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	Date	Travel history	Total number of confirmed COVID-19 cases until Feb 6, 2020
USA	Jan 20, 2020	Returned from Wuhan, China	12
Canada	Jan 27, 2020	Returned from Wuhan, China	5
France	Jan 24, 2020	Returned from China	6
Taiwan	Jan 21, 2020	Returned from China	13
Total	36

COVID-19=coronavirus disease 2019.

Table: Date and travel history of the first confirmed COVID-19 case in the USA, Canada, France, and Taiwan

I read with interest the Correspondence by Ashleigh Tuite and colleagues,¹ and I respectfully disagree with the methods used by the authors and their conclusion.

Tuite and colleagues stated that they estimated the potential burden of coronavirus disease 2019 (COVID-19) in Egypt using the approach of Fraser and colleagues.² This approach was applicable to a scenario where abundant data were obtained from an epicentre of the H1N1 epidemic in Mexico in 2009, an approach that was disease and context specific. Although both viruses cause respiratory diseases and spread by contact and nose droplets, influenza has a shorter median incubation period than does severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Also, by contrast with influenza transmission, initial data for COVID-19 indicate that children are less affected than adults and that clinical attack rates in the 0–19 years age group are low. Fraser and colleagues used detailed H1N1 incidence data; by May 4, 2009, 11 356 suspected and 822 laboratory-confirmed cases had been reported in Mexico.^{2–4} By contrast, Tuite and colleagues based their conclusion on three reported cases in Egypt by March 6.¹ The scarcity of data available to the authors, as stated in their Correspondence, does not allow for the use of an appropriate modelling technique to estimate the burden of an epidemic.

Alternatively, Tuite and colleagues should have considered potential reasons for the low number of COVID-19 cases in Egypt, such as the considerable effort the Egyptian government has made to effectively control the outbreak. On March 25, a team of experts from WHO concluded a COVID-19 technical mission in Egypt. Yvan Hutin, director for communicable diseases in WHO's regional office and mission team lead, stated that "after several days of intensive meetings and field visits both inside and outside Cairo, we see that Egypt is making substantial efforts to control COVID-19

economic, and tourism fields, it would be inaccurate to confidently consider these incomplete statistical data for the present model of February, 2020. Second, Tuite and colleagues' model assumes that the population mixing in Egypt is equally likely between Egyptian residents and tourists and that tourists and Egyptian residents are at equal risk of infection, which is not correct for the following reasons: Egyptian population demographics are different from those of the USA, Canada, France, and Taiwan, particularly regarding life expectancy and population age groups, a well known risk factor for symptomatic COVID-19 infections; and Egypt is an agricultural country, with tourism destinations in Egypt, as reported on the official website of the ministry of tourism, being related to either Ancient Egypt or the coastal areas.³ Most tourism destinations are in special locations far away from residential places and have low population densities. Therefore, we cannot assume that population mixing in Egypt is equally likely between Egyptian residents and tourists because several high-density residential cities do not have tourists.

Third, Tuite and colleagues' model focused on 1 month, from Feb 6 to March 6, 2020. By Feb 6, the four countries (USA, Canada, France, and Taiwan) had officially reported a total of 36 confirmed COVID-19 cases (table). Therefore, we cannot rule out the opposite possibility that some of

these COVID-19 cases were infected before arriving in Egypt. What makes this scenario possible is that Egyptian authorities applied COVID-19 airport screening for travellers from China alone but not from other countries, owing to insufficient resources (as reported by the WHO office in Egypt). Another observation is that most of the early confirmed Egyptian cases were reported in Luxor and Aswan, two major tourism destinations in Egypt.

On the basis of these points, I argue that Tuite and colleagues' model is not accurate and might not be suitable to estimate the burden of COVID-19 in Egypt. Besides, we cannot rule out the possibility that COVID-19 cases in Egypt were imported from other countries.

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- 1 Tuite AR, Ng V, Rees E, et al. Estimation of the COVID-19 burden in Egypt through exported case detection. *Lancet Infect Dis* 2020; published online March 26. [https://doi.org/10.1016/S1473-3099\(20\)30233-4](https://doi.org/10.1016/S1473-3099(20)30233-4).
- 2 Fraser C, Donnelly CA, Cauchemez S, et al. Pandemic potential of a strain of influenza A (H1N1): early findings. *Science* 2009; **324**: 1557–61.
- 3 Egyptian Tourism Authority. This is Egypt. 2020. <http://www.egypt.travel> (accessed March 27, 2020).

outbreak. Significant work is being done, especially in the areas of early detection, laboratory testing, isolation, contact tracing and referral of patients.” Hutin referred to the existing pattern of transmission as local rather than community and agreed with local authorities on additional measures to further slowdown COVID-19 spread.⁵ The report listed the various steps that have been made by the Egyptian Government—namely, allocating additional dedicated human and financial resources needed to contain the outbreak, expanding the number of peripheral laboratories that are able to test for SARS-CoV-2, and with support from WHO and other partners, increasing testing capacity (Egypt now has the capacity to do up to 200 000 tests).⁵ The report also commended Egypt’s strong disease surveillance system and contact-tracing efforts as the main reasons behind the successful management of sporadic and clusters of cases before they spread.⁵

Another potential explanation for the low number of COVID-19 cases in Egypt is the mandatory—and free of charge—vaccination against tuberculosis with the BCG vaccine. The immune response-boosting effect of this vaccine has been postulated to potentially protect against SARS-CoV-2 infection, given that it has been shown to be effective against similar viruses. In March, a multicentre, phase 3, randomised clinical trial in Australia endorsed by WHO was fast tracked to investigate whether the BCG vaccine can protect against SARS-CoV-2.⁶ This trial aims to enrol 4000 health-care workers from hospitals in Australia in the next few weeks and should allow assessment of whether BCG vaccine can lessen the severity of COVID-19 symptoms.⁶

Finally, evolving data continue to support the slow spread of COVID-19 in Egypt. As of April 21, 2020, WHO estimates are of 3333 diagnosed cases in Egypt.⁷ These estimates continue to be carefully monitored, together with efforts taken to continue to slow down the spread of the disease.

I declare no competing interests.

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- 1 Tuite AR, Ng V, Rees E, et al. Estimation of the COVID-19 burden in Egypt through exported case detection. *Lancet Infect Dis* 2020; published online March 26. [https://doi.org/10.1016/S1473-3099\(20\)30233-4](https://doi.org/10.1016/S1473-3099(20)30233-4).
- 2 Fraser C, Donnelly CA, Cauchemez S, et al. Pandemic potential of a strain of influenza A (H1N1): early findings. *Science* 2009; **324**: 1557–61.
- 3 Direccion General Adjunta de Epidemiologia. Brote de influenza humana A H1N1 Mexico; Boletin Diario No 10. Mexico City: Secretaría de Salud de Mexico, 2009.
- 4 Direccion General Adjunta de Epidemiologia. Brote de influenza humana A H1N1 Mexico; Boletin Diario No 11. Mexico City: Secretaría de Salud de Mexico, 2009.
- 5 WHO. WHO delegation concludes COVID-19 technical mission to Egypt. 2020. <http://www.emro.who.int/pdf/media/news/who-delegation-concludes-covid-19-technical-mission-to-egypt.pdf?ua=1> (accessed April 17, 2020).
- 6 Agence France-Presse. Australia’s trialling a TB vaccine against COVID-19, and health workers get it first. *Science Alert*. 2020. <https://www.sciencealert.com/australia-is-trialling-a-tb-vaccine-for-coronavirus-and-health-workers-get-it-first> (accessed April 17, 2020).
- 7 WHO. Coronavirus disease 2019 (COVID-19) situation report—92. 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200421-sitrep-92-covid-19.pdf?sfvrsn=38e6b06d_4 (accessed April 22, 2020).

We read with interest the Correspondence by Ashleigh Tuite and colleagues.¹ We thank them for their interest in estimating the coronavirus disease 2019 (COVID-19) burden in Egypt. However, their model-based calculations used the number of patients known on March 6, and the numbers of patients and deaths are continuously changing. Attempting to reach a more up-to-date estimate

of the expected number of patients in Egypt, we used other assumptions according to real-life data.

The rapid spread of COVID-19, which started in China, led to its characterisation as a pandemic by WHO on March 11.² On Feb 14, Egypt announced its first COVID-19 case.³ Thereafter, Egypt scaled up preventive measures, with a partial lockdown starting on March 25. RT-PCR was done in nasopharyngeal swabs from symptomatic patients and contacts of confirmed cases traced in the preceding 2 weeks. In patients with a high rate of suspicion, the test was repeated after 48 h. Screening at airports included body temperature and clinical assessment and the use of a rapid diagnostic test for anti-severe acute respiratory syndrome coronavirus 2 IgM and IgG. Deaths from influenza-like illness were also reviewed.

As of March 31, Egypt announced 710 COVID-19 cases and 46 related deaths (fatality rate 6.48%, 95% CI 4.78–8.55).⁴ We acknowledge that, in the absence of open screening, this could be an underestimation of the total number of patients and an overestimation of the fatality rate. To estimate the expected disease burden in Egypt, we used fatality rates in the USA and Germany, because they applied open screening, and in regional countries with conditions similar to those of Egypt (Algeria, Bahrain, Iran, Israel, Jordan, Saudi Arabia, Lebanon, Morocco, Palestine, Qatar, Tunisia, Turkey, and United Arab Emirates). On



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	Number of patients with confirmed COVID-19*	Number of deaths related to COVID-19*	Fatality rate, % (95% CI)	Expected number of patients with COVID-19 in Egypt (95% CI)
Egypt	710	46	6.48% (4.78–8.55)	..
Germany	71 690	774	1.08% (1.01–1.16)	4261 (3377–5241)
USA	185 159	3773	2.04% (1.97–2.10)	2257 (1720–2886)
USA and Germany	256 849	4547	1.77% (1.72–1.82)	2598 (1974–3331)
Region†	68 936	3281	4.76% (4.60–4.92)	966 (738–1233)
Global	854 013	42 006	4.92% (4.87–4.96)	935 (697–1222)

COVID-19=coronavirus disease 2019. *As of March 31, 2020. †Includes Algeria, Bahrain, Iran, Israel, Jordan, Saudi Arabia, Lebanon, Morocco, Palestine, Qatar, Tunisia, Turkey, and the United Arab Emirates.

Table: Estimated number of patients with COVID-19 in Egypt