7 Lessons from the Pandemic for Low and Middle-Income Countries

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Lesson 1

The pandemic was an unprecedentedly large economic shock for LMICs
Annual Global GDP growth, 1961-2020 (in %)

Sources:

World Bank national accounts data, and OECD National Accounts data files.
Economic Effects of COVID-19 in LMICs

Falling living standards during the COVID-19 crisis: Quantitative evidence from nine developing countries

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Drop in Income
8%-87% of respondents report a drop in income during the crisis period (median 70%)

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Drop in Food Security
9%-87% of respondents report missing or reducing meals during the crisis period (median 45%)
Lesson 2

LMICs cannot afford to blindly copy pandemic responses and public health strategies from high-income nations.
Developing countries may not be best suited for strict social distancing

**Very Different Population Distributions**

17.4% of the population in HIC is elderly vs only 3% in LMICs

**Flattening the curve unlikely to release pressure from health systems in LMICs**

Delaying infections only useful if we can prevent the health system from getting overwhelmed. Not as valuable if health system capacity is extremely low or non-existent

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Relative concerns about disease risk vs economic livelihoods very different in LMICs than in HICs

Day-wage laborers, migrants, agricultural workers in South Asia now facing food insecurity

80% of survey respondents concerned about income shocks and food security

<table>
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<th>Percentage</th>
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<td>Safety</td>
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66% decrease in hours worked between Jan and Apr 2020

65% reported that they were worried about enough food
**EXECUTIVE SUMMARY**

Social distancing has become the primary policy prescription for combating the COVID-19 pandemic, and has been widely adopted in Europe and North America. We combine country-specific economic estimates of the benefits of disease avoidance with an epidemiological model that projects the spread of COVID-19 to analyze whether the benefits of social distancing and suppression vary across rich and poor countries. This modeling exercise yields the following key insights:

1. Populations in rich countries tend to skew older, and COVID-19 mortality effects are therefore predicted to be much larger than in poor countries, even after accounting for differences in health system capacity.
2. Social distancing measures are predicted to save a large number of lives in high-income countries, to the extent that practically any economic cost of distancing is worth bearing. The economic value generated by equity-effective social distancing policies is estimated to be $200 times larger for the United States, or 70 times larger for Germany, compared to the value created in Pakistan or Nigeria. The value of benefits estimated for each country translates to a savings of 39% of US GDP, 68% of German GDP, but only 14% of Bangladesh’s GDP or 19% of India’s.
3. The much lower estimated benefits of social distancing and social suppression in low-income countries are driven by three critical factors:
   a. Developing countries have smaller proportions of elderly people to save via social distancing compared to low-fertility rich nations.
   b. Social distancing saves lives in rich countries by flattening the curve of infections, to reduce pressure on health systems. Defeating infections is not as useful in countries where the limited number of hospital beds and ventilators are already overwhelmed and not accessible to most.
   c. Social distancing lowers disease risk by limiting people’s economic opportunities. Poorer people are naturally less willing to make these economic sacrifices. They place relatively greater value on their livelihood concerns compared to concerns about contracting coronavirus.

Not only are the epidemiological and economic benefits of social distancing much smaller in poor countries, such policies may also exact a heavy toll on the poorest and most vulnerable. Workers in the informal sector lack the resources and social protections to isolate themselves from others and sacrifice economic opportunities until the virus passes. By limiting their ability to earn a living, social distancing can lead to an increase in hunger, deprivation, and related mortality and morbidity in poor countries. Flattening the epidemiological curve of COVID-19 for buy time until a vaccine can be developed may not be very useful for poor countries if the timeline for vaccine development is too long for distancing to be maintained.

Poorer countries also have limited capacity to enforce distancing guidelines, and lockdowns may have counterproductive effects if they force informal sector workers and migrants to move to increasingly densely populated urban areas and spread the disease to remote rural areas of poor countries. It is imperative that the source code for influential epidemiological models (in which the widely-adopted social distancing guidelines are based) are made publicly accessible, so that social scientists can explore the sensitivity of benefit estimates to changes in assumptions about compliance with distancing guidelines or the baseline prevalence of co-morbidities, chronic illnesses or malnutrition that make COVID-19 infections more deadly. Not accounting for co-morbidities, or the greater pollution in poorer countries is an important limitation of these models. Publishing code would also allow the research community to quantitatively explore the costs and benefits of alternative harm-reduction measures that better allow poor people to sustain themselves economically while reducing COVID-19 related mortality to the greatest possible extent.

1. Masks and home-made face coverings are comparatively cheap. A universal mask-wearing requirement when workers leave their homes is likely feasible for almost all countries to implement.
2. Targeted social isolation of the elderly and other at-risk groups, while permitting productive individuals with lower risk profiles to continue working. Given the presence of multi-generational households, this would likely require us to rely on families to make decisions to protect vulnerable members within each household.
3. Improving access to clean water, hand-washing and sanitation, and other policies to decrease the viral load.
4. Widespread social influence and information campaigns to encourage behaviors that slow the spread of disease, but do not undermine economic livelihoods. This could include restrictions on the use of religious and social congregations, or programs to encourage community and religious leaders to endorse safer behaviors and communicate them clearly.

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**ARGUMENT**

**Poor Countries Need to Think Twice About Social Distancing**

Policies imposed in rich countries to fight the coronavirus could have adverse effects in low-income nations—potentially endangering more lives than they save.

BY AHMED MUSHFIQ MOBARAK, ZACHARY BARNETT-HOWELL | APRIL 10, 2020, 4:23 PM

In response to the coronavirus pandemic, varying levels of social distancing have been implemented around the world, including in China, Europe, and much of the United States. Hundreds of millions of people have accepted dramatic disruptions to their daily lives and substantial economic losses based on the reasoning that slowing the spread of the coronavirus can keep health care systems from becoming overwhelmed.

Epidemiological models make clear that the cost of not intervening in rich countries would be in the hundreds of thousands to millions dead, an outcome far worse than the deepest economic recession imaginable. In other words, social distancing interventions and aggressive suppression, even with their associated economic costs, are overwhelmingly justified in high-income societies.

But the logic of this response is built on the characteristics of the industrialized, relatively wealthy societies where the policy has emerged. Low- to middle-income countries, such as Bangladesh and Nigeria, are different and raise different questions, namely: Do the benefits of countrywide lockdowns also outweigh the costs in poor countries?

We see several reasons—including demographic composition, the source of people’s livelihoods, and institutional capacity—that suggest that the answer may be different than in the United States or Europe. To put it bluntly, imposing strict lockdowns in poor countries—which people often depend on during hands-
The Answer for LMICs is different from that in rich countries:

ARGUMENT: Saving Lives Saves Livelihoods

ARGUMENT

Saving Lives Saves Livelihoods

For rich countries, there was always only one right answer: Impose strict early lockdowns to crush the virus and enable a return to economic growth.

BY AHMED MUSHFIQ MOBARAK | MARCH 9, 2021, 5:18 PM
Change in Mobility in U.S, U.K., and NZ during the Pandemic

Drop in visits to retail establishments (relative to Jan 2020 baseline)

Date

4/1/2020 7/1/2020 10/1/2020 1/1/2021
A @dawn_com op-ed accuses me of valuing #Pakistani lives less than American lives because our paper (foreignpolicy.com/2020/04/10/poo...) uses VSL. The following 3 tweets explain in plain English (as the writer requests) why this is a gross misrepresentation.

The Yale study that Asad Umar cites to buttress his case literally argues that the dollar value of the lives that lockdowns in South Asia save is less than the foregone economic output that result from these lockdowns. dawn.com/news/amp/15551...

Richer people can afford to stay at home. Both this journalist and I can work from home, and even if not, we're willing to sacrifice our economic livelihoods to avoid the risk of contracting COVID. Because even with pay-cuts, we can still easily put food on the table.

A poor day-wage laborer in Pakistan, in contrast, is willing to forego less of his economic livelihood, because staying at home in a shutdown means that his family may not have enough to eat.
Lesson 3

Data was missing –
Researchers (e.g. DECRG) could provide important insights for government policymakers
Addressing Concerns with Seasonal Variation in Outcomes
In Nepal, the excessive food insecurity experienced during the COVID-19 crisis is much greater than the natural seasonal patterns recalled in a typical prior year.

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Gender Differences in the COVID-19 Experience in Sierra Leone

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Comparing Male to Female-Headed Households to Understand Gender Effects

• We tracked 7047 respondents from 195 rural villages in Sierra Leone

• 34% of respondents are “Female-headed households”
  • Migration, history of civil war

• Compare male to female-headed households to understand whether women experienced the COVID crisis any differently.
  • Less knowledgeable about disease early in the pandemic
  • Less engagement in social distancing and safer public health behaviors
  • Worse food insecurity (children more likely to go hungry)
  • …yet, 10% less likely to receive government aid.

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Lesson 4

LMICs also had a lot to offer

We could teach each other

We could teach rich countries about appropriate strategies
This Country Fought Ebola. It May Beat Another Disease.

How to combat Covid-19 in a developing economy.

By Niccoló F. Meriggi and Ahmed Mushfiq Mobarak

Mr. Meriggi and Dr. Mobarak are economists.
What the US can learn from how African countries handled Covid

Opinion by Ahmed Mushfiq Mobarak and Rifaiyat Mahbub
Published 5:37 AM EST, Tue November 3, 2020
Vaccines are changing the course of the COVID-19 pandemic, but in grossly uneven ways. Low- and middle-income countries (LMICs) face considerable obstacles in both receiving and distributing doses. To limit virus transmission, its devastating impacts, and opportunities for further mutations, this must change. Until it does, nonpharmaceutical interventions such as masking must remain a priority. *Science* invited global experts to highlight research and innovations aimed at quickening the end of COVID-19 in LMICs. —*Brad Wible*

**Contributions to COVID-19 research and innovation**

*By Amrita Ahuja and Ahmed Mushfiq Mobarak*

Although it is common knowledge that LMICs have suffered severe pandemic-related economic consequences, less well known is that many of their pioneering research and innovation efforts have helped mitigate pandemic impacts and shape policy globally, including in high-income countries (HICs). **Prominent examples include genome sequencing in South Africa, which led to early identification of the Omicron variant; vaccine development of both injectable and intranasal Covaxin in India; and trials of fluvoxamine, an existing drug repurposed for treatment of COVID, in Brazil.** Models integrating economic and epidemiological concerns for cost-benefit analyses of lockdown policies were first developed for LMIC contexts (1), and household survey data collected in LMICs highlighted the large losses to income, employment, market access, and food security during the pandemic (2). These influenced discourse around the nature and length of economic and social restrictions globally.
Lesson 5

International Organizations like WHO and CDC also needed more and data evidence that LMICs could provide
LARGE-SCALE RCT EVALUATING THE EFFECT OF MASK-WEARING ON COVID-19

A partnership between Yale, IPA, and Stanford

Cluster randomized controlled trial (RCT) evaluation

Large-scale trial: 342,183 adults in 600 villages in rural Bangladesh

Tested two types of mask (cloth vs. surgical)

First Stage: tested a portfolio of encouragement strategies to identify the precise combination needed to increase mask-wearing

Second Stage: Documented effects on COVID-19 seroprevalence

The research team gratefully acknowledges GiveWell, which recommended a grant from the Effective Altruism Global Health and Development Fund.
THE NORM MODEL

N: No-cost free masks distribution

O: Offering information about masks

R: Reinforcement in-person and in public

M: Modeling and endorsement by trusted leaders
Mask use was sustained 10 weeks into the trial, even after the NORM intervention ended

Proportion of people properly wearing a mask
Main Results

**Mask use**
- Control: 13.40%
- Treatment: 42.27%
  - 28.8 percentage points increase
  - p-value 0.00

**COVID symptoms**
- Control: 8.60%
- Treatment: 7.63%
  - 11.6% reduction
  - p-value 0.00

**Symptomatic seropositivity**
- Control: 0.76%
- Treatment: 0.68%
  - 9.5% reduction
  - p-value 0.03

Intervention coefficient: 0.287
Confidence interval: [0.264, 0.310]

Adjusted prevalence ratio: 0.884
Confidence interval: [0.834, 0.934]

Adjusted prevalence ratio: 0.905
Confidence interval: [0.815, 0.995]
The NORM model with surgical masks prevents $\frac{1}{3}$ of COVID-19 among people over 60.

- **Older than 60**
  - Intervention Villages: 0.84%
  - Comparison Villages: 1.15%
  - Decrease of 35.3% $p=0.000$

- **Between 50 and 60**
  - Intervention Villages: 0.94%
  - Comparison Villages: 1.19%
  - Decrease of 22.8% $p=0.012$

- **Younger than 50**
  - Intervention Villages: 0.66%
  - Comparison Villages: 0.67%
  - No statistically significant decrease $p=0.870$
Impact of community masking on COVID-19: A cluster-randomized trial in Bangladesh


“The Bangladesh study is still perhaps the most important research done during the pandemic outside of the vaccine clinical trials...”
World Health Organization and US Centers for Disease Control and Prevention updated their recommendations for mask use, partly citing our *Science* study.
Lesson 6

Partnership goes beyond research

Governments also need implementation support

Civil society, NGOs, media, private sector all came together beautifully in Bangladesh
Step-by-Step Guide

1. Preparation
   2-6 weeks before fieldwork
   1.1 Identify Implementation Areas
   1.2 Estimate & procure masks
   1.3 Produce communication materials
   1.4 Align on COVID-19 safety protocols

2. Field preparation
   3-4 weeks before fieldwork
   2.1 Plan reinforcement
   2.2 Plan Surveillance
   2.3 Plan and Recruit Team
   2.4 Purchase equipment
   2.5 Train Team
   2.6 Identify community leaders
   2.7 Complete Baseline Surveillance

3. Field Activity
   Week 1-2
   3.1 Meet community leaders
   3.2 Complete Household Distribution
   3.3 Start in-person reinforcement
   3.4 Complete midline surveillance
   3.5 Complete reinforcement activity
   3.6 Complete endline surveillance

4. Field Activity
   Week 3-8+
   4.1 Complete midline surveillance
   4.2 Complete reinforcement activity
   4.3 Complete endline surveillance

For examples of the detailed protocol in the guide, click on the hyperlinked boxes.
Our team is currently working with partners in Bangladesh, India, Nepal, and Pakistan to scale-up NORM to more than 100 million people.

THE IMPACT

- **NEPAL**: 350,000 people
- **BANGLADESH**: 81 million people
- **INDIA**: 3-4 million people
- **PAKISTAN**: 4 million people

We have delivered over:
- 56 million masks to Bangladesh
- 20 million masks to Pakistan
Lesson 7

With lagging vaccinations, the pandemic was never quite “over” in the poorest countries
Global vaccine coverage by country

Panel A: April 1\textsuperscript{st}, 2021

Panel B: November 30\textsuperscript{th}, 2021

Sources: Official data collated by Our World in Data (Ritchie et al. 2020), downloaded 1 Dec 2021.
Why are Vaccination Rates Lagging?
Covid-19 vaccine acceptance is higher in every LMIC studied (average 80%), compared to USA or Russia.

Childhood vaccine acceptance is very high in most low and middle income countries.

Healthcare workers are the most trusted source of guidance on vaccine uptake in most LMICs.
In late 2021 in Sierra Leone, it took over 3 hours each way for the average rural person to get to a vaccination center, at a cost of 6.5 USD each trip
We conducted a trial in the most remote communities

150 Study Sites

Control

Last Mile Delivery of Vaccines

nature

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Article | Open access | Published: 13 March 2024

Last-mile delivery increases vaccine uptake in Sierra Leone

Niccolò F. Meriggi, Maarten Voors, Madison Levine, Vasudha Ramakrishna, Desmond Maada Kangbai, Michael Rozelle, Ella Tyler, Sellu Kallon, Junisa Nabieu, Sarah Cundy & Ahmed Mushfig Mobarak

Nature 627, 612–619 (2024) | Cite this article
• Immunization rates increased by ~26 percentage points within 48–72 h
• Auxiliary populations visited our community vaccination points, which more than doubled the number of inoculations administered
Bonus Lesson 8

This experience taught us how to improve health service delivery in remote, rural areas of LMICs
We formed a coalition to procure a bundle of health services:

1. **Routine immunizations for children under 5**
   - BCG, pneumococcal, rotavirus, IPTi, MCV, yellow fever, Malaria RTs, IPV, pentavalent, OPV

2. **HPV vaccines for girls aged 10-17**

3. **Health services that protect infants and children**
   - Vitamin A drops
   - Deworming pills
   - ORS/Zinc sachets to treat cases of diarrhea
   - Chlorination tablets to treat drinking water

Next step we intend to distribute a bundle in a new trial.
Our Inspiration: Infant Mortality in Bangladesh