



C O M C O R



ComCor: A study of sociodemographic characteristics, behaviours and habits associated with SARS-CoV-2 infection in France

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Study design

Cases

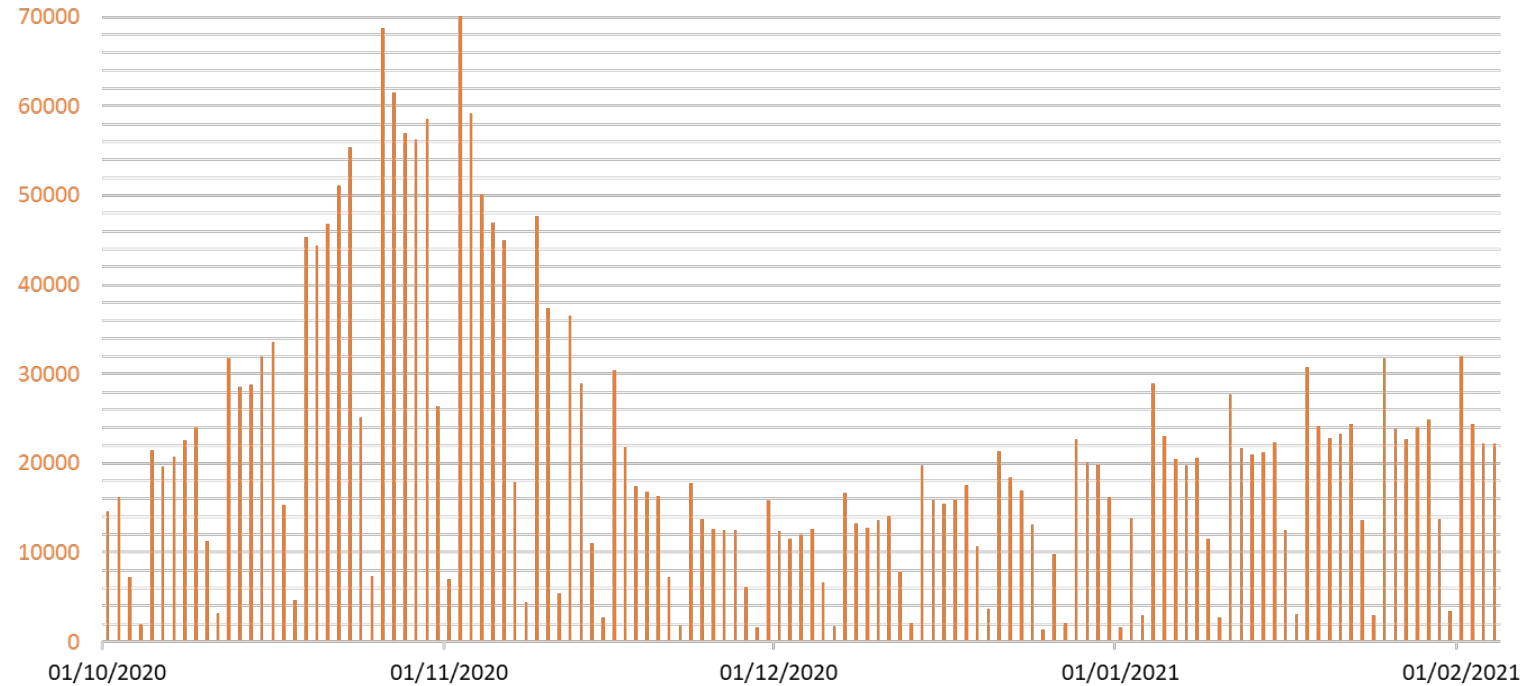
- Caisse Nationale d'Assurance Maladie (CNAM) receives notification of all cases of SARS-CoV-2 infection in France.
- CNAM sends an email to all individuals in CNAM database of SARS-CoV-2 infected individuals inviting them to participate in the study (1 192 000 emails sent between 28 October 2020 and 5 February 2021).
- Cases complete informed consent and questionnaire online (n= 97 709; 8.2%).

Controls

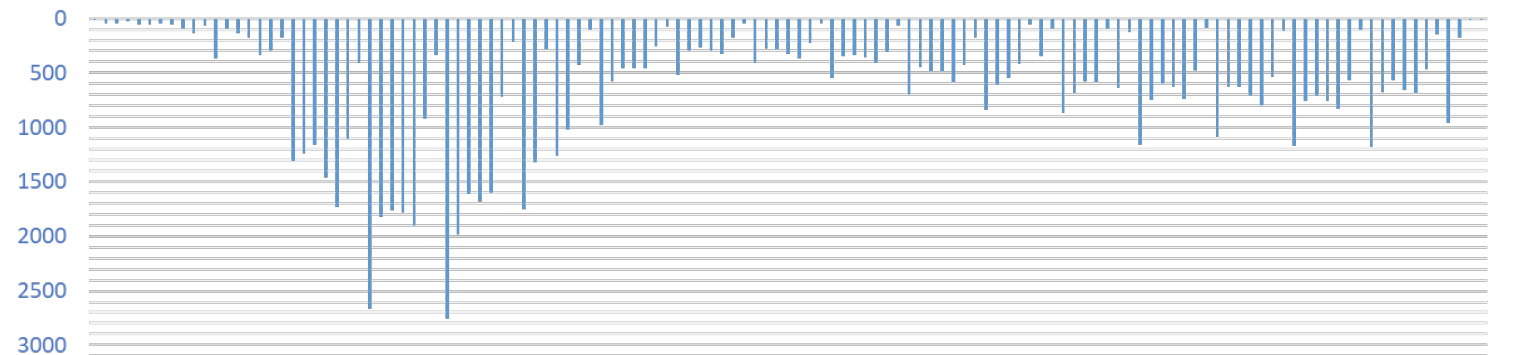
- IPSOS is a market research and public opinion company which maintains a panel that is representative of the French population.
- IPSOS selects controls at regular intervals from from the panel using frequency-matching with cases on:
 - age (18-28, 29-58, 59+ years),
 - sex,
 - region of residence,
 - population density,
 - time period
- Controls complete informed consent and similar online questionnaire as cases.

Cases recruitment , October 2020 – January 2021, France

National cases



**Study cases
(n=97 709)**



Case-control study of factors associated with SARS-CoV-2 infection in France

- 8702 cases and 4351 controls, matched by age, sex, region of residence, population density and time period :
 - 1) During a period of evening **curfew**: October 2020 (1522 cases, 761 controls)
 - 2) During a period of **stay at home orders**: November 2020 (2588 cases, 1294 controls)
 - 3) During the period of **end of year holidays**: December 2020 (1630 cases, 815 controls)
 - 4) During a period of **return to school and evening curfew**: January 2021 (1962 cases, 1481 controls)
- Online questionnaire gathers information on factors associated with recent, acute SARS-CoV-2 infection during the respective time period
- Objective: Identify the risk factors for SARS-CoV-2 infection, by comparing the sociodemographic characteristics, behaviours and habits of cases and controls

COMCOR – Case-control study – Sociodemographic characteristics

Characteristics	Cases (n=8702)	Controls (n=4351)	Univariable OR	Multivariable OR
Time period				
Evening curfew (October 2020)	1522 (17.5)	761 (17.5)		
Stay-at-home orders (November 2020)	2588 (29.7)	1294 (29.7)		
End-of-year holidays (December 2020)	1630 (18.7)	815 (18.7)		
Return to school and evening curfew (January 2021)	2962 (34.0)	1481 (34.0)		
Region of residence				
Île-de-France	1354 (15.6)	677 (15.6)		
Centre - Val de Loire	316 (3.6)	158 (3.6)		
Bourgogne -Franche-Comté	706 (8.1)	353 (8.1)		
Normandie	432 (5.0)	216 (5.0)		
Hauts-de-France	646 (7.4)	323 (7.4)		
Grand Est	1268 (14.6)	634 (14.6)		
Pays de la Loire	386 (4.4)	193 (4.4)		
Bretagne	264 (3.0)	132 (3.0)		
Nouvelle-Aquitaine	524 (6.0)	262 (6.0)		
Occitanie	534 (6.1)	267 (6.1)		
Auvergne-Rhône-Alpes	1434 (16.5)	717 (16.5)		
Provence-Alpes-Côte d'Azur + Corse	838 (9.6)	419 (9.6)		
Population density				
Rural/ Less than 5 000 inhabitants	2360 (27.1)	1180 (27.1)		
5 000 - 19 999 inhabitants	870 (10.0)	435 (10.0)		
20 000 - 99 999 inhabitants	1176 (13.5)	588 (13.5)		
>100 000 inhabitants	3146 (36.2)	1573 (36.2)		
Paris	1150 (13.2)	575 (13.2)		

COMCOR – Case-control study – Sociodemographic characteristics

Characteristics	Cases (n=8702)	Controls (n=4351)	Univariable OR	Multivariable OR
Age (years)				
18-20	243 (2.8)	148 (3.4)		
21-23	364 (4.2)	152 (3.5)		
24-26	455 (5.2)	206 (4.7)		
27-29	532 (6.1)	291 (6.7)		
30-33	558 (6.4)	102 (2.3)		
33-36	604 (6.9)	161 (3.7)		
36-39	631 (7.3)	240 (5.5)		
39-42	679 (7.8)	322 (7.4)		
42-44	653 (7.5)	334 (7.7)		
45-47	672 (7.7)	378 (8.7)		
48-50	687 (7.9)	429 (9.9)		
51-53	576 (6.6)	472 (10.8)		
54-56	500 (5.7)	240 (5.5)		
57-59	398 (4.6)	57 (1.3)		
60-62	336 (3.9)	78 (1.8)		
63-65	263 (3.0)	76 (1.7)		
66-69	193 (2.2)	148 (3.4)		
69-72	139 (1.6)	164 (3.8)		
72-74	102 (1.2)	187 (4.3)		
75+	117 (1.3)	166 (3.8)		
Sex				
Male	3034 (34.9)	1517 (34.9)		
Female	5668 (65.1)	2834 (65.1)		

COMCOR – Case-control study – Household characteristics

Characteristics	Cases (n=8702)	Controls (n=4351)	Univariable OR	Multivariable OR
Type of residence				
House	5450 (62.6)	2523 (58.0)	1 (ref.)	1 (réf.)
Apartment	3185 (36.6)	1805 (41.5)	0.72 (0.69-0.76)	0.91 (0.85-0.96)
Social housing; Long term care facility	67 (0.8)	23 (0.5)	1.63 (1.21 - 2.14)	1.75 (1.35-2.30)
Number of people in household				
1	1330 (15.3)	896 (20.6)	1 (réf.)	1 (réf.)
2	2519 (28.9)	1514 (34.8)	1.13 (1.05 - 1.21)	1.11 (1.03-1.20)
3	1843 (21.2)	836 (19.2)	1.48 (1.36 - 1.60)	1.33 (1.21-1.47)
4	2035 (23.4)	806 (18.5)	1.77 (1.64 - 1.91)	1.46 (1.32-1.62)
5	712 (8.2)	222 (5.1)	2.32 (2.09 - 2.56)	1.95 (1.68-2.26)
6+	263 (3.0)	77 (1.8)	2.56 (2.22 - 2.95)	2.22 (1.84-2.65)
Children in household attending <u>nursery</u>				
No	8398 (96.5)	4269 (98.1)	1 (réf.)	1 (réf.)
Yes	304 (3.5)	82 (1.9)	1.36 (1.19 - 1.52)	1.13 (0.97-1.29)
Children in household looked after by <u>caregiver</u>				
No	8352 (96.0)	4274 (98.2)	1 (réf.)	1 (réf.)
Yes	350 (4.0)	77 (1.8)	1.71 (1.53 - 1.92)	1.39 (1.22-1.58)
Children in household attending <u>kindergarten</u>				
No	7711 (88.6)	4045 (93.0)	1 (réf.)	1 (ref)
Yes	991 (11.4)	306 (7.0)	1.31 (1.22 - 1.41)	1.15 (1.05-1.24)

COMCOR – Case-control study – Household characteristics

Characteristics	Cases (n=8702)	Controls (n=4351)	Univariable OR	Multivariable OR
Children in household attending <u>primary school</u>				
No	7103 (81.6)	3736 (85.9)	1 (ref.)	1 (ref.)
Yes	1599 (18.4)	615 (14.1)	1.24 (1.16 - 1.32)	1.00 (0.93-1.08)
Children in household attending <u>middle school</u>				
No	7172 (82.4)	3774 (86.7)	1 (ref.)	1 (ref.)
Yes	1530 (17.6)	577 (13.3)	1.56 (1.46 - 1.66)	1.27 (1.18-1.37)
Children in household attending <u>high school</u>				
No	7340 (84.3)	3794 (87.2)	1 (ref.)	1 (ref.)
Yes	1362 (15.7)	557 (12.8)	1.53 (1.43 - 1.64)	1.29 (1.19-1.40)
Children in household attending <u>university</u>				
No	7855 (90.3)	3900 (89.6)	1 (ref.)	1 (ref.)
Yes	847 (9.7)	451 (10.4)	1.04 (.96 - 1.12)	0.83 (0.76-0.91)
Children outside household: spend time at a nursery				
No	8530 (98.0)	4314 (99.1)	1 (ref.)	1 (ref.)
Yes	172 (2.0)	37 (0.9)	2.01 (1.68 - 2.35)	1.76 (1.47-2.11)

COMCOR – Case-control study – Modes of transport and travel

Characteristics	Cases (n=8702)	Controls (n=4351)	Univariable OR	Multivariable OR
Carpooling				
No	7988 (91.8)	4108 (94.4)	1 (ref.)	1 (ref.)
Yes	714 (8.2)	243 (5.6)	1.51 (1.39 - 1.64)	1.58 (1.44-1.74)
Bus				
No	8033 (92.3)	3783 (86.9)	1 (ref.)	1 (ref.)
Yes	669 (7.7)	568 (13.1)	0.53 (0.49-0.57)	0.62 (0.57-0.68)
Tram				
No	8353 (96.0)	4057 (93.2)	1 (ref.)	1 (ref.)
Yes	349 (4.0)	294 (6.8)	0.56 (0.50-0.62)	0.71 (0.62-0.80)
Subway				
No	8066 (92.7)	3954 (90.9)	1 (ref.)	1 (ref.)
Yes	636 (7.3)	397 (9.1)	0.71 (0.65 - 0.78)	0.99 (0.89-1.10)
Train				
No	8282 (95.2)	4062 (93.4)	1 (ref.)	1 (ref.)
Yes	420 (4.8)	289 (6.6)	0.65 (0.59 - 0.72)	0.78 (0.70-0.88)
Recent overseas travel				
No	8455 (97.2)	4270 (98.1)	1 (ref.)	1 (ref.)
Yes	247 (2.8)	81 (1.9)	1.42 (1.25 - 1.61)	1.53 (1.32-1.77)
Recent travel outside region of residence				
No	7410 (85.2)	3696 (84.9)	1 (ref.)	1 (ref.)
Yes	1292 (14.8)	655 (15.1)	0.95 (0.89-1.01)	0.94 (0.87-1.01)

COMCOR – Case-control study – Work setting

Characteristics	Cases (n=8702)	Controls (n=4351)	Univariable OR	Multivariable OR
Working from home				
Working in office, no working from home	1554 (17.9)	632 (14.5)	1 (ref.)	1 (ref.)
Not currently working	1969 (22.6)	1387 (31.9)	0.65 (0.61 - 0.71)	0.75 (0.68-0.84)
Working, but not in an office	2931 (33.7)	1273 (29.3)	0.93 (0.88 - 1.00)	0.96 (0.90-1.05)
Part-time working from home	1223 (14.1)	580 (13.3)	0.85 (0.78 - 0.92)	0.76 (0.70-0.83)
Full-time working from home	1026 (11.8)	479 (11.0)	0.85 (0.79 - 0.93)	0.70 (0.64-0.77)
Recent in-person work meeting				
No	6541 (75.2)	3439 (79.0)	1 (ref.)	1 (ref.)
Yes	2161 (24.8)	912 (21.0)	1.15 (1.09-1.20)	1.04 (0.98-1.10)
School or university classes/ Continuing education				
No	8226 (94.5)	4004 (92.0)	1 (ref.)	1 (ref.)
Yes	476 (5.5)	347 (8.0)	0.63 (0.57-0.69)	0.70 (0.63-0.78)

COMCOR - Case-control study – Gatherings and activities

Characteristics	Cases (n=8702)	Controls (n=4351)	Univariable OR	Multivariable OR
Recent private gatherings (among friends and/or family)				
Period 1: Evening curfew (October 2020)				
No	628 (41.3)	415 (54.5)	1 (ref.)	1 (ref.)
Yes	894 (58.7)	346 (45.5)	1.58 (1.42-1.75)	1.64 (1.47-1.83)
Period 2: Stay-at-home orders (November 2020)				
No	1790 (69.2)	956 (73.9)	1 (ref.)	1 (ref.)
Yes	798 (30.8)	338 (26.1)	1.19 (1.09-1.30)	1.27 (1.15-1.39)
Period 3: End-of-year holidays (December 2020)				
No	679 (41.7)	294 (36.1)	1 (ref.)	1 (ref.)
Yes	951 (58.3)	521 (63.9)	0.74 (0.66-0.82)	0.76 (0.68-0.86)
Period 4: Return to school and evening curfew (January 2021)				
No	1580 (53.3)	738 (49.8)	1 (ref.)	1 (ref.)
Yes	1382 (46.7)	743 (50.2)	0.84 (0.78-0.90)	0.87 (0.80-0.94)

COMCOR - Case-control study – Gatherings and activities

Characteristics	Cases (n=8702)	Controls (n=4351)	Univariable OR	Multivariable OR
Attended recent religious gathering				
No	8466 (97.3)	4226 (97.1)	1 (ref.)	1 (ref.)
Yes	236 (2.7)	125 (2.9)	1.05 (0.91 - 1.19)	1.02 (0.88-1.18)
Performed sports activities outside				
No	7209 (82.8)	3471 (79.8)	1 (ref.)	1 (ref.)
Yes	1493 (17.2)	880 (20.2)	0.82 (0.77-0.87)	0.83 (0.78-0.88)
Frequented retail or convenience stores				
No	2180 (25.1)	769 (17.7)	1 (ref.)	1 (ref.)
Yes	6522 (74.9)	3582 (82.3)	0.64 (0.61 - 0.67)	0.66 (0.62-0.69)

Main findings of case-control study

1. Factors associated with increased risk of SARS-CoV-2 infection:

- Larger household
- Having children attend school:
 - Kindergarten or looked after by a caregiver
 - Middle school and high school
- Carpooling
- Recent overseas travel
- Certain professions: drivers, health care workers and social workers, business executives, managers and sales representatives, engineers and technical executives, and civil servant executives
- Attending bars, restaurants, fitness centres (although risk could not be evaluated in latter time periods due to nationwide closure of such places)

Main findings of case-control study

2. Factors associated with decreased risk of SARS-CoV-2 infection:

- Working from home
- Certain professions: farmers, professors and scientific occupations, Companies – intermediate administrative and business jobs, teachers and school administrative staff, police and military personnel, service providers, Civil servants– intermediate administrative jobs, retirees, business administrators, civil servants.

Main findings of case-control study

3. Factors with no evidence of increased risk of infection:

- Using public transport (train, bus, tram, subway)
- Attending courses in classrooms or lecture halls (continuing education)
- Attending religious gatherings,
- Attending retail or convenience stores, hair salons
- Private gatherings among friends and family
 - Increased risk of infection in October and November
 - No increased risk of infection in December and January (likely better adherence to infection prevention and control measures)
- Performing sports activities outside
- Attending cultural places (museums, theatres, cinema etc.) during the periods in which they were open)

Limitations of the study

- Selection bias in cases and controls due to requirement to complete online questionnaire
 - Young, female, educated, health conscious: associations may still be the same
- Information bias derived from self-reported behaviours and activities
 - Answers may reflect public health advice, rather than true behaviours and activities
- Confounding: protection associated with teleworking is not the same as protection associated with taking the bus

Despite these limitations, the results are in many ways in line with published scientific literature on SARS-CoV-2 infection

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