

EDITORIAL

The COVID-19 insidious trick: Subjective perception of numbers

It is almost one year now from the moment coronavirus disease 2019 (COVID-19) started to change our routine as clinicians. As—later or sooner—in many other parts of the world, in the first months of this year we saw an increasing number of patients with acute hypoxemia caused by SARS-CoV-2, that grew exponentially and rapidly surpassed our hospital bed capacity in both infectious diseases and intensive care units.¹⁻³ The activity of many other wards was rapidly turned to the care of COVID-19 patients to avoid collapse of the emergency department, and many usual services provided to individuals with chronic conditions were temporarily cancelled or sensibly reduced. After a relatively quiet summer, cases started to increase again, and COVID-19 renewed its demand for a large number of hospital beds. Second waves were also experienced in other parts of the world.⁴⁻⁶ However, we should not fall into the temptation of thinking this is a strict rule everywhere. Indeed, as elegantly discussed by John PA Ioannidis,⁷ the spread and behaviour of COVID-19 are highly heterogeneous, with some regions observing a firm decline in the number of infections, whereas others are experiencing a sustained diffusion over the year or a resurgence after suppression of a first wave. This comes hand in hand with substantial differences in the impact on several layers (health, economy, society) of both the disease and the measures taken to tackle this unprecedented pandemic and its disruptive effects.⁷ Here, we want to briefly add some personal opinions on how this heterogeneity may be subjectively perceived by the public in a way that could increase misunderstandings and hamper our ability to counteract both the direct and indirect unfavourable consequences of the pandemic, at least while waiting for highly efficacious drugs and vaccines.

Very importantly, all of this heterogeneity does not mean that COVID-19 should not be considered everywhere as a global, unprecedented emergency (it is without any doubt). The point we want to make here is another, that is, this heterogeneity may have subtle implications on how numbers are perceived by individuals dependent on the time and place, that may fuel confusion and friction among the public. For example, professor Ioannidis thoughtfully started its commentary by reminding us that official COVID-19 deaths have surpassed 1 million worldwide, but with high heterogeneity ranging from <1 death to >50 deaths per 100 000 population

across different countries.⁷ Besides the discussion of possible uncertainty in estimates already and comprehensively provided by the author, we would like to add that, in our opinion, the subjective impression of the risk of either acquiring or dying of COVID-19 may be different across people in different countries. Furthermore, independent of the country, it could also be different across different professional figures (eg, healthcare personnel caring for severe COVID-19 patients in hospital and nonhealthcare workers mostly facing asymptomatic patients in the community). We think all of this can contribute to create useless but profound frictions in the public, between some calling for extreme contention measures and other feeling extreme measures to be excessive and leading to perilous increases in poverty and unemployment.

In other words, we must recognize that our judgement could theoretically be at risk (even in a subtle, unconscious way) to be influenced by the numerator and the denominator we see in our everyday life (Box 1). For example, think about the much-debated infection fatality rate of COVID-19 (ie number of deaths per number of individuals with the infection), with an estimated median of 0.23% across 51 locations (for detailed stratification of fatality estimates across different countries see⁸). While it is true that this low infection fatality should reassure people that most infected individuals do not die, it should not be confused as a confirmation of a subjective impression (eg, possibly arising in people outside hospitals that only see asymptomatic/mildly symptomatic cases) that there is not an emergency and that individuals may soften the adoption of the necessary prevention and control measures to interrupt the spread of the disease. Indeed, if only a small percentage of patients are at risk of dying and require hospital care but many are infected in a very short window of time, the absolute number of those requiring admission may rapidly surpass the hospitals and intensive care units bed capacity, reducing quality of care and increasing fatality in patients with severe disease presentation (change of denominator), reaching values higher than 25%-30% in intensive care units.⁹⁻¹¹ This impression of a constantly severe disease may be the one of healthcare personnel caring for hospitalized COVID-19 patients in highly affected areas, who everyday see several patients worsening and requiring invasive mechanical

Box 1 The perilous role of subjective perception of COVID-19 numbers in fuelling frictions and misunderstandings

Key points

- Influence of the denominators and numerators seen in the everyday/professional life for estimating/judging the necessary level of prevention and infection-control measures (ie risk of considering subgroups as representative of the entire population of infected patients)
- Erroneous consideration of case fatality and infection fatality as interchangeable terms
- Difficulty in estimating indirect unfavourable effects of either COVID-19 or infection-control measures on societal and economic levels (eg increased poverty, unemployment, mental health disruption, excess deaths from reduced care for other diseases)
- Different perception based on everyday/professional life of both direct and indirect disruptive effects of the pandemic
- Current lack of solid data regarding the true risk of re-infection
- Current unavailability of vaccines and highly efficacious treatments (at least until completion and release of complete results of vaccines RCT after promising preliminary data)

Abbreviations: COVID-19, coronavirus disease 2019; RCT, randomized controlled trials.

ventilation. This ‘only severe’ vision, although certainly true when restricted to patients in overcrowded hospitals (denominator = severe patients), in our opinion should not be transmitted to the public as the only truth for all infected individuals (denominator = all infected patients). This may indeed have the unintended effect of extremizing subjective fears in the public, with at least two potential, unfavourable consequences: (a) increased access to already saturated emergency departments by scared patients with mild forms that could be cured at home; (b) delayed access to hospitals for severe disease other than COVID-19 because of fear of acquiring the latter.

Overall, these two different perspectives (that we may generally define ‘outside’ and ‘inside’ the hospital) should converge in a unique balanced vision aimed at reducing transmission and hospitals overcrowding, at the same time without putting too much pressure on societal and economic levels for nonhealthcare workers. However, we must not take this convergence for granted. Indeed, as discussed above, seeing different denominator may increase misunderstandings, in turn increasing frictions that do not help in preventing or counteracting the indirect disruptive effects of the pandemic

(eg suboptimal care of other diseases, mental health disruption, increased poverty).

If this occurs where hospitals are already filled by COVID-19 patients, the consequent obliged reduction in services provided to patients with other diseases may further increase both conflicts and fears. What an insidious COVID-19 trick, pitting us against each other while we should instead combine different perspectives into one constructive solution, since we are all in it.


KEYWORDS

case fatality, coronavirus, COVID-19, infection fatality, mortality, SARS-CoV-2

CONFLICT OF INTEREST

Outside the submitted work, M. Bassetti has received funding for scientific advisory boards, travel and speaker honoraria from Angelini, Astellas, AstraZeneca, Basilea, Bayer, BioMérieux, Cidara, Correvio, Cubist, Menarini, Molteni, MSD, Nabriva, Paratek, Pfizer, Roche, Shionogi, Tetrphase, Thermo Fisher, and The Medicine Company. Outside the submitted work, DR Giacobbe reports honoraria from Stepstone Pharma GmbH and unconditional grants from MSD Italia and Correvio Italia.

Matteo Bassetti^{1,2} 

Daniele Roberto Giacobbe¹ 

¹*Clinica Malattie Infettive, Ospedale Policlinico San Martino – IRCCS, Genoa, Italy*

²*Department of Health Sciences, University of Genoa, Genoa, Italy*


Correspondence

Matteo Bassetti, Clinica Malattie Infettive, Ospedale Policlinico San Martino – IRCCS, L.go R. Benzi 10, Genoa 16132, Italy.

Email: matteo.bassetti@unige.it

ORCID

Matteo Bassetti  <https://orcid.org/0000-0002-0145-9740>

Daniele Roberto Giacobbe  <https://orcid.org/0000-0003-2385-1759>

REFERENCES

1. Vena A, Giacobbe DR, Di Biagio A, et al. Clinical characteristics, management and in-hospital mortality of patients with coronavirus disease 2019 in Genoa, Italy. *Clin Microbiol Infect.* 2020;26(11):1537-1544.
2. Remuzzi A, Remuzzi G. COVID-19 and Italy: what next? *Lancet.* 2020;395(10231):1225-1228.
3. Bassetti M, Giacobbe DR, Aliberti S, et al. Balancing evidence and frontline experience in the early phases of the COVID-19 pandemic: current position of the Italian Society of Anti-infective

- Therapy (SITA) and the Italian Society of Pulmonology (SIP). *Clin Microbiol Infect.* 2020;26(7):880-894.
4. Long SW, Olsen RJ, Christensen PA, et al. Molecular architecture of early dissemination and massive second wave of the SARS-CoV-2 virus in a major metropolitan area. *MBio.* 2020;11(6):e20199125.
 5. Mahase E. Covid-19: UK government must "get its act together" as modelling suggests 85 000 deaths in second wave, experts say. *BMJ.* 2020;371:m4242.
 6. Saito S, Asai Y, Matsunaga N, et al. First and second COVID-19 waves in Japan: a comparison of disease severity and characteristics: Comparison of the two COVID-19 waves in Japan. *J Infect.* 2020. [Epub ahead of print]
 7. Ioannidis JPA. Global perspective of COVID-19 epidemiology for a full-cycle pandemic. *Eur J Clin Invest.* 2020;50(12):e13423.
 8. Ioannidis JPA. The infection fatality rate of COVID-19 inferred from seroprevalence data. *Bulletin of the WHO.* 2020 (in press). Available at https://www.who.int/bulletin/online_first/BLT.20.265892.pdf
 9. Yang X, Yu Y, Xu J, et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Respir Med.* 2020;8(5):475-481.
 10. Grasselli G, Greco M, Zanella A, et al. Risk factors associated with mortality among patients with COVID-19 in intensive care units in Lombardy, Italy. *JAMA Intern Med.* 2020;180(10):1345-1355.
 11. Botta M, Tsonas AM, Pillay J, et al. Ventilation management and clinical outcomes in invasively ventilated patients with COVID-19 (PRoVENT-COVID): a national, multicentre, observational cohort study. *Lancet Respir Med.* 2020. [Epub ahead of print]

How to cite this article: Bassetti M, Giacobbe DR. The COVID-19 insidious trick: Subjective perception of numbers. *Eur J Clin Invest.* 2021;51:e13465. <https://doi.org/10.1111/eci.13465>