Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

COVID-19 in Africa: between hope and reality

When WHO declared the COVID-19 pandemic to be a Public Health Emergency of International Concern on Jan 30, 2020, countries around the world began to prepare. Preparation, however, is becoming increasingly difficult in many African countries, especially in central African countries, such as Republic of the Congo and others, where the effects of the Ebola virus disease epidemic on the economy and health structures are still being felt. The first case of COVID-19 in Africa was reported on Feb 14, and within a few weeks the virus had spread to 54 African countries. Only a few African Union member states have been successful in implementing detection, prevention, and control measures. Republic of the Congo reported its first case on March 14, and by May 9 a total of 274 confirmed cases and ten deaths had been reported. Very few countries in Africa have sufficient and appropriate diagnostic capacities, and obvious challenges exist to handle an outbreak of this extent.[1]

Densely populated communities in urban areas are particularly vulnerable to COVID-19 outbreaks, and the most vulnerable region in Republic of the Congo is undoubtedly Brazzaville. Our institution, the Congolese Foundation for Medical Research,[2] supports the National Public Health Laboratory with COVID-19 diagnoses and thus with extended monitoring measures. We feel that operational research at the local level in Brazzaville through testing people living in densely populated communities and health workers is a moral responsibility. As of May 9, three asymptomatic health-care workers had tested positive for severe acute respiratory syndrome coronavirus 2. With the number of cases observed in our laboratory growing (up to 24 cases per day), fear and anxiety among our Congolese scientists also grows.

A question that Republic of the Congo and other member states in the region must ask themselves is why are we seeing only a gradual increase in the detection of cases? Are we missing infections? A probable answer is that people with symptoms do not present to health-care facilities because of their concerns about fragile health systems, social stigma, and quarantine in suboptimal facilities. Other questions still to be resolved are related to the dynamics of viral transmission across geographical regions, between humans, across different ecosystems, and within different genetic backgrounds, and to whether any protective herd immunity exists.

Given the fragile health systems in most sub-Saharan African countries, new and re-emerging infectious disease outbreaks can paralyse health systems and existing structures. Yet the COVID-19 pandemic poses a challenge not only for sub-Saharan African countries[3] but also for those with well functioning health systems.[4] The responsibility now for African scientists is to join forces and fight at local and regional levels[5] to ensure the slow down and eventual halt of the spread of COVID-19. This can be well achieved by supporting existing regional and local health structures in sub-Saharan Africa.

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Negative SARS-CoV-2 PCR in patients with chilblain-like lesions

We read with interest the Correspondence by Claudio Guarneri and colleagues suggesting that chilblain-like lesions could reveal asymptomatic severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection.[1] Several reports of cutaneous manifestations suspected to be linked to SARS-CoV-2 infection, mostly chilblain-like lesions, have been published.[2–5] All are case reports or retrospective case series without systematic and in-depth evaluation of cases, and in most PCR or serology testing for SARS-CoV-2 infection were not done.

We did a prospective cohort study in patients with cutaneous manifestations who were referred to Centre Hospitalier Universitaire de Nice, France, between April 9 and 17, 2020, with suspected SARS-CoV-2 infection. 40 consecutive patients (21 [53%] female) with chilblain-like lesions were included. Consistent with previous reports,[2–5] most patients were young, with a median age of 22 years (range 12–67; IQR 15–28). 26 (65%) patients were tested for SARS-CoV-2 RNA with RT-PCR using primers and probes recommended by WHO, and all patients were tested for SARS-CoV-2-specific IgA, IgM, and IgG antibodies with ELISAs (IgM and IgG with EDI Novel Coronavirus COVID-19 ELISA

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Kits [Epitope Diagnostics, San Diego, CA, USA]; and IgA and IgG with Euroimmune ELISAs [Euroimmun, Lübeck, Germany]).

25 (63%) patients were asymptomatic on physical examination, and the remaining patients had only mild symptoms compatible with COVID-19. 24 (60%) patients reported contact with a person suspected of having COVID-19. However, no patient was PCR positive at the time of consultation, a finding that is inconsistent with the PCR positivity of all three cases reported by Guarneri and colleagues.[1] Our results are not surprising considering no patient reported having fever or signs of upper or lower respiratory tract infection in the past 3 days. However, COVID-19 serology was positive in 12 (30%) patients: seven had only IgA antibodies, three had only IgG antibodies, one had IgM and IgG antibodies, and one had IgA and IgG antibodies. This proportion is substantially higher than expected for our area (estimated at 3·4%[6]). Although these results require further investigation, they suggest that in young patients SARS-CoV-2 is completely suppressed before a humoral immune response is induced.

Taken together, our results suggest that chilblain-like lesions are associated with mild or asymptomatic SARS-CoV-2 infection, and in this respect our findings are in accordance with the cases reported by Guarneri and colleagues.[1] However, physicians should be aware that most patients presenting with chilblain-like lesions will probably have negative PCR results at the time of presentation.

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Biostatistics to better detect fishy findings

We commend Srinivas Mantha[1] for the much needed clarification of the differences between risks, ratios, and rates, and of the latter's underlying notion of time. There is, however, an additional and important difference.

The main scientific basis for epidemiology is biostatistics,[2] which applies rigorous mathematical laws of probability and statistics to the fascinating but unpredictable diversity of living organisms. This is done by accepting some measure of uncertainty. If the sample in which we document data is large enough and representative of the population from which the sample is selected, then we can be confident—at a usually chosen 5% risk of being wrong—that the measure in the population is close to that found in the sample and situated within a range of values called the confidence interval (CI). The CI is a fundamental statistical tool for estimating values and comparing them between groups. Upper and lower bounds of the CI of a risk or ratio computed using a normal or a binomial distribution are equally distant from the estimated value.

Unlike risks and ratios, however, rates are usually very small numbers: their numerator can vary but their denominator is usually much larger, especially when composed of a number of people exposed multiplied by a number of days, weeks, or months of exposure.[3] CIs for rates, especially for rates of repeatable events, are computed using a Poisson distribution and can be substantially skewed towards the upper bound. This skew has important consequences: when calculating incidence rates of COVID-19 endpoints to compare them between different populations or groups (especially repeatable events such as hospital admissions or repeat clusters over a time period), computing their CIs using a normal instead of a Poisson distribution would wrongly cut them short on the right. This might result in a statistically significant difference between groups' incidence rates when there would not be any under a Poisson distribution. This also has consequences when estimating the sample size needed to achieve desired power before comparing incidence rates between samples.[4]

The emergence and rapid global expansion of COVID-19 within weeks and implementation of lockdowns worldwide have made epidemiology a household word.[5] We enthusiastically welcome increased awareness among clinicians, researchers, and indeed the general public of the importance of epidemiology and biostatistics. As we progress from computing percentages in observational studies to comparing rates and CIs within or among groups, clinicians and researchers must be aware that—unlike risks or ratios—incidence rates follow a Poisson distribution.

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