

Association between virtual primary care and emergency department use

March 15th, 2022

INSPIRE Team: Tara Kiran, Mike Green, Fangyun Wu, Rachel Strauss, Peter Gozdyra, Alex Kopp, Lidija Latifovic, Eliot Frymire, Rick Glazier

Funder: Ontario Health, CIHR, INSPIRE-PHC

Methods

Primary question: Does more virtual care in the primary care (PC) setting correspond with more emergency department (ED) visits?

Study population:

- All physicians with associated OHIP home/office/virtual claims between Feb & Oct 2021 associated with specialty of '00', designated for family general practice
 - Categorized into groups based on the percentage of total visits that were virtual between February and Oct 2021
 - Our primary analysis did not exclude focused practice physicians (e.g. palliative, sports medicine). However, we did a sensitivity analysis limited to comprehensive physicians
- All patients living in Ontario alive and eligible for OHIP as of March 31, 2021
 - Patients attached to physicians based on enrolment and virtual rostering

Methods

Data Sources

Registered Person's Database (RPDB)

- Identification of Ontario population
- Patient-level characteristics

OHIP claims database

- Primary care physician visits

Primary Care Population (PCPOP) dataset

- Physician model of care
- Physician patient panel size

Discharge Abstract Database (DAD)

- Hospitalizations

Corporate Provider Database (CPDB)

- Physician-level characteristics

Postal Code Conversion File (PCCF)

- Rural Index of Ontario (RIO)

National Ambulatory Care Reporting System (NACRS)

- Emergency department visits

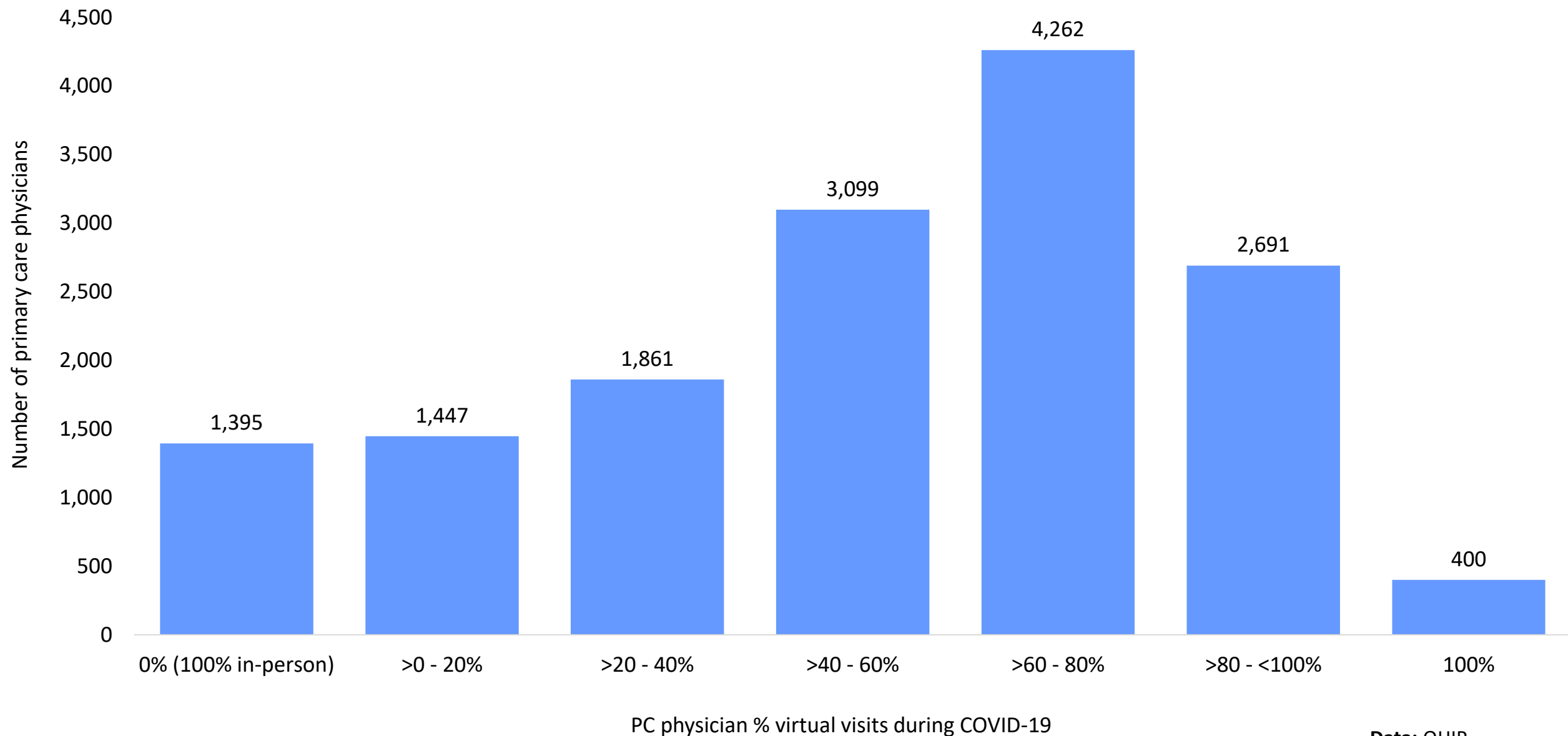
Methods

Analysis

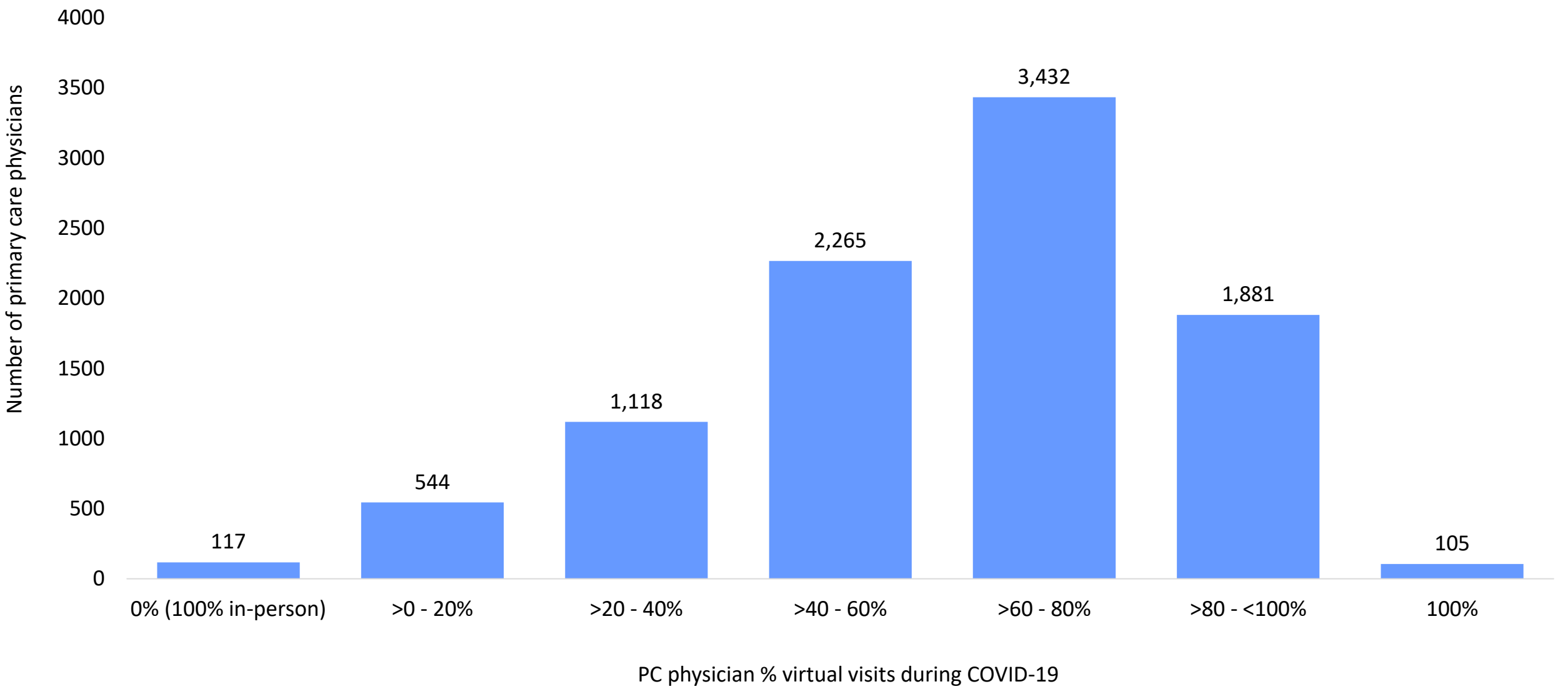
- Trends in volume of visits between January 2019 and October 2021
 - Primary care visits (total, office, virtual)
 - ED visits (Total and by CTAS)
- Stratification of physicians and their patients by the percent of virtual care delivered by the primary care physician (Feb to Oct 2021)
 - Physician and patient characteristics
 - Health service utilization
 - Physicians included all with OHIP home/office/virtual claims between Feb and Oct 2021 with associated specialty of '00', designated for family general practice
 - Sensitivity analysis of comprehensive primary care physicians only
- Comparison of mean ED visits for each physician in Feb to Oct 2019 vs Feb to Oct 2021 stratified based on the percent of virtual care delivered by the physician during the 2021 time period

Physician and patient characteristics
by the percent of visits provided
virtually by primary care physicians

**Histogram showing number of primary care physicians by the percentage of total visits that are virtual,
February to October 2021**



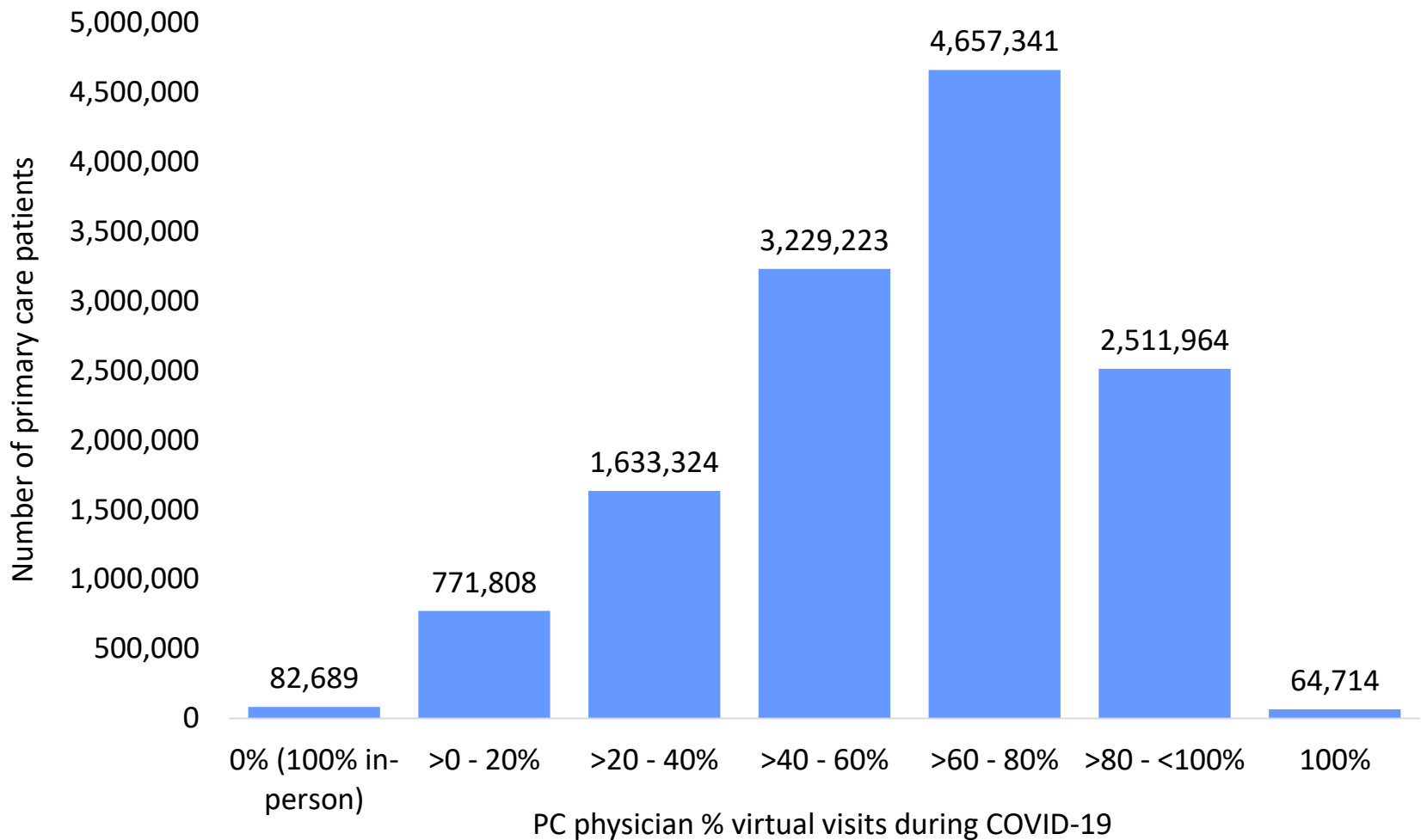
Histogram showing number of **comprehensive** primary care physicians by the percentage of total visits that are virtual, February to October 2021



For most Ontarians, their family physician provided 40-80% of care virtually

Histogram showing number of patients by the percentage of total visits that are virtual for rostered provider, February to October 2021

- Between February and October 2021:
 - The largest proportion of primary care patients were seen by physicians who provided >60-80% of care virtually (31.7%, 4,657,341/14,705,864)
 - ~1% of patients were seen by physicians who provided 0% (82,689/14,705,864) and 100% (64,714/14,705,864) virtual care.



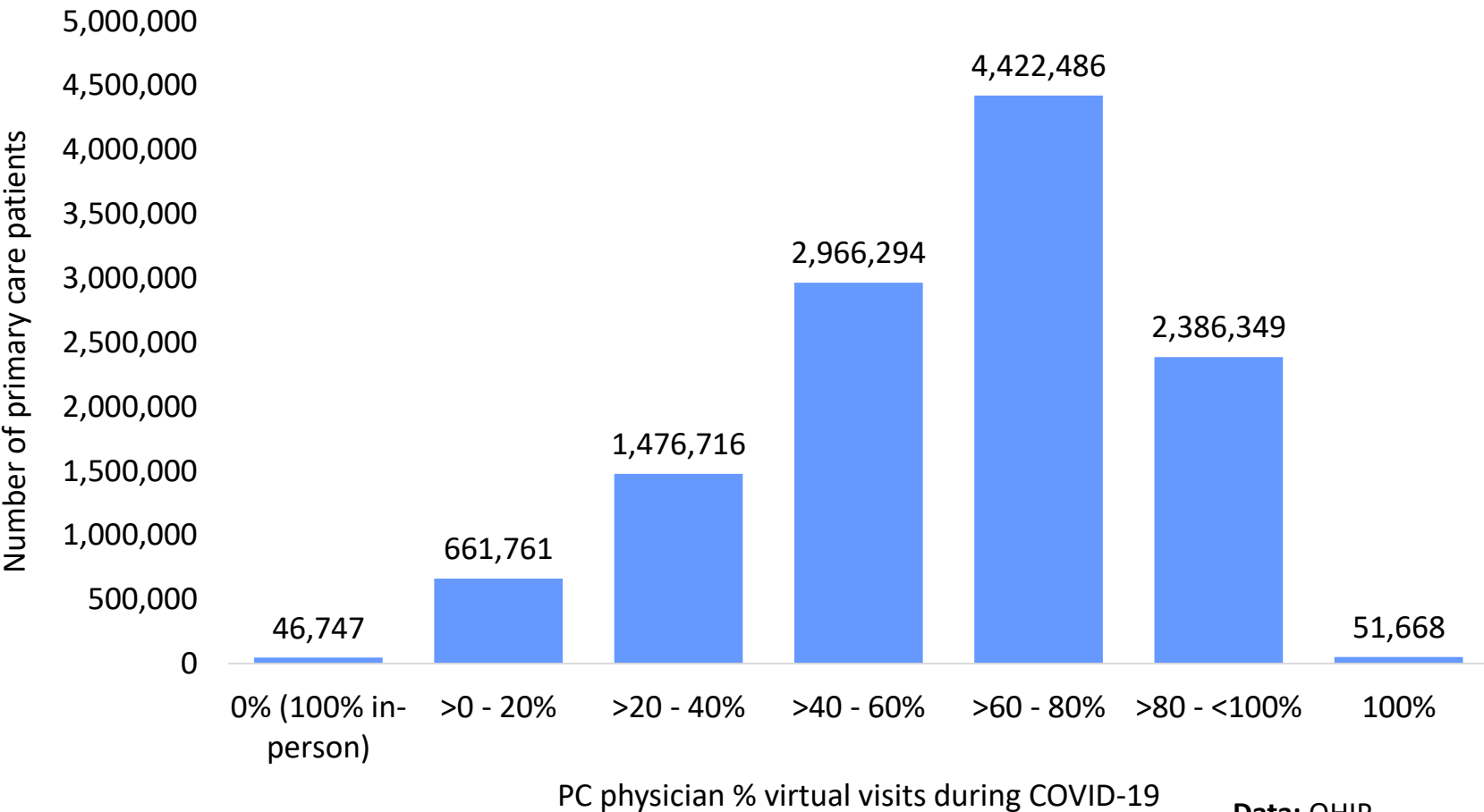
Note: the graph does not show patients unassigned to a PC physician through formal/virtual rostering and those rostered to physicians with no visits during the study period.

For most Ontarians, their family physician provided 40-80% of care virtually.

- Between February and October 2021:
 - The largest proportion of primary care patients seen by comprehensive PC physicians were seen by physicians who provided >60-80% of care virtually (36.5%, 4,422,486/12,125,959)
 - <1% of patients were seen by physicians who provided 0% (46,747/12,125,959) and 100% (51,668/12,125,959) virtual care.

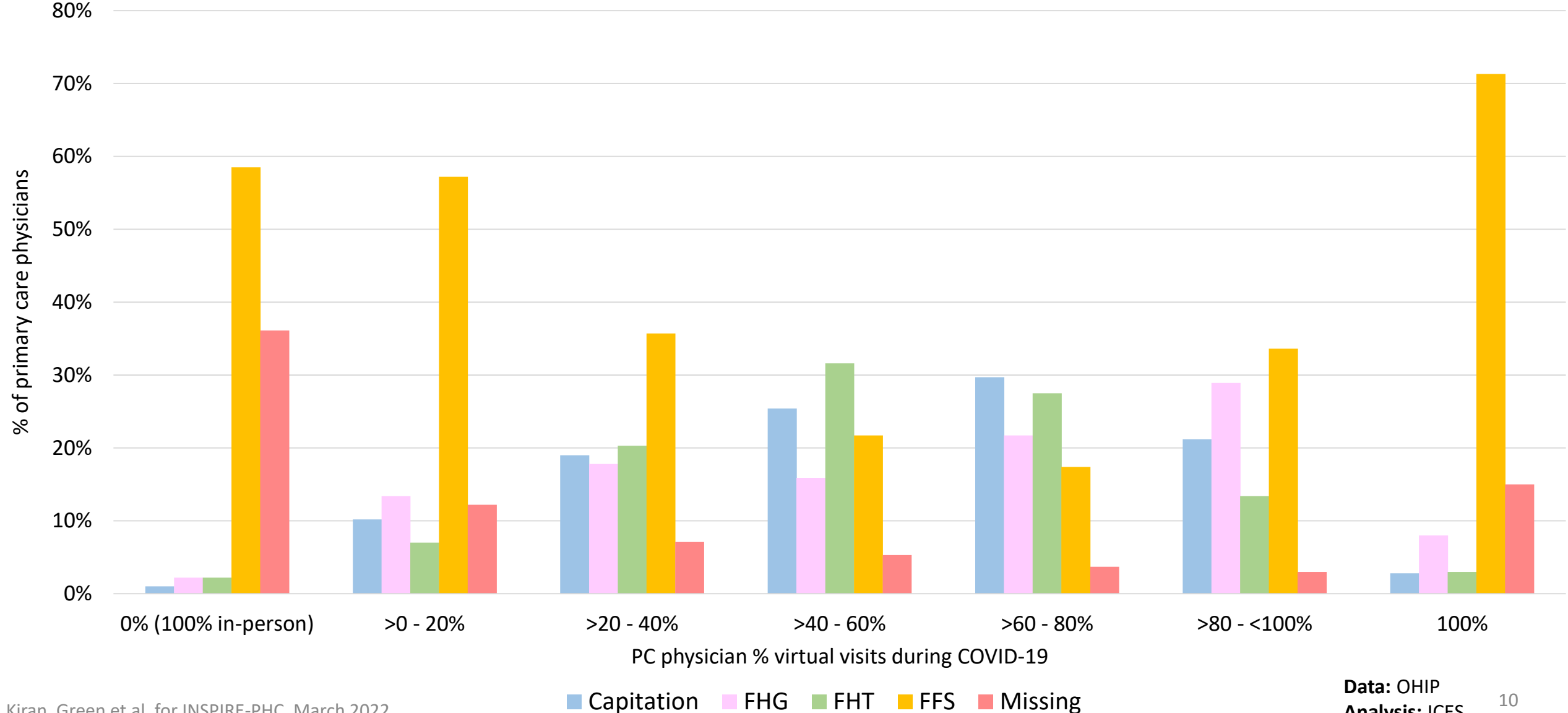
Note: the graph does not show patients unassigned to a PC physician through formal/virtual rostering and those rostered to physicians with no visits during the study period.

Histogram showing number of patients who saw comprehensive primary care physicians by the percentage of total visits that are virtual for rostered provider, February to October 2021

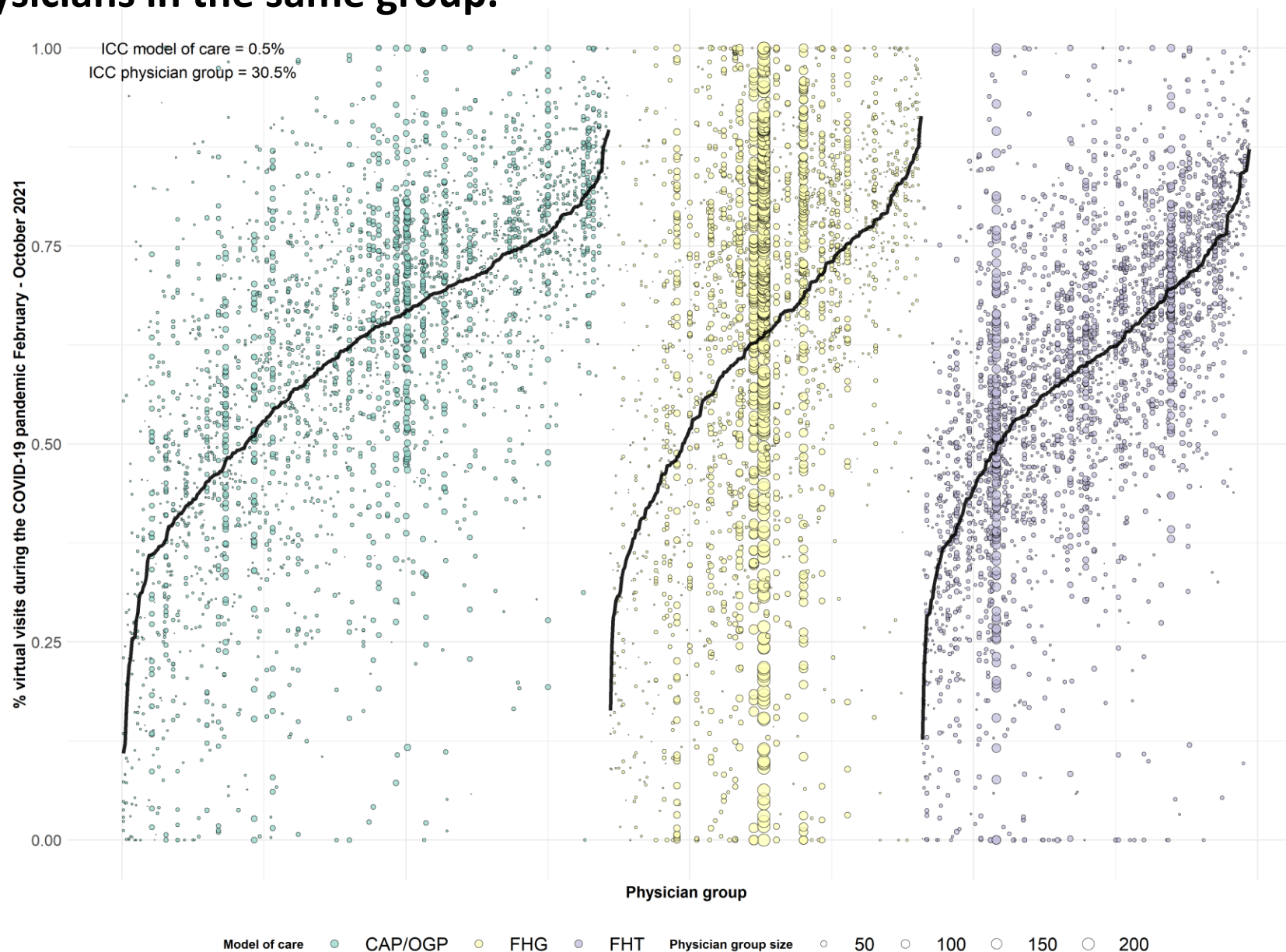


Most primary care physicians that provided 100% in-person care and 100% virtual care practiced outside a Patient Enrolment Model

Physician model of care, stratified by percent of total visits that were virtual, February to October 2021

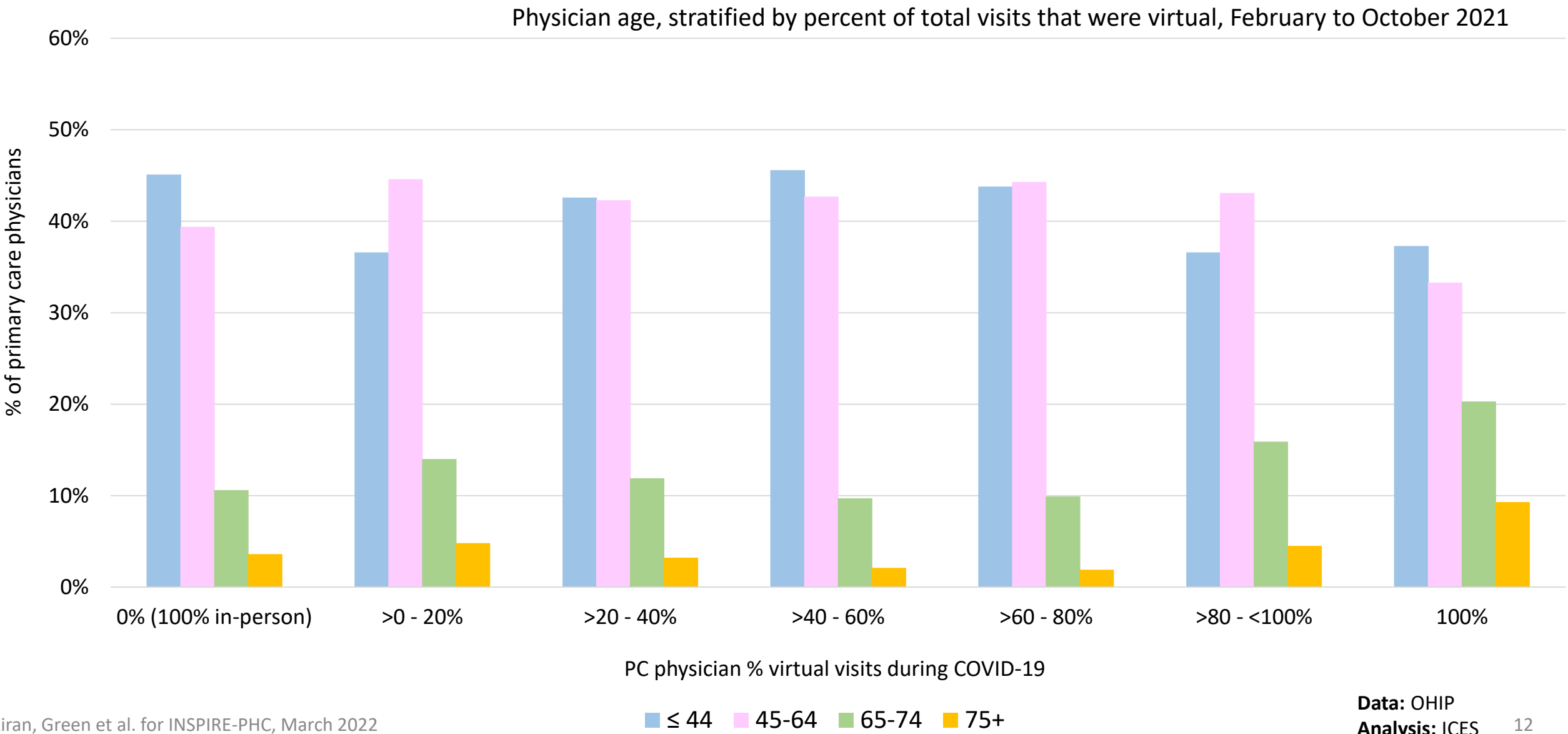


There was substantial variation in the proportion of visits that were virtual—both between groups and between physicians in the same group.



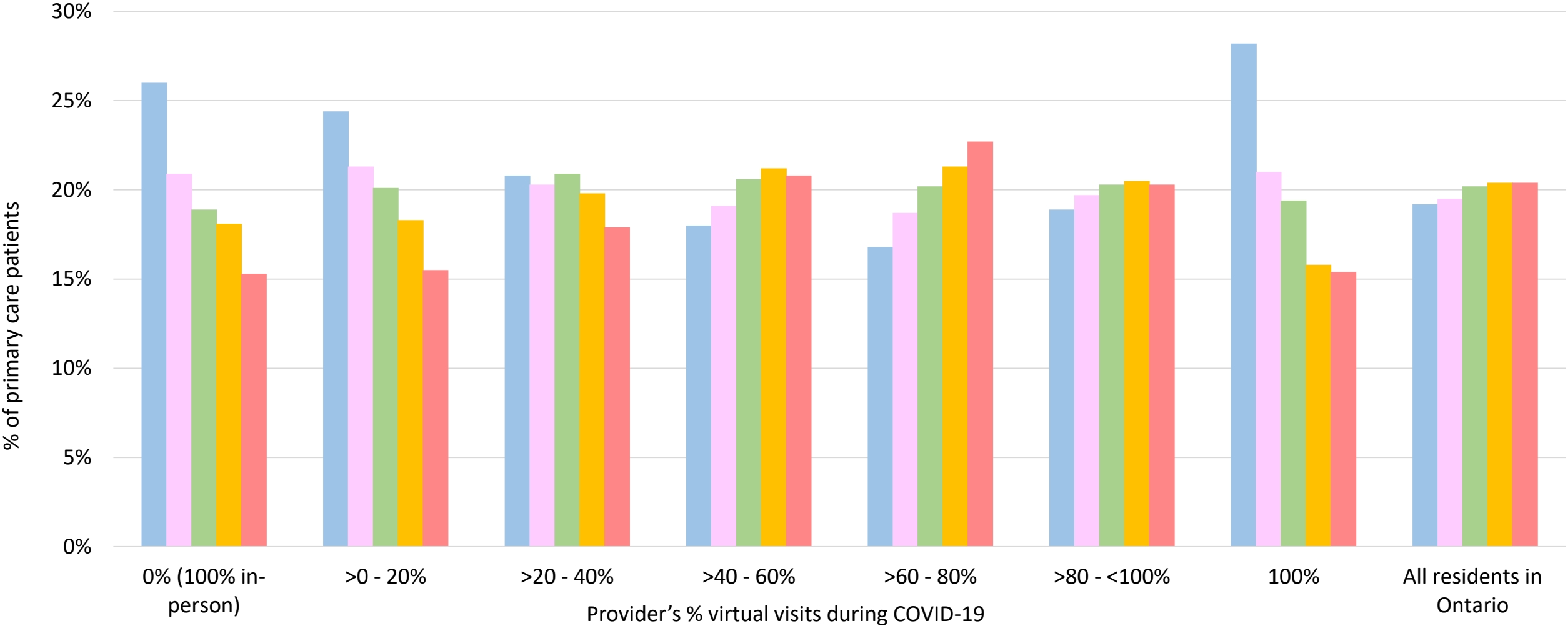
Note: The black line represents the mean ratio for the practice group. Each group can have 3 or more physicians. Each dot represents a physician. Physicians within the same practice group are represented on the same vertical line. We calculated an intraclass correlation coefficient from a three-level, intercept-only mixed linear model to understand how much of the total variance in virtual visits was attributable to physician group and practice type. We found the variation was not explained by model of care (ICC: 0.5%), whereas a high proportion of variation was explained by specific practice group the physician belonged to (ICC:30.5%).

A higher proportion of primary care physicians providing 100% virtual care were age 75 or older compared to those providing less virtual care



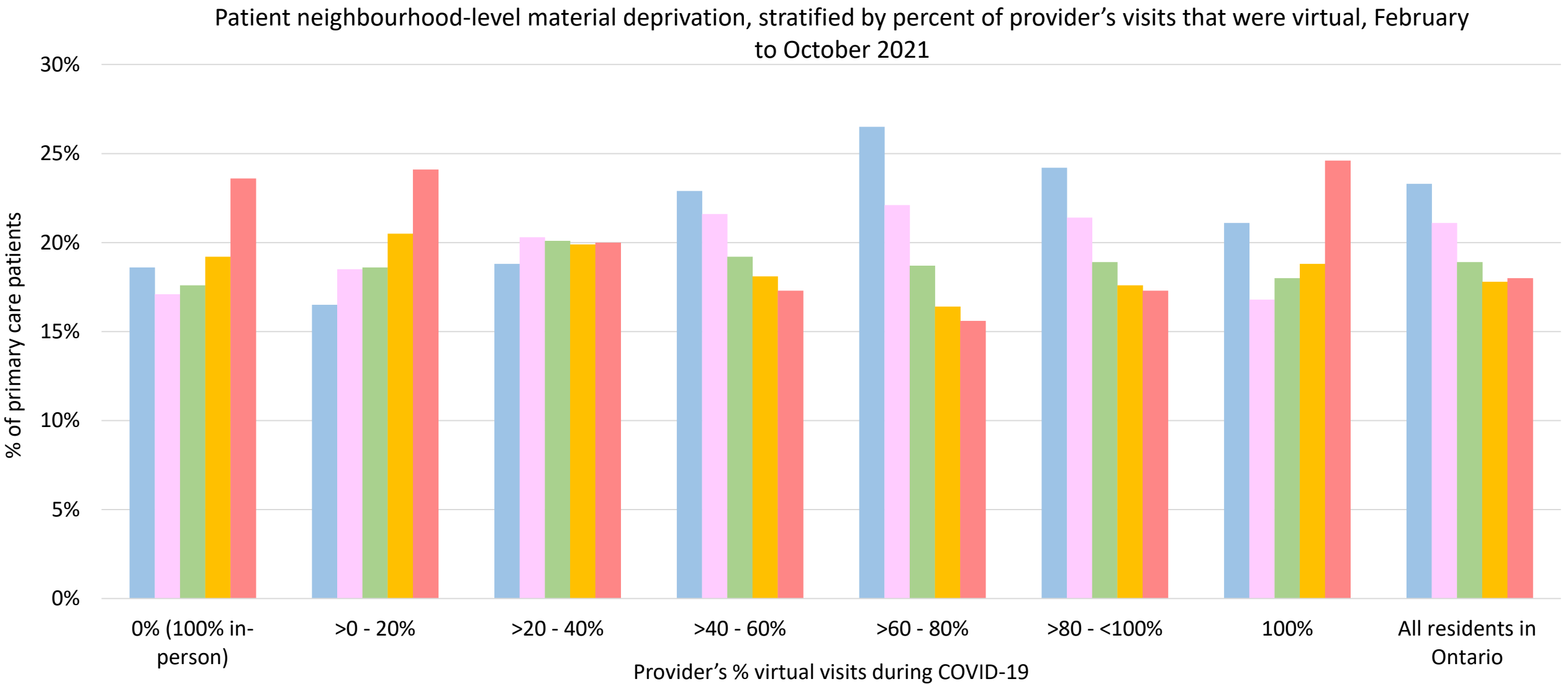
A higher proportion of patients seen by primary care physicians providing 0-20% virtual care and 100% virtual care lived in neighbourhoods in the lowest income quintile

Patient neighbourhood-level income quintile, stratified by percent of provider's visits that were virtual, February to October 2021

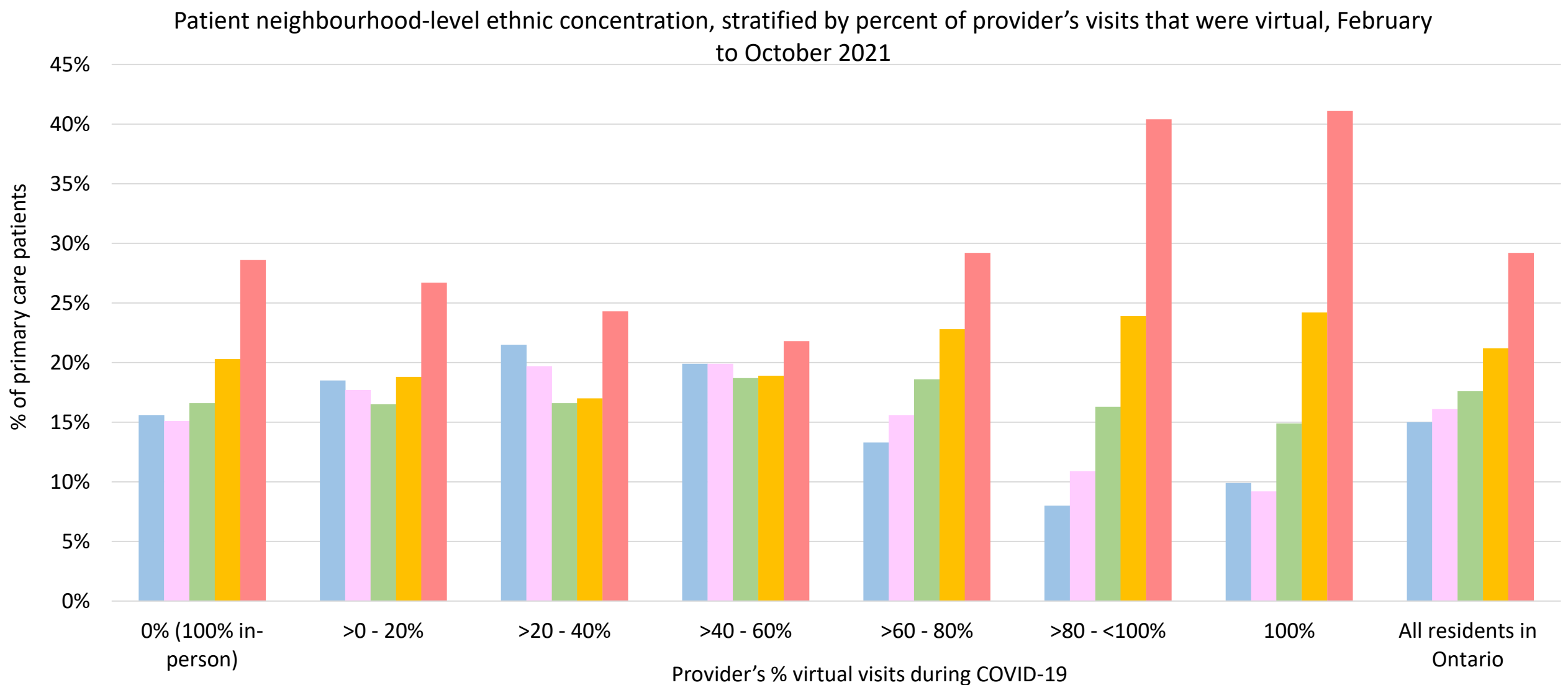


■ Q1 lowest income ■ Q2 ■ Q3 ■ Q4 ■ Q5 highest income

A higher proportion of patients seen by primary care physicians providing 0-20% virtual care and 100% virtual care lived in neighbourhoods associated with increased material deprivation



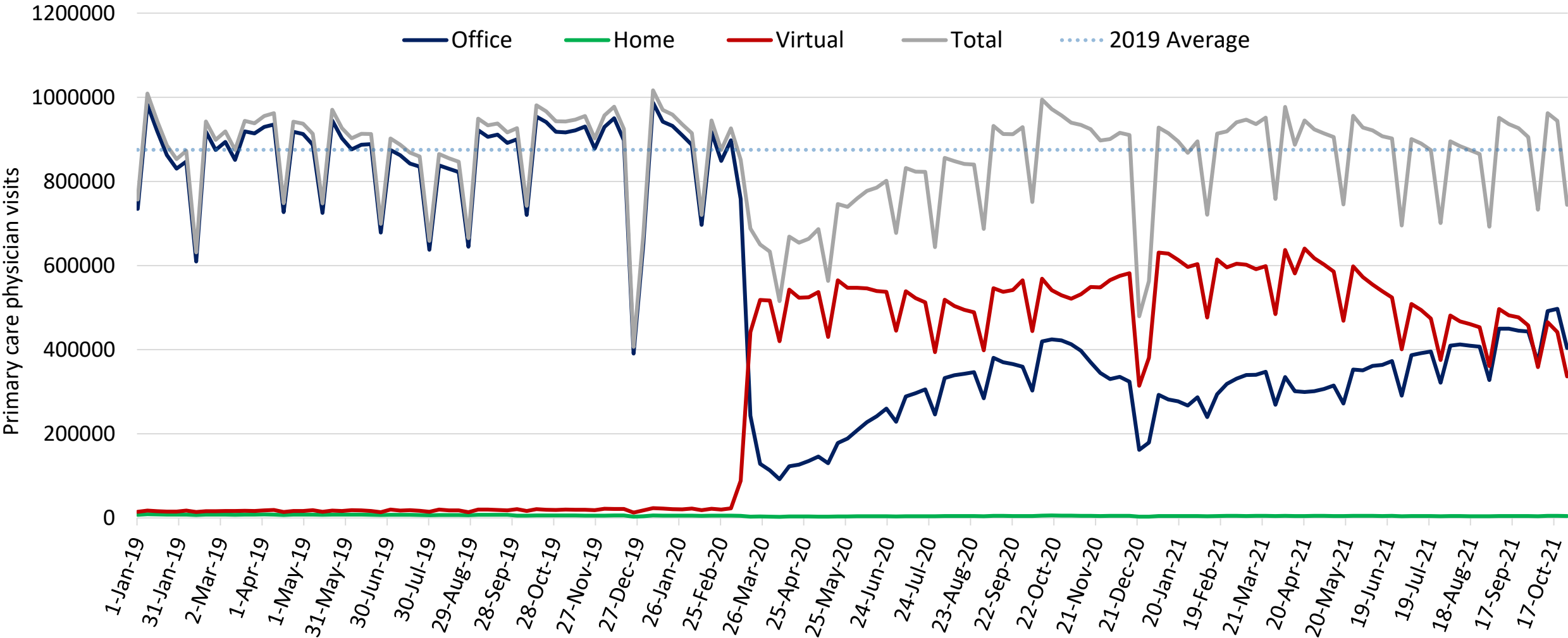
A higher proportion of patients seen by primary care physicians providing >80-100% virtual care lived in more ethnically concentrated neighbourhoods



Trends in primary care & emergency department visits

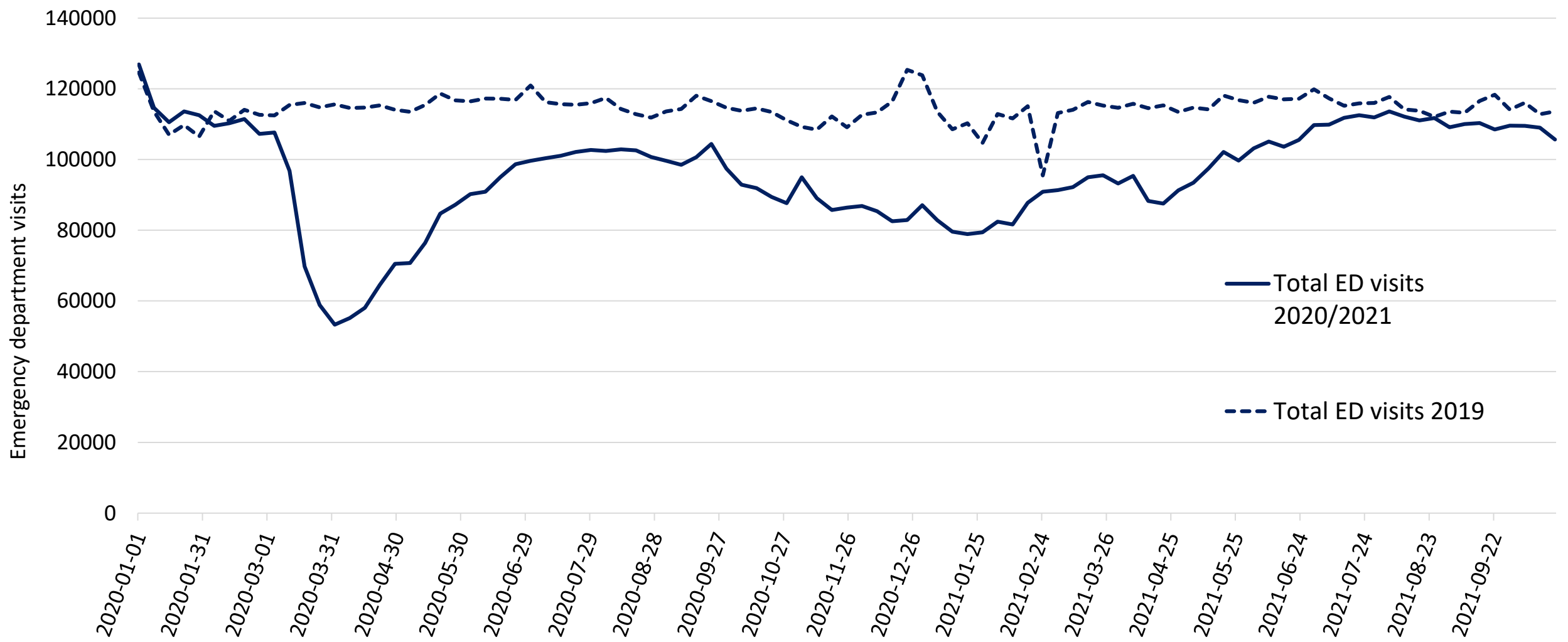
Total visit volumes to primary care decreased early in the pandemic but reached pre-pandemic levels by Fall 2020

Weekly primary care visits by type, January 2019 to October 2021



Emergency department visits decreased notably at the onset of the pandemic, though are slowly approaching pre-pandemic levels

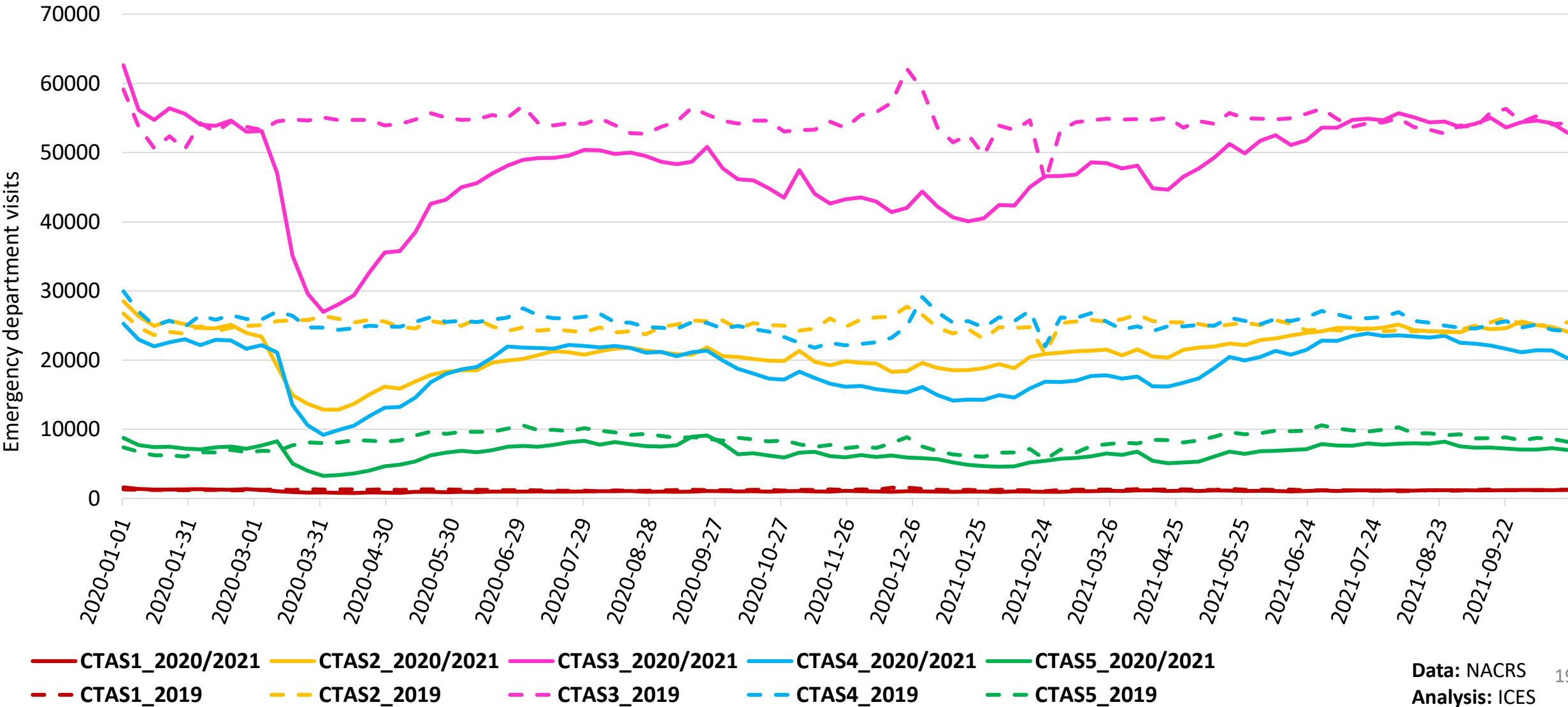
Weekly emergency department visits, January 2019 to October 2021



Canadian Triage and Acuity Scale (CTAS) 2, 3 and 4-level emergency department visits decreased notably at the onset of the pandemic and are slowly approaching pre-pandemic levels

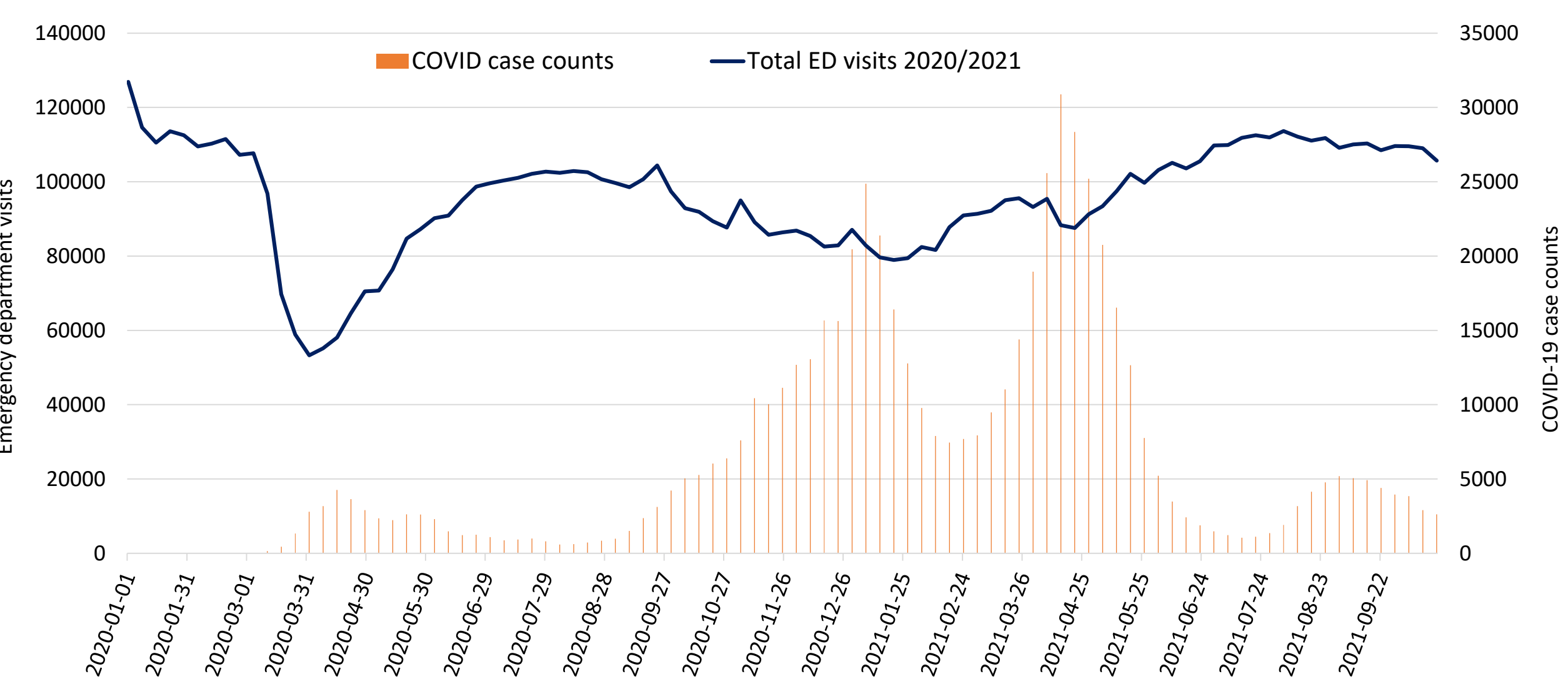
Kiran, Green et al.
for INSPIRE-PHC,
March 2022

Weekly emergency department visits by CTAS level, January 2019 to October 2021



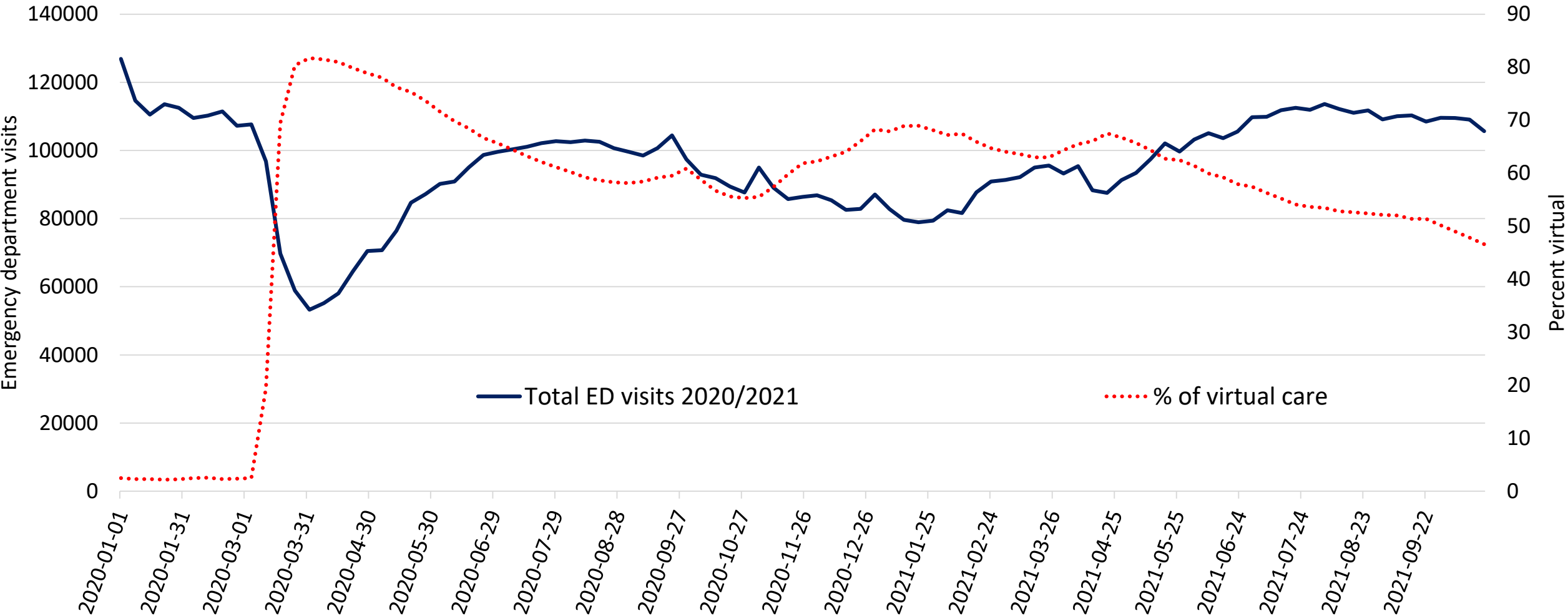
Emergency department visit volumes decreased during COVID-19 waves

Weekly emergency department visits and COVID-19 case counts, January 2020 to October 2021



There appears to be an inverse association between the percentage of virtual visits in primary care and the number of emergency department visits

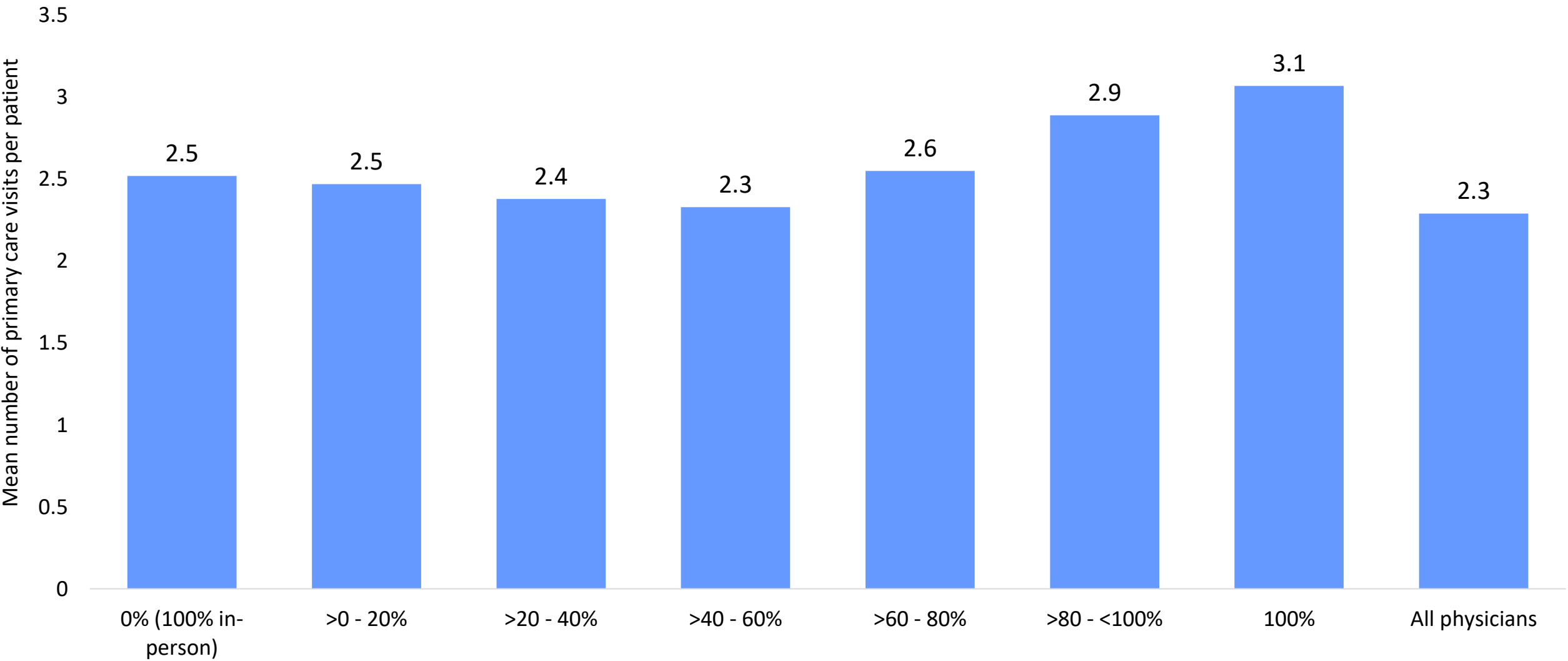
Emergency department visits and percent overall virtual primary care visits, January 2020 to October 2021



Patient health service utilization by percent virtual care of rostered primary care physician

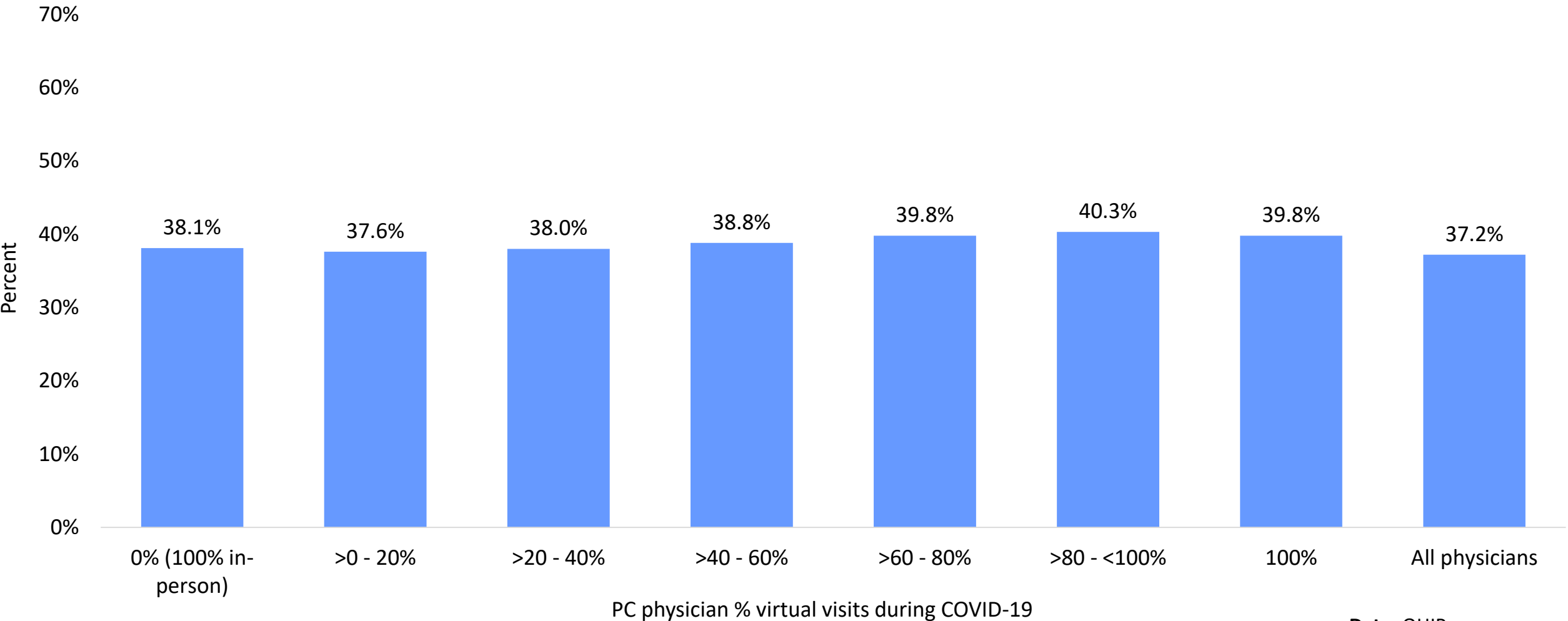
Patients seen by physicians who provided 80-100% of care virtually had a higher mean number of primary care visits per patient

Mean number of primary care visits per patient by percent virtual care for given physician, February to October 2021



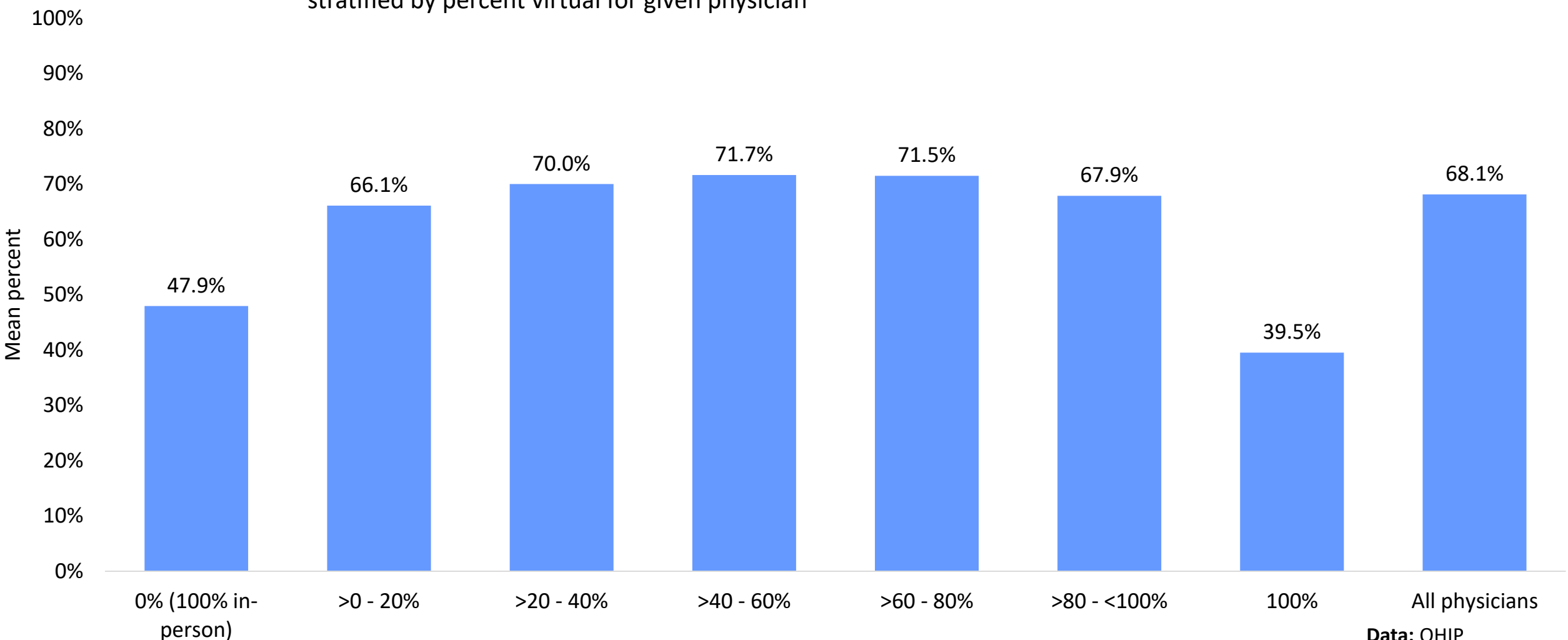
The percentage of patients with a specialist visit was relatively stable across levels of virtual care provided by their physician

Percentage of patients with a specialist visit between February and October 2021, by percent virtual for given physician



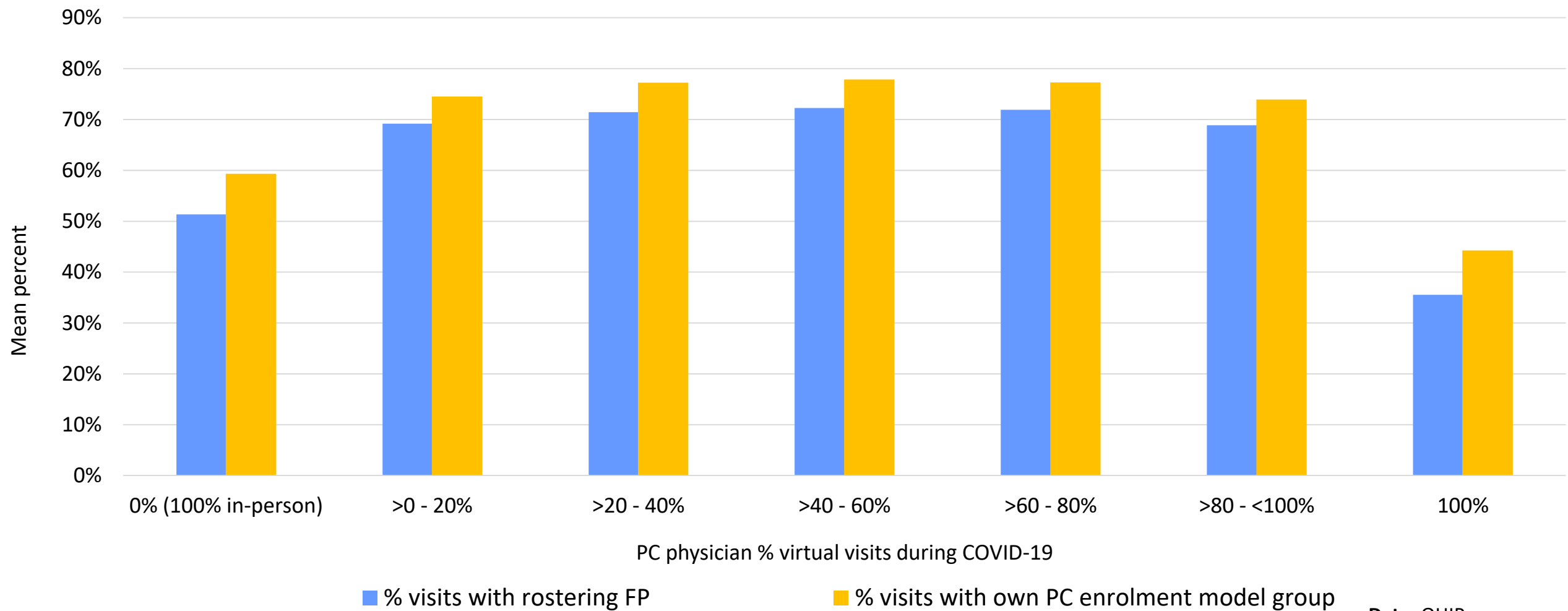
Patients seen by physicians who provided 0% or 100% of care virtually had lower continuity of care with their family physician

Continuity: Mean percent of patient visits to most responsible family physician between February and October 2021, stratified by percent virtual for given physician



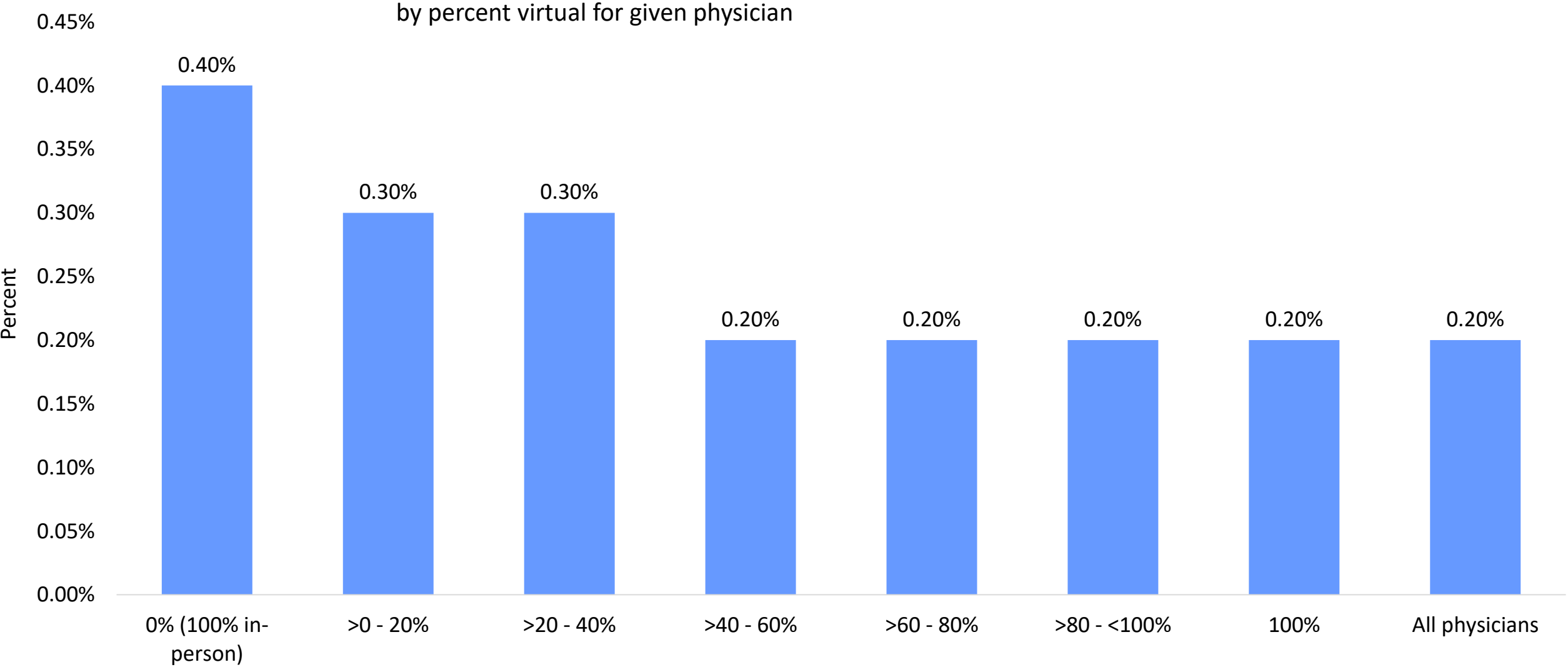
Patients seen by physicians who provided 0% or 100% of care virtually had lower continuity of care with their family physician or their Patient Enrolment Model group

Continuity for subset of enrolled patients: mean percent of patient visits to rostering primary care physician and group between February and October 2021, stratified by percent virtual for given physician



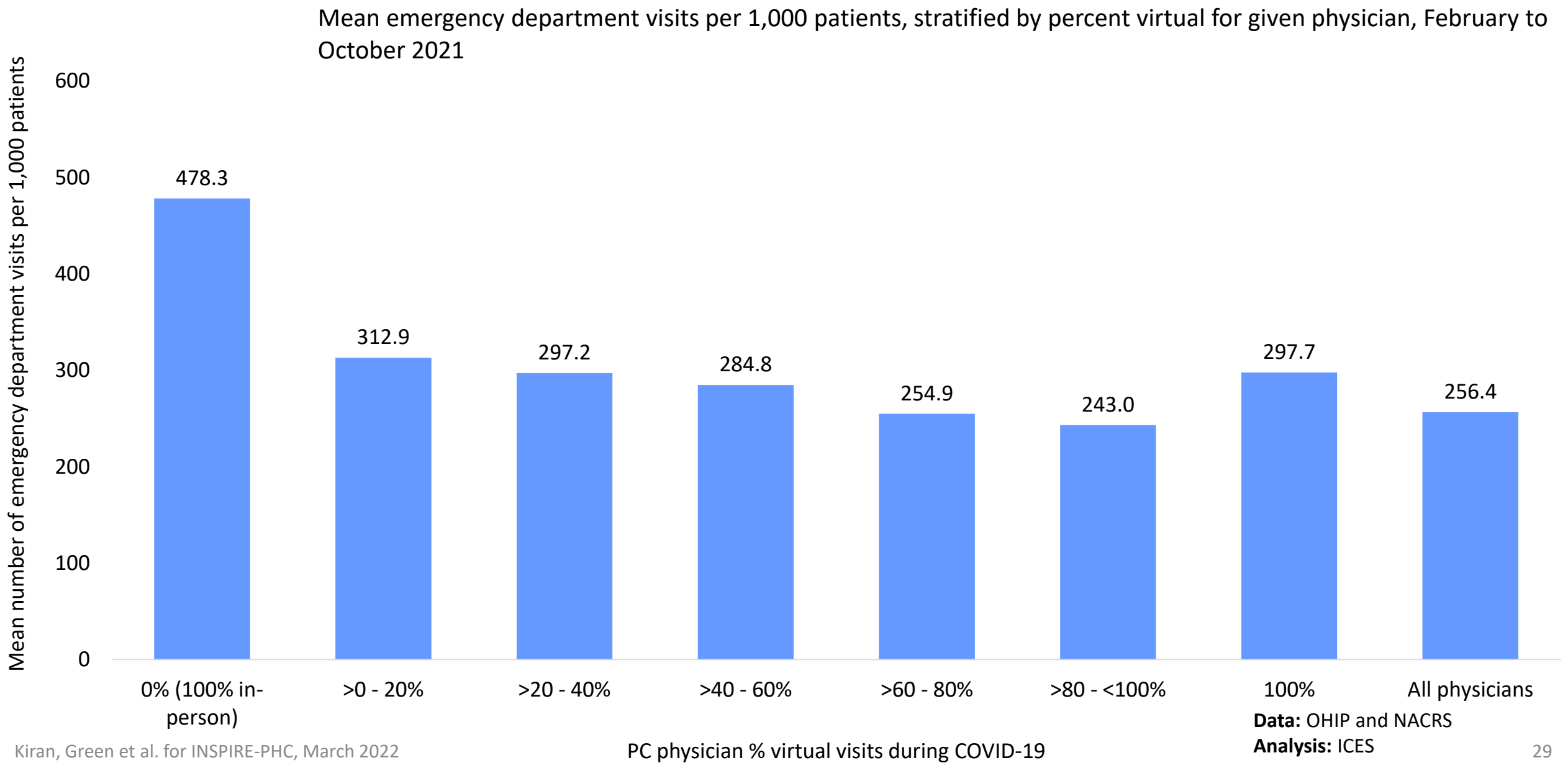
Among patients whose physicians provided 40% or more of the care virtually, the percentage of ambulatory care sensitive hospitalizations was no higher than average.

Percentage of patients with an ambulatory care sensitive hospitalization between February and October 2021, by percent virtual for given physician



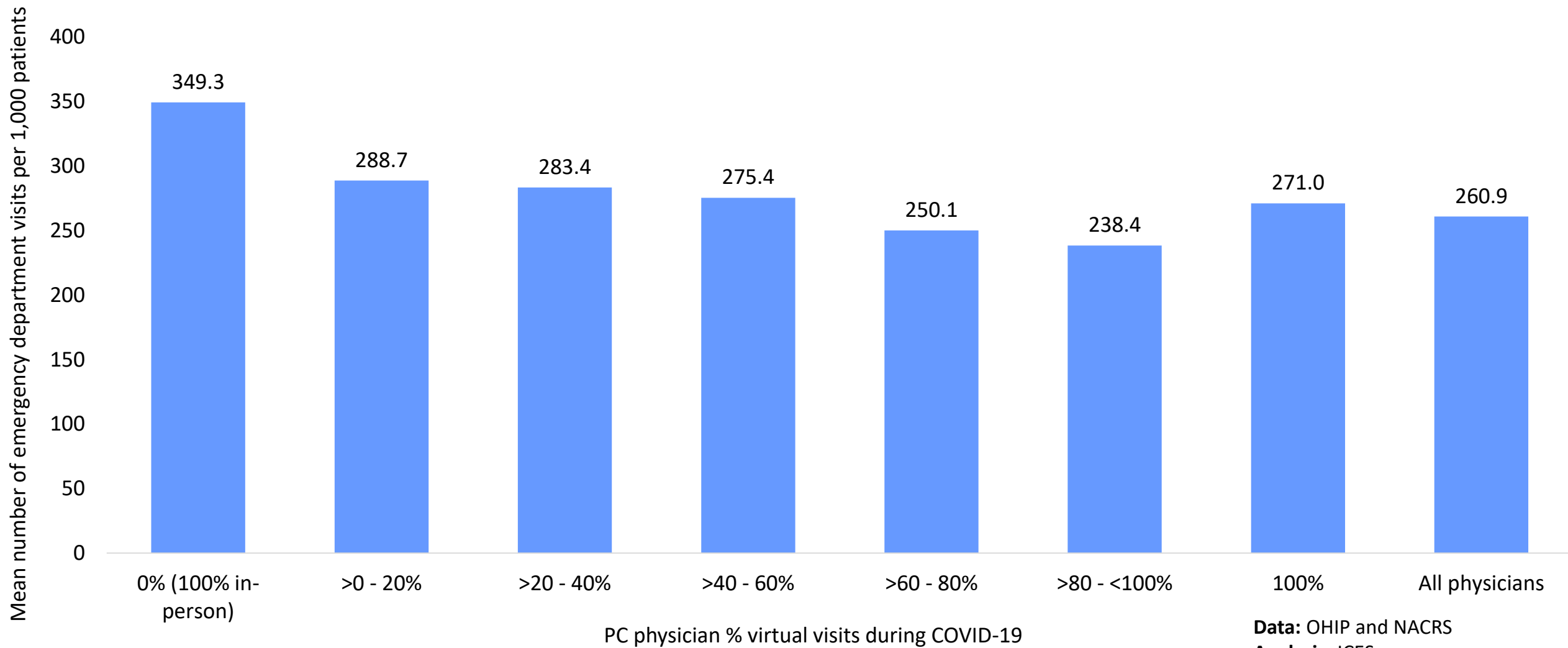
Emergency department visits 2019 vs 2021

Mean emergency department use was highest among physicians who saw 100% of patients in person

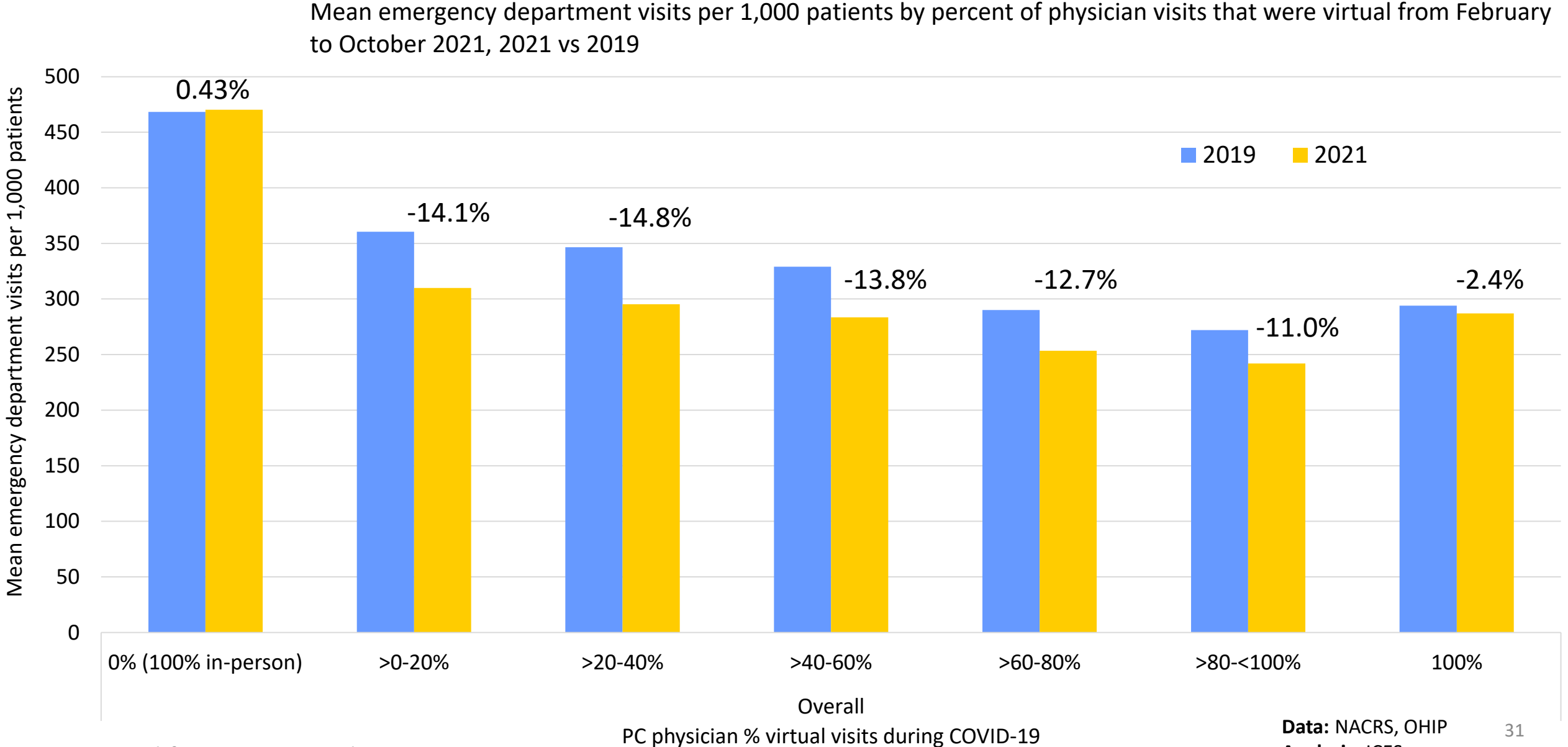


Among patients attached to comprehensive primary care physicians, mean emergency department use was highest among physicians who saw 100% of patients in person

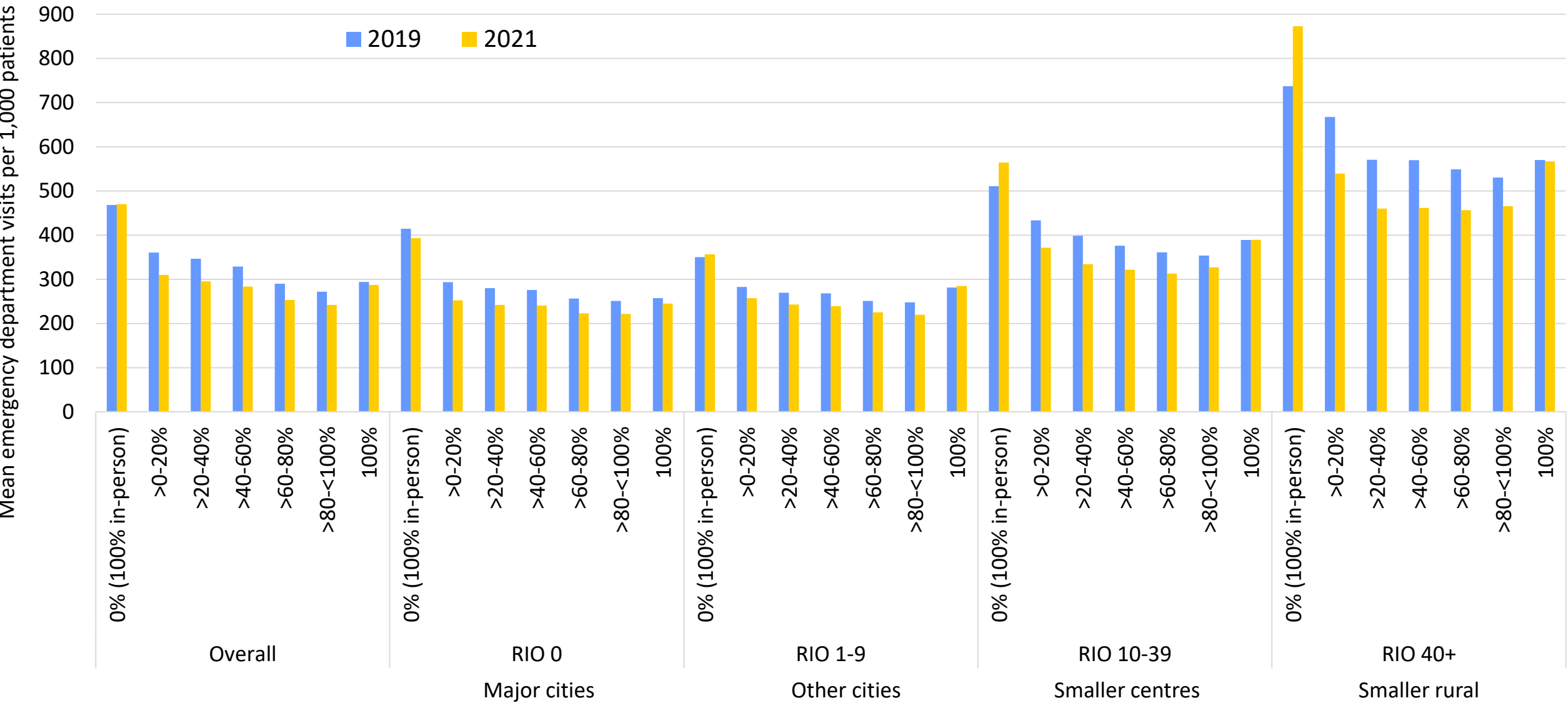
Mean emergency department visits per 1,000 patients by percent virtual for given physician, February to October 2021, among patients attached to **comprehensive** primary care physicians only



There was some difference in the mean number of emergency department visits by the proportion of virtual care a physician delivered in 2021 but these differences largely predated the pandemic.



Mean emergency department visits per 1,000 patients by percent of physician visits that were virtual by RIO from February to October 2021, 2021 vs 2019



Limitations

- Unadjusted comparisons
- Primary care visits were based on physician billing; virtual visits includes phone and video but not email
- We did not look at reason for visit and cannot judge appropriateness
- Current to most complete available data (October 2021)

Interpretation

Data from February to October 2021 do not support the narrative that family physicians seeing too few people in-person is driving up emergency department visit volumes.

Total emergency department volumes during the pandemic were lower than the 2019 volumes.

Very few family physicians provided 100% of care virtually, affecting <1% of Ontarians. Family physicians delivering 80-99% of care virtually did not have many more patients visiting the emergency department.

There was some difference in the mean number of emergency department visits by the proportion of virtual care a physician delivered in 2021 but these differences largely predated the pandemic.

Acknowledgements

INSPIRE team: Tara Kiran, Mike Green, Fangyun Wu, Rachel Strauss, Alex Kopp, Eliot Frymire, Lidija Latifovic, Maryam Danesh, Rick Glazier

Ontario Health team: Karen Waite, Erik Hellsten, Gail Dobell

This study was supported by ICES, which is funded by an annual grant from the Ontario Ministry of Health (MOH) and the Ministry of Long-Term Care (MLTC). This study also received funding from CIHR, Ontario Health, and INSPIRE-PHC.

Parts of this material are based on data and information compiled and provided by MOH and CIHI. The analyses, conclusions, opinions and statements expressed herein are solely those of the authors and do not reflect those of the funding or data sources; no endorsement is intended or should be inferred.