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# Allocation of scarce resources in Africa during COVID-19: Utility and justice for the bottom of the pyramid?

Keymanthri Moodley | Stuart Rennie | Frieda Behets | Adetayo Emmanuel Obasa | Robert Yemesi | Laurent Ravez | Patrick Kayembe | Darius Makindu | Alwyn Mwinga | Walter Jaoko

**Correspondence**
Keymanthri Moodley, PhD, Center of Medical Ethics and Law, Department of Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa.
Email: km@sun.ac.za

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## Abstract

The COVID-19 pandemic has raised important universal public health challenges. Conceiving ethical responses to these challenges is a public health imperative but must take context into account. This is particularly important in sub-Saharan Africa (SSA). In this paper, we examine how some of the ethical recommendations offered so far in high-income countries might appear from a SSA perspective. We also reflect on some of the key ethical challenges raised by the COVID-19 pandemic in low-income countries suffering from chronic shortages in health care resources, and chronic high morbidity and mortality from non-COVID-19 causes. A parallel is drawn between the distribution of severity of COVID-19 disease and the classic "Fortune at the bottom of the pyramid" model that is relevant in SSA. Focusing allocation of resources during COVID-19 on the 'thick' part of the pyramid in Low-to-Middle Income Countries (LMICs) could be ethically justified on utilitarian and social justice grounds, since it prioritizes a large number of persons who have been economically and socially marginalized. During the pandemic, importing allocation frameworks focused on the apex of the pyramid from the global north may therefore not always be appropriate. In a post-COVID-19 world, we need to think strategically about how health care systems can be financed and structured to ensure broad access to adequate health care for all who need it. The root problems underlying health inequity, exposed by COVID-19, must be addressed, not just to prepare for the next pandemic, but to care for people in resource poor settings in non-pandemic times.

KEYWORDS
COVID-19, scarce resources, Africa

## 1 | INTRODUCTION

While the COVID-19 pandemic has raised many public health challenges that are universal, the task of conceiving ethical responses to these challenges must take historical, political and social contexts into account.

In this paper, we reflect on two broad ethical questions in regard to the COVID-19 pandemic in the sub-Saharan African (SSA) context. First, how might some of the ethical recommendations offered so far in high-income countries appear from a resource poor SSA perspective? Second, what are some of the key ethical challenges raised by the COVID-19 pandemic in low-income countries suffering

  

from chronic shortages in health care resources, and chronic high morbidity and mortality from non-COVID-19 causes?

To respond to these questions, we take the recommendations for fair allocation offered by Emanuel et. al.[1] in the New England Journal of Medicine as a sounding board and point of departure. These recommendations, authored by prominent bioethics figures in arguably one of the most prestigious medical journals in the world, and cited 530 times in the space of less than four months (March 23-July 8, 2020), have many commonalities with others currently being offered in North America and Western Europe. In the process, it will become clear that our ethical concerns in regard to COVID-19 in SSA include, but extend beyond, the design of fair allocation schemes for mechanical ventilators and intensive care units (ICUs). For the bigger picture, and one more relevant to resource poor settings in Low-to-Middle Income Countries (LMICs) in Africa, our group taps into its own longstanding experiences as bioethics scholars working in South Africa, Democratic Republic of Congo (DRC), Kenya, Zambia, Ethiopia and Madagascar.

## 2 | SAVING LIVES AND SAVING YEARS

Emanuel et. al.[2] recommend that scarce medical resources be allocated in ways that maximize benefits, and more specifically, that maximize the number of lives saved and improvements in patients' years of post-treatment life. They argue that this recommendation enjoys considerable agreement among experts and can be ethically defended on both utilitarian (i.e. best overall outcomes) and non-utilitarian (i.e. value of human life) grounds. In practice, this will mean prioritizing the allocation of scarce resources to patients who are likely to recover and will have a reasonable life expectancy. On this basis, their approach generally favors younger patients over older ones, which Emanuel et al.[3] further justify with a life-cycle argument: each person should have an equal opportunity to live through the various phases of life.

The recommendation may be intuitively appealing, but it also may be difficult to apply or lead to counterintuitive conclusions. For example, say we are comparing a 34-year-old male with very few skills and a history of smoking and substance use with a highly skilled 50-year-old woman with a history of asthma, who is supporting her children and parents. Both patients are diagnosed with COVID-19 with similar likelihood of recovery. In the Emanuel et al.[4] scheme, and others like it, we are asked to strip away all patient characteristics deemed morally irrelevant. There are ethical reasons to disagree with this move. When a pandemic strikes impoverished communities that were only just getting by pre-COVID-19, there are understandable consequentialist reasons to favor individuals who are crucial to their family or community network. Although bringing in considerations of a person's 'social worth' in allocation schemes is controversial, and can be difficult (and sometimes impossible) to implement in fast-moving triage decisions, leaving them out of all such decision-making can also be problematic. Where Clinical Ethics Committees (CECs) or triage committees on the frontline are expected to assist with choosing between two patients with equivalent clinical conditions and prognosis for one ICU bed, social justice considerations may become the only tie-breaker.

In addition, the life-cycle argument, promoted as a tie-breaker in situations where prognoses are similar, is assumed to be universal. This is not obvious. Is it universally accepted that, when forced to choose, a young person's life should always take precedence (other relevant considerations being equal) over that of someone older? Or does the life-cycle argument reflect the values and life-course conceptions of particular cultures?[5] For example, Jecker argues that in some LMIC settings the aged are regarded other than persons whose worth is diminished by 'already having had their fair share' of living.[6] The few studies of this question have been limited to high-income countries.[7] There are ethical reasons to take local community views about the life-course into consideration when making decisions about resource allocation. If the 'fair innings' conception of the life course is alien to how communities associate age and value, then using 'fair innings' as a tiebreaker may be regarded as an imposition of an alien construct and undermine community trust in the basis on which life and death decisions are being made. More empirical research and community engagement are needed before assuming that life-cycle arguments embedded in influential resource allocation schemes (mostly from North America) reflect the values of communities worldwide.

## 3 | HEALTH CARE WORKERS: PRIORITY ACCESS AND DECISION-MAKING

In SSA, health care professionals are a highly valued resource, particularly during a pandemic. While they themselves are relatively scarce, unlike ventilators or other equipment, they "cannot be urgently manufactured or run at 100% capacity or occupancy for long periods".[8]

During the COVID-19 crisis, many have been working on the frontlines with suboptimal personal protective equipment (PPE) and poor access to testing. All frontline workers, including supportive staff, are

[1]Emanuel, E.J., Persad, G., Upshur, R., et al. (2020). Fair Allocation of Scarce Medical Resources in the Time of Covid-19. *The New England Journal of Medicine*. 1–7. https://doi.org/10.1056/NEJMsb2005114.

[2]Ibid.

[3]Ibid.

[4]Ibid.

[5]Schweda, M., Pfaller, L., Brauer, K., Adloff, F., & Schicktanz, S. (2017). "A season to everything"? Considering life-course perspectives in bioethical and public-health discussions on ageing. *Planning Later Life: Bioethics and Public Health in Aging Societies (Eds.). London: Routledge*.

[6]Jecker, N.S. (2020). African Conceptions of Age-Based Moral Standing: Anchoring Values to Regional Realities. *Hastings Center Report*. *50*(2), 35–43. https://doi.org/10.1002/hast.1100.

[7]Biddison, E.L.D., Gwon, H.S., Schoch-Spana, M., et al. (2018). Scarce Resource Allocation During Disasters: A Mixed-Method Community Engagement Study. *Chest*. *153*(1), 187–195. https://doi.org/10.1016/j.chest.2017.08.001.

[8]Ntusi, N. (2019). South African Heart Journal 2019 : A year in review. *S Afr Med J*. (4), 2–5.

taking risks and deserve priority on reciprocity and utility grounds. But in resource poor settings, scarcity is likely to dictate that priority access to scarce health care resources only be extended to healthcare professionals directly involved in COVID-19 patient care who become sick. In these circumstances, having any sort of 'priority lane' to health care is controversial, and therefore broad policies about which health care workers should be given priority and why (i.e. their role in pandemic response) should ideally be a matter of public debate.

In regard to the process of making patient care allocation decisions, Emanuel et al.[9] suggest taking the burden largely out of the hands of clinicians, or even individual health institutions. They advocate for an approach where others (such as triage officers or committees of physicans and ethicists) formulate standardized guidance, and help physicians make decisions. This, they argue, will help minimize the burden of emotional distress on clinicians and the subjectivity of 'a clinician's intuition in the heat of the moment.' But it is not clear that such a division of labor between clinicians and triage committees is necessary or feasible. In resource poor settings in LMICs, triage decisions are made all the time, for all kinds of conditions, in accordance with well-thought out triage policies by experienced and highly skilled critical care doctors, nephrologists, emergency medicine doctors and primary care physicians. This is in response to chronic shortages of many health interventions including simple measures like antibiotics, antiretroviral drugs and even analgesics in addition to dialysis and ventilation. While the swiftness, magnitude and uncertainties of the COVID-19 pandemic differ from situations of medical scarcity experienced in the past, how this is expressed in clinical situations will not be completely unprecedented. Furthermore, in the heat of the moment, who is to say that 'clinical intuition' is necessarily worse than decision-making based on sophisticated allocation schemes overseen by a triage committee? It partly depends on what is meant here by 'intuition'. If intuition means impulsive, subjective and idiosyncratic judgments by doctors, it clearly should not play any role. On the other hand, if it means the experienced perception of those who have long engaged with the implementing of triage criteria in particular cases across a variety of contexts, and whose judgments have been regarded as reasonable over a history of cases, it would be prudent not to sideline this kind of expertise in the process of allocation decision-making, even if it is obviously not infallible.[10] It is even less prudent to do so in resource poor settings in LMICs where it may be challenging to establish effective allocation committees with independent intensivists and bioethicists. This issue about decision-making processes is not just an issue in LMICs: in some New York hospitals, practical and legal considerations made the use of Sequential Organ Failure Assessment (SOFA) scores and Triage Committees unfeasible (webinar presentation – Dr Katherine Fischkoff, New York Presbyterian Hospital).[11] When these triage decisions needed to be made in hospital emergency rooms during the surge in New York City, use of SOFA scores was simply not possible (webinar presentation, Dr Nancy Dubler,[12] New York City Health and Hospitals Corporation). More empirical work is needed on how triage decisions are actually made (and can be made) in pandemic circumstances, in LMICs and elsewhere, before recommending the marginalization of judgments by experienced clinicians.

## 4 | LOTTERY-BASED ALLOCATION

Emanuel et al.[13] argue that when patients have similar prognoses, the best way of allocating scarce medical resources fairly is through random allocation, such as a lottery. This could arise, for example, when two or more patients have equal chances of recovery and the life-years saved would be roughly the same. Random allocation, they argue, is superior as a tie-breaker to a first-come, first-served approach, because the latter may unfairly favor those living closer to medical facilities, lead to crowding and increased transmission risk, and disadvantage those who need health care later because they were adherent to public health guidelines.

While lottery-based allocations of scarce medical resources are sometimes promoted in bioethics theories, they are rarely used in practice.[14] Part of the reason may be that lotteries are difficult to govern and susceptible to corruption whenever there is a great deal at stake. In countries like the DRC, for example, highly valued scarce resources are most likely to be allocated to powerful members of Congolese society.[15] In many LMICs, communities may have good reasons to doubt whether medical resource lotteries would be truly random.

In addition, even if a lottery-based approach was well-governed, the allocation of lifesaving resources in some communities may appear to trivialize human life rather than embodying ideal rationality and impartiality. In the interests of transparency and accountability, the presence of a lottery element in allocations would need to be publicized and negotiated with affected communities. There is no guarantee that such an approach would be found acceptable, though attitudes may differ towards lotteries for allocating preventive interventions (such as vaccines) as opposed to treatments.[16]

[9]Emanuel, Persad, Upshur, Thome, Parker, Glickman, *et al.* (op. cit. n. 1) : 1–7.

[10]Christen, M., Van Schaik, C., Fischer, J., Huppenbauer, M., Tanner, C. (2015). Empirically Informed Ethics: Morality between Facts and Norms by Christen et al. Filosofia Unisinos (Vol. 16). https://doi.org/10.4013/fsu.2015.162.07

[11]Fischkoff, K. (2020). COVID-19: Ethical Dilemmas in Human Lives (ZOOM). Retrieved from https://globalcenters.columbia.edu/events/covid-19-ethical-dilemmas-human-lives-zoom.

[12]Dubler, N.N. (2020). COVID-19: Ethical Issues in the Management of COVID-19. Retrieved June 25, 2020, from https://www.networkforphl.org/resources/covid-19-ethical-issues-in-the-management-of-covid-19/.

[13]Emanuel, Persad, Upshur, Thome, Parker, Glickman, *et al.* (op. cit. n. 1) : 1–7.

[14]Scheunemann, L.P., & White, D.B. (2011). The ethics and reality of rationing in medicine. *Chest. 140*(6), 1625–1632. https://doi.org/10.1378/chest.11-0622.

[15]Dizolele, M.P. (2010). The mirage of Democracy in the DRC. *Journal of Democracy. 21*(3), 143–157. https://doi.org/10.1353/jod.0.0189.

[16]McLachlan, H. V. (2012). A proposed non-consequentialist policy for the ethical distribution of scarce vaccination in the face of an influenza pandemic. *Journal of Medical Ethics. 38*(5), 317–318. https://doi.org/10.1136/medethics-2011-100031; Wardrope, A. (2012). Scarce vaccine supplies in an influenza pandemic should not be distributed randomly: Reply to McLachlan. *Journal of Medical Ethics. 38*(12), 765–767. https://doi.org/10.1136/medethics-2012-100750; Zimmerman, R.K. (2007). Rationing of influenza vaccine during a pandemic: Ethical analyses. *Vaccine. 25*(11), 2019–2026. https://doi.org/10.1016/j.vaccine.2006.11.045.

## 5 | RESEARCH PARTICIPATION AND RESOURCE ALLOCATION

Emanuel et al.[17] argue that participation in COVID-19 related research should function as a tie-breaker in cases where patients have similar prognoses. As a matter of desert, priority access to scarce medical resources should be given to those who help future patients by volunteering for research, and who expose themselves to study-related risks. This reward, they argue, will also encourage other patients to join such trials.

It is reasonable to claim that it is ethically imperative to conduct research during pandemics, particularly ones where (as in the case of COVID-19) there is no effective vaccine or treatment. Such studies need volunteers in sufficient numbers in order to be scientifically valid. This being said, making research participation a deciding factor in allocation decisions remains problematic. Setting up such a system will undoubtedly encounter practical challenges, such as how to track those who have participated in research over time and how to conduct research activities without unduly disrupting patient care. But the main ethical problem has to do with voluntary consent. In pandemic circumstances, marked by limited access to medical (including lifesaving) resources, are those who join research studies in order to gain a (potentially lifesaving) medical benefit making a voluntary choice? Or is this a case of 'structural coercion'?[18] This is especially relevant to low resource settings in LMICs, where concerns about exploitation often arise when individuals are offered medical benefits that are otherwise unobtainable for them by joining biomedical research studies. In LMICs during the COVID-19 pandemic, it is likely that the conditions for valid informed voluntary consent will be seriously undermined. The question is less whether and how to reward research participation within an allocation scheme and more how to conduct research ethically in pandemic circumstances of fear, grief, social disruption, poverty and entrenched injustice.

## 6 | COVID-19 PATIENTS AND PATIENTS WITH OTHER CONDITIONS

Emanuel et al.[19] rightly point out that some of the medical resources needed by COVID-19 patients will also be needed by patients with cancer, heart failure or non-COVID-19 related respiratory diseases. They argue that there should be no difference in allocating scarce resources between patients with COVID-19 and those with other medical conditions. Similarly, White and Lo (2009)[20] state that in ordinary clinical practice, patients who require life sustaining treatments should receive them, except if they or their surrogates refuse, or in the rare circumstances in which they are deemed medically futile. This issue is especially relevant to LMICs.

Is equity in access between COVID-19 and non-COVID-19 patients a reasonable ideal in the context of LMICs? There are two issues here: is the recommendation ethically desirable, and can the recommendation actually be followed?

The ethical recommendation of equitable access is intuitively desirable. In practical terms, it entails treating non-COVID-19 patients needing emergency care the same as if the COVID-19 pandemic had not happened. This would require retaining original ICU beds, high flow oxygen and ventilators for non-COVID-19 patients and setting up additional equivalent resources for COVID-19 patients. Ideally, scarce ICU beds or other relevant resources are not allocated specifically or prioritised for COVID-19 patients; one simply looks at patient need and potential for benefit for COVID-19 and non-COVID-19 patients alike. The question is to what extent this attractive recommendation can help guide health system responses in resource poor settings in LMICs faced with a rapid spike in COVID-19 cases together with a longstanding, pre-existing inability of those systems to provide sufficient critical care for non-COVID patients who need it.

The attainability of the equity ideal seems highly remote in many resource poor LMIC clinics and hospitals, who are unable to provide what White and Lo call 'ordinary clinical practice'. Prior to the COVID-19 pandemic, many critically ill patients in low resource settings in LMICs were not able to access the medical resources they needed. A systematic review by Murthy et al. (2015)[21] revealed that ICU capacity in low-income countries is extremely weak; for example, Uganda only had one ICU bed per million population.[22] Kinshasa, the capital of the DRC, has roughly 100 ventilators for an estimated 15 million people, some of which are in private hospitals and normally reserved for surgical cases (personal communication). In such settings, distributing critical care resources equally between COVID-19 and non-COVID-19 patients would be challenging, if not impossible. Early in the pandemic, South Africa had 7195 ICU beds of which 4917 were in the private sector.[23] Although these statistics are changing modestly as donations of ventilators have increased in the past few weeks, supply remains suboptimal in the face of growing demand. While some hospitals have separate COVID-19 and non-COVID-19 ICUs, others do not. In the interests of equity, is it justifiable to keep non-COVID-19 ICU beds empty, when there is a surge of COVID-19 patients requiring critical care? And, given that COVID-19 patients may occupy ICU beds or ventilators for longer than

[17]Emanuel, Persad, Upshur, Thome, Parker, Glickman, *et al.* (op. cit. n. 1) : 1–7.

[18]Fisher, J.A. (2013). Expanding the frame of 'Voluntariness' in informed consent: Structural coercion and the power of social and economic context. *Kennedy Institute of Ethics Journal. 23*(4), 355–379. https://doi.org/10.1353/ken.2013.0018.

[19]Emanuel, Persad, Upshur, Thome, Parker, Glickman, *et al.* (op. cit. n. 1) : 1–7.

[20]White, D.B., Katz, M.H., Luce, J.M., & Lo, B. (2009). Who should receive life support during a public health emergency? Using ethical principles to improve allocation decisions. *Annals of Internal Medicine. 150*(2), 132–138. https://doi.org/10.7326/0003-4819-150-2-200901200-00011.

[21]Murthy, S., Leligdowicz, A., & Adhikari, N.K.J. (2015). Intensive care unit capacity in low-income countries: A systematic review. *PLoS ONE. 10*(1), 1–12. https://doi.org/10.1371/journal.pone.0116949.

[22]Ibid.

[23]van den Heever, A. (2020). Projections on SA health system and whether there are enough hospital beds to cope. Retrieved May 20, 2020, from https://www.dailymaverick.co.za/article/2020-03-16-projections-on-sa-health-system-and-whether-there-enough-hospital-beds-to-cope/.

non-COVID-19 patients, how does equity play out under such circumstances?

The anticipated rise of COVID-19 infections is likely to aggravate scarcity of critical care resources in resource poor settings in LMICs significantly. Some patients who might have gained access to critical care a few months ago could be tragically out of luck during the COVID-19 crisis. Equity requires the presence of resources many of these clinics and hospitals have not had and do not have.

## 7 | COVID-19 IN LMICs IN SUB-SAHARAN AFRICA: WIDENING THE ETHICAL LENS

In the context of resource poor settings in LMICs, the allocation issue presented by Emanuel et. al.[24] would affect a vanishingly small number of people: the relatively few in need who had the ability to access and benefit from what few critical care resources are available. It is not clear that this is a burning issue even in high-income countries, as only a much smaller proportion of COVID-19 patients than previously anticipated stand to benefit from mechanical ventilation and other critical care interventions.[25] This development undermines the idea that the main ethical question about allocation of scarce medical resources during the COVID-19 crisis is about how to distribute mechanical ventilators and ICU beds. But even before the limitations of mechanical ventilation for COVID-19 care were recognized, this ethical debate was of little relevance to many sub-Saharan African countries where ICUs and ventilators may be extremely scarce or even non-existent.[26] So what are some of the key ethical issues in regard to COVID-19 faced by resource poor settings in LMICs in sub-Saharan Africa?

The context of LMICs is different, and a change of paradigm is required. Baker et al. describe the distribution of the COVID-19 severity in terms of a pyramid, with a small minority (5%) of the most severely ill patients located at the apex and the vast majority (80%) spread out over the middle and the base.[27] Most patients have mild (40%) or moderately severe disease (40%) that is likely responsive to less complex treatments like oxygen and other forms of supportive therapy.[28]

The pyramid metaphor is instructive, as it suggests a way of framing ethical responses to the COVID-19 crisis in LMICs more generally. Prahalad and Hart famously created a socio-economic pyramid with four tiers of global wealth, with an affluent minority at the apex, and the remaining vast majority having diminished wealth to a greater or lesser degree.[29] The socio-economic inequities within countries between the apex and the rest is measured in terms of the GINI coefficient. Six out of ten countries with the highest GINI coeffients are in sub-Saharan Africa, and South Africa has the highest GINI coefficient in the world.[30] Those not belonging to the apex of the pyramid in these countries – again, the vast majority of persons - not only have less wealth, but have much worse health indicators and greatly reduced access to quality health care. Focusing allocation of resources during COVID-19 on the 'thick' part of the pyramid in LMICs could be ethically justified on utilitarian and social justice grounds, since it prioritizes a large number of persons who have been economically and socially marginalized.

To take the pyramid metaphor further, the needs of those at the bottom of the pyramid are also best met through different distribution channels of healthcare – mobile clinics and field workers going out to communities as compared to health systems that require people to present to tertiary hospitals and critical care units. The South African response to COVID-19, has included a combination of mass screening and targeted testing implemented by an army of 28 000 health workers who have been trained to work in communities as part of the strategy implemented in the fight against HIV and Tuberculosis.[31]

Yet another concept emphasized by Prahalad and Hart is the importance of combining local and global knowledge instead of replicating approaches from the global north that may not be implementable in the global south such as LMICs in SSA. The advisories around social distancing or physical distancing included in all WHO guidance has been met with sharp criticism in many African and other LMIC settings where overcrowding in informal settlements makes any form of distancing challenging.[32] This challenge in physical distancing also exists in High Income Countries (HICs) such as the United States where, due to similar health inequities, a disproportionate burden of disease has been borne by poor "bottom of the pyramid" communities in high density neighbourhoods with socio-economic disadvantage.[33]

[24]Emanuel, Persad, Upshur, Thome, Parker, Glickman, *et al.* (op. cit. n. 1) : 1–7.

[25]Gattinoni, L., Marini, J.J., Collino, F., et al. (2017). The future of mechanical ventilation: Lessons from the present and the past. *Critical Care*. *21*(1), 1–11. https://doi.org/10.1186/s13054-017-1750-x.

[26]R. Maclean, S.M. (2020). 10 "African countries have no ventilators. That's only part of the program," New York Times. April 18, 2020. https://www.nytimes.com/2020/04/18/world/africa/africa-coronavirus-ventilators.html. Retrieved May 2, 2020, from https://www.nytimes.com/2020/04/18/world/africa/africa-coronavirus-ventilators.html.

[27]Baker, T., Schell, C.O., Petersen, D.B., et al. (2020). Essential care of critical illness must not be forgotten in the COVID-19 pandemic. *The Lancet*. *395*(10232), 1253–1254. https://doi.org/10.1016/S0140-6736(20)30793-5.

[28]Halpern, S.D., & Miller, F.G. (2020). The Urge to Build More Intensive Care Unit Beds and Ventilators: Intuitive but Errant. *Annals of Internal Medicine*. (8), 1–11. https://doi.org/10.7326/M20-2071.

[29]Prahalad, C.K. and Hart, S.L. (2001). The Fortune at the Bottom of the Pyramid. Security and Strategy 2001. Retrieved from http://www.stuartlhart.com/sites/stuartlhart.com/files/Prahalad_Hart_2001_SB.pdf.

[30]The World Bank Data. (2020). GINI Index. World Bank Estimates. Retrieved May 20, 2020, from https://data.worldbank.org/indicator/SI.POV.GINI.

[31]Cotterill, J. (2020). South Africa's mass screening helps stem the coronavirus tide.

[32]Cash, R., & Patel, V. (2020). Perspectives The art of medicine Has COVID-19 subverted global health ? *The Lancet*. *6736*(20), 19–20. https://doi.org/10.1016/S0140-6736(20)31089-8.

[33]Halpern & Miller, op. cit. note 20: 1–11R.; Maclean, op. cit. note 18, Retrieved May 2, 2020 from: https://www.nytimes.com/2020/04/18/world/africa/africa-coronaviruses-ventilators.htm; Riley, T., Elizabeth Sully, Zara Ahmed, & Ann Biddlecom. (2020). Estimates of the Potential Impact of the COVID-19 Pandemic on Sexual and Reproductive Health In Low- and Middle-Income Countries. *International Perspectives on Sexual and Reproductive Health*. *46*, 73. https://doi.org/10.1363/46e9020; The World Bank Data, op. cit. note 22, Retrieved May 20, 2020 from: https://data.worldbank.org/indicator/SI.POV.GINI; Prahalad, C.K. and Hart, S.L. (2001). The Fortune at the Bottom of the Pyramid. Security and Strategy 2001. Retrieved from July 7 , 2020 from: http://www.stuartlhart.com/sites/stuartlhart.com/files/Prahalad_Hart_2001_SB.pdf.

It is becoming evident that in seeking solutions to ending the pandemic, in LMICs, we should be seeking approaches that combine utilitarian and justice considerations, i.e. those that assist the greatest number who have historically been most at the (negative) receiving end of the social determinants of health. The COVID-19 crisis is bringing into mainstream consciousness what infectious disease epidemiologists (often working in LMICs) have known for decades: that health inequities rooted in unjust social structures dramatically worsen the impact of epidemics on society as a whole.[34] Issues about allocation of scarce medical resources (in LMICs and elsewhere) cannot be meaningfully discussed independently of public health responses.[35] The more effectively SARS-CoV-2 transmissions are reduced by public health measures and community action, the less demand there will be for medical resources. However, mounting an effective public health response against COVID-19 in LMICs faces considerable challenges, and it is not clear that approaches favored in privileged communitites in HICs can be cut-and-pasted into resource poor settings in LMICs.[36] Even seemingly simple measures such as regular hand washing and use of hand sanitizer come at a non-negligible cost in such settings in LMICs. In the Democratic Republic of Congo, 73% of the population live on less than 2 US dollars per day.[37] In Kinshasa, liquid soap (30cl) costs between 1 and 1.5 US dollars. The size of the average household in Kinshasa is 7 persons. This means that to follow the recommendation, 4-7 dollars per week would need to be spent by each household. In addition, the majority of the population do not have piped water in their houses, setting up a conflict between recommendations to wash hands and to keep social distance. These measures are more feasible for those higher up in the pyramid.

In addition, the ethics of a national lockdown in LMICs should be examined in the light of local realities. Privileged groups within LMICs are likely to be relatively insulated from the impacts of severe public health restrictions. This is not true for the rest of the population. The vast majority of economic activities (including the 'informal economy') cannot be conducted online and unlike high income countries, there is little hope of governments providing sufficient financial compensation for workers or businesses. In LMICs, the use of measures like closing all but non-essential services for an extended period of time could drive some populations even further into poverty or even provoke a famine.[38] The requirement to 'remain in place' in LMICs is also likely to result in even greater social isolation than in privileged communities in middle and high-income countries, where most individuals and families can continue to stay in touch via electronic devices and reliable internet service. Public health approaches may need to be applied selectively, i.e. depending on the burdens they place on different socio-economic groups. Without such nuance, strategies which may be more workable elsewhere may require sacrifices in resource poor settings in LMICs so profound that they could undermine trust in government and threaten to bring the credibility of global public health agencies into question.

Scarcity of resources mirrors the Prahalad and Hart pyramid more closely than we may think. The scarcity at the bottom of the pyramid in the face of a disproportionate demand is exacerbated by global geopolitical forces that place Africa last in line in procurement of medical supplies, even where countries may have the financial means to ramp up resources. Testing kits, PPE and medication, are being preferentially supplied to countries with asymmetric purchasing power.[39] This may apply to future vaccines as well.[40]

## 8 | CONCLUSIONS

The Emanuel et al.[41] article, and others like it, are focused on decision-making for allocations of scarce critical care resources in response to COVID-19. Although not explicitly intended for export to resource poor settings in LMICs, such recommendations by leading figures in bioethics, published by prestigious medical journals, often influence policy-makers worldwide. The recommendations typically do not come with a disclaimer that they might not apply or may need to be reinterpreted when used elsewhere. This is a characteristic they share with many public health recommendations during COVID-19, promoted by powerful global health agencies. But how to fairly allocate scarce medical resources and how to responsibly control a novel infectious disease are questions that have to be negotiated in specific epidemiological, social and political contexts.

A leading ethical concern for resource poor settings in LMICs is how to respond to the COVID-19 pandemic, in clinical and public

[34]Abrams, E.M., & Szefler, S.J. (2020). COVID-19 and the impact of social determinants of health. *The Lancet. Respiratory Medicine. 2019*(20), 2019–2020. https://doi.org/10.1016/S2213-2600(20)30234-4; Owen, W.F., Carmona, R., & Pomeroy, C. (2020). Failing Another National Stress Test on Health Disparities. *JAMA - Journal of the American Medical Association*. https://doi.org/10.1001/jama.2020.6547; Wadhera, R.K., Wadhera, P., Gaba, P., et al. (2020). Variation in COVID-19 Hospitalizations and Deaths Across New York City Boroughs. *JAMA - Journal of the American Medical Association. April*, 29–31. Retrieved July 7, 2020 from: https://jamanetwork-com.ezproxy.cul.columbia.edu/journals/jama/fullarticle/2765524; Williams, D.R., & Cooper, L.A. (2020). COVID-19 and Health Equity-A New Kind of 'Herd Immunity'. *Jama*. https://doi.org/10.1001/jama.2020.8051; Yancy, C.W. (2020). COVID-19 and African Americans. *JAMA - Journal of the American Medical Association. 60611*, 5–6. https://doi.org/10.1001/jama.2020.6548.

[35]Cain, M.C. (2020). Avoiding Coronavirus May Be a Luxury Some Workers Can't Afford. *The New York Times*.

[36]Cash & Patel, op. cit. note 24: 19–20.

[37]The World Bank Data, op. cit. note 22. Retrieved May 20, 2020 from: https://data.worldbank.org/indicator/SI.POV.GINI.

[38]van den Heever, A., Francis, D., Venter, F., et al. (2020). South Africa needs a post-lockdown strategy that emulates South Korea. Retrieved June 29, 2020 from: https://www.wits.ac.za/covid19/covid19-news/latest/south-africa-needs-a-post-lockdown-strategy-that-emulates-south-korea.html.

[39]Kavanagh, M.M., Erondu, N.A., Tomori, O., et al. (2020). Access to lifesaving medical resources for African countries: COVID-19 testing and response, ethics, and politics. *Lancet (London, England). 6736*(20), 19–22. https://doi.org/10.1016/S0140-6736(20)31093-X.

[40]Ibid.

[41]Emanuel, Persad, Upshur, Thome, Parker, Glickman, et al., *op. cit.* note 1: 1–7.

health contexts, such as to avoid worsening existing health and other inequalities. Beyond avoiding the promotion of policies and approaches that clearly favor already privileged groups, bioethicists working in LMICs are faced with many unknowns. It is possible that the overall impact of COVID-19 in Africa is relatively modest due to the fact that African populations are younger and there are very few care homes for the aged, which have been hotspots for infection in higher-income countries. In this optimistic hypothetical scenario, demand for critical care resources would be low and the need for radical disease control measures like national lockdowns would be obviated. But it is also possible that some crowded areas will be hotspots for infection among the elderly, and prolonged exposure to the virus could increase severity of disease and mortality in the younger age groups. The epidemiological details matter for determining ethical approaches to saving the most lives and improving the life prospects of those who recover.

Despite this uncertainty, it is likely that lower-tech and easier to implement clinical interventions will have the greatest benefits for the 'thick' parts of the pyramid in LMICs. As with other serious disease threats faced by SSA in the past, this will be a community-engaged approach mobilizing available local resources and expertise. Some approaches – like relying on diagnoses by clinical officers or paramedicals (as occurs in Malawi), rather than doctors conducting tests to confirm cases – may appear 'suboptimal' from some perspectives but nevertheless can reach and benefit a wide number of patients who might have been neglected otherwise. However, regardless of approach, decisions will involve painful costs. The COVID-19 pandemic – and what it is bringing to light - should invite reflection about how we got here and where we are going. In a post-COVID-19 world, we need to think strategically about how health care systems can be financed and structured such that there is broad access to adequate health care for all who need it. The root problems underlying health inequity, exposed by COVID-19, must be addressed, not just to prepare for the next pandemic, but to care for people in non-pandemic times. Most importantly, much work lies ahead to restore public trust in medical and public health institutions after the shortcomings of health care systems have been so brutally exposed in high, middle and low income settings alike.

## 9 | DEDICATION

This article is dedicated to the memory of Prof. Patrick Kayembe, who passed away during its development. Patrick was a leader in public health research and practice in Central Africa and beyond for decades, and was part of the Democratic Republic of Congo governmental COVID-19 response team. He was also a passionate advocate for research ethics and public health ethics.

### ORCID

*Keymanthri Moodley* https://orcid.org/0000-0003-3404-4901

### AUTHOR BIOGRAPHIES

**Keymanthri Moodley** is a Professor in the Department of Medicine and is the Director of the Centre for Medical Ethics and Law, Faculty of Health Sciences, Stellenbosch University. In 2017, she was appointed Adjunct Professor, Department of Social Medicine, University of North Carolina-Chapel Hill, USA. She is a family physician and a bioethicist and has been awarded 4 NIH grants.

**Stuart Rennie** is Associate Professor in the Department of Social Medicine and Core Faculty in the Center for Bioethics at the University of North Carolina at Chapel Hill, USA, as well as Extraordinary Professor of Medicine at Stellenbosch University, South Africa. He has worked on a number of bioethics research and educational projects in sub-Saharan Africa since 2004.

**Frieda Behets** is Professor Emeritus at the Department of Epidemiology, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, USA. She has been principal investigator of numerous research projects on infectious diseases with vulnerable populations in countries such as Haiti, Jamaica, Democratic Republic of Congo, Madagascar and Malawi.

**Adetayo Emmanuel Obasa** is currently a lecturer and ARESA postgraduate coordinator in the Centre for Medical Ethics and Law, Department of Medicine at Stellenbosch University. Dr Obasa completed his MSc and PhD studies at the Division of Medical Virology, He is currently registered for a Postgraduate Diploma in Applied Ethics at Stellenbosch University.

**Robert Yemesi** works at the University of Science and Technologies of Lodja, Democratic Repubic of Congo. He is a member of the Centre Interdisciplinaire de Bioéthique pour L'Afrique Francophone (CIBAF) at the Kinshasa School of Public Health, and is a provincial President of the National Ethics Committee (CNES).

**Laurent Ravez** is Professor of Bioethics and Head of the Centre for Bioethics, Faculty of Medicine and Faculty of Sciences, at the University of Namur, Belgium. He has worked on issues in medical ethics, public health ethics and bioethics education in the Democratic Republic of Congo and Madagascar for more than a decade.

**Patrick Kayembe** was Professor and former Dean at the Kinshasa School of Public Health (KSPH), chair of the KSPH research ethics committee, and co-Principal Investigator of the Fogarty NIH bioethics project 'Strengthening Bioethics Capacity and Justice in Health' (2004-2020).

**Darius Makindu** is Professor in the Département des Sciences Politiques et AdministrativesUniversité Pédagogique Nationale, Kinshasa, Democratic Republic of Congo. He is also a member of the Centre Interdisciplinaire de Bioéthique pour L'Afrique Francophone (CIBAF) at the Kinshasa School of Public Health.

**Alwyn Mwinga** is Chief Executive Officer of the Zambia AIDS Related Tuberculosis Project (Zambart). Before joining Zambart, she worked in different capacities at CDC Zambia. She was an Expert Consultant on TB/HIV Research Priorities for the WHO in addition to serving as a member of multiple national and international boards relating to TB.

**Walter Jaoko** is a Professor of Medical Microbiology and Tropical Medicine, Director of KAVI and former Chair of the Department of Medical Microbiology at University of Nairobi. He has thirty (30) years' experience in teaching and research and has published 166 articles in peer-reviewed scientific journals. He is an extra-ordinary professor in the Department of Medicine, Stellenbosch University.

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