ORIGINAL ARTICLE

Prioritizing Improved Access to Public Health Resources Over Technology: The Pros and Cons of Teaching an Old Dog Tricks

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The lack of "global justice" in the distribution of the world's enormous economic and public health resources has led bioethicists to examine the ethics of the relationship between resource-rich and resource-poor countries. Although virtually all of the world's poorest countries are indeed benefiting from globalization on an absolute scale, the unfairness lies in the relative distribution of this immense wealth of resources. Taking into consideration the tradeoffs presented by four basic ethical perspectives and the role of social determinants of health on the ethics of resource allocation, the author argues that public health resources should be allocated primarily to improving existing health care systems while limiting funding for basic science research. A case study analysis of malaria treatment campaigns illustrates the benefits of focusing on improving access to existing technologies instead of investing in future public health-related technologies.

INTRODUCTION

Bioethics addresses fundamental ethical controversies involved in challenging public health decisions. Public health workers often struggle to make ethical decisions because of the power they exercise over the poor, sick and those otherwise marginalized in society. Of particular concern to bioethicists is the lack of "global justice" in the distribution of the enormous economic and public health resources generated by globalization. Although virtually all of the world's poorest countries are indeed benefiting from globalization, the unfairness lies in the relative distribution of this immense wealth of resources.[1] That is to say, developing countries are not benefiting as much from globalization as developed countries. As an illustration, Daar refers to the well-established "10/90 gap" in which scientific advancements are almost entirely produced by rich countries for their own diseases at the expense of poorer countries' public health problems.[2] While the 10/90 gap shows the importance of changing research priorities in particular to ensure better public health on a global scale, the greater question is how to make the decision between focusing limited public health resources towards either the fidelity—the improvement of existing health care systems—or the efficacy—new basic science research developments—of public health strategies.

In support of longer-term technology solutions to resolve these fundamental public health resource inequalities, Juma recommend that developed countries invest more money in basic science research that could—once available—provide "improved diagnostic methods," "safer vaccines" developed from genetic engineering, and "injection-free and controlled-release delivery systems" that would directly benefit developing countries.[3] At first blush some may conclude that science research should certainly be public health's primary focus, because newly-developed technologies have shown great potential in the past (e.g. smallpox and polio vaccines) and will likely continue to improve global health in the future. But, certain tradeoffs need to be considered in order to come to this conclusion. Specifically, scientific research plans involving drug planning and animal/human trial stages can take decades to complete and might fail or not be as successful as promised, whereas improving existing successful public health strategies entails many fewer risks. Also, improving the efficacy of existing technologies and strategies tailored directly to developing countries ensures that these resources will be spent on public health problems relevant to the developing world as opposed to those of the richest 10% of the world.

Thus, given that public health resources allocated to basic science research cannot be used to treat those suffering today and vice versa, the essential question becomes: What should the balance be between long-term and short-term public health strategies from a bioethical perspective? And, by extension, are lives saved today (e.g. by improving the existing distribution of insecticide-treated bednets) "worth" more than lives saved in the future (e.g. by developing a malaria vaccine)?

Taking into consideration the tradeoffs presented by four basic ethical perspectives and the role of social determinants of health on the ethics of resource allocation, public health resources should be allocated primarily to improving existing health care systems while limiting funding for basic science research. By expanding efforts to better distribute medical supplies, to train new health care workers and to integrate existing scientific knowledge with public health practices to ensure local applicability of public health strategies, improving the use of today's public health resources is more ethical than investing in riskier, future science developments.

First, we will examine the fundamental philosophical views underlying bioethical decisions in order to assess the pros and cons of these two approaches to public health. Then, analysis of a case-study on technology's role in global malaria treatment will support the position presented in favor of improving access and use of existing resources.

PHILOSOPHICAL PERSPECTIVES: PROS AND CONS

Public health is not as grounded in a universal ethical framework as medicine, but four philosophical views are often consulted by public health practitioners as they attempt to reach a resolution to an ethical dilemma. First, utilitarianism strives to improve a population's "overall health" without regard to the means required by employing Jeremy Bentham's "hedonic calculus."[4] In this sense, a mathematical model that

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maximizes lives saved (by either improving fidelity or efficacy of public health resources) would be able to resolve the debate at hand from a utilitarian perspective. A theoretical model of this sort was in fact developed and analyzed by Woolf, who concluded that in developing countries "large and unrealistic increases in efficacy must be achieved to surpass the potential gains from improving fidelity."[5] That is to say, Woolf argues that resources should be focused on improving access to current public health access and not on developing new technologies.

However, utilitarianism (including Woolf's model) has a few significant flaws in its assumptions. First, developed nations—who are in control of the vast majority of the world's public health resources—already have very high access to drugs and therefore might choose to emphasize development of new drugs instead of improving other populations' access to existing drugs. Second, the developing world emphasizes drug development for diseases that are more relevant to their own populations over drugs for diseases that cause the greatest health problems globally. As Cohen argues, certain diseases—including hookworm, schistosomiasis, and leprosy—are neglected by many developed countries' research initiatives despite their significance in developing regions of the world.[6] Third, although conclusions drawn from this model might be in the best interest of the world's global health, they cannot be directly translated into policy since this decision on the allocation of resources is determined by many different governments, NGOs and private groups and not by a single decision-maker. Despite these complicating factors, the principle of utilitarianism supports the decision to allocate resources to improve access to resources since it ensures better "overall" health of the world.

In contrast to utilitarianism, egalitarian (positive-rights) liberalism declares individual rights "paramount" and argues that people ought to be ends in themselves and not means to another's end. In this sense, it could be argued that by allocating resources away from increasing access to existing care towards research for future developments, people today are being used as means towards the ends of people in the future. The question thus remains: Is a life saved today worth as much as a life saved in the future? Utilitarianism offers a strict calculus to circumvent this concern by assigning each equal worth. But, since liberalism is based on rights instead of on results, it has to consider whether lives today are as highly valued as future lives.

Liberalism's concept of "justice as fairness" will be constructive in addressing this question. It guarantees each citizen a certain "minimum quality and quantity of life" by emphasizing a redistribution of resources to minimize the extension of life of the elderly and to maximize care for younger individuals who have more to gain from these resources.[4] In other words, care for a sick 30-year-old who has not yet "had the chance to develop and implement [his or her] life plan" would be considered more worthwhile than care for a 75-year-old who, arguably, has had this chance.[4] Using this same logic then, liberalists would argue from a global perspective that instead of devoting limited resources to the developed world's science research to lengthen the lifespan or minutely improve the lives of average healthy individuals in the developed world, these resources should instead work towards "averting premature death and disability" for those in developing countries. Thus, public health resources should be distributed globally to provide the maximum benefit for individuals who are "worst-off from a lifetime perspective," i.e. those in the developing world who have the greatest potential for lost or disabled life years. Therefore, guaranteeing liberalism's minimum health care standard to those throughout the world would be more feasible by limiting resource spending on research and by maximizing efforts to increase efficient access to current public health resources.

However, by ignoring the cultural and familial ties within in a society, liberalism and utilitarianism are limited in their ability to fully integrate into different societies that are not focused on the individual. Posing a solution to this problem, communitarianism emphasizes the cultural and community aspects of public health by arguing that there are inherent inequalities between individuals and that each individual has a unique duty to the community. The goal of universalist communitarianism is to reach "a superior form of social organization" that justifies certain behaviors and patterns not directly because of their public health consequences but instead inherently because of the improvement of society itself.[4] Although universalist communitarianism could be considered a noble ethical perspective, in practice it would be virtually impossible for all nations to universally decide upon equal distributions of resources for research and existing medical care. But, on the other hand, relativist communitarianism takes into account differences between societies by considering "morality as inherently contextual," that is to say that it morality is defined differently in different countries.[4] Thus, relativist communitarians would likely conclude that the debate at hand over the distribution of resources between science research and increasing access to existing resources should be decided based on the needs of each country. Assuming an international source of public health resources, developing countries would likely emphasize improving access to existing resources while developed countries would likely emphasize basic science research to develop new drugs to use and market. However, there is no neutral source of public health resources for the world because developed countries hold nearly all of these resources, and so the question about which distribution of resources is most ethical is still unanswered on a global scale. The feminist perspective of "ethics of care" grapples with this concern.

Ethics of care concerns itself with a fundamental "responsibility to particular others" that directly applies to this question at hand, since it bridges the divide between the haves and the have-nots.[7] In other words, those who have traditionally been marginalized and deemed "other"—whether by a particular society or by certain regions of the world—would be provided equal if not better care under "ethics of care" than would be possible under "efficiency-oriented utilitarianism or rights-based liberalism."[4] Ethics of care changes the dynamic of public health resource allocation on a global scale

by calling on those least in need (i.e. developed countries) to use their resources for the benefit of those most in need who "have little or no influence over the global politics of public health."[8]

Developed nations, who are now spending the vast majority of their resources on research for drugs that will strengthen the "alliance between the biomedical sciences and corporate power," are not supporting developing nations adequately from an ethics of care perspective because they are squandering public health resources away from immediate care.[8] From an ethics of care perspective, these developed countries have a moral responsibility to the developing world to allocate more resources towards improving the health of those alive today.[4] Therefore, ethics of care would not support developing new technologies because, assuming limited resources, this would cause more suffering today and would be considered a breach of this moral responsibility developed nations have to developing nations.

So despite some of these conflicts within and between these philosophical views, utilitarianism, liberalism and ethics of care all support redistributing resources to maximize access to existing public health care at the expense of developing new technologies. (Communitarianism does not offer a practical resolution to this debate, as described above.) Health inequalities throughout the world have been explained by social determinants of health such as lower education rates, unemployment, lack of social support and lack of availability to food and clean water but also more fundamentally by differences in individual abilities to cope with the stress induced by hierarchical societies.[9,10] Technological advancements will not contribute as much towards disrupting the correlation between lower social and health statuses as improvements in access to current resources would. From a global perspective, public health resources need to be distributed in such a way as to utilize existing scientific knowledge for the benefit of developing nations because, as Evans argues, "the health of a population depends on the equality of income distribution, rather than the average income."[10] Finally, by analyzing the pros and cons presented in this debate in a case-study of malaria control and prevention, I will determine whether improving access to existing public health care is, in fact, more ethical than concentrating resources on science research.

CASE STUDY: MALARIA VACCINES VS. TREATED BEDNETS?

Malaria is a poverty-related disease that is "responsible for an estimated million clinical cases and thousands of deaths each day" and therefore demands the attention of public health workers to determine the most effective and ethical malaria public health strategy.[11] The long-term science research-oriented approach to malaria control has been the development of a vaccine, but so far a vaccine has failed to come into fruition despite support from numerous philanthropists, NGOs and governments over the course of many decades. The future of malaria vaccine development is arguably less bleak than its history would suggest, according to Moorthy, but even assuming that a malaria vaccine is developed in the next decade, many researchers virtually ignore consideration for which public health approaches would lose funding as a result of the drain vaccine development would take on international public health resources.[12,13] Specifically, in light of drug resistance complications from some antimalarial drugs and the exorbitant price of prophylactic drug treatments, certain short-term strategies (including household spraying and insecticide-treated bednets) for controlling malaria have proven very effective at curtailing malaria infections, especially in pregnant women and children who have lower natural acquired immunities than others.[14]

Insecticide-treated bednets (ITNs) are an example of one of these proven strategies against malaria that would be negatively affected by increasing vaccine development funding. Although ITNs have been shown to significantly reduce transmission of malaria, especially when targeted to pregnant women and children as mentioned, many individuals in malaria-endemic regions simply do not have access to them, whether financially or logistically. By increasing investment into the distribution of ITNs even to a much lesser degree than that called for by malaria vaccine research, many fewer people would be infected by malaria. These individuals would then be able to contribute more to their local and national economies and would in turn drain fewer public health resources from their countries' healthcare in the future.

Although it could be argued that these same benefits—and perhaps even more—could come from greater investment into malaria vaccine development, insecticide-treated bednets have already been implemented and found to be effective in malaria-endemic regions today, while vaccine development has many barriers. For example, vaccine development is encumbered by the life cycle of the malaria-carrying parasite Plasmodium falciparum itself, because generally-speaking "immunity to one stage of the parasite is restricted to that part of the life cycle."[12] Also, clinical trials need to be first carried out in adults before they can be tested in children and pregnant women because of complicating factors that they present in vaccine usage, but this prioritizes men and non-pregnant women who are least vulnerable.[12] In addition to scientific obstacles, regulatory delays for approval of clinical trials, for example, also slow vaccine development progress. This is not to say that these regulations should not be in place, but that they should be considered when weighing the costs and benefits of investing in future technologies. Because all of these negative aspects of developing new technologies outweigh those of investing more into improving current use of ITNs, malaria control and prevention would be best brought about by relying on proven shorter-term strategies such as ITNs, as opposed to investing untold amounts of money and time into vaccine developments that will take at least a decade to complete even in the best case scenario.

CONCLUSION

By analyzing various perspectives to come to an ethical resolution of this conflict between research funding and improving existing resource access, the improvement of the fidelity of existing, proven public health tools should be paramount to technology development. However, it is too simplistic to say that these two public health strategies are independent of each other. For example, scientific improvements in

the delivery of existing drugs such as with biodegradable polymers to avoid multiple doses or skin diffusion patches would make the improvement of public health resource access much easier.[3] With that said, however, to ensure that research developments will focus on more immediate and locally-applicable technologies, there need to be better links between (mainly) developed world research institutions and communities in the developing worlds. Even better yet would be increasing international funding to the developing world to organize and lead a much greater proportion of relevant research in their own countries, and in this way address problems like the "developed-world flavor" of the Gates Foundation's Grand Challenges initiative that has only three of its 43 selected research labs in developing countries.[6] Also, community involvement is often underutilized in disseminating critical public health information and improving access to care in order to "achieve sustained improvements in population health."[15] Lastly, there needs to be an emphasis not only on researching new technologies in the lab but also on local "operational" research into the most efficient use of these resources.[16] By reversing current global trends to maximize international spending on drug development at the expense of distribution of proven resources, global public health efforts will be more ethical because they will be most beneficial to those most in need.

REFERENCES

1. Sen, Amartya. "How to Judge Globalism." The American Prospect 13.1 (2002): A2-A6.
2. Daar Abdallah, et. al. "Top ten biotechnologies for improving health in developing countries." Nature Genetics 32 (2002): 229-232.
3. Juma, Calestous and Lee Yee-Cheong. "Reinventing global health: the role of science, technology and innovation." Lancet 365 (2005): 1105-7.
4. Roberts, Marc and Michael Reich. "Ethical analysis in public health." Lancet 359 (2002): 1055-9.
5. Woolf, Steven and Robert Johnson. "The Break-Even Point: When Medical Advances Are Less Important Than Improving the Fidelity With Which They Are Delivered." Annals of Family Medicine 3.6 (2005): 545-552.
6. Cohen, Jon. "The New World of Global Health." Science 311 (2006): 162-7.
7. Almond, Brenda. Introduction: Ethical Theory and Ethical Practice. Introducing Applied Ethics. By Almond. Boston: Blackwell Publishers, 1995. 1-9.
8. Gandy, Matthew. "Deadly Alliances: Death, Disease, and the Global Politics of Public Health." PLoS Medicine 2.1 (2005): 9-11.
9. Marmot, Michael. "Social determinants of health inequalities." Lancet 365 (2005): 1099-1104.
10. Evans, Robert. Introduction. Why Are Some People Healthy and Others Not? The Determinants of Health of Populations. By Evans. New York: Aldine de Gruyter, 1994. 3-26.
11. Sauerwein, Robert. "Editorial: Malaria investments and activities: it is now! or never?" Tropical Medicine and International Health 7.12 (2002): 1009-11.
12. Moorthy, Vasee, et. al. "Malaria vaccine developments." Lancet 363 (2004): 150-56.
13. Ritvo, Paul, et. al. "Vaccines in the public eye." Nature Medicine Supplement 11.4 (2005): S20-S24.
14. Curtis, Christopher, et. al. "Scaling up coverage with insecticide-treated nets against malaria in Africa: who should pay?" Lancet Infectious Diseases 3 (2003): 304-7.
15. Durrheim, David, et. al. "Research that influences policy and practice – characteristics of operational research to improve malaria control in Mpumalanga Province, South Africa." Malaria Journal 1.9 (2002): 1-7.
16. Beaglehole, Robert, et. al. "Public health in the new era: improving health through collective action." Lancet 363 (2004): 2084-6.