

closures due to poor performers downsizing or exiting the market may be a positive outcome, if higher-quality or safety-net facilities leave the market, older adults will have reduced access to high-quality services.

As our reports from NH administrators convey, the crisis of this pandemic compels us to fundamentally reimagine long-term care delivery for vulnerable older adults now to prepare for the unforeseen future. Although provision of care in the community will likely expand in the coming years, some older adults will nonetheless require NH services. In the context of an evolving and uncertain financial outlook, policymakers must adequately fund the provision of high-quality NH care.

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#### AUTHOR CONTRIBUTIONS

The corresponding author has listed everyone who contributed significantly to the work. Drs. Gadbois and Shield were responsible for the study concept and design. All authors contributed to data collection and analysis and interpretation of data. Dr. Gadbois was responsible for manuscript preparation.

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The sponsor did not play a role in the design, methods, subject recruitment, data collection, analysis, or preparation of the article.

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#### REFERENCES

1. Chen AT, Ryskina KL, Jung HY. Long-term care, residential facilities, and COVID-19: an overview of federal and state policy responses. *J Am Med Dir Assoc.* 2020;21(9):1186-1190. <https://doi.org/10.1016/j.jamda.2020.07.001>
2. Ouslander JG, Grabowski DC. COVID-19 in nursing homes: calming the perfect storm. *J Am Geriatr Soc.* 2020;68(10):2153-2162. <https://doi.org/10.1111/jgs.16784>
3. United States Department of Health and Human Services. Office of the Assistant Secretary for Planning and Evaluation. COVID-19 Intensifies Nursing Home Workforce Challenges; October 2020. <https://aspe.hhs.gov/basic-report/covid-19-intensifies-nursing-home-workforce-challenges>.
4. Centers for Medicare and Medicaid Services. CMS Announces Resumption of Routine Inspections of All Provider and Suppliers, Issues Updated Enforcement Guidance to States, and Posts Toolkit to Assist Nursing Homes; August 17, 2020. <https://www.cms.gov/newsroom/press-releases/cms-announces-resumption-routine-inspections-all-provider-and-suppliers-issues-updated-enforcement>.
5. United States Department of Health and Human Services. CARES Act Provider Relief Fund: Data; May 3, 2021. <https://www.hhs.gov/coronavirus/cares-act-provider-relief-fund/data/index.html>.
6. QSR International Pty Ltd. NVivo; Released March 2020. <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home>.

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## Secrets to longevity: The Methuselahs that survived COVID-19

*To the Editor:* The coronavirus disease-2019 (COVID-19) was declared a global pandemic on the March 11, 2020, resulting to date in more than 197 million cases and 4.2

million deaths around the world. Since the early phases of the pandemic, old age was identified as a major risk factor for morbidity and mortality, along with comorbidities.<sup>1</sup>



**FIGURE 1** Ms Lucille Randon is the oldest person to survive a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection at the age of 117 years. She is currently the second oldest verified person in the world.

Source: Public domain via Gerontology wiki. Accessed July 21, 2020. [https://gerontology.wikia.org/wiki/Lucile\\_Randon](https://gerontology.wikia.org/wiki/Lucile_Randon)

To date, at least 252 people aged 105 years or more have tested positive for the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that can cause COVID-19.<sup>2</sup> One hundred of these Methuselahs have successfully recovered from a SARS-CoV-2 infection. Among them are a dozen of supercentenarians, that is, people of at least 110 years of age, including the current second oldest living person (verified) in the world, Ms Lucille Randon from France, who is 117 years and 171 days of age (born on February 11, 1904). Ms Randon recovered from a SARS-CoV-2 infection in January 2021, when at the age of 117 years (Figure 1).<sup>3</sup>

Another supercentenarian, Ms Iris Estay from Chile, remarkably recovered from a SARS-CoV-2 infection twice, testing positive for the virus first in September 2020 and recovering in October, but then testing again positive in February 2021 and recovering in March.<sup>4</sup> Ms Estay was vaccinated in April 2021, becoming one of the oldest people to receive a SARS-CoV-2 vaccine.<sup>5</sup>

Epidemiological analyses have described age and certain comorbidities as the major risk factors for

COVID-19 morbidity and mortality. In March 2021, the Centers for Disease Control and Prevention (CDC) reported that 80% of the people who were hospitalized in the United States with COVID-19 were either overweight or obese.<sup>6</sup> The CDC also reported that 95% of more than half a million adults hospitalized with COVID-19 in more than 800 U.S. hospitals had at least one comorbidity, with hypertension, diabetes, and obesity being the most common.<sup>7</sup> The same report identified obesity as the strongest risk factor for mortality in this cohort, followed by anxiety and fear disorders, and diabetes with complication.<sup>7</sup>

Current global epidemiological efforts are focused on identifying risk factors for morbidity and mortality, as this information is of utmost importance in order to protect the populations that are most at risk. As we emerge from the pandemic, it will be of value to also extract information on the determinants of health, wellness, and longevity, such as why some older persons can survive the SARS-CoV-2 infection, even when they have surpassed the average global life expectancy by more than 40 years, whereas others do not.<sup>2</sup>

Photographs of the older persons surviving SARS-CoV-2 depict people within a normal weight range that do not, phenotypically at least, manifest any signs of metabolic syndrome.<sup>2</sup> Metabolic syndrome has been implicated in the attenuation of the immune response, with both obesity and diabetes independently affecting the structure, migration, and function of the cells, tissues, and other components of the immune system.<sup>8</sup> In addition to these conditions, physical activity reportedly protects against adverse outcomes in people with SARS-CoV-2, with prior cardiorespiratory fitness and strength conferring protection even many years later in people with SARS-CoV-2 infection, independent of other risk factors such as overweight.<sup>9,10</sup>

Unfortunately, the list of surviving older people with SARS-CoV-2 does not contain demographic or medical information to facilitate an insight with regard to the factors that promote a healthy immune system and longevity in the aging population.<sup>2</sup> It is therefore not known if the survivors were engaging in physical activity either during the recent years prior to the infections or during earlier years of their life. It is also not known if they had comorbidities that were managed. The only available information, other than the age of the survivors, is any inferences that can be made via the hospital discharge pictures and short, unverified biographical notes. This perspective

attempted to draw some conclusions based on preliminary data and inferences that have known limitations. Future epidemiological efforts should focus on elucidating the determinants of health and wellness in very old populations to facilitate an insight on how to live a long and healthy life.

### CONFLICT OF INTEREST


The author declares no conflict of interest.

### AUTHOR CONTRIBUTIONS

George Siopis conceived the idea, analyzed the data, and wrote the manuscript.

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None.

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### REFERENCES

- Centers for Disease and Control Prevention. COVID-19. Older adults. Accessed July 21, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/older-adults.html>
- Gerontology Wiki. List of oldest people with Covid-19. Accessed July 21, 2020. [https://gerontology.wikia.org/wiki/List\\_of\\_oldest\\_people\\_with\\_COVID-19](https://gerontology.wikia.org/wiki/List_of_oldest_people_with_COVID-19)
- Reuters. Europe's oldest person, 117-year-old French nun, survives COVID-19. Accessed July 21, 2020. <https://www.reuters.com/business/healthcare-pharmaceuticals/europes-oldest-person-117-year-old-french-nun-survives-covid-19-2021-02-09/>
- Gerontology Wiki. Iris Estay. Accessed July 21, 2020. [https://gerontology.wikia.org/wiki/Iris\\_Estay](https://gerontology.wikia.org/wiki/Iris_Estay)
- Gerontology Wiki. List of oldest people vaccinated against COVID-19. Accessed July 21, 2020. [https://gerontology.wikia.org/wiki/List\\_of\\_oldest\\_people\\_vaccinated\\_against\\_COVID-19](https://gerontology.wikia.org/wiki/List_of_oldest_people_vaccinated_against_COVID-19)
- Centers for Disease and Control Prevention. Morbidity and Mortality Weekly Report. Body mass index and risk for COVID-19-related hospitalization, intensive care unit admission, invasive mechanical ventilation, and death — United States, March–December 2020. Accessed July 21, 2020. [https://www.cdc.gov/mmwr/volumes/70/wr/mm7010e4.htm?s\\_cid=mm7010e4\\_x](https://www.cdc.gov/mmwr/volumes/70/wr/mm7010e4.htm?s_cid=mm7010e4_x)
- Kompaniyets L, Pennington AF, Goodman AB, et al. Underlying medical conditions and severe illness among 540,667 adults hospitalized with COVID-19, March 2020–March 2021. *Prev Chronic Dis.* 2021;18:E66. <https://doi.org/10.5888/pcd18.210123>.
- Siopis G. The case for promoting physical activity amidst the COVID-19 pandemic. *J Sci Med Sport.* 2021;24:327-328. <https://doi.org/10.1016/j.jsams.2020.11.019>.
- Sallis R, Young DR, Tartof SY, et al. Physical inactivity is associated with a higher risk for severe COVID-19 outcomes: a study in 48 440 adult patients. *Br J Sports Med.* 2021. <https://doi.org/10.1136/bjsports-2021-104080>
- Af Geijerstam A, Mehlig K, Börjesson M, et al. Fitness, strength and severity of COVID-19: a prospective register study of 1 559 187 Swedish conscripts. *BMJ Open.* 2021;11:e051316. <https://doi.org/10.1136/bmjopen-2021-051316>.