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Research Notes

The ABCs of Covid-19 prevention in Malawi: Authority, benefits, and costs of compliance

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A B S T R A C T

A wide array of authorities—from religious leaders to government ministers—call upon citizens to take preventative measures against Covid-19. Which authorities can most effectively gain public compliance, and which measures will the public take up? Moreover, do people comply with authorities out of respect for their legitimacy, due to their expertise, or for fear of sanctioning? Answers to these questions are important for development practitioners, who need to understand how different partnerships might affect health behavior, and for scholars interested in understanding authority, legitimacy, and compliance. We explore these questions using a conjoint experiment embedded in a telephone survey of 641 Malawians. Individuals in our sample are more likely to say that they will comply with precautionary measures when the costs are low and expected benefits are high. Respondents view both traditional authorities and hospital heads as legitimately issuing directives and having the ability to monitor and sanction non-compliance, but appear to comply more with hospital heads and to do so out of respect for their expertise. These results emphasize how *who* issues directives affects whether individuals comply and provides insights as to why they do so. The findings also reflect individuals' cost-benefit calculations when considering precautionary measures, highlighting the importance of steps that can reduce costs (e.g., food security or income measures) or accurately reflect risks (e.g., information signaling the prevalence of Covid-19). The study not only helps to address the Coronavirus crisis but also has important implications for broader questions of authority and compliance.

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1. Introduction

In April 2020, as the number of Covid-19 cases increased, Malawi's Minister of Health announced plans to impose a 21-day nationwide lockdown. The lockdown would have joined a series of other measures aimed at combating the Covid-19 virus under a declared "State of Disaster" that banned public gatherings; closed all schools, national borders and airports; introduced a handwashing and social distancing campaign; and limited the size of social gatherings. This announcement of a national lockdown was met with sporadic protests across the country. Protestors complained that a lockdown without government support to small businesses and poor households would create serious economic hardships

for millions. A coalition of human rights organizations, operating under the banner of the Human Rights Defenders Coalition, obtained a court injunction against the proposed lockdown, arguing that it was unconstitutional and that, in the absence of government economic support, a lockdown would lead to the starvation of thousands of citizens. The lockdown was accordingly suspended.

The failed attempt to institute a lockdown in Malawi and subsequent retooling of the Covid-19 taskforce raises important questions about the ability of authorities to enact public health measures in times of a pandemic. Which authorities can most effectively gain public compliance with difficult measures? Do people comply with authorities out of respect for their expertise, or fear of sanctioning? Does compliance depend on the type and associated cost of the measure, or the prevalence of the illness and therefore risk of catching it in the community?

We draw on a survey experiment embedded in a telephone survey implemented in Malawi in May 2020 to explore these questions. We focus on district-level officials and find that Malawians

are more likely to report compliance with directives from the head of the district hospital than with religious authorities or traditional authorities. Our data suggests that compliance with the hospital head reflects respect for their expertise. Malawians in our sample are more likely to report that the head of the district hospital and traditional authorities (TAs)[1] have the right to ask for compliance and would monitor, as well as quite possibly sanction, compliance compared to religious authorities. We also find that individuals are more likely to state that they would observe less costly measures, such as frequent handwashing. However, if the benefits of engaging in a costly action increase, as they do when many in the local area have Covid-19 symptoms, then our respondents report greater willingness to avoid large gatherings and even to stay at home. Finally, with respect to engagement in more costly actions, our results suggest that authorities who are seen as having the most expertise in the area of health gain the most compliance. In short, Malawians value appropriate expertise, prefer less costly measures, and are more likely to engage in costly ones when a situation appears dire.

These findings not only lend policy-relevant insights into the rationale driving Malawians' uptake of precautionary measures, but they also contribute to a literature aimed at understanding pandemics and public health responses in the Global South. They highlight how the drivers of compliance with public health directives may vary according to different authorities, with some based upon respect for expertise. We also demonstrate how the widely cited Health Belief Model (Rosenstock, 1966), developed in the West, travels to the Global South.

2. Authority and compliance in the fight against Covid-19

A range of authorities can be incorporated in the fight against Covid-19. In Malawi, an increasingly broad set of actors is engaged in formulating policy responses and communicating directives, including local- and national-level actors, non-state and government authorities. Initially, President Mutharika appointed a Special Cabinet Committee on Covid-19, composed entirely of government ministers, to oversee the government response. However, as the number of cases grew and the cabinet committee faced growing criticism over its handling of Covid-19, Mutharika dissolved it and selected a more inclusive 21-member Presidential Task Force. Membership of the Taskforce, co-chaired by a public health expert from the Malawi College of Medicine, included the nine cabinet ministers from the Special Cabinet Committee, alongside other key stakeholders – the influential Christian Health Association of Malawi (CHAM) and Chiefs Council among them.[2]

These authorities may differ in their ability to mobilize citizens' compliance with preventative measures. Research suggests that compliance is higher when people view authorities as legitimate (e.g. Sunshine & Tyler, 2003), which is often measured in terms of perceptions of it being right and proper for an authority to do something (Tyler, 2006) or in terms of generalized trust in them (Tyler & Jackson, 2014), although most of the health literature focuses on the latter measure. Individuals in the Democratic Republic of Congo were more likely to take preventative measures when they trusted local officials (Vinck et al., 2019), a result

echoed in a survey in Liberia (Blair et al., 2017). Arriola and Grossman (2020), studying HIV/AIDS testing, find that Guineans listen to the president if they share his ethnicity and argue that this, too, is driven by trust. Citizens with higher institutional trust also were more likely to take preventative measures against Covid-19 in China (Wong et al., 2020). Other findings point to leaders' ability to reward compliance, or sanction dissent. Studying the Ebola crisis in Sierra Leone, Van der Windt and Voors (2020) find that chiefs facing less competition for their positions were associated with lower death rates, leading them to conclude that "strong leaders" have both greater desire and higher capacity for implementing policies that counter the spread of the disease. This resonates with arguments that restrictive measures, often associated with authoritarian regimes, may best contain the Covid-19 pandemic, and thus, that Covid-19 may foster authoritarianism (Wang, 2020).

These insights are instructive, but questions remain. Which authorities garner the most trust? For instance, individuals trust local authorities more than national leaders in DR Congo (Vinck et al., 2019), co-ethnic more than non-co-ethnic leaders in Guinea (Arriola & Grossman, 2020), and those whom they know personally in Canada (DiGiovanni et al., 2004, p. 270). How do people gauge legitimacy: is it based on specific expertise (e.g., medical knowledge) or a more encompassing role in society (e.g., a TA)? Or, is compliance driven more by carrots and sticks than conviction? And if so, which authorities are most likely to be effective? Answering these questions provides important insights that can underpin public health initiatives in Malawi and, for practitioners and scholars of other countries, turn attention to the importance of basing public health initiatives on a more nuanced understanding of the drivers of compliance with public health measures.

Of course, compliance may be more difficult to achieve when individuals view the actions prescribed as more costly or less beneficial. The Health Belief Model (HBM), first described by Rosenstock (1966, 2005), predicts that people are more likely to take up appropriate health behavior if they believe they are at risk, recognize the severity of the health problem, feel that the behavior will reduce the likelihood of negative health outcomes, and do not face high barriers to adopting the measures.[3] This model is consistent with evidence that cost-and-benefit assessments influence Australians' preparedness to comply with measures combatting an influenza pandemic (Barr et al., 2008), Canadians' compliance with quarantines (Cava et al., 2005), and Nigerians' willingness to vaccinate (Onyeneho et al., 2015). Uptake is particularly likely if there are cues to action and, as a meta-study of the HBM (Carpenter, 2010) found, when actions are aimed at prevention, as in the measures we study here.

3. Survey experiment

We explore questions about compliance with preventative measures through a single-profile conjoint experiment. The experiment was embedded within a broader phone survey on the Covid-19 pandemic conducted in May 2020 in Malawi (Lust et al., 2020). Our sampling frame was derived from telephone numbers collected from respondents to surveys the team conducted in Malawi in 2019 (N ~ 10,000) (Lust et al., 2019) and 2016 (N ~ 8,000) (Lust et al., 2016). The final sample included 4,641 respondents. (See the Appendix for details.)

The experiment presents each respondent with a hypothetical scenario that describes the extent of the pandemic and guidance to combat it from various authorities. Treatments were aimed at assessing the extent to which the degree of risk, the cost of action,

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[1] Traditional Authorities (TAs) are leaders within Malawi's traditional authority system, corresponding roughly to the district-level. They stand above village headman and group village headman and below chiefs and paramount chiefs, sit on the District Committee and serve as Chairpersons of Area Development Committees. For more on the relationship between the state and TAs, see Chinsinga (2006) and Power (2020), and on TAs' ability to influence public opinion, see Muriaas et al. (2018).

[2] Malawi Broadcasting Corporation Online, https://www.mbc.mw/news/entertainment/item/9387-presidential-task-force-on-covid-19-mutharika-hires-21-member-team.

[3] See also Carpenter (2005) for a review.

and the nature of the authority affect compliance. (See Table 1.) The extent to which others in the area were sick with Covid-19 proxies the degree of risk, and therefore benefit of compliance, with "many people" reflecting high risk and "no one" low risk. The actions represented different costs of compliance, with handwashing being the least costly action, not gathering in groups of 50 or more the second least costly, and staying at home except for essentials the costliest measure. The nature of authority included three types, all chosen to be roughly at the district level and thus about equidistant from the respondents: the head of the respondent's district hospital, the respondent's TA, and the respondent's religious leader. These authorities differ with regard to expertise: the district hospital head has relevant medical expertise, the religious authority has expertise in spiritual matters (potentially relevant regarding large, church gatherings), and the traditional authority has no medical expertise but is seen as an important traditional leader, concerned with community welfare. They also differ with regard to their ability to sanction respondents: the head of the district hospital has a low ability to monitor and sanction, while the traditional authority has a high ability to monitor and sanction, drawing on the network of village heads for monitoring and enforcement. We anticipate the religious leader's ability to monitor and sanction is located between that of the hospital head and TA.[4]

The experimental prompt read as follows: "If (many people in your area are/a few people in your area are/no one in your area is) sick with Covid-19 and (the head of your district hospital/your Traditional Authority/your {religious leader})[5] asked everyone to (stay at home except for essential needs/not gather in groups of more than 50 people including religious services, weddings, and funerals/frequently wash their hands with soap and water)."

Respondents were asked five outcome questions in a fixed order. The first question asked about compliance of the respondent, while the second asked about the expected compliance of others in the community.[6] Finally, we queried whether the authority has the right to ask for compliance, if doing so will lessen the risk of getting Covid-19, and if the authority would monitor compliance with the action. (See the Appendix for exact wording.)

Two follow-up questions help us interrogate alternative mechanisms. The first asked how much the respondent trusted each of the following: their TA, their religious leader, or the head of their district hospital. Answers were a 4-point Likert scale, ranging from not at all to a lot. The second asked which of the following best understood Covid-19 for the same set of authorities. (Details in the appendix.)

Hypotheses. We investigate a series of hypotheses on authority, risks, and costs and benefits. All hypotheses were pre-registered, with a few exceptions that we note below. (See details on Open Science Framework pre-registration in the Appendix.)

H1. Authorities. We test three bases of compliance with authorities: legitimacy, sanctioning, and expertise.

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[4] According to the 2019 LGPI survey (Lust et al., 2020), we find that people are more likely to fear sanctions from village heads, who perform under Traditional Authorities and Traditional Authorities themselves, than they are to fear sanctions from religious leaders. See the Appendix for more details.

[5] We piped in relevant religious leaders, given the individuals' religion stated in response to an earlier question: sheikh if the respondent is Muslim, pastor if the respondent is Protestant, and priest if the respondent is Catholic. Respondents who stated no religion were given "a local religious leader" in your district.

[6] We included the question of others' compliance because we felt it would reduce potential social desirability bias. However, we found that people had seemingly little problem with admitting that they would not be willing to personally comply with some directives. We thus focus on individuals' compliance here and report results regarding others' expected compliance in the appendix.

Table 1
Treatments.

Treatment	Arms
A. Prevalence of Covid-19 (*Risk/Benefits*)	A1. Many people A2. A few people A3. No one
B. Authority (*Nature of Authority*)	B1. Head of your district hospital B2. Traditional Authority B3. Your {religious leader} (piped in according to religion)
C. Action (*Costliness of Compliance*)	C1. Frequently wash their hands with soap and water C2. Not gather in groups of more than 50 people including religious services, weddings, and funerals C3. Stay at home except for essentials

H1a. Legitimacy drives compliance. If legitimacy drives compliance, on average, we expect the authority to gain higher scores on the question of whether "it is right and proper that this authority asks for compliance with his/her directives." We did not have a pre-registered hypothesis as to which authority would gain the most compliance, on average, but we are able to use the experiment to see which ones do.

H1b. Fear of sanctioning drives compliance. If fear drives compliance, on average, people will say they will comply with, and expect others in their community will comply with, requests from their traditional authority (B2), who has a greater ability to monitor citizens via their appointed village heads and has a more direct impact on respondents' daily lives. We verify this using the outcome question on monitoring, expecting that individuals are more likely to think the traditional authority knows whether or not they comply.

H1c. Expertise drives compliance. If expertise drives compliance, we hypothesize that people will express greater willingness to comply with the requests of their district hospital head (B1) because s/he has more experience with, and knowledge of, health issues. We verify this using the outcome question on whether the respondents think they will get Covid-19, expecting this to reflect the quality of advice. We expect respondents will think compliance is more likely to be beneficial if it is in response to the district hospital head's advice.

H2. Benefits. *People comply when more people are sick, as risks of infection then appear higher and there are increased benefits to compliance.* As people become more scared, they are more likely to comply with advice from officials on preventing the spread of the virus. Respondents are therefore more likely to state that they will comply with any request when there are many people (A1) or a few people (A2) who are sick compared to no one (A3).

H3. Costs. *People are less likely to comply with more costly actions.* As stated above, we assume that the cost of actions increases from handwashing, to avoiding large gatherings, to staying at home. We predict respondents are significantly more likely to state that they would more frequently wash their hands (C1) with soap and water than not gather in groups of more than 50 people (C2) or stay at home except for essentials (C3).

H4. Benefits X Costs. *The higher the prevalence of the virus, and therefore greater the benefits of compliance, the more likely people will express willingness to comply with costly actions.* We test this with an interaction between the prevalence of the virus (Treatment A) and action (Treatment C).

H5. Authorities X Costs. *We predicted that authorities' ability to gain compliance would vary across actions because they would have more legitimacy in making some recommendations than others.* We hypothesized that religious leaders would be seen as having the most legitimacy in asking for avoidance gatherings of 50 or more

Table 2
Average Marginal Component Effects Across Dependent Variables.

Treatments	(1) Comply	(2) Others Comply	(3) Has Right	(4) Lessen Risk	(5) Will Monitor
Authority, baseline: Your religious authority					
Your traditional authority	0.0143	0.0229	0.0654***	0.0120	0.0539**
	(0.0115)	(0.0177)	(0.0120)	(0.0130)	(0.0176)
The head of your public hospital	0.0394***	0.0253	0.0645***	0.0108	0.0580***
	(0.0110)	(0.0177)	(0.0120)	(0.0130)	(0.0176)
Prevalence, baseline: No one in your area					
Many people in your area	0.0272*	0.0218	0.0102	0.00209	−0.00511
	(0.0110)	(0.0176)	(0.0116)	(0.0129)	(0.0175)
A few people in your area	0.0166	0.00128	0.0178	0.000445	0.0117
	(0.0113)	(0.0176)	(0.0116)	(0.0130)	(0.0174)
Action, baseline: Frequently wash hands					
Stay home except for essentials	−0.190***	−0.308***	−0.203***	−0.0936***	−0.149***
	(0.0112)	(0.0173)	(0.0119)	(0.0130)	(0.0175)
Do not gather in groups	−0.0772***	−0.159***	−0.0695***	−0.0341**	−0.0411*
	(0.00857)	(0.0179)	(0.00902)	(0.0119)	(0.0169)
Constant	0.943***	0.590***	0.911***	0.884***	0.674***
	(0.0121)	(0.0229)	(0.0136)	(0.0168)	(0.0216)
Observations	4,617	4,501	4,581	4,545	4,412
R-squared	0.066	0.065	0.075	0.012	0.021

Note. Robust standard errors in parentheses. ***$p < 0.001$ **$p < 0.01$ *$p < 0.05$ ^ $p < 0.1$.

Table 3
Average Conditional Interaction Effects of Prevalence of Covid-19 and Action.

Treatments	(1) Comply	(2) Others Comply	(3) Has Right	(4) Lessen Risk	(5) Will Monitor
Many people in your area X Stay at home except for essentials	0.0608*	0.0870*	0.0123	−0.00556	0.0426
	(0.0274)	(0.0424)	(0.0294)	(0.0316)	(0.0430)
Many people in your area X Do not gather in groups	0.0134	0.0559	0.0124	−0.0131	0.0643
	(0.0211)	(0.0438)	(0.0220)	(0.0294)	(0.0420)
A few people in your area X Stay at home except for essentials	0.0493^	0.0506	0.0611*	−0.00100	0.00431
	(0.0284)	(0.0423)	(0.0292)	(0.0322)	(0.0428)
A few people in your area X Do not gather in groups	0.0210	0.0814^	0.00171	0.00637	0.0403
	(0.0218)	(0.0441)	(0.0225)	(0.0294)	(0.0415)
Observations	4,617	4,501	4,581	4,545	4,412
R-squared	0.070	0.068	0.080	0.014	0.022

Note. Robust standard errors in parentheses. ***$p < 0.001$ **$p < 0.01$ *$p < 0.05$ ^ $p < 0.1$

people on the grounds that this action affects church services. Further, traditional authorities are likely to have the most legitimacy in asking people to stay home. We test this with an interaction between the prevalence of the virus (Treatment B) and type of request (Treatment C).

4. Results and discussion

We ran a standard causal conjoint analysis (Hainmueller et al., 2014), using OLS regression to obtain consistent estimates of the average marginal component effects (AMCE)[7] of each factor and the average component interaction effects (ACIE)[8] between the factors. Tables 2–4 provide the AMCE and ACIE estimates with robust standard errors in parentheses.

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[7] AMCE is the causal effect of an attribute, averaged over the joint distribution of the remaining attributes (Hainmueller et al., 2014).

[8] ACIE is the difference in the causal effect of an attribute, conditional on the value of another attribute (Hainmueller et al., 2014). We also estimated Average Marginal Interaction Effects, which do not rely on a baseline attribute (Egami & Imai 2019). We note here that our results are not robust to this analysis; yet, since our hypotheses are structured around the comparison of our treatments to baselines, we do not believe this detracts from our findings.

Authority. *Legitimacy.* Compared to religious leaders, traditional authorities and district hospital heads are about 6.5 percentage points (pp) ($p < 0.001$) more likely to be seen as having the right to issue directives, (H1a).

Sanctioning. Traditional authorities and district hospital heads are seen as being 5 pp ($p < 0.01$) and 6 pp ($p < 0.001$), respectively, more likely to monitor (and have the ability to sanction) compliance than religious leaders, (H1b).

Expertise. Looking at compliance, we see that district hospital heads gain 4 pp ($p < 0.01$) more compliance than religious leaders (H1a), while there is no evidence that traditional authorities have any such effect. Moreover, in models with the traditional authority as the baseline comparison authority, we find that district hospital heads are still significantly more likely to gain compliance. In post-experiment questions we find that 46% of the sample agreed that only the head of district hospital understands the Covid-19 virus best, compared to just 2% for their traditional authority and 8% for their religious leader.[9] When asked about trust, 78% of the sample reported a lot of trust in religious leaders compared to 60% in traditional authorities and 64% in heads of district hospitals. This lends

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[9] Note that twenty-seven percent of respondents in the sample believe that all of the three authorities understand the Covid-19 virus and 4% believe that none of them does.

Table 4
Average Conditional Interaction Effects of Authority Type and Action.

Treatments	(1) Comply	(2) Others Comply	(3) Has Right	(4) Lessen Risk	(5) Will Monitor
Head of District Hospital X Stay at home except for essentials	0.0396	−0.0235	0.0643*	−0.0167	0.0432
	(0.0276)	(0.0428)	(0.0297)	(0.0321)	(0.0435)
Head of District Hospital X Do not gather in groups	0.0511*	0.0647	0.0488*	−0.0283	−0.00693
	(0.0205)	(0.0440)	(0.0232)	(0.0293)	(0.0420)
Traditional Authority X Stay at home except for essentials	0.0229	−0.0325	0.0902**	0.0321	0.0303
	(0.0282)	(0.0427)	(0.0301)	(0.0325)	(0.0433)
Traditional Authority X Do not gather in groups	0.00679	−0.001	0.0806***	0.0234	−0.0362
	(0.0227)	(0.0440)	(0.0236)	(0.0297)	(0.0421)
Observations	4,617	4,501	4,581	4,545	4,412
R-squared	0.070	0.068	0.080	0.014	0.022

Note. Robust standard errors in parentheses. ***$p < 0.001$ **$p < 0.01$ *$p < 0.05$ ^ $p < 0.1$.

observational support that expertise drives compliance (H1c) more than generalized trust.

Benefits. The results suggest that people are on average 3 pp ($p < 0.05$) more likely to comply when many people are sick in their area. We further find no evidence that people are more likely to comply when only a few people are sick. Thus, we find some support for the hypothesis that perceived risk increases compliance (H2).

Costs. We find evidence that the costs associated with preventative actions affect compliance. Compared to a directive to wash hands frequently, the least costly action in our set, not gathering in groups generates 8 pp ($p < 0.001$) less compliance and stay at home orders lose 19 pp ($p < 0.001$) of compliance (H3).

Benefits X Costs. We estimate the ACIEs between the treatments of type of action and prevalence of the disease on compliance, finding evidence that people are more likely to comply with more costly actions when prevalence increases, as shown in Table 3. Compared to the least costly action, handwashing, and no one in the area diagnosed with Covid-19 as baselines, we find an increase in reported compliance with staying at home except for essentials (by 5 pp, $p < 0.10$) when just a few people in the respondent's area are sick; moreover, this condition is associated with an increase in the right of an authority to ask for this action (by 6 pp, $p < 0.05$). When the risks become even higher, with many people in the area becoming sick, this costly action gains significantly more compliance by 6 pp ($p < 0.05$). As the threat of contracting the virus increases, respondents are more willing to comply with more costly actions to combat its spread. (H4).

Authorities X Costs. Considering the ACIEs between types of authority and action, we find mixed results concerning our pre-registered hypotheses (H5). As shown in Table 4, using the religious authority and frequent hand washing as the baseline comparisons, it is significantly more right and proper for heads of district hospitals and traditional authorities to ask people to not gather in groups (by 5 pp, $p < 0.05$, and 8 pp, $p < 0.001$ respectively) and to ask people to engage in the most costly action of staying at home (by 6 pp, $p < 0.05$, and 9 pp, $p < 0.001$ respectively). Yet, legitimacy does not seem to be all that matters to our respondents as only the head of the district hospital gains significantly more compliance for asking people not to gather in large groups, in contrast to our expectations.

5. Conclusion

We find that the perceived cost of directives has the greatest impact on compliance. Type of authority and perceived benefits

of directives were also found to impact compliance, but to a lesser degree. Malawians in our sample view both traditional authorities and hospital heads as legitimate in issuing directives and being about equally likely to monitor them, but our findings suggest that hospital heads are seen as having appropriate expertise. Notably, citizens are more likely to state they will comply with heads of hospitals than religious leaders or TAs.

These findings have important implications. For policymakers and development specialists, they highlight how different authorities may be important, distinct partners in the fight against Covid-19. Our results suggest that *who* issues directives affects whether individuals comply, and legitimacy, expertise, and the capacity to monitor/sanction contribute to authorities' abilities to gain compliance. The results also reflect individuals' cost-benefit calculations when considering precautionary measures, highlighting the importance of steps to reduce costs (e.g., food security or income measures that offset costs of staying at home) and accurately reflect risks (e.g., dissemination of information on the prevalence of Covid-19 in the area). Note that those in our sample do not perceive staying at home or not gathering in groups to lessen their risk of catching the disease more than just frequently washing hands. This may be due to a lack of information on why such measures are important or possibly because our data was collected in the very early stages of the pandemic spread in Malawi.

For scholars and policymakers, important questions remain: what types of individuals are more likely to state compliance out of respect for expertise, or concern for enforcement? What information can convince individuals that Covid-19 is a serious threat in their community, and are there ways to signal crises before situations become truly dire? And finally, what is the relationship between stated compliance and behavior, in both the short- and long-term? Answers to these and other questions may help to address the Covid-19 crisis and lend insights into broader questions of authority, benefits, and compliance.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://dataverse.harvard.edu/dataverse/covidauthorityexperimentmalawi2020, https://doi.org/10.1016/j.worlddev.2020.105167.

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