

A randomized controlled trial to test financial incentives for COVID-19 vaccination in Ghana

Raymond Duch * Edward Asiedu †, Ryota Nakamura ‡, Thomas Rouyard §

Carlos Yevenes ¶, Laurence Roope †, Mara Violato ** Philip Clarke †, †

March 22, 2022

*Nuffield College, University of Oxford, Oxford, United Kingdom raymond.duch@nuffield.ox.ac.uk.

† University of Ghana, Accra, Ghana edasiedu@ug.edu.gh

‡ Hitotsubashi University, Tokyo, Japan ryota.nakamura@r.hit-u.ac.jp

§ Hitotsubashi University, Tokyo, Japan thomas.rouyard@r.hit-u.ac.jp

¶University of Santiago, Santiago, Chile. carlos.yevenes@usach.cl

†University of Oxford, Oxford, United Kingdom. laurence.roope@dph.ox.ac.uk

**University of Oxford, Oxford, United Kingdom. mara.violato@dph.ox.ac.uk

††Health Economics Research Centre, Nuffield Department of Population Health, University of Oxford and University of Melbourne, Melbourne, Australia. Philip.clarke@ndph.ox.ac.uk

1

To the Editor - Achieving high levels of vaccine uptake across Africa will be critical to achieving global COVID-19 vaccination. Cash incentives have been proposed as a way to improve the efficiency and equity of the roll-out in Africa (1). While there is a large body of experimental evidence suggesting that financial incentives can promote health care use (2), studies on the promotion of COVID-19 vaccination uptake from high income countries have had mixed results. Large randomized controlled trials (RCTs) of financial incentives in Sweden and the United States have produced conflicting results about their impact on COVID-19 vaccine uptake (3; 4).

There have been some encouraging results regarding incentives and vaccination uptake from studies in lower and middle income countries (LMICs) (5). Nevertheless, a recent review suggests the impact of cash incentives have been understudied in LMICs (6). The COVID-19 pandemic has ratcheted up the need to understand whether financial incentives are an effective policy tool for promoting vaccinations, particularly in an African context. Accordingly, we are undertaking a RCT in rural districts in Ghana that addresses whether cash incentives of different magnitudes affect the willingness to get vaccinated against COVID-19; at the same time we will assesses the policy implications of scaling up a programme of financial incentives for vaccinations.

The Ghana Financial Incentives study is an RCT designed primarily to determine whether cash incentives, which participants are informed about via a video message, increase uptake of COVID-19 vaccines. In addition, we also explore: the relative impact of cash incentives versus providing health information; how different levels of cash incentives may impact on vaccine uptake; and the potential for spillover effects of incentives, whereby providing financial incentives in the treatment arm may impact on vaccine uptake among others who have not been treated.

Beyond the impact of financial incentives on vaccine uptake, there is also the broader question of the costs and benefits of such a policy intervention. An \$11 vaccine incentive, which has recently been proposed (1) for Africa would cost in the order of \$US9 billion if implemented across the continent. A key issue that can be informed by our study is to identify the levels of financial incentives that would be most cost-effective.

We designed the Ghana Financial Incentive project with a view to assessing the broader indirect consequences of a vaccine incentive policy initiative. There is a general concern that financial incentives can undermine intrinsic motivations (7) and hence could have net social costs. This concern has been specifically articulated with respect to incentives and vaccines (8). Building on the recent evaluation framework (9), we anticipate refining our estimate of the social benefits of financial incentives for vaccination by estimating the causal spillover effect of the interventions.

The design addresses two dimensions that should be considered in scaling up a vaccine programme: spill-overs and treated subjects. Following a recent African RCT(10) we

explicitly incorporate design features that will allow us to estimate the geographic spillover effect of the cash incentive treatments, which can come from diffusion of information about cash payments. A second concern is that cash incentives will have unintended, and potentially negative consequences for future health-related behavior. An extended follow-up with treated subjects is being planned in order to address this question.

Ghana is classified as a low income country with a GDP per capita of just under \$US2000; it has though experienced high rates of economic growth in recent years. The subject population for the trial is from six rural districts that tend to be less developed than urban areas. The field work for the study is being undertaken by a team from the University of Ghana.

A post-treatment phase of the RCT occurs approximately two months after the initial intervention, when enumerators will contact all treated subjects who indicated they were vaccinated, in order to verify their vaccine certificates. During this phase a sample of approximately 3,500 households from neighboring non-treated villages will be surveyed to determine their rate of vaccine uptake during the six-month period following the initial video treatments. These verified vaccinations from non-treated subjects will facilitate the estimation of spillover effects of the treatments.

A final follow-up phase of the experiment will allow us to estimate whether financial incentives have intended or unintended consequences for the longer term health behavior of subjects who were affected (both in treatment and in spillover) by the financial incentive treatments. We will implement a baseline survey and then a six-month follow up to collect information on: health attitudes and behavior; vaccine attitudes and behavior; and vaccination status including information on second doses and booster shots.

The initial challenge for ensuring COVID-19 vaccination coverage in Africa was the limited availability of the vaccine. In the future the number of people willing to be vaccinated may be the main constraint on global efforts to control the COVID-19 pandemic. Randomized experiments of incentives and health messaging can play an important role in designing effective policies that will maximize global COVID-19 vaccination coverage.

79

80 **Acknowledgements**

81 This research was supported by funding from the NIHR Oxford Biomedical Research Centre,
82 Hitotsubashi Institute for Advanced Study and the University of Santiago Chile. MV is partly
83 supported by the NIHR Applied Research Collaboration Oxford and Thames Valley. The views
84 expressed are those of the authors and not necessarily those of the NIHR or the Department of Health
85 and Social Care.

86

87 **Author contributions**

88 All authors were involved in the conceptualization of this correspondence. R.D, E.A and PC were
89 involved in overall study design. PC and RD prepared the first draft. All authors were involved in
90 review and editing.

91 **Competing interests**

92 The authors declare no competing interests.

93

94 **Figure legend**

95 **Figure 1: Flow Chart of Ghana Financial Incentives Experiment**

96 The figure summarizes the random cluster design for one of the six districts. Villages are randomly
97 assigned to one of four 45-second video treatments in the experiment: a placebo video (concerning
98 solar charging devices); a health message; an offer of \$3 if vaccinated; and an offer of \$10 if
99 vaccinated. The 45-second video treatment is administered to subjects on a tablet. 20 enumerators
100 contact randomly selected households and administer random assignment of videos which contain
101 information about one of the four interventions. At the end of this first treatment phase, six weeks
102 after the initial intervention, all 6,500 subjects are contacted via telephone to determine their
103 vaccination status. This is the primary outcome of the first phase of the study.

104

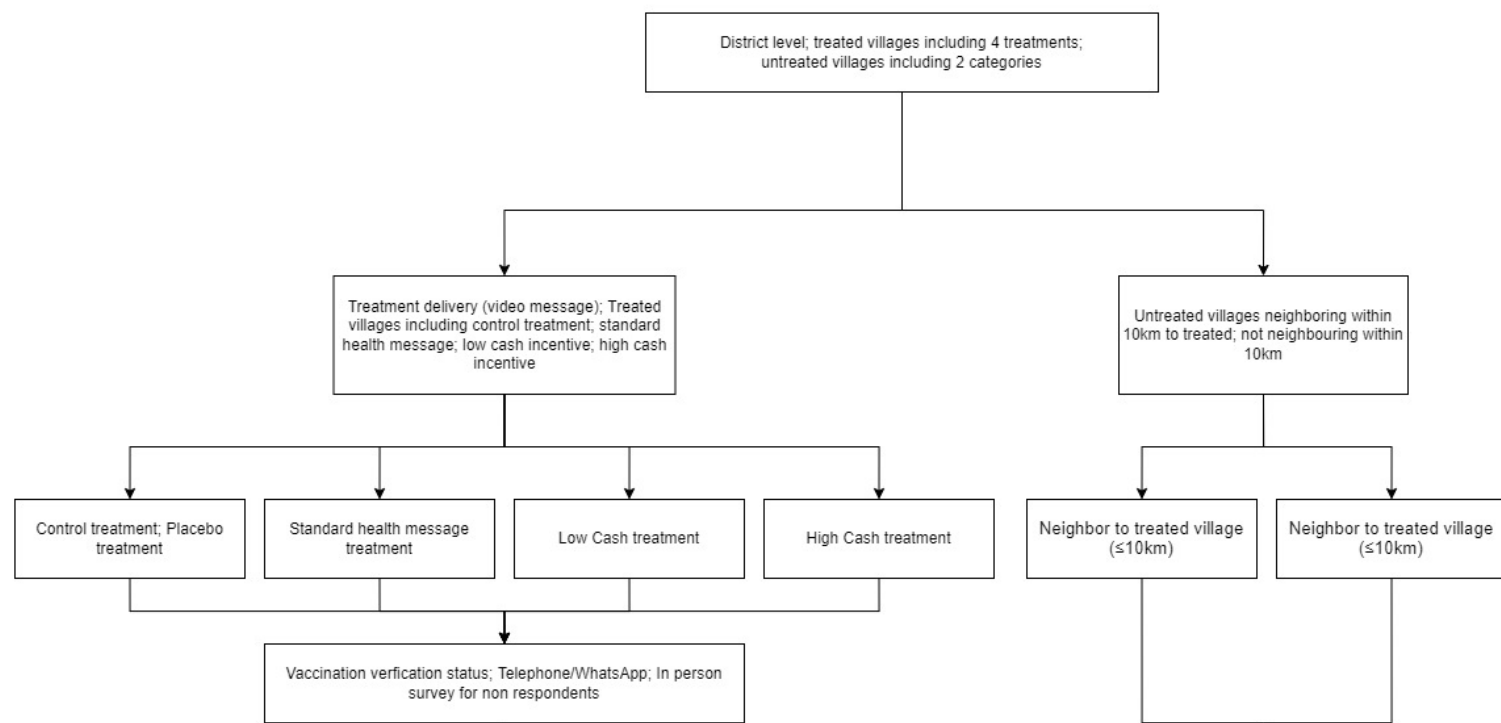
105

References

- [1] Arezki, R *Nature* **596** 9 (2021).
- [2] Lagarde, M. Haines, A. Palmer, N. *Cochrane Database Syst Rev.* **7** (2009).
- [3] Campos-Mercade, P. et al., *Science* . **374** 879-882 (2021).
- [4] Chang, T. et. al. *National Bureau of Economic Research Working Paper* **29403** (2021).
- [5] Gibson, DG. et al.,. *The Lancet Global Health*, **5** 428–438 (2017).
- [6] Merriam, S. & Behrendt H. *Behavioural Insights Team Technical Report* (2020).
- [7] Gneezy, U. Meier, S. & Rey-Biel, P. *Journal of Economic Perspectives* 25, 191–210 (2011).
- [8] Promberger, M. & Marteau, TM. *Health Psychology*, **32** 950–57 (2013).
- [9] Fletcher, J. & Marksteiner, R. *American Economic Journal: Economic Policy* 9, 144–66 (2017).
- [10] Giné, X. & Mansuri, G. *American Economic Journal: Applied Economics* 10, 207–35 (2018).

Treatment Phase

Jan - April 2022



Objective

Treatment delivery (video message)

Measuring direct treatment effects (+ 6 weeks)

Post-treatment Phase

May 2022

Vaccination verification status; in person survey

Vaccination verification status; in person survey

Measuring indirect (spillover) treatment effects :
• Within-village level

Measuring indirect (spillover) treatment effects :
• Across-village level

Follow-up phase (+2 weeks)

May 2022

Telephone/WhatsApp survey

Baseline health behaviour

Follow-up phase (+6 months)

November 2022

Telephone/WhatsApp

Endline health behaviour