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Original research

Early impact of COVID-19 vaccination on older populations in four countries of the Americas, 2021

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ABSTRACT

Objective. To estimate the early impact of coronavirus disease 2019 (COVID-19) vaccination on cases in older populations in four countries (Chile, Colombia, Guatemala, and the United States of America), and on deaths in Chile and Guatemala.

Methods. Data were obtained from national databases of confirmed COVID-19 cases and deaths and vaccinations between 1 July 2020 and 31 August 2021. In each country, pre- and post-vaccination incidence ratios were calculated for COVID-19 cases and deaths in prioritized groups (50–59, 60–69, and ≥70 years) compared with those in the reference group (<50 years). Vaccination effect was calculated as the percentage change in incidence ratios between pre- and post-vaccination periods.

Results. The ratio of COVID-19 cases in those aged ≥50 years to those aged <50 years decreased significantly after vaccine implementation by 9.8% (95% CI: 9.5 to 10.1%) in Chile, 22.5% (95% CI: 22.0 to 23.1%) in Colombia, 20.8% (95% CI: 20.6 to 21.1%) in Guatemala, and 7.8% (95% CI: 7.6 to 7.9%) in the USA. Reductions in the ratio were highest in adults aged ≥70 years. The effect of vaccination on deaths, with time lags incorporated, was highest in the age group ≥70 years in both Chile and Guatemala: 14.4% (95% CI: 11.4 to 17.4%) and 37.3% (95% CI: 30.9 to 43.7%), respectively.

Conclusions. COVID-19 vaccination significantly reduced morbidity in the early post-vaccination period in targeted groups. In the context of a global pandemic with limited vaccine availability, prioritization strategies are important to reduce the burden of disease in high-risk age groups.

Keywords Vaccination; COVID-19 vaccines; adults; morbidity; Americas.

The coronavirus disease 2019 (COVID-19) pandemic has had unprecedented effects on human health. By January 22 2023, 664 million COVID-19 cases and 6.7 million deaths had been reported worldwide (1). As part of the recommended control measures, vaccination against COVID-19 began in December 2020 (2) following phased implementation plans that prioritized high-risk populations. The main objective was to prevent severe disease and death caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. Data from clinical trials and surveillance have demonstrated high efficacy and effectiveness of COVID-19 vaccines in preventing deaths and hospitalizations (3), with some variations between vaccine products and circulating variants (4). Evaluating the effect of COVID-19 vaccination on morbidity and mortality reduction at the population level is needed to understand its benefits for public health.

Because of the limited availability of COVID-19 vaccines globally, most countries implemented a phased roll-out prioritizing high-risk populations (5). The speed of vaccination roll-out in the Americas region varied greatly according to countries' access to vaccines. The United States of America (USA) and Chile achieved 10% coverage with one dose in the general population as early as February 2021, while other countries such as Colombia and Guatemala reached this coverage by mid-2021

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(Supplementary material, Appendix A). In most settings in the Americas, the introduction of the COVID-19 vaccine coincided with the emergence of the Delta variant of SARS-CoV-2 in May 2021. Compared with previously circulating variants, the Delta variant was characterized by a greater reproduction number (6) and an increased risk of hospitalization (7). Its relative severity by age group was similar to previously circulating strains (8).

Because of epidemiological and virological changes during vaccination roll-out, measuring the effect of COVID-19 vaccines cannot be achieved using a traditional pre–post approach in a given population. As an alternative approach, studies in the USA (9) and Israel (10) estimated the effect of COVID-19 vaccination on prioritized groups by evaluating relative incidence changes and temporal changes in weekly case numbers. These studies concluded that the initial roll-out of COVID-19 vaccinations was associated with significant reductions in COVID-19 cases and hospital admissions in older adults. However, estimates from the Americas region, where almost one third of global COVID-19 cases and half of global deaths were reported (11), are scarce. This study aimed to estimate the initial effect of COVID-19 vaccination roll-out on COVID-19 cases and deaths in older populations in four countries in the region of the Americas.

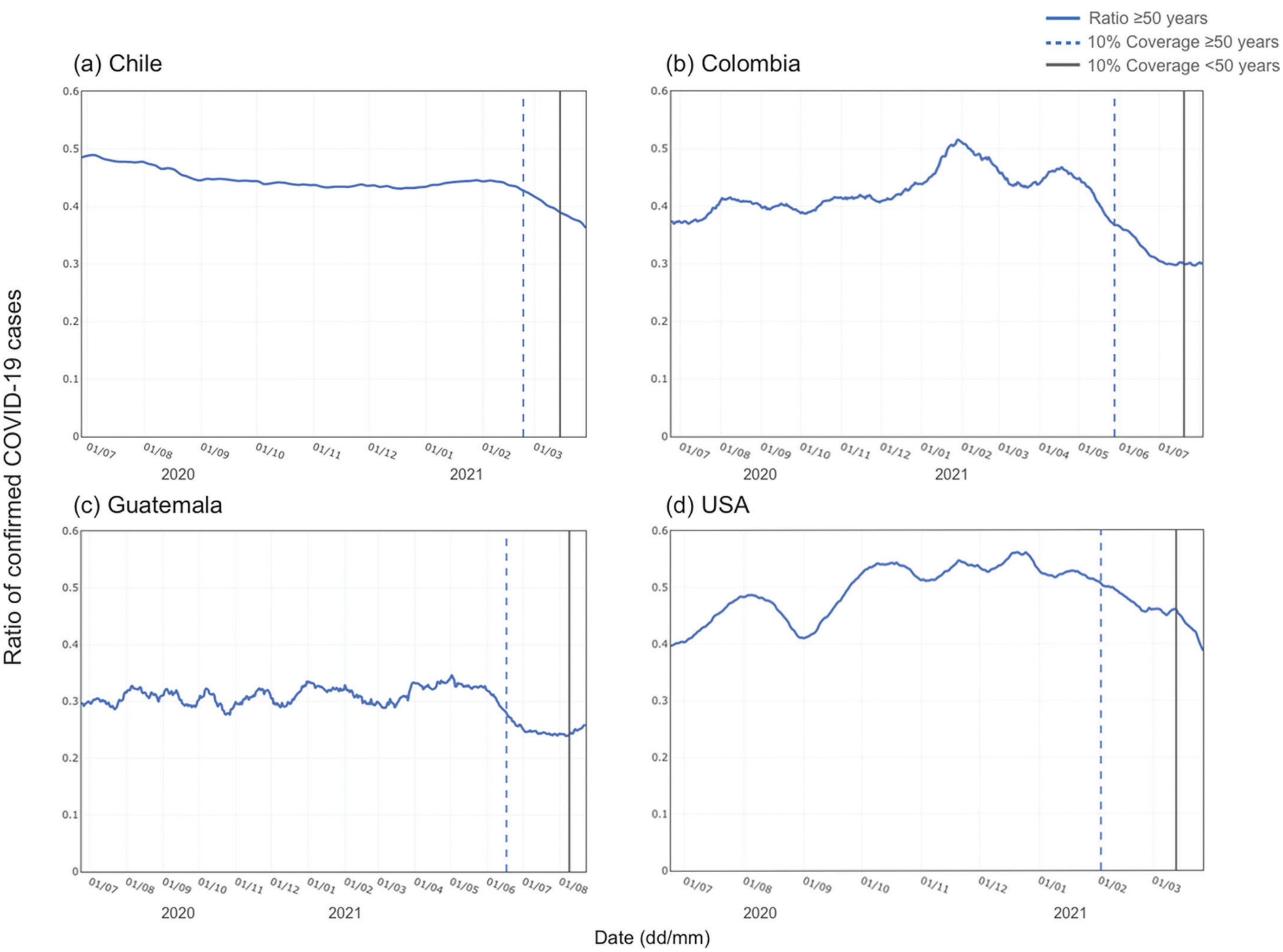
METHODS

An ecological study was conducted using national databases of confirmed COVID-19 cases and vaccination between 1 July 2020 and 31 August 2021. We estimated the ratios of COVID-19 cases in persons ≥50 years to COVID-19 cases in those <50 years before and after the introduction of COVID-19 vaccines in four countries in the Americas: Chile, Colombia, Guatemala, and the USA.

Data sources

The four countries included had publicly available age-specific data on daily confirmed COVID-19 cases, deaths and

FIGURE 1. Ratio of confirmed COVID-19 cases in age groups ≥50 versus <50 years before and after vaccination implementation, by country, 2020–2021



COVID-19, coronavirus disease 2019; USA, United States of America.
Notes: Pre-vaccination period: 1 July 2020 up to 10% vaccination coverage achieved in the age group ≥ 50 years (dotted line). Post-vaccination period: period between 10% vaccination coverage in the age group ≥50 years (dotted line) and 10% vaccination coverage in the reference group (<50 years) (solid line).
Source: prepared by authors using study results.

vaccination dates (12–16). Age-stratified data between 1 July 2020 and 31 August 2021 were obtained from each country's daily COVID-19 surveillance data published officially by their health ministries. No substantial changes were reported in local surveillance systems during the study period – that is, case definitions and testing policies did not change (Supplementary material, Appendix A). This analysis period was not affected by the widespread availability of self-tests for COVID-19 diagnosis that could be done at home, with no requirement for reporting to the ministry of health. Previously published population estimates by age group for each country were used (17).

Data management

A standardized vertical database format was established to conduct the same analysis for each country. Rows recorded daily data on confirmed COVID-19 cases and deaths by age group (<50, 50–59, 60–69, and ≥70 years) and by country. The same format was used to record vaccination data by age group to calculate first dose vaccination coverage. Data transformations included summarizing and grouping the data into specific age groups used in this analysis and making format changes to create vertical datasets.

Definitions

COVID-19 cases were cases confirmed by either antigen or polymerase chain reaction testing, according to each country's laboratory protocol. Vaccination coverage was analyzed based on at least one dose of any COVID-19 vaccine (either as part of a one- or two-dose schedule) for the following age groups: <50, 50–59, 60–69, and ≥70 years. To capture a period with stable access to COVID-19 testing, the pre-vaccination period starting point was defined as 1 July 2020. To account for the 14-day period needed to build an immune response and start to see a population effect of the vaccination program, the end of the pre-vaccination period in each country was defined as the date when each eligible group reached 10% coverage with one dose of the vaccine. The early post-vaccination period in each country was defined as the dates between reaching 10% coverage with one dose of the vaccine in each prioritized age group and reaching 10% vaccination coverage in the reference group (<50 years).

TABLE 1. Pre- and post-vaccination COVID-19 cases and ratios by age group and country, 2021

Period	Age group, years	Number of confirmed cases of COVID-19			
		Chile	Colombia	Guatemala	USA
Pre-vaccination	<50	450 846	2 389 975	198 161	12 992 974
	≥50	202 348	1 017 682	61 765	6 700 737
	Ratio	0.45	0.43	0.31	0.52
Post-vaccination	<50	88 407	942 043	97 489	1 601 635
	≥50	35 833	310 702	24 104	762 438
	Ratio	0.41	0.33	0.25	0.48
Pre/post ratio % change (95% CI)		9.8 (9.5 to 10.1)	22.5 (22.0 to 23.1)	20.8 (20.6 to 21.1)	7.8 (7.6 to 7.9)
Pre-vaccination	<50	450 846	2 389 975	198 161	12 992 974
	50 to 59	95 160	484 364	29 788	2 824 012
	Ratio	0.21	0.20	0.15	0.22
Post-vaccination	<50	88 407	942 043	97 489	1 601 635
	50 to 59	17 923	165 458	12 288	337 210
	Ratio	0.20	0.18	0.13	0.21
Pre/post ratio % change (95% CI)		3.8 (3.7 to 3.8)	13.3 (12.7 to 13.9)	16.0 (15.7 to 16.3)	2.8 (2.7 to 2.8)
Pre-vaccination	<50	415 221	1 940 928	178 484	12 228 126
	60 to 69	54 493	245 248	17 253	1 890 559
	Ratio	0.13	0.13	0.1	0.16
Post-vaccination	<50	124 032	1 391 090	117 166	2 366 483
	60 to 69	14 949	142 188	9 246	357 053
	Ratio	0.12	0.10	0.08	0.15
Pre/post ratio % change (95% CI)		7.6 (7.4 to 7.9)	19.1 (18.2 to 19.9)	18.6 (17.9 to 19.2)	2.6 (2.5 to 2.6)
Pre-vaccination	<50	382 756	1 568 607	167 860	12 146 850
	≥70	41 307	163 304	10 935	1 745 391
	Ratio	0.11	0.10	0.07	0.14
Post-vaccination	<50	156 497	1 763 411	127 790	2 447 759
	≥70	14 346	127 821	6 363	308 939
	Ratio	0.09	0.07	0.05	0.13
Pre/post ratio % change (95% CI)		14.8 (13.9 to 15.7)	30.8 (29.3 to 32.2)	23.2 (22.2 to 24.0)	12.5 (12.0 to 13.0)

COVID-19, coronavirus disease 2019; CI, confidence intervals; USA, United States of America.
Notes: Pre-vaccination period was between 1 July 2020 and the date at which 10% of each eligible age group had received one dose of the vaccine. Post-vaccination period was between the date at which 10% of each eligible age group had received one dose of the vaccine and the date at which 10% of the reference group had received one dose of the vaccine. The reference group was age <50 years. All % changes in incidence ratios were statistically significant.
Source: prepared by authors using study results.

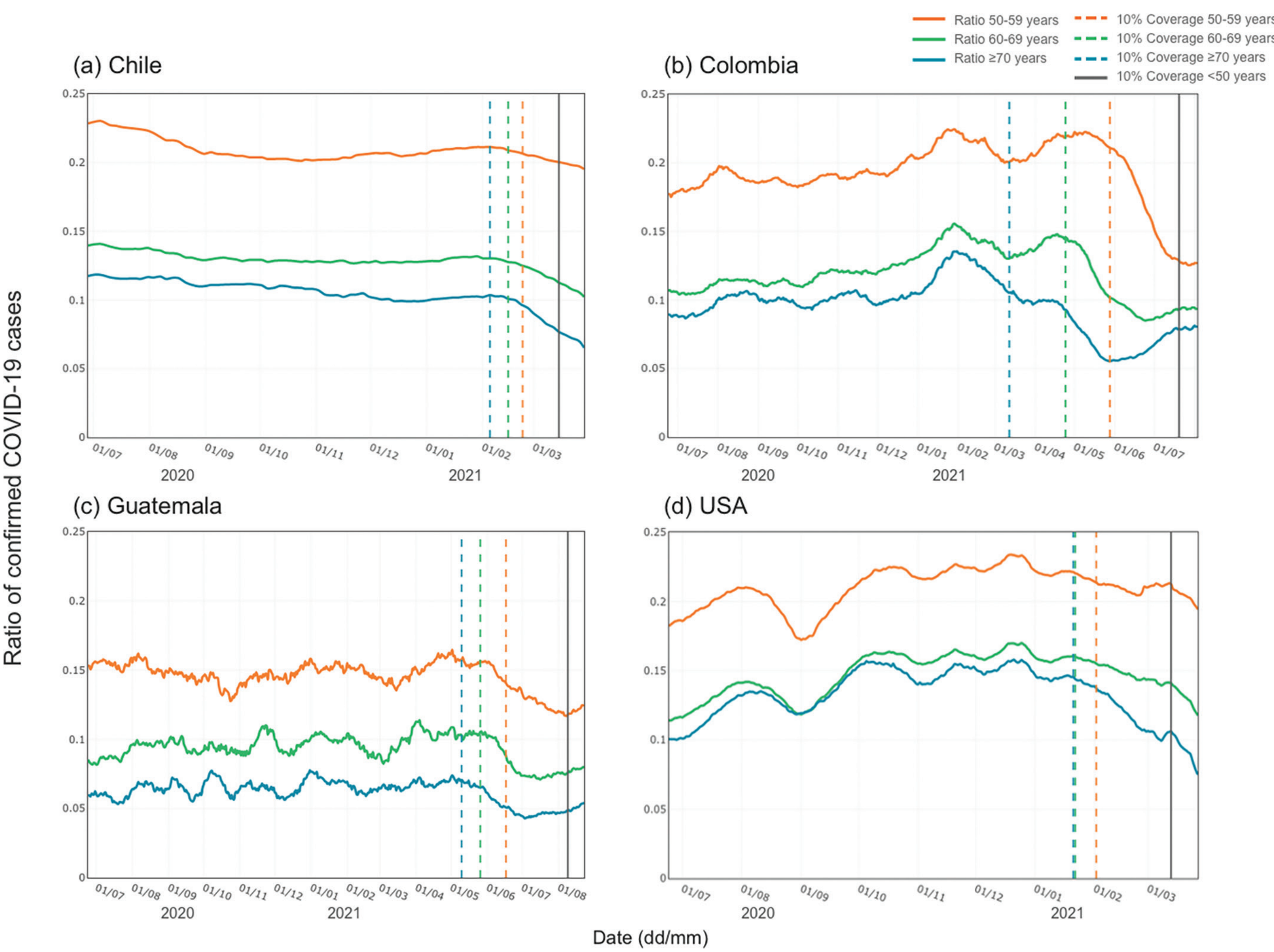
Statistical analysis

To measure the effect of vaccination on morbidity, using data from each country, we calculated the incidence ratio of confirmed COVID-19 cases in the groups prioritized for early vaccination (50–59, 60–69, and ≥70 years) to confirmed COVID-19 cases in the reference group (<50 years). These ratios were calculated for the pre- and post-vaccination periods. A difference-in-differences approach was used to calculate the effect estimate as the relative percentage change in the incidence ratios between pre- and post-vaccination periods (9). Absolute numbers of cases were used, assuming that the changes in the population denominator over the study period would be minimal. By comparing age-specific incidence ratios over time, this analysis aimed to minimize age-associated changes in the effect estimates. Confidence intervals (CIs) for the pre/post ratio percentage changes were calculated using fractional uncertainties for each ratio. To address potential pre-existing changes in the ratio, rolling 7-day averages were calculated, and pre- and post-vaccination trends were compared using the Chow test for F statistic, defining $p<0.05$ as statistically significant.

The same analysis was done to measure the effect of COVID-19 vaccination on mortality using data on confirmed COVID-19 deaths in Chile (14) and Guatemala (countries for which data were publicly available) (18).

Two additional analyses incorporating time lags were conducted. To account for the time needed to produce a protective immune response after COVID-19 vaccination (19), the end of the pre- and post-vaccination periods was defined by adding 14 days to the date when 10% one-dose vaccination coverage was reached in the reference and comparison groups. To further account for the median time for progression from COVID-19 infection to death (20), the end of pre- and post-vaccination periods was defined by adding 28 days to the date when 10% one-dose vaccination coverage was reached in the reference and comparison groups.

FIGURE 2. Ratio of confirmed COVID-19 cases before and after vaccination with one COVID-19 vaccine dose (any vaccine) by age group and country, 2020–2021



COVID-19, coronavirus disease 2019; USA, United States of America.
Notes: Pre-vaccination period: 1 July 2020 up to 10% vaccination coverage achieved in each age group (dotted lines). Post-vaccination period: period between 10% vaccination coverage in each age group (dotted lines) and 10% vaccination coverage in the reference group (<50 years) (solid line).
Source: prepared by authors using study results.

Additional sensitivity analyses using different reference age-group populations (18–49 years and 40–49 years) were also conducted.

All analyses were conducted using R statistical software, version 4.0.2 (R Foundation, Vienna Austria).

Ethics

This secondary analysis was conducted using publicly available routine surveillance data which did not have any personal identifiers; hence ethical approval was not considered necessary.

RESULTS

Vaccination effect on COVID-19 cases

Age group ≥50 years versus <50 years. The ratio of COVID-19 cases in those aged ≥50 years to those aged <50 years decreased significantly after vaccine implementation by 9.8% (95% CI: 9.5 to 10.1%) in Chile, 22.5% (95% CI: 22.0 to 23.1%) in Colombia, 20.8% (95% CI: 20.6 to 21.1%) in Guatemala, and 7.8% (95% CI: 7.6 to 7.9%) in the USA (Table 1). The trend in the ratio of COVID-19 cases between age groups ≥50 and <50 years significantly decreased after vaccine implementation in all countries (Chow test $p<0.05$) (Figure 1).

Prioritized age groups versus <50 years. The pre/post ratio percentage changes in COVID-19 cases by age group (50–59, 60–69, and ≥70 years versus <50 years) ranged from: 3.8% to 14.8% in Chile; 13.3% to 30.8% in Colombia; 16.0% to 23.1% in Guatemala; and 2.8% to 12.5% in the USA (Table 1). This change was highest in adults ≥70 years who were the group eligible for first vaccination, and lowest in the age group 50–59 years who were the last of these three age groups to be vaccinated. The trend in the ratio of COVID-19 cases for all three age groups ≥50 years compared with <50 years significantly decreased after vaccine implementation in Colombia, Guatemala, and the USA (Figure 2). A significantly greater decreasing trend in the ratio of COVID-19 cases was observed for age group ≥60 years versus <50 years after vaccine implementation in Chile, but this was not seen for the age group 50–59 years (Chow test $p<0.05$) (Figure 2).

Sensitivity analysis. Additional sensitivity analyses were conducted using age groups 18–49 and 40–49 years as the reference groups (instead of <50 years). The result showed slightly lower percentage changes in the pre- and post-vaccination ratios of COVID-19 cases in those aged ≥50 years compared with those aged 18–49 or 40–49 years in Colombia and Guatemala. When using these alternative reference groups, the effect of vaccination was close to zero in the USA and Chile, where the analysis could only be done in age groups 60–69 and ≥70 years. In the 50–59 year age group in Chile, the date when 10% coverage was reached was the same for the comparison and reference groups, hence the analysis was not feasible.

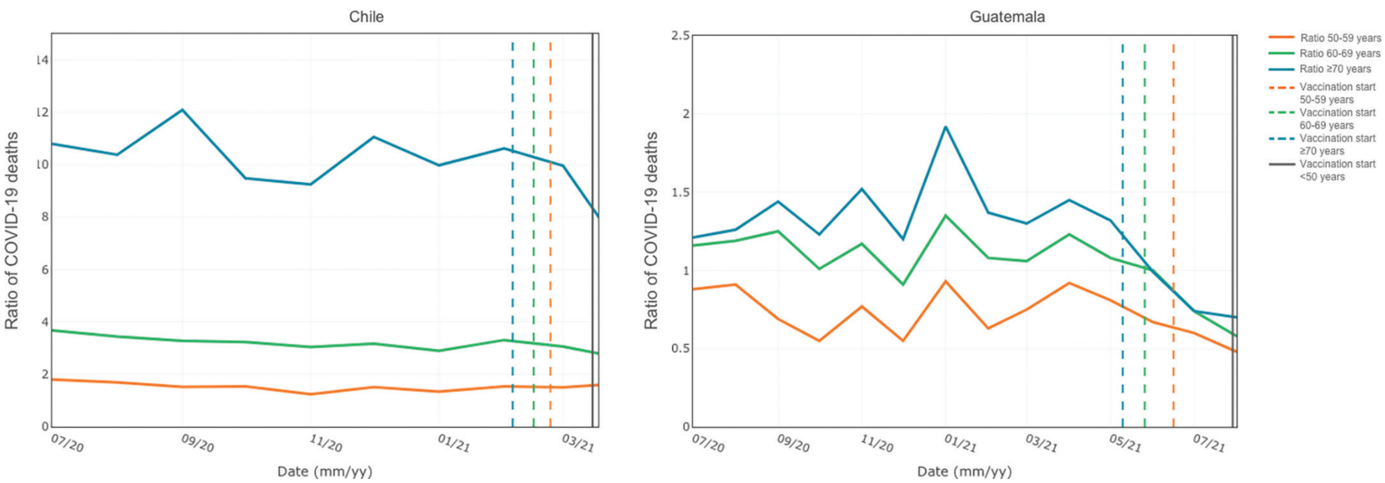
Incorporating a 14-day lag time in the pre-vaccination period resulted in higher percentage reductions in the pre/post

TABLE 2. Pre- and post-vaccination COVID-19 deaths and ratios by age group, Chile and Guatemala, 2021

Period	Age group, years	Number of confirmed deaths from COVID-19					
		Chile			Guatemala		
		No lag	14-day lag	28-day lag	No lag	14-day lag	28-day lag
Pre-vaccination	<50	1 133	1 182	1 263	1 725	1 856	2 002
	50–59	1 858	1 954	2 062	1 382	1 454	1 554
	Ratio	1.64	1.65	1.63	0.8	0.78	0.78
Post-vaccination	<50	83	108	135	718	864	976
	50–59	130	153	224	416	499	579
	Ratio	1.57	1.42	1.66	0.58	0.58	0.59
Pre/post ratio % change (95% CI)		4.3 (3.0 to 5.6)	13.9 (9.4 to 18.4)	−1.8 (−1.1 to −2.5)	27.5 (22.3 to 32.7)	25.6 (21.2 to 30.0)	24.4 (20.6 to 28.2)
Pre-vaccination	<50	1 096	1 158	1 216	1 602	1 682	1 795
	60–69	3 773	3 959	4 155	1 850	1 936	2 058
	Ratio	3.44	3.42	3.42	1.15	1.15	1.15
Post-vaccination	<50	121	132	181	862	1 065	1 210
	60–69	395	399	546	680	797	884
	Ratio	3.26	3.02	3.02	0.79	0.75	0.73
Pre/post ratio % change (95% CI)		5.2 (3.9 to 6.5)	11.7 (8.6 to 14.8)	11.7 (9.0 to 14.4)	31.3 (25.1 to 37.5)	34.8 (28.4 to 41.2)	36.5 (30.6 to 42.4)
Pre-vaccination	<50	1 051	1 106	1 166	1 496	1 577	1 653
	≥70	11 095	11 738	12 369	2 008	2 120	2 207
	Ratio	10.56	10.61	10.61	1.34	1.34	1.34
Post-vaccination	<50	165	183	232	956	1 158	1 338
	≥70	1 855	1 814	2 106	836	976	1 167
	Ratio	11.24	9.91	9.08	0.87	0.84	0.87
Pre/post ratio % change (95% CI)		−6.4 (−5.0 to 7.8)	6.6 (5.3 to 7.9)	14.4 (11.4 to 17.4)	35.1 (28.1 to 42.1)	37.3 (30.9 to 43.7)	35.1 (29.5 to 40.7)

COVID-19, coronavirus disease 2019; CI, confidence intervals; USA, United States of America.
Notes: Pre-vaccination period was between 1 July 2020 and the date at which vaccination began in a given eligible age group. Post-vaccination period was between the date at which vaccination began and the date at which 10% of the reference group had received one dose of the vaccine. The reference group was age <50 years. All % changes in incidence ratios were statistically significant.
Source: prepared by authors using study results.

FIGURE 3. Ratio of confirmed COVID-19 deaths after start of vaccination by age group in Chile and Guatemala, 2020–2021



COVID-19, coronavirus disease 2019.
Notes: Pre-vaccination period: 1 July 2020 up the date vaccination began. Post-vaccination period: period between start of vaccination (dotted lines) in each age group and date at which 10% of the reference group had received one dose of the vaccine (<50 years) (solid line).
Source: prepared by authors using study results.

vaccination ratios of COVID-19 cases between age groups in all countries (Supplementary material, Appendix B).

Vaccination effect on COVID-19 deaths

The percentage change in the ratio of confirmed deaths between pre- and post-vaccination periods in Chile, without time lags was –6.4% (95% CI: –5.0 to –7.8%) in adults aged ≥70 years and 4.3% (95% CI: 3.0 to 5.6%) in those aged 50–59 years (Table 2). In Guatemala, the percentage change was highest in the age group ≥70 years (35.1%; 95% CI: 28.1 to 42.1%) and lowest in the age group 50–59 years (27.5%; 95% CI: 22.3 to 32.7%). Incorporating 14- and 28-day time lags in the pre- and post-vaccination periods resulted in higher percentage changes in the ratio of COVID-19 deaths between the age groups compared in both Chile and Guatemala. The percentage change in the ratio of confirmed deaths between pre- and post-vaccination periods incorporating time lags in Chile and Guatemala was highest in the age group ≥70 years: 14.4% (95% CI: 11.4 to 17.4%) and 37.3% (95% CI: 30.9 to 43.7%), respectively.

The trend in the ratio of COVID-19 deaths for all three age groups ≥50 years compared with <50 years significantly decreased after vaccine implementation in Chile and Guatemala compared with the pre-vaccination period (Chow test $p<0.05$) (Figure 3).

Sensitivity analysis. Using the age groups 18–49 and 40–49 years as reference (instead of <50 years), percentage changes in the ratio of COVID-19 deaths between the age groups before and after vaccine implementation ranged from 22.1% to 35.1% in Guatemala. In Chile, where the analysis could only be done for age groups 60–69 and ≥70 years, the vaccine effect was close to zero (Supplementary material, Appendix B).

DISCUSSION

This study estimated the effect of COVID-19 vaccination in prioritized age groups in the early post-vaccination period in four countries of the Americas. These results show that the early phases of COVID-19 vaccination programs led to significant reductions in confirmed COVID-19 cases and deaths in the older adults prioritized to receive the vaccine (21).

COVID-19 morbidity

Between pre- and early post-COVID-19 vaccination periods, reductions in the ratio of confirmed COVID-19 cases in adults aged ≥50 years versus those <50 years ranged from 7.8% in the USA to 22.5% in Colombia. The effect of vaccination on confirmed cases was greatest in the oldest age group (≥70 years) in the four countries. This reduction in the ratio of cases in the age groups prioritized for vaccination versus the reference group (<50 years old) continued for about 2 weeks after 10% vaccination coverage was achieved in the reference group. After this, the ratios of prioritized age groups to the reference group increased because the gap in vaccination coverage between the groups declined.

The effect of COVID-19 vaccination in the age group ≥70 years was greater than in the age group 50–69 years in all countries, indicating a dose–response effect – that is, higher percentage reduction in the ratio of cases in groups with higher vaccination coverage and longer observation time. During the study period, and because of the prioritization strategies used, older age groups (≥70 years) had greater coverage with two doses of a COVID-19 vaccine compared with younger prioritized age groups (50–59 or 60–69 years), which increased their time to develop an adequate immune response against COVID-19. When accounting for the time to mount an adequate immune response to COVID-19 vaccination (by increasing the pre-vaccination period by 14 days), our sensitivity analysis showed a greater effect of COVID-19 vaccines on the number of confirmed cases. Given COVID-19 vaccine effectiveness is higher after receiving a second dose of the vaccine (22), a greater effect would be expected as vaccination coverage with two doses increased in the studied populations. Our results are in line with another study that showed a reduction in the COVID-19 case incidence ratio in older populations in the USA when differences on vaccination coverage between adults aged ≥65 years and those aged 50–64 years were greatest (9). Our analysis provides additional results on the effect of COVID-19 vaccination in selected Latin American countries, from which estimates were previously lacking, and highlights the importance of vaccinating high-risk groups to reduce the COVID-19 burden in older adults.

COVID-19 mortality

Using COVID-19 mortality data from Chile and Guatemala, we observed that the effect of COVID-19 vaccination was proportional to the time of observation and it was greater for mortality than morbidity in older age groups, similar to findings in other studies (23, 24). Adding lag time to the observation period to account for the time required to achieve an adequate immune response (14 days) and progression from infection to death (28 days), resulted in greater effects which are closer to reality – especially seen in Chile where the effect of COVID-19 vaccination was not observed without these lag times. This finding is in line with data from Brazil, where an important decline in mortality in adults aged ≥80 years was seen after the introduction of the COVID-19 vaccine (25). Studies in Canada, France, and Israel also showed that initial vaccination efforts directed at adults aged 65 years and older resulted in significant overall declines in COVID-19 cases and deaths, ranging from 21% to 80% in COVID-19 cases and 30% to 87% in COVID-19 deaths (10, 26, 27). Given the greater COVID-19 vaccine efficacy against hospitalization and death, further studies to evaluate the effect of COVID-19 vaccines on different clinical outcomes, such as mortality or hospitalization, in the general population would be useful to increase the evidence of the public health benefits of COVID-19 vaccination. Furthermore, running these specific analyses by vaccine type and schedule could provide valuable insights to support vaccination programs.

Study limitations

For the approach used in our study to be valid, non-vaccination prevention and diagnostic measures and relative risks of COVID-19 between age groups had to remain constant over pre- and post-vaccination periods. The data gathered for the countries included in this analysis indicated that no changes occurred in age-group specific testing policies or behaviors over the study period (28, 29). In addition, relative age-specific risks of symptomatic infection and severity with the Delta variant and previous variants of concern were similar (8). With regard to non-pharmaceutical prevention measures, changes in requirements for physical distancing, isolation and mask use were frequent in all countries. If applied to all age groups at the same time, these measures should have had limited impact on our estimates. However, in settings where age groups have different exposures to non-pharmaceutical measures over time, the estimates could be affected. This bias could apply to countries where a high proportion of older people live in long-term care facilities, such as in European countries or the USA. In Latin American countries, where social mixing between age groups is higher, smaller differences between age groups would be expected in exposure to non-pharmaceutical measures and hence to SARS-CoV-2 (30, 31). To ensure the populations were as similar as possible, sensitivity analyses were conducted using reference age groups of 18–49 and 40–49 years. The results of these analyses were similar to the main analysis in Guatemala and Colombia, validating the reference group selection in these countries. The effect of COVID-19 vaccination observed through this analysis is directly related to the speed at which vaccination in the reference groups reached 10% vaccination coverage with at least one dose of the vaccine. In the Chile and the USA, where vaccination roll-out was faster, comparison and reference groups reached this cut-off at a similar time, resulting in a very short (or no) observation time and, consequently, a measured effect close to zero. Finally, it is important to stress that this work is based on the secondary analysis of surveillance data, for which direct validation checks were not possible to make.

CONCLUSION

Ratio analysis is a practical approach to measure the effect of phased vaccine introductions in rapidly evolving virological settings. The findings of this analysis suggest that COVID-19 vaccination had a rapid and significant effect on COVID-19 morbidity in older age groups in four countries in the Americas in the early post-vaccination period. A dose–response effect was observed, with the greatest effect in the groups that were targeted first (≥70 years). In the context of a global pandemic, where vaccine availability is limited, these findings highlight the relevance of prioritization strategies to reduce the burden of disease in high-risk age groups. Further analyses should focus on evaluating the effect on hospitalization and mortality in other countries, which were the primary targeted outcomes for the current COVID-19 vaccines. Prioritization of high-risk groups for COVID-19 vaccination should be continued to reduce virus transmission and severe outcomes of infection.

Author contributions. MR, EB, LG, and CJ designed the study and undertook the research, and LFQ did the statistical analysis. All authors contributed to the analysis and discussion of the results, and to writing the final manuscript. All authors approved the final version.

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Impacto temprano de la vacunación contra la COVID-19 en adultos mayores en cuatro países de las Américas, 2021

RESUMEN

Objetivo. Estimar el impacto temprano sobre los casos de enfermedad por coronavirus 2019 (COVID-19) obtenido con la vacunación contra la COVID-19 en los grupos poblacionales de edad avanzada en cuatro países (Chile, Colombia, Estados Unidos de América y Guatemala), así como el efecto en la mortalidad en Chile y Guatemala.

Métodos. Los datos se obtuvieron a partir de las bases de datos nacionales sobre vacunaciones y sobre casos de COVID-19 y muertes debidas a esta enfermedad entre el 1 de julio del 2020 y el 31 de agosto del 2021. Para cada país, se calcularon las razones de incidencia de casos de COVID-19 y de muertes por COVID-19 anteriores y posteriores a la vacunación en los grupos priorizados (50-59, 60-69 y ≥70 años) en comparación con las del grupo de referencia (<50 años). Se calculó el efecto de la vacunación expresado en forma de variación porcentual de la razón de las incidencias entre el período anterior y el posterior a la vacunación.

Resultados. Tras la introducción de la vacuna, la razón de los casos de COVID-19 entre las personas ≥50 años y las <50 disminuyó significativamente en un 9,8% (IC del 95%: 9,5% a 10,1%) en Chile, en un 22,5% (IC del 95%: 22,0% a 23,1%) en Colombia, en un 7,8% (IC del 95%: 7,6% a 7,9%) en Estados Unidos de América y en un 20,8% (IC del 95%: 20,6% a 21,1%) en Guatemala. Las reducciones de la razón fueron máximas en las personas adultas ≥70 años. El efecto de la vacunación sobre las muertes, una vez incorporados los desfases cronológicos, fue máximo en el grupo de personas ≥70 años, tanto en Chile como en Guatemala: 14,4% (IC 95%: 11,4% a 17,4%) y 37,3% (IC 95%: 30,9% a 43,7%), respectivamente.

Conclusiones. La vacunación contra la COVID-19 redujo significativamente la morbilidad en el período inmediato posterior a la vacunación en los grupos destinatarios. En el contexto de una pandemia con disponibilidad limitada de vacunas a nivel mundial, las estrategias de asignación de prioridades son un factor importante para reducir la carga de morbilidad en los grupos etarios de alto riesgo.

Palabras clave Vacunación; vacunas contra la COVID-19; adulto; morbilidad; Américas.

Impacto inicial da vacinação contra a COVID-19 em populações idosas em quatro países das Américas, 2021

RESUMO

Objetivo. Estimar o impacto inicial da vacinação contra a doença pelo coronavírus 2019 (COVID-19) nos casos em populações idosas de quatro países (Chile, Colômbia, Guatemala e Estados Unidos da América) e nas mortes no Chile e na Guatemala.

Métodos. Os dados foram obtidos de bancos de dados nacionais de casos e mortes confirmados por COVID-19 e de vacinações entre 1º de julho de 2020 e 31 de agosto de 2021. Em cada país, foram calculadas taxas de incidência pré e pós-vacinação de casos e mortes por COVID-19 em grupos priorizados (50 a 59, 60 a 69 e ≥70 anos) em comparação com o grupo de referência (<50 anos). O efeito da vacinação foi calculado como a mudança percentual nas taxas de incidência entre os períodos pré e pós-vacinação.

Resultados. A incidência de casos de COVID-19 em pessoas com idade ≥50 anos em relação às com idade <50 anos diminuiu significativamente após a implementação da vacina, em 9,8% (IC 95%: 9,5 a 10,1%) no Chile, 22,5% (IC 95%: 22,0 a 23,1%) na Colômbia, 20,8% (IC 95%: 20,6 a 21,1%) na Guatemala e 7,8% (IC 95%: 7,6 a 7,9%) nos EUA. As reduções na incidência foram maiores em adultos com idade ≥70 anos. O efeito da vacinação sobre as mortes, com defasagens temporais incorporadas, foi maior na faixa etária ≥70 anos no Chile e na Guatemala, 14,4% (IC de 95%: 11,4 a 17,4%) e 37,3% (IC de 95%: 30,9 a 43,7%), respectivamente.

Conclusões. A vacinação contra a COVID-19 reduziu significativamente a morbidade no início do período pós-vacinação nos grupos-alvo. No contexto de uma pandemia mundial com disponibilidade limitada de vacinas, estratégias de priorização são importantes para reduzir a carga de doença em grupos etários de alto risco.

Palavras-chave Vacinação; vacinas contra COVID-19; adulto; morbidade; América.