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.

days. Widespread restrictions on cases to urgent (67%) or no outpatients at all (31%) were reported to have been instituted an average of 2 weeks before the survey. Weekly endoscopy volumes declined by 57% to 96% for all procedure types, with EGD and ERCP being the most frequently performed during the pandemic (Fig. 1A). Eight endoscopists (13%) reported having performed endoscopy on confirmed COVID-19+ patients. The majority (53%) of physicians reported they had been redeployed from usual duties to cover COVID-19+ hospital medicine services.

Universal N95 respiratory use for all cases since the onset of COVID-19 was reported by only 65%. Many endoscopists reported that the use of N95 masks was restricted to known or suspected COVID-19 cases because of limited availability (17%) or were not available at all (9%). Our data also show that overall PPE use changed significantly in comparison with pre-COVID practices (Fig. 1B). Testing patients for COVID-19 was not routine before endoscopy for most respondents (54%) at the time of this survey.

In conclusion, COVID-19 has had a drastic impact on the practice of endoscopy and procedure volumes in the New York metropolitan area. These numbers may provide an early estimate of the impact of this pandemic on GI practices. The initial experience of expansion of universal PPE and limited availability of PPE are notable, especially in light of joint gastroenterology society guidelines released on April 1 that recommend universal N95 mask use for all endoscopy team members.[3] Although these data reflect the first weeks of a rapidly evolving pandemic in the United States, they may inform preparedness efforts in regions that anticipate, or are at an earlier phase of, the pandemic.

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COVID-19 testing before every endoscopy: Is India ready for prime time?

To the Editor:

The first case of SARS-CoV-2 infection in India was reported on January 30, 2020, from Kerala.[1] The disease since then has increased manifold to reach figures of over 45,000 infections across the country, making a significant impact on healthcare with drastic changes in clinical practice. Multiple society guidelines have been published since the outbreak of the virus, with a major focus on screening and precautions for patients undergoing endoscopy. Continuing hospital services in a

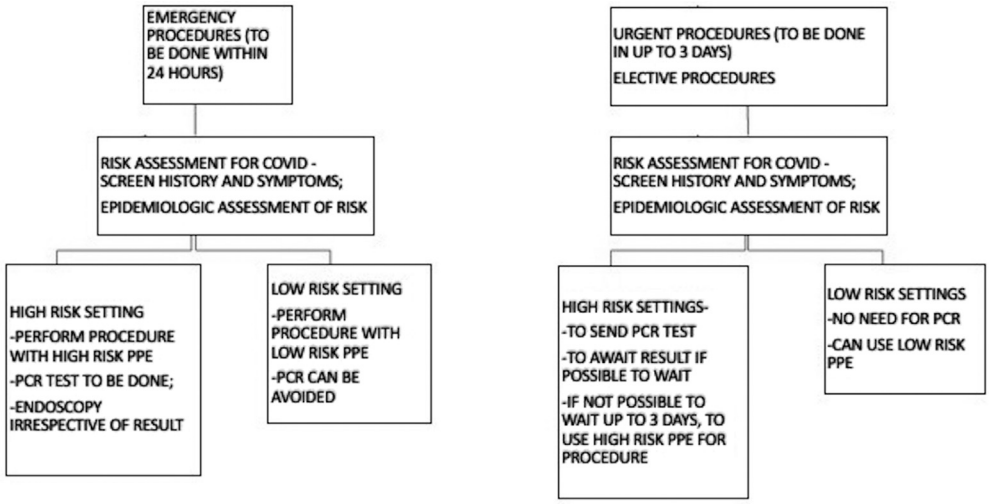

Figure 1. Algorithm for testing before endoscopic procedures. High-risk clinical setting includes symptomatic patient with severe acute respiratory syndrome or influenza-like illness or asymptomatic contact with COVID-positive patient. High-risk epidemiologic setting includes hailing from a high-prevalence area/hotspot/containment zone; areas where no cases are reported for 14 days can be classified as low-risk epidemiologic setting. *PCR*, Polymerase chain reaction; *PPE*, personal protective equipment.

smooth and effective manner while taking care of patients' and caregivers' safety remains a priority. COVID-19 has had its economic impact; hospitals have cut down on elective procedures, affecting patient care and also the revenue generated. One question that has remained largely unanswered in all guidelines is whether we should routinely test for COVID-19 before elective and semiurgent endoscopies.

A recent study from Duval County in Florida by Corral et al[2] tried to analyze the economic and health effects of interventions, namely, endoscopies for urgent indications alone, with testing done beforehand without awaiting the results, versus testing before semiurgent procedure, versus testing all patients and performing semiurgent and elective endoscopies. The authors had been performing only 12.8% of the endoscopy volume done before COVID-19. On the other hand, by using testing in patients with semiurgent indications, they would have been able to do 19% of procedures with an additional cost of $22 U.S. dollars (USD) for polymerase chain reaction (PCR) testing per patient. On the other hand, the third strategy of testing all patients would help increase the caseload back to 95%, but with an additional cost of $105 USD per patient for PCR testing. The model they designed tried to factor, based on the prevalence of disease in the community, what the costs would be, also accounting for standard endoscopy costs across the United States. Considering the low prevalence of disease, with low rates of false negative results, the rates of healthcare professionals infected per week would be low (<1), if breaches of personal protective equipment (PPE) do not occur. The weekly costs incurred according to each strategy would be $6 million, $13 million, and $64 million USD, respectively. The net gain for providers factoring endoscopy costs would be $75 million, $165 million, and $767 million USD, respectively. The authors concluded that testing before endoscopy remains a reasonable strategy for prevention over a 3-month period, considering the rate of infection, helping to generate significant revenue despite the money spent on testing.

India is a unique healthcare setting; the costs of healthcare interventions are very low.[3] The average upper GI endoscopy cost in India is between rupees (Rs) 2000 and Rs 4000 (~$30 to $60 USD). Colonoscopy costs are between Rs 7000 and Rs 10,000 (~$100 to $140 USD). Meanwhile, the average testing cost for novel coronavirus PCR is Rs 4500 (~$60 to $65 USD) in private laboratories. Also, the report may not be available right away, considering that pool testing is done at various centers. The low endoscopy costs and higher PCR test costs may not justify PCR testing for all patients. The population prevalence of the disease in India is approximately 3.6 per 100,000 as compared with 122 per 100,000 in the study by Corral et al.[2] The chances of disease detection fall significantly, considering the low prevalence. The disease prevalence in high-risk pockets like Mumbai are close to 70 per 100,000 population, which is much less than the prevalence in the study previously quoted. However, an important consideration becomes the likelihood that disease prevalence will increase further. Hence, testing for all may not be the right strategy at the moment. However, constant appraisal of the situation will guide us better for further decisions on testing. Adequate screening before patient assessment and endoscopy remains the cornerstone for prevention. Clinical judgement should take precedence over laboratory investigations to decide the necessity of investigations. The prudent use of PPE appropriate to the risk setting remains

imperative and cannot be overemphasized. We designed an algorithm for restarting semiurgent and elective procedures once there is de-escalation of isolation measures (Fig. 1).

Our reliance on PCR makes it difficult to test all individuals, considering the logistic and financial difficulties. Serologic tests with antibody testing may be the solution, where tests can be offered for all individuals. However, current first-generation enzyme-linked immunoassays for COVID-19 IgM and IgG are still in the stages of evolution and require validation in our setting.[4] The caveat is also that early stages of the disease may not be detected, leading to increased infections in the hospital. The American Enterprise Institute has provided a roadmap to reopening after the coronavirus pandemic.[5] India is likely to go from phase 1 to phase 2 after lockdown measures are relaxed. Despite our slogan being "Go Corona Go," I guess that the virus is here to stay. What remains crucial is to build our disease surveillance, testing, and treatment capacity to smooth the transition. To conclude, we may still not be ready for prime time with PCR testing for all patients, largely because we may not need it in the first place at the moment.

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Response:

We thank Dr Sundaram and colleagues[1] for their interest in our article.[2] Comparing the implementation of a COVID-19 testing campaign before endoscopy between 2 countries (India and the United States) illustrates the complexity of this pandemic. Differences in disease prevalence, cost of endoscopy, access to polymerase chain reaction (PCR) testing, and characteristics of local healthcare systems determine the feasibility and benefit of PCR screening at a grassroots level.

Before a PCR program is considered in other healthcare systems, it is important to answer 2 key questions. First, is PCR testing cost effective? As shown by Sundaram et al,[1] when the cost of the test is higher than the primary procedure, the "test all endoscopy candidates" strategy is prohibitive. The effectiveness of COVID-19 screening is difficult to assess. Do we measure clinical benefit for the patient, do we include the benefit to the healthcare providers and system, or do we consider the benefits to family members as well? These 2 parameters have to be contrasted with the willingness to pay for each community. Overall, the benefits of testing run parallel with disease prevalence. In low-prevalence areas with limited resources, clinical screening (symptoms, fever, and exposure) is necessary to increase pretest probability and justify the costs of testing. Despite limited data measuring how COVID-19 testing has affected healthcare budgets, PCR testing comes with opportunity costs. Assigning funds to testing can divert resources from other critical healthcare needs. Will it limit HIV and tuberculosis treatments, or neglect vaccination and reproductive health campaigns? These strategies may still be a priority in low-income and middle-income countries. Performing urgent endoscopies without testing (in low-risk settings, in patients with negative history and symptoms), following adequate requirements for personal protective equipment would be an acceptable alternative.

Second, do the benefits of testing reach beyond the health system? In our study,[2] we measured only the direct impact of COVID-19 testing on the patient and the healthcare providers. However, if the test result is positive, this affects the community (requiring home isolation and other preventive interventions). Four months after the first cases were reported in India and the United States, identifying asymptomatic carriers remains one of our biggest challenges.[3] While researchers find efficient ways to monitor exposed individuals and identify asymptomatic carriers, the question of who deserves testing will be revisited frequently. Do we test before all procedures? Should we test for lower endoscopies if risk can be reduced by the use of physical barriers? Should we test healthcare workers regularly? Triage algorithms like the one presented by Sundaram et al[1] may be particularly beneficial until we answer these and other questions.

We encourage teams across the globe to measure how clinical algorithms allow resumption of endoscopy workflow and to continue epidemiologic surveillance to monitor infections associated with endoscopy. Hopefully, countries with low disease prevalence, like India, can transition safely to the next COVID-19 phases without implementing expensive screening programs.