

COVID-19 vaccination uptake strongly predicts averted deaths of older people across Europe

Camilla Mattiuzzi

Service of Clinical Governance, Provincial Agency for Social and Sanitary Services, Trento, Italy

Brandon M. Henry

Clinical Laboratory, Division of Nephrology and Hypertension, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA & Disease Intervention & Prevention and Population Health Programs, Texas Biomedical Research Institute, San Antonio, Texas, USA

Giuseppe Lippi (✉ giuseppe.lippi@univr.it)

4. Section of Clinical Biochemistry and School of Medicine, University of Verona, Italy

Short Report

Keywords: COVID-19, SARS-COV-2, Vaccination, Mortality

Posted Date: November 30th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-1123463/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Version of Record: A version of this preprint was published at Biomedical Journal on January 1st, 2022. See the published version at <https://doi.org/10.1016/j.bj.2022.01.014>.

COVID-19 vaccination uptake strongly predicts averted deaths of older people across Europe

Camilla Mattiuzzi¹, Brandon M. Henry^{2,3}, Giuseppe Lippi⁴

1. Service of Clinical Governance, Provincial Agency for Social and Sanitary Services, Trento, Italy.
2. Clinical Laboratory, Division of Nephrology and Hypertension, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA
3. Disease Intervention & Prevention and Population Health Programs, Texas Biomedical Research Institute, San Antonio, Texas, USA
4. Section of Clinical Biochemistry and School of Medicine, University of Verona, Italy.

Short title: COVID-19 vaccination and mortality

Word count: 389 words + 1 Figure

Type of article: Short Report

Key words: COVID-19; SARS-COV-2; Vaccination; Mortality

***Corresponding author:**

Prof. Giuseppe Lippi

Section of Clinical Biochemistry,

Department of Neurosciences, Biomedicine and Movement Sciences

P.le L.A Scuro, 10, 37134 Verona, Italy.

Phone ++39 045 8124512

Fax ++0458124514

E-mail: giuseppe.lippi@univr.it

Abstract

Background: Nationwide COVID-19 (coronavirus disease 2019) vaccination campaigns have been effective to avert as many as 51% deaths in people aged ≥ 60 years in the European region between December 2020 and November 2021, though broad heterogeneity has been observed in the percentage of averted deaths across the different European countries.

Methods: We downloaded data of vaccine uptake and efficacy into an Excel Worksheet, and we then performed univariate (Spearman's correlation) and multivariate (multiple linear regression analysis) correlations.

Results: A significant linear association was found between the percentage of averted deaths of older people and percentage of vaccine uptake in each corresponding European country (Spearman's correlation: $r=0.872$; $p<0.001$), though such relationship was even better fitted by using an exponential curve ($r=0.881$; $p<0.001$). In multiple linear regression analysis, the percentage of deaths averted by COVID-19 vaccination remained independently associated with vaccine uptake ($p<0.001$), but not with the type of vaccine administered ($p=0.264$).

Conclusions: The results of analysis support the foremost importance of reinforcing nationwide COVID-19 vaccination campaigns, especially in those countries where vaccination programmes have been less successful.

Introduction

The almost unstoppable spread of coronavirus disease 2019 (COVID-19) has now lead to infection of over 256 million people worldwide, accompanied by over 5.2 COVID-19 associated deaths [1]. Despite physical preventive measures such as face masking, social distancing and hand hygiene may be effective to limit virus spread, widespread COVID-19 vaccination is an unavoidable resource to further contain the dramatic medial, societal and economic consequences of COVID-19 [2]. In a recent article, Meslé et al. demonstrated that nationwide vaccination campaigns have been effective to avert as many as 51% deaths in people aged ≥ 60 years in the European region between December 2020 and November 2021 [3]. Nonetheless, since a broad heterogeneity could be noted in the percentage of averted deaths across the different European countries, we carried out an additional analysis of this data.

Materials and Methods

We downloaded the data reported in table 1 of the article of Meslé et al. [3] into an Excel Worksheet (Microsoft Excel; Microsoft, Redmond, WA, US), which were then used to perform univariate (Spearman's correlation) and multivariate (multiple linear regression analysis) correlations, using Analyse-it (Analyse-it Software Ltd, Leeds, UK). The study was based on data published in the article of Meslé et al. [3], so that no Ethics Committee approval was necessary. This analysis study was conducted in accordance with the Declaration of Helsinki.

Results

A significant linear association was found between the percentage of averted deaths of older people and percentage of vaccine uptake in each corresponding European country (Spearman's correlation: $r=0.872$ and 95%CI 0.754-0.935; $p<0.001$),

though such relationship was even better fitted by using an exponential curve ($[y] = 3.6347^{0.0296 \times [x]}$; $r=0.881$; $p<0.001$) (Figure 1). In multiple linear regression analysis, where averted deaths were entered as dependent variable whilst vaccine uptake and types of vaccine administered in each country were entered as independent variables, the percentage of deaths averted by COVID-19 vaccination remained independently associated with vaccine uptake ($p<0.001$), but not with the type of vaccine administered ($p=0.264$).

Conclusions

The results of our further analysis support the important data published by Meslé et al. [3], by confirming the existence of an almost exponential relationship between vaccine uptake and deaths of older people saved in the European region, thus further supporting the foremost importance of reinforcing nationwide COVID-19 vaccination campaigns, especially in those countries where vaccination programmes have been less successful.

Acknowledgements: None

Conflicts of interest: None declared

Authors' contributions: GL and BMH conceived and designed the study; GL and CM conceptualized and conducted the analysis; GL wrote the manuscript. All authors (GL, BMH and CM) were involved in the review and development of the manuscript.

References

1. John Hopkins University. Coronavirus Resource Center. Available at: <https://coronavirus.jhu.edu/>. Last updated, November 29, 2021.

2. Meijer M, Verschuuren M, Weggen E. COVID-19 vaccines a global public good? Moving past the rhetoric and making work of sharing intellectual property rights, know-how and technology. *Eur J Public Health* 2021;31:925-6
3. Meslé MM, Brown J, Mook P, Hagan J, Pastore R, Bundle N, et al. Estimated number of deaths directly averted in people 60 years and older as a result of COVID-19 vaccination in the WHO European Region, December 2020 to November 2021. *Euro Surveill.* 2021 Nov;26(47). doi: 10.2807/1560-7917.ES.2021.26.47.2101021.

Figure 1. Association between percentage of averted deaths and vaccine uptake per country in the European region between December 2020 and November 2021, according to data published by Meslé et al [3].

