

REPLY TO DOWD ET AL.:

Dangerous to overemphasize the importance of specific COVID-19 risk factors based on (unadjusted) macro-level analyses

Bruno Arpino^{a,1}, Valeria Bordone^b, and Marta Pasqualini^c

Dowd et al. (1) state that it is “dangerous to claim ‘no clear association’ between intergenerational relationships and COVID-19.” We agree. However, our paper’s title (2) already specifies “from macro-level analyses.” The main criticism in ref. 1 originates in a misunderstanding of our macro-level analyses as a denial of risks inherent to intergenerational relationships (IR). It is valuable to have the opportunity to clarify this point.

We aim to warn against simplistic interpretations of macro-level correlations and clearly state that physical contacts, whether intergenerational or not, favor virus transmission. In the last months, in academia and on (social) media, IR were claimed to be crucial in explaining the high spread and lethality of COVID-19 in countries like Italy (“intergenerational contacts hypothesis”), drawing on anecdotal evidence or very simple (simplistic, we would argue) country-level analyses. We showed that similarly simple analyses do not support such a macro-level hypothesis.

As our paper was not meant to be a direct reply to Dowd et al.’s early study (3), it did not test their interaction effect. We used analyses similar to ref. 4, the only study by then to have empirically examined the relationship between IR and COVID-19.

We agree that our analyses could be improved in many ways and admit in the paper that our approach “demonstrates neither the existence nor the absence of a causal link between intergenerational relationships and the severity of COVID-19” (at the macro level). Although case fatality rate (CFR) has several limitations, this outcome allowed for consistency with previous studies (including ref. 3) and our results were confirmed when analyzing number of cases (2). Using

excess deaths is promising, and ongoing analyses confirm our previous conclusions.

We agree that timing in severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) seeding is important. While our paper mentions that confounding factors should also be considered, more complex macro-level models will unlikely find a considerable role for IR. This is confirmed by a recent study accounting for timing of epidemic onset and some confounders (5). Also, IR should be analyzed together with other types of relationships (6).

We disagree with Dowd et al.’s (1) argument that levels of IR are homogeneously high throughout Italy. Italy’s huge regional heterogeneities in demographic behaviors (7) and IR (8, 9) are also confirmed in our data (2), showing, for example, that multigenerational coresidence varies between 31% and 52%, resembling the country-level mean gap between Germany and Italy.

Individual-level data will allow for a better testing of IR’s role. In this vein, the interesting Swedish study (10) suggests that living in care homes is by far the “riskiest” living arrangement and that contacts with working-age individuals at home or in the neighborhood increase the risk of death due to COVID-19.

Finally, we subscribe to Dowd et al.’s (1) statement that “there is no reason to expect aggregate-level correlations between IR and COVID-19 mortality.” Mimicking their title, we argue that it is dangerous to draw strong conclusions on specific risk factors for COVID-19 from (unadjusted) macro-level analyses, as also stressed by others (11). This, and not the absence of individual-level risk of transmission, was the point we made in ref. 2.

^aDepartment of Statistics, Computer Science, Applications, University of Florence, 50134 Florence, Italy; ^bDepartment of Sociology, University of Vienna, 1090 Vienna, Austria; and ^cDepartment of Political and Social Sciences, Universitat Pompeu Fabra, 08005 Barcelona, Spain

Author contributions: B.A., V.B., and M.P. wrote the paper.

The authors declare no competing interest.

Published under the [PNAS license](#).

¹To whom correspondence may be addressed. Email: bruno.arpino@unifi.it.

-
- 1 J. B. Dowd, P. Block, V. Rotondi, M. C. Mills, Dangerous to claim “no clear association” between intergenerational relationships and COVID-19. *Proc. Natl. Acad. Sci. U.S.A.*, 10.1073/pnas.2016831117 (2020).
 - 2 B. Arpino, V. Bordone, M. Pasqualini, No clear association emerges between intergenerational relationships and COVID-19 fatality rates from macro-level analyses. *Proc. Natl. Acad. Sci. U.S.A.* **117**, 19116–19121 (2020).
 - 3 J. B. Dowd et al., Demographic science aids in understanding the spread and fatality rates of COVID-19. *Proc. Natl. Acad. Sci. U.S.A.* **117**, 9696–9698 (2020).
 - 4 C. Bayer, M. Kuhn, “Intergenerational ties and case fatality rates: A cross-country analysis” (IZA Discussion Paper 13114, IZA Institute of Labor Economics, Bonn, Germany, 2020).
 - 5 A. Aparicio Fenoll, G. Shoshana, “Intergenerational residence patterns and COVID-19 fatalities in the EU and the US” (IZA Discussion Paper 13452, IZA Institute of Labor Economics, Bonn, Germany, 2020).
 - 6 M. Albertini, L. Sage, S. Scherer, Intergenerational contacts and COVID-19 spread: Omnipresent grannies or bowling together? *SocArXiv:10.31235/osf.io/exym8* (7 June 2020).
 - 7 R. Impicciatore, F. C. Billari, Secularization, union formation practices, and marital stability: Evidence from Italy. *Eur. J. Popul.* **28**, 119–138 (2012).
 - 8 E. Santarelli, F. Cottone, Leaving home, family support and intergenerational ties in Italy: Some regional differences. *Demogr. Res.* **21**, 1–22 (2009).
 - 9 M. Tosi, Leaving-home transition and later parent–child relationships: Proximity and contact in Italy. *Eur. Soc.* **19**, 69–90 (2017).
 - 10 M. Brandén et al., Residential context and COVID-19 mortality among the elderly in Stockholm: A population-based, observational study. <https://cadmus.eui.eu/handle/1814/67690>. Accessed 20 August 2020.
 - 11 M. Belloc, P. Buonanno, F. Drago, R. Galbiati, P. Pinotti, Cross-country correlation analysis for research on COVID-19. *Vox-CEPR Policy Portal*. <https://voxeu.org/article/cross-country-correlation-analysis-research-covid-19>. Accessed 26 April 2020.