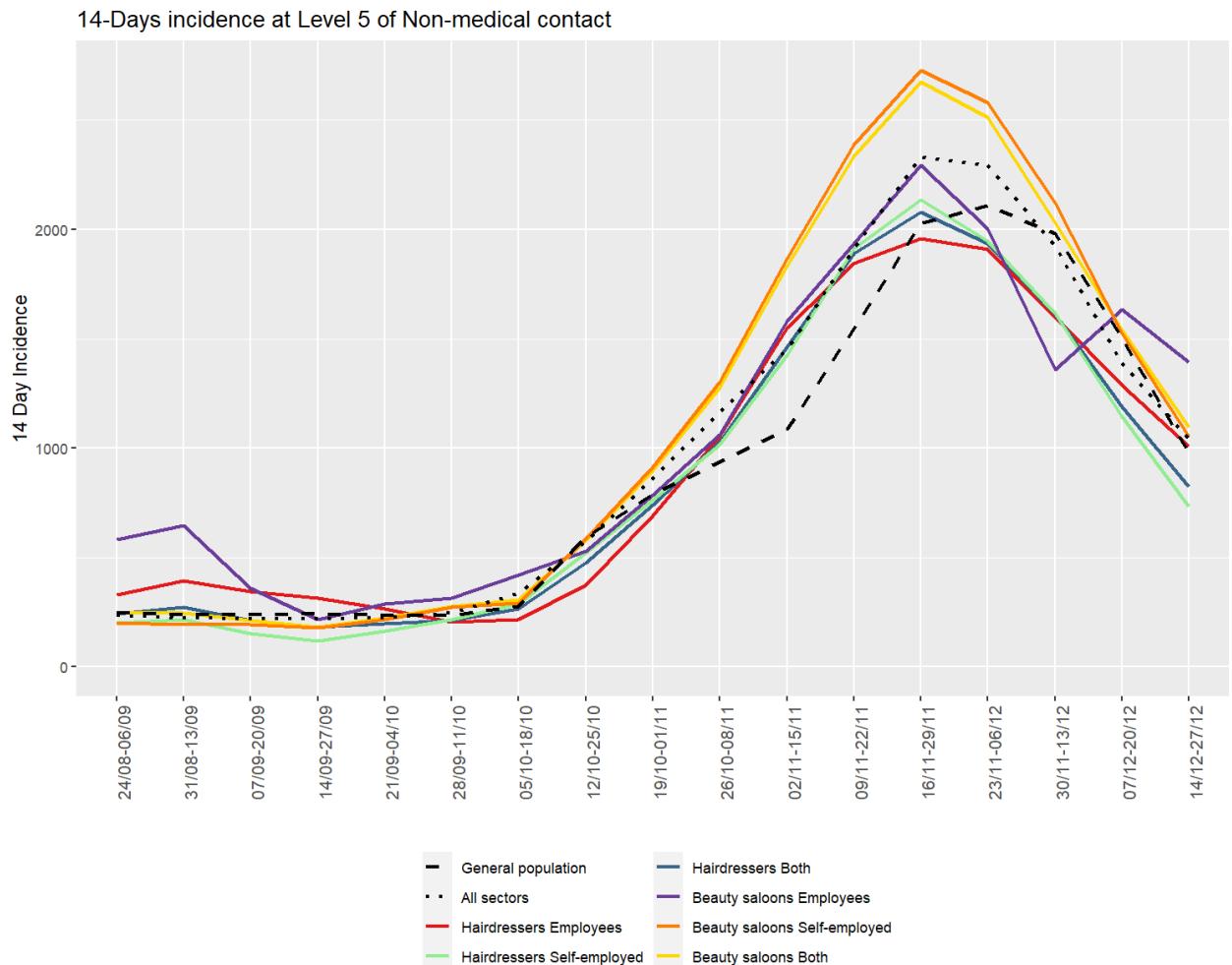


Figure 7: 14-Day incidence of COVID-19 infection at Level 5 of non-medical contact professions.

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 Arts, entertainment and recreation (sector R), Information and communication

(sector J), Professional, scientific and technical activities (sector M) are markedly elevated compared to the working and general population (Figure 8). The highest incidences are present in the creative arts sectors and motion picture and television programming.

Although the 14-day incidence in Financial and insurance activities (sector K), Education (sector P), Transportation and storage (sector H), Human health and social work sector (sector Q) and Other service activities (sector S) is around the working population average, individual subsectors show an increased incidence. Non-life insurance (sector 6512), Secondary and other education (sector 853, 855), Passenger air and rail transport (sector 5110, 4910), Other residential care (sector 8790), Child day-care (sector 8891) and Activities of other membership associations (sector 9499) all show increased incidences compared to the working population.

The incidence in 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).

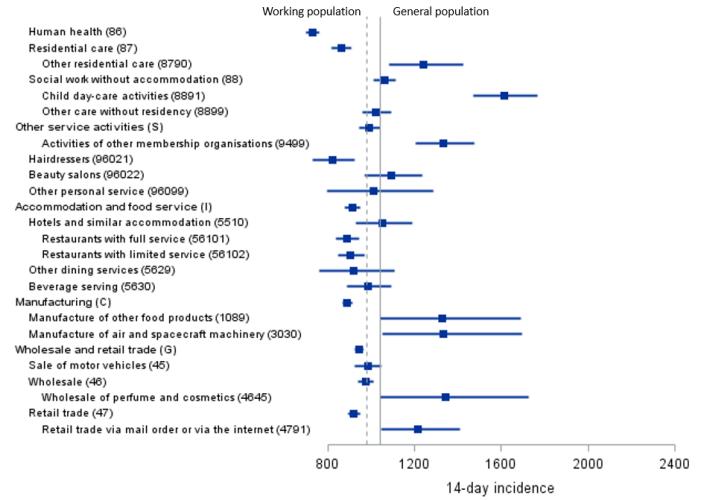
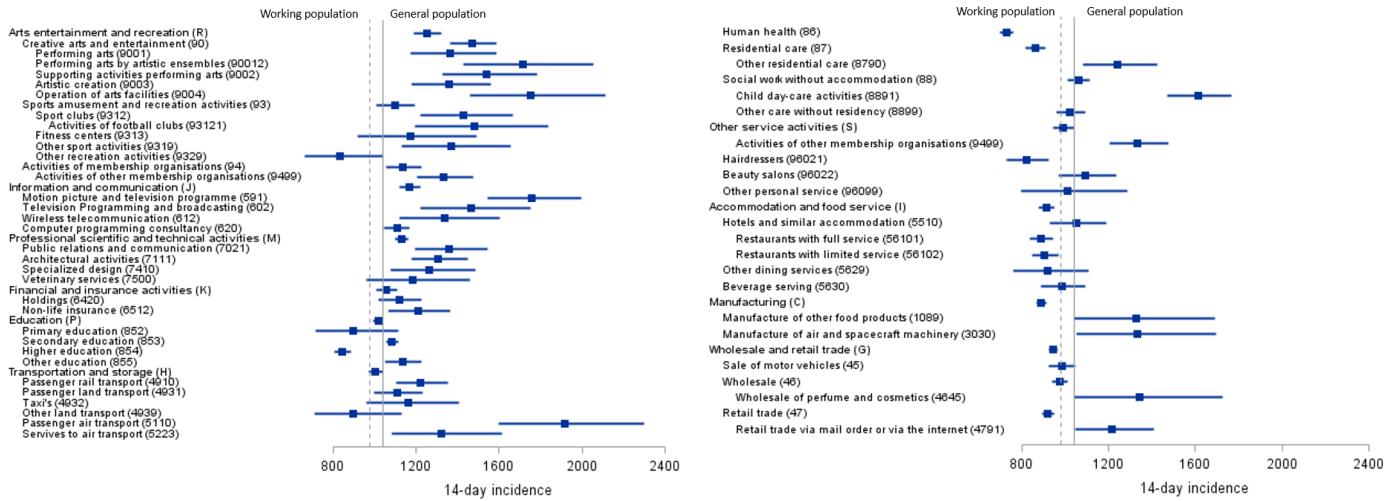


Figure 8: Forest plot of 14-Day incidence and 95% CI of selected sectors on 27 December 2021 in both employees and self-employed.

3.7 Contact tracing

In 2020–2021 about 800,000 employees are under medical surveillance of IDEWE. Among these, 39,703 COVID-19 index cases were registered between 22 July 2020 (week 30) and 23 December 2021, for whom the customer segment, region and the registration date are known for 39,283 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 335 per 100.000 in 14 days on 21 December. The incidence is highest in Education with 774 index cases per 100.000 in 14 days at its peak, and in Public transport (414 per 100.000 in 14 days) and Emergency services with 405 per 100.000 in 14 days. The regions with the highest incidences is Gent with 407 per 100.000 in 14 days(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.

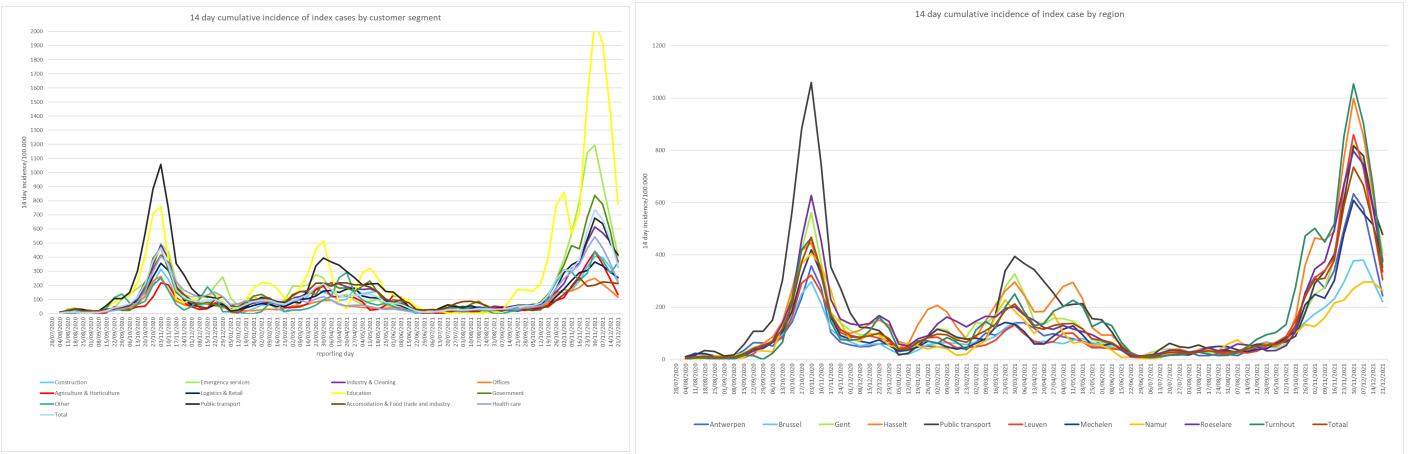


Figure 9: 14-Day incidence of index cases by segments under surveillance (left) and by region (right)

Since the establishment of the tracing app on 29 October 2020, there are 32,959 index cases of whom high-risk contacts were recorded. Of 32,701 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 2020–23 December 2021 (Figures 10).

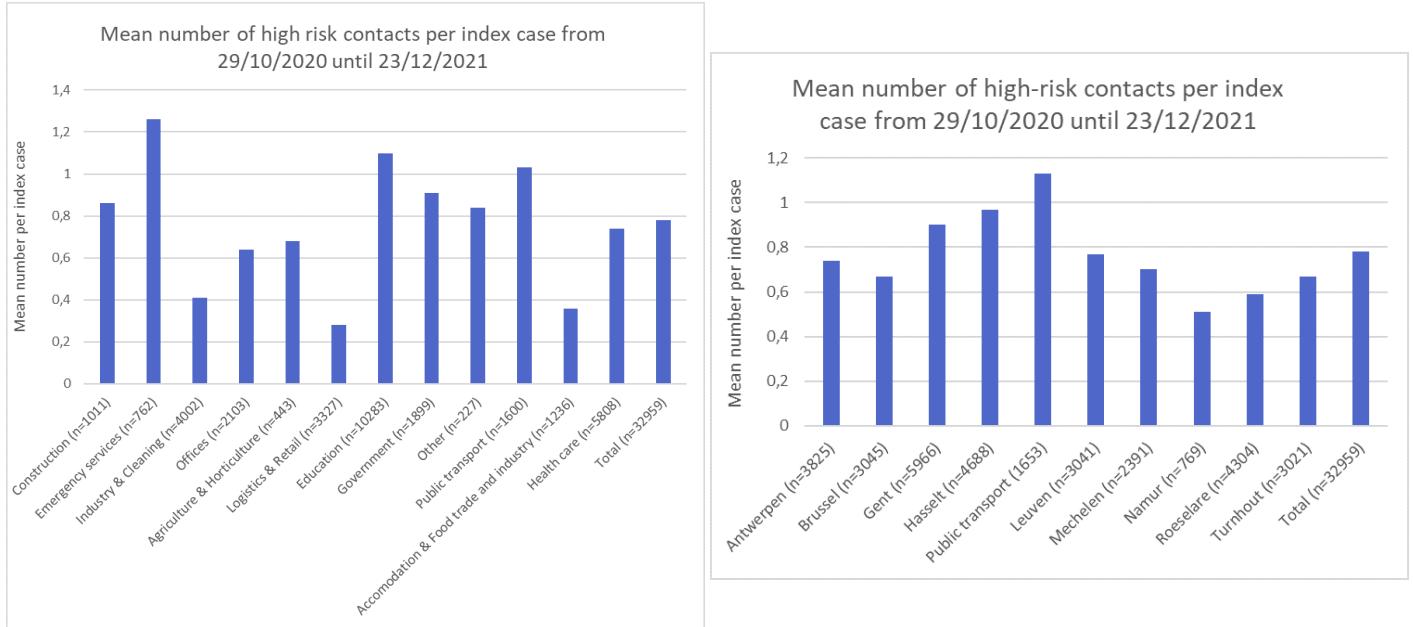


Figure 10: The mean number of high-risk contacts per index case by segments under surveillance (left) and by region (right)

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 eight 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).

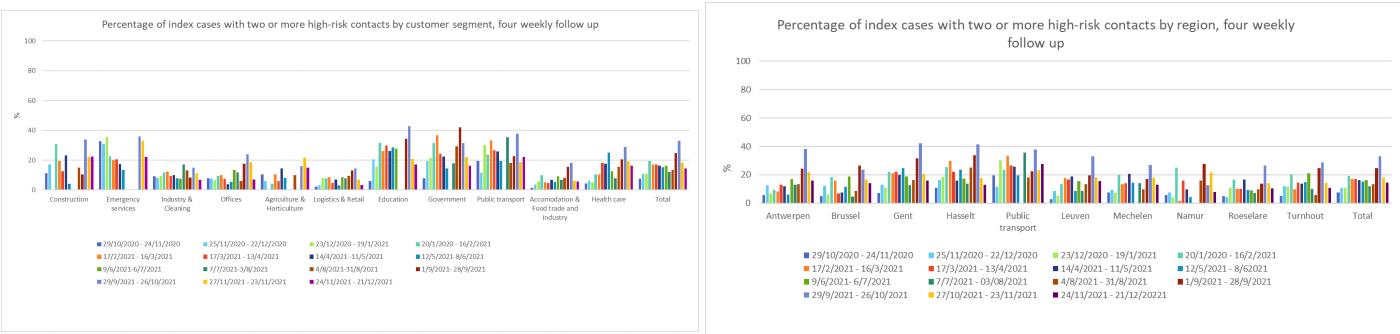


Figure 11: Four weekly percentage of index cases with two or more high-risk contacts by segments under surveillance (left) and by region (right)

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 21,375 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 5,492 (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.

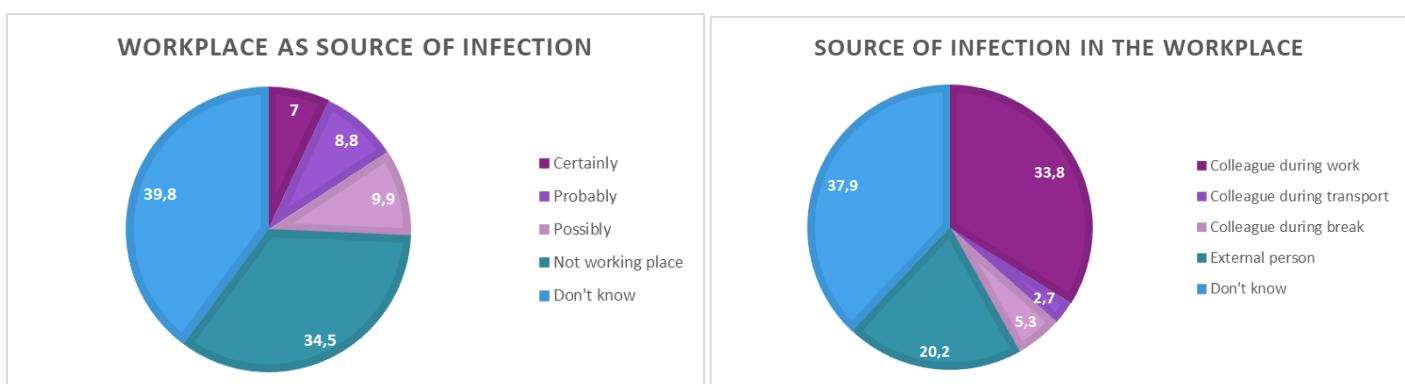


Figure 12: Distribution of the probability and source of infection at work by index case

The proportion of index cases in the Education segment that are attributed to pupils was around 40% during the schoolyear, and is now about 36%. (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 (87%) in school year 2021 is aged under 12 years (and unvaccinated) and 22% were under 6. The proportion of pupils under 6 is growing (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.

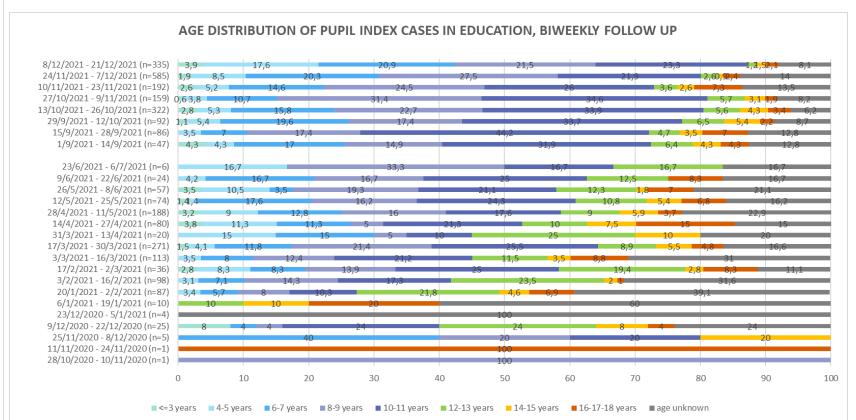
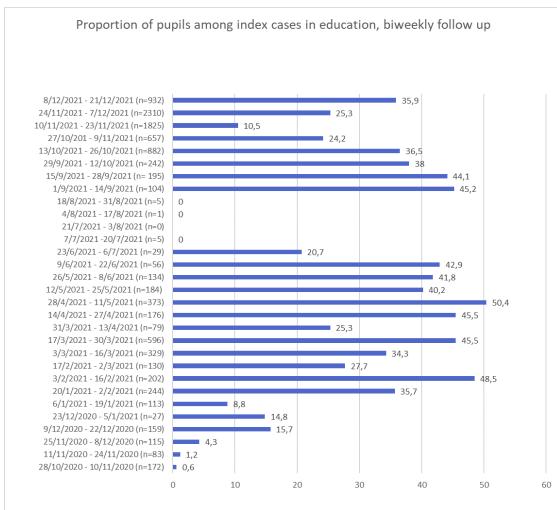


Figure 13: The evolution of index cases of pupils in school (left) and their age distribution (right).

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 15,746 adult index cases we had information about their vaccination status: 13,606 were partially or completely vaccinated (9,005 Cominarty, 2,126 Vaxzevria, 719 Moderna and 819 Johnson % Johnson and 937 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).

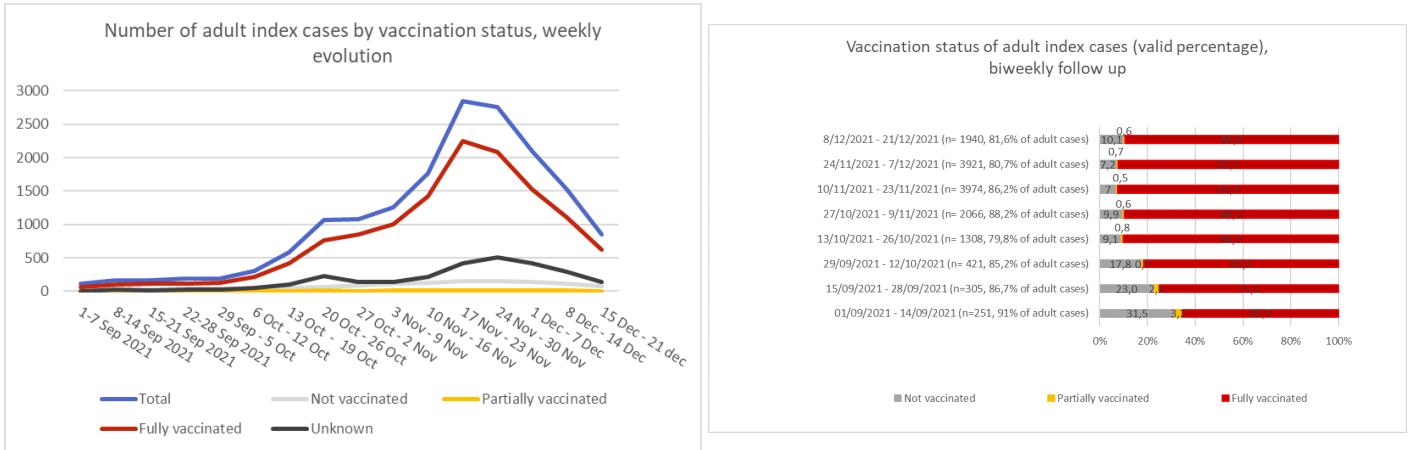


Figure 14: The weekly evolution of index cases and their vaccination status (left) and biweekly evolution of the self-reported vaccination status of index cases (right).

4 Conclusion

Despite the limitations of the data, both the contact tracing as the RSZ/ONSS data demonstrate a slowing decline of the 14-day COVID-19 incidences in most sectors, reflecting the effect of the upcoming more contagious omicron variant-of-concern despite mitigation measures and the booster vaccination. The highest incidences are present in Arts, entertainment and recreation sector. The average incidence in the working population is slight higher than the average incidence in the general population, suggesting that infections are passed on mostly among adults. Among children the incidence among children below 6 years is increasing and is dominated with children below 12 years of age. Vigilance is required in sectors with close contacts, 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 the decline is slowing down, while in subsequent levels some sectors show an increase in incidence.

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 multiple close physical proximity, and with close proximity with younger, not yet vaccinated individuals. Creative and performing arts, Movie and television programming and broadcasting, Rail and air transport, Sport activities, Nurseries and crèches, Secondary education and some Residential care sectors, show high incidences and require careful attention.

For some sectors the reason for the higher incidences is not immediately obvious, such as Public relations, Architectural activities, Specialized design and Non-life insurance. 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 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 eight 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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