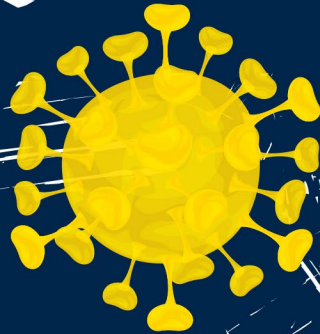


CROI ICAR

CROI Affiliated Event for
Italian Young Investigators

AWARDS 2024



CHAIRS:

F. Kirchhoff

(Ulm, Germany, EU)

D. Margolis

(Chapel Hill, North Carolina, USA)



Denver, Colorado

March 4th, 2024

h 06.00 - 07.30 pm

CROI 31st CONFERENCE ON
Retroviruses and Opportunistic Infections
MARCH 3-6 2024 DENVER, COLORADO

ICAR 16th NATIONAL CONGRESS
Italian Conference on AIDS and Antiviral Research
JUNE 19-21 ROME, ITALY



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SARS-CoV-2 Infection and Hospitalization in Immunocompromised Children: A Population-Based Study

Costanza Di Chiara, Giugni A., Le Prevost M., Boracchini R., Barbieri E., Lupattelli A., Giaquinto C., Donà D.#, Cantarutti A.

on behalf of the VERDI study team

SARS-CoV-2 Infection and Hospitalization in Immunocompromised Children: A Population-Based Study #861

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INTRODUCTION

The burden of SARS-CoV-2 infection in immunocompromised children remains unclear due to limited population-based studies.

OBJECTIVES

To assess the risk of primary SARS-CoV-2 infection, hospitalization, and severe COVID-19 outcomes in children with and without immunocompromising conditions.

RESULTS

A total of 27,957 children (IC=22,964, non-IC=4910, IC=1183) were included. IC and non-IC were older than RC (median age [IQR]: 7 (4-10), 9 (8-10), and 6 (5-8) years, p<0.001) (Fig. 1).

Fig. 1 shows the frequencies of IC, non-IC, and RC children (N) and their age distribution across immunocompromising conditions (IC=1183).

Fig. 2 shows the risk for primary SARS-CoV-2 infection and hospitalization among IC, non-IC, and RC. Models were adjusted for selected variables (age, gender, observation time, number of visits and antibiotic prescriptions).

CONCLUSION

IC demonstrated a comparable likelihood of SARS-CoV-2 primary infection but a higher risk of hospitalizations to both IC and non-IC. Notably, no severe COVID-19 cases were reported among this cohort. These findings suggest a potentially elevated risk in IC, possibly attributed to higher antibiotic prescriptions.

ADDITIONAL KEY INFORMATION

IC demonstrated a comparable likelihood of SARS-CoV-2 primary infection but a higher risk of hospitalizations to both IC and non-IC. Notably, no severe COVID-19 cases were reported among this cohort. These findings suggest a potentially elevated risk in IC, possibly attributed to higher antibiotic prescriptions.

METHODS

- Population-based cohort study on children aged 0-14 years in the Veneto region, Italy, from February 2020 to February 2022.
- Data were obtained from an Italian pediatric primary care database (PediCare), covering ~15% of the Veneto region pediatric population <15 years of age, also including data from the COVID-19 surveillance system (Verdi).
- All immunocompromising conditions of the Veneto region.
- SARS-CoV-2 infection was diagnosed by positive COVID-19 IgG.
- Hospitalization was defined as hospital admission within five days from the first positive IgG.
- Severe COVID-19 was defined as intensive care unit (ICU) admission, and/or ventilation or hemodynamic support need, and/or death.

Participants were classified into three groups:

- Immunocompromised children (IC), 1183 children with specific immunocompromising conditions.
- Non-immunocompromised children (non-IC), 4910 children with no immunocompromising conditions.
- Reference children (RC), 22,964 children with no immunocompromising conditions.

Key risk factors for severe pediatric COVID-19 (IC, IC and IC) reference children (RC) (i.e., those children not included in IC and non-IC) (Tab. 1).

Tab. 1 shows the IC and non-IC population included in the study.

Con: proportional hazard models were employed to estimate adjusted hazard ratios (aHR) with their corresponding 95% confidence intervals (95% CI) for the risk of SARS-CoV-2 infection among IC, non-IC, and RC. COVID-19 vaccination was considered as a competing event in our analysis. We analyzed the distribution of COVID-19 related hospitalizations and severe cases among IC, non-IC, and RC cases with SARS-CoV-2 infection.

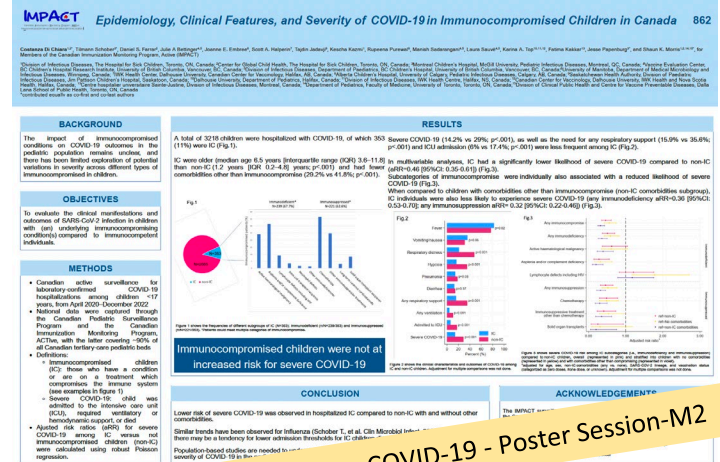
#861 - Poster Session-M2

Background

Conflicting evidence exists on COVID-19 incidence and severity in immunocompromised (IC) children



- What is the risk of SARS-CoV-2 infection in IC kids?
- Is IC status a risk factor for severe COVID-19 in kids?



#862 - Factors Affecting Outcome of Acute COVID-19 - Poster Session-M2



Study objectives

To assess the incidence and severity of SARS-CoV-2 infection in immunocompromised children.

We evaluated the risk of:

- SARS-CoV-2 primary infection
- COVID-19-related hospitalization
- Severe COVID-19 outcomes

in children **with or without** an **immunocompromising status**



Study design and methods

Study design and Data Sources

- Population-based cohort study
- Real-world data from electronic medical registries in Italy and Norway
- Children aged 0-18 years
- Data collected from February 2020 to February 2022



Study design and methods

Definitions

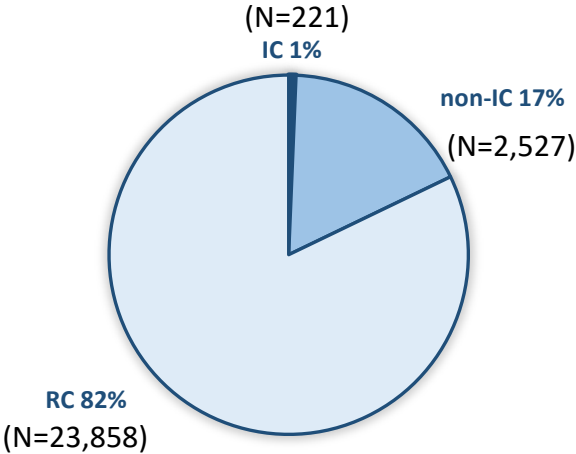
- Severe COVID-19: ICU admission, and/or ventilation or hemodynamic support need, and/or death
- Participants were classified into three groups:
 - IC:** Immunocompromised children (see table)
 - non-IC:** Children with specific non-immunocompromising underlying conditions recognized as risk factors for severe pediatric COVID-19 (e.g., diabetes, obesity, etc)
 - RC:** Reference children (i.e., neither IC nor non-IC)

IC	non-IC
Humoral, cellular, and combined immunity deficiencies, including HIV	Cardiovascular conditions, (i.e., chronic, congenital cardiac diseases, and arrhythmias)
Active haematological malignancy	Cerebrovascular conditions
Neoplasm	Respiratory conditions (i.e., chronic obstructive pulmonary disease, cystic fibrosis, diseases of pulmonary circulation, and pulmonary TB)
Disorders of blood and blood-forming organs, including spleen disorders	Neurocognitive conditions
Bone marrow or hematopoietic stem cell transplant	Metabolic conditions (i.e., diabetes, obesity and metabolic syndrome)
Solid Organ Transplant	Other conditions (i.e., chronic kidney disease and renal failure, liver cirrhosis, autoimmune hepatitis)
Chemotherapy	

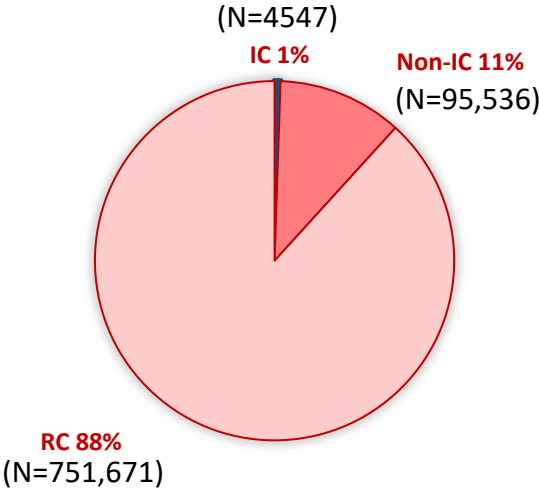


Results – cohorts' characteristics

Italy
N=26,606



Norway
N=851,536



■ Italy ■ Norway

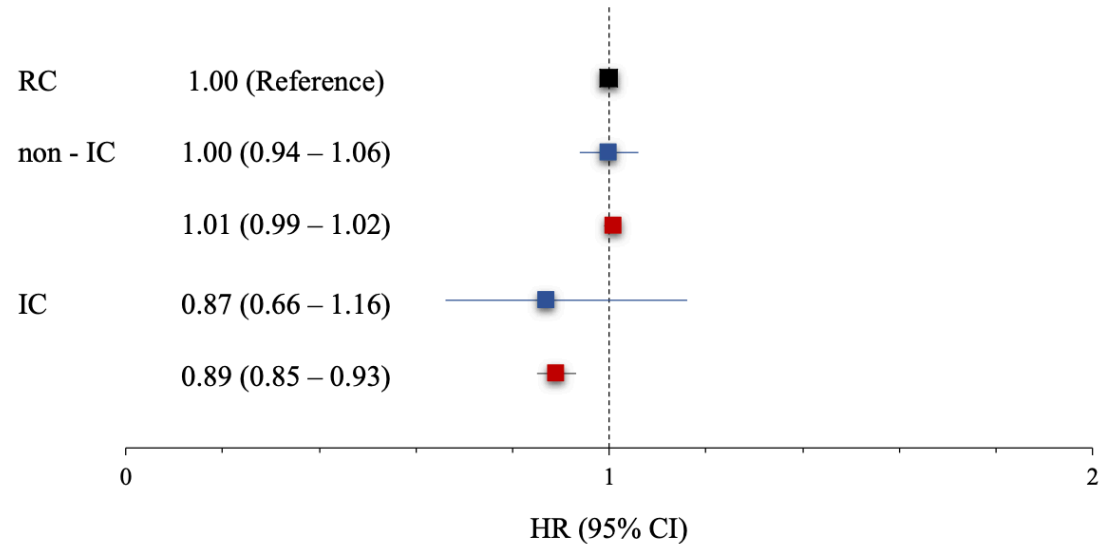


Results – Risk of SARS-CoV-2 infection

■ Italy ■ Norway

IC children showed **comparable or lower risk of SARS-CoV-2 infection** to immunocompetent children

Risk of SARS-CoV-2 primary infection

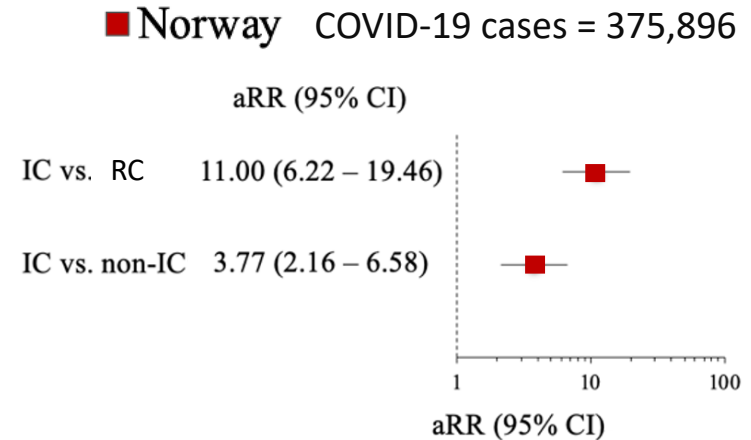
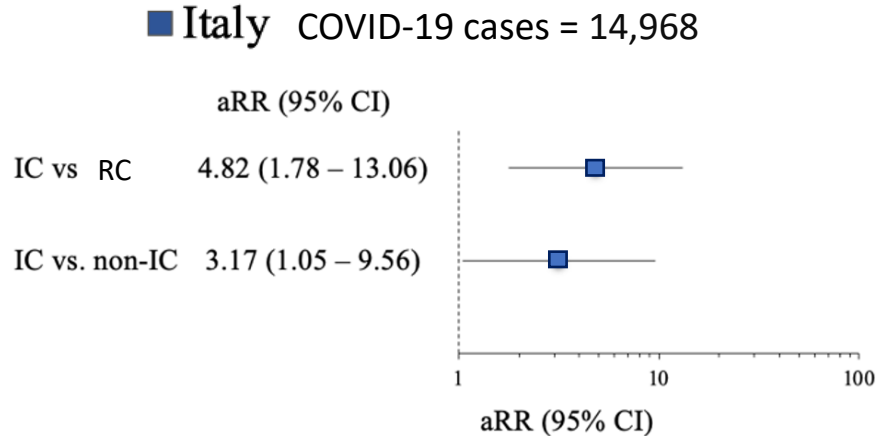


Models were adjusted for several potential confounders (age, gender, deprivation index, number of visits and antibiotic prescriptions). COVID-19 vaccination was considered as a competing event in our analysis.



Results – Risk of hospitalization

IC children had a **4-11-fold higher risk of hospitalization** compared to immunocompetent children without other risk factors, regardless of infection severity



Zero and five cases developed severe COVID-19 in Italy and Norway, respectively.



Conclusions

- Data from Italy and Norway are in general comparable
- IC children showed a **comparable / lower risk of SARS-CoV-2 primary infection** but a **higher risk of hospitalization** compared to both non-IC and RC
- Notably, severe COVID-19 cases were very rare in both datasets
- Lower risk of infection IC may be related to a reduced exposure (e.g. higher isolation measures) and/or higher vaccine acceptance
- Higher hospitalization rate in IC may be due to **lower admission thresholds**
- The higher risk of hospitalization in IC did not translate into higher rate of COVID-19 severity.



Acknowledgments



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Thank you!

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