Use of healthcare services by people with and without documented SARS-CoV-2 infection

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COVID LONGUE WEB

BACKGROUND

- Infection with SARS-CoV-2 can be asymptomatic or give rise to COVID-19 symptoms. In addition, it can lead to the exacerbation or worsening of pre-existing conditions, the onset of complications or sequelae of the acute episode, and the development of a post-COVID-19 condition. The long-term consequences of SARS-CoV-2 infection on sufferers and on healthcare systems are still relatively unknown.

AIM

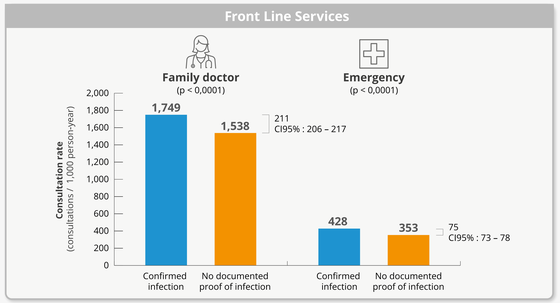
- To compare the use of healthcare services by people with confirmed SARS-CoV-2 infection and those without documented proof of infection during the first two years of COVID-19 pandemic.

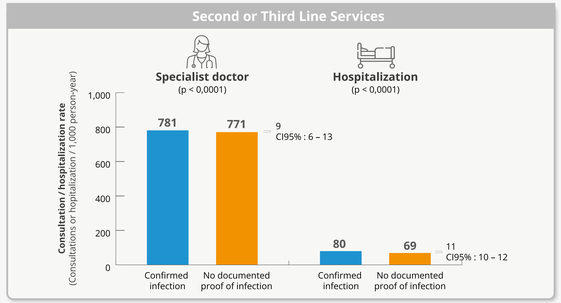
METHODS

- **Study design**: Retrospective matched cohort study.
- **Study population**: People of all ages, alive on March 1st 2020 and covered by Quebec's health insurance. Groups were formed based on the existence or not of a documented proof of infection between March 1, 2020, and November 30, 2021 (PCR positive result or provincial COVID-19 epidemiological inquiry). Vaccination was available to all people age 12 and over from March 1st, 2021, and a three-month inverval was required between first two doses.
- **Data sources**: Seven clinical administrative databases.
- **Index date**: Persons with confirmed infection: date of first positive PCR result or onset of symptoms in case of confirmation by epidemiological links or clinical profile. Persons without documented evidence of infection: same date as the person to whom they were matched.
- **Follow-up period**: From the 31st day after index date until March 31, 2022, or until the date of death or termination of health insurance coverage, whichever came first.
- **Propensity score and matching**: The propensity score was estimated using a logistic regression model. Each person of the exposed population was matched in a 1:1 ratio without replacement to a person of the non-exposed population based on the nearest neighbour algorithm.
- **Primary outcomes**: Acute-care hospitalization, emergency department consultation and ambulatory medical consultation with a family doctor or specialist. For all these variables, no distinction was made regarding the cause of service use (i.e., related to COVID-19 or not).
- **Statistical analysis**: Estimation of consultation or hospitalization rates for the totality of the follow-up period, and of hazard ratios for different time interval using a Cox proportional hazards model.

RESULTS

- SARS-CoV-2 infection is associated with increased use of healthcare services between day 31 and day 729 after confirmation, mainly front-line services.





- The pressure on the healthcare system is greatest in the first three months following confirmation of infection but is still tangible up to two years later.

Front Line Services

Days since infection confirmation	31 to 90	91 to 182	183 to 365	366 to 729
Family doctor	**HR: 1.21** CI95%: 1.19 – 1.22	**HR: 1.11** CI95%: 1.10 – 1.13	**HR: 1.07** CI95%: 1.06 – 1.08	**HR: 1.07** CI95%: 1.06 – 1.08
Emergency	**HR: 1.34** CI95%: 1.31 – 1.36	**HR: 1.22** CI95%: 1.19 – 1.24	**HR: 1.16** CI95%: 1.14 – 1.18	**HR: 1.17** CI95%: 1.15 – 1.20

Second or Third Line Services

Days since infection confirmation	31 to 90	91 to 182	183 to 365	366 to 729
Specialist doctor	**HR: 1.02** CI95%: 1.01 – 1.04	HR: 1.02 CI95%: 1.00 – 1.03	HR: 1.00 CI95%: 0.99 – 1.01	HR: 0.99 CI95%: 0.98 – 1.01
Hospitalization	**HR: 1.37** CI95%: 1.31 – 1.43	**HR: 1.14** CI95%: 1.10 – 1.18	**HR: 1.10** CI95%: 1.07 – 1.14	**HR: 1.09** CI95%: 1.05 – 1.13

HR: hazard ratio; risk of consultation or hospitalization of people with confirmed SARS-CoV-2 infection comparatively to those without documented evidence of infection.

Color legend for HR:

* n.s.: non-significant HR

- Severe initial infection and age 65 and over are mainly associated with increased use of healthcare services compared with mild initial infection or age under 65.

Front Line Services (31 to 90 days after confirmation of infection)

Initial severity	HR (CI95%) Family doctor	HR (CI95%) Emergency
Mild[1]	**1.18** (1.17 – 1.20)	**1.23** (1.20 – 1.26)
Severe[2]	**1.67** (1.60 – 1.75)	**2.43** (2.26 – 2.62)
Age in years		
< 18 ans	**1.15** (1.11 – 1.18)	**1.24** (1.18 – 1.30)
18 à 64 ans	**1.21** (1.19 – 1.22)	**1.28** (1.25 – 1.31)
≥ 65 ans	**1.27** (1.23 – 1.30)	**1.64** (1.56 – 1.73)

Second or Third Line Services (31 to 90 days after confirmation of infection)

Initial severity	HR (CI95%) Specialist doctor	HR (CI95%) Hospitalization
Mild[1]	1.01 (0.99 – 1.03)	1.01 (0.96 – 1.06)
Severe[2]	**1.22** (1.15 – 1.30)	**3.26** (2.90 – 3.67)
Age in years		
< 18 ans	**1.09** (1.04 – 1.13)	**1.45** (1.23 – 1.72)
18 à 64 ans	**1.04** (1.02 – 1.07)	**1.09** (1.03 – 1.16)
≥ 65 ans	**0.92** (0.89 – 0.96)	**1.84** (1.71 – 1.98)

HR : hazard ratio; risk of consultation or hospitalization of people with confirmed SARS-CoV-2 infection comparatively to those without documented evidence of infection. [1] No hospitalization in the first 30 days after infection confirmation. [2] Hospitalization in the first 30 days after infection confirmation.

- Initial severe[1] SARS-CoV-2 infection is associated with an increased risk of being hospitalized for diabetes, heart failure or respiratory disorders compared to people without documented proof of infection during the entire follow-up period.

Cause of hospitalization

Days since infection confirmation	31 to 90	91 to 182	183 to 365	366 to 729
Diabetes	**HR: 4.32** CI95%: 1.28 – 14.57	**HR: 4.31** CI95%: 1.44 – 12.90	**HR: 3.26** CI95%: 1.61 – 6.58	**HR: 2.26** CI95%: 1.08 – 4.72
Heart failure	**HR: 4.89** CI95%: 3.03 – 7.90	**HR: 3.18** CI95%: 2.10 – 4.82	**HR: 1.91** CI95%: 1.34 – 2.72	**HR: 1.71** CI95%: 1.19 – 2.48
Respiratory disorders	**HR: 7.90** CI95%: 5.56 – 11.23	**HR: 3.04** CI95%: 2.22 – 4.17	**HR: 2.56** CI95%: 1.99 – 3.30	**HR: 2.25** CI95%: 1.69 – 3.01

HR: hazard ratio; risk of hospitalization of people with confirmed SARS-CoV-2 infection comparatively to those without documented evidence of infection.
[1] Hospitalization in the first 30 days after infection confirmation.

CONCLUSION

- This study contributes to the evolving body of knowledge about the impact of the COVID-19 pandemic on the health-care system. However, generalization of the results to the post-vaccination period, and to infections with the Omicron variant and its subtypes, is fraught with uncertainty.

ACKNOWLEDGEMENTS

We would like to thank Dr Patrick Archambault, Dr James Brophy and Dr Sara Carazo for critical reading of the complete report, as well as Marjolaine Rondeau and Adriana Freitas for help with poster design.

REFERENCES

For more details and to see all references, see the complete report on INESSS website INESSS.qc.ca.

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