

Chapter 16

Antimicrobial Resistance and Social Inequalities in Health: Considerations of Justice



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Abstract Within-country social inequalities in health have widened while global health inequalities have (with some exceptions) narrowed since the Second World War. On commonly accepted prioritarian and sufficientist views of justice and health, these two trends together would be acceptable: the wealthiest of the wealthy are pulling ahead, but the worst off are catching up and more are achieving sufficiency. Such commitments to priority or sufficiency are compatible with a common “development” narrative about economic and social changes that accompany changes (“transitions”) in population health. I set out a very simple version of health egalitarianism (without commitment to any particular current theory of justice) and focus on two common objections to egalitarianism. Priority and sufficiency both address the levelling down and formalism objections, but these objections are distinct: giving content to equality (I argue here) places in question the claimed normative superiority of priority and sufficiency. Using examples of the role of antimicrobials in both these trends – and the future role of AMR – I clarify (first) the multiple forms and dimensions of justice at play in health, and (second) the different mechanisms at work in generating the two current patterns (seen in life course narratives and narratives of political economy). The “accelerated transition” that narrowed global health inequalities is fed by anti-microbials (among other technology transfers). It did not accelerate but replaced the causal processes by which current HICs achieved the transition (growing and shared economic prosperity and widening political franchise). The impact of AMR on widening social inequalities in health in HICs will be complex: inequality has been fed in part by tertiary care enabled by antimicrobials; AMR might erode the solidarity underlying universal health systems as the well-off seek to maintain current expectations of curative and rehabilitative surgery and chemotherapy while AMR mounts. In light of both speculations about the impact of AMR on social and global health inequalities, I close with practical and with theoretical reflection. I briefly indicate the practical impor-

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E. Jamrozik, M. Selgelid (eds.), *Ethics and Drug Resistance: Collective Responsibility for Global Public Health*, Public Health Ethics Analysis 5, https://doi.org/10.1007/978-3-030-27874-8_16

257

tance of understanding AMR from the perspective of health justice for policy response. Then, from a broader perspective, I argue that the content by which I meet the formalism objection demonstrates that the two trends (broadening within-country inequality and narrowing global inequality) are selective and biased samples of a centuries-long pattern of widening social inequalities in health. We are not in the midst of a process of “catching up”. In light of the long-term pattern described here, is the pursuit of sufficiency or priority morally superior to the pursuit of equality as a response to concrete suffering – or do they rationalize a process more objectively described as the best-off continuing to take the largest share of one of the most important benefits of economic development?

Keywords Bioethics · Public health ethics · Antimicrobial resistance · Health inequality · Health justice

16.1 Introduction

What is the significance of antimicrobial resistance (AMR) for health inequalities? This question refers not just to the extent to which AMR might exacerbate or mitigate health inequalities, but to the ways that we should think about health inequalities in order to be adequately sensitive to the justice dimensions of AMR and to the lessons that AMR might offer about the nature of health inequalities as such and their normative status (or the normative plausibility of responses to health inequalities).

The development of AMR in bacteria, viruses, fungi, and parasites detrimental to human health is already a substantial public health concern; it is estimated to cause 700,000 deaths a year globally. The UK government’s O’Neill report paints what it calls a worst-case scenario—a post-antimicrobial world in which antimicrobial-resistant infections are collectively the second leading cause of death by 2050, causing 10 million deaths a year and lowering world population by 700 million (O’Neill 2014, 2016). This “worst case scenario” is based on projecting the consequences of AMR for a small selection of conditions and as such may underestimate the potential consequences of AMR (Jamrozik and Selgelid, Chap. 1, this volume).

It is widely acknowledged that the development of AMR will have different effects on high-income, middle-income, and low-income countries. Other chapters in this volume propose or evaluate policies to address and mitigate AMR as these matter for health equity and for global health.

In this chapter, I situate the use of antimicrobials and the growth of AMR in a narrative of population health (Valles 2018), specifically the story of narrowing global (between country) and widening local (within country) health inequalities, and argue that the development of AMR puts pressure on normative commitments to sufficientism and prioritarianism as purportedly more feasible and more normatively satisfying goals for health justice.

Faced with data showing that people who live in one neighbourhood may have a life expectancy 10–20 years lower than people in a nearby neighbourhood, or that the difference in life expectancy between countries is in some cases as high as 35 years, many express a normative worry that social inequality in health and global health inequalities are unjust (Marmot 2015). However, among academics who discuss health justice, few are egalitarians about health. Sufficiency – the attainment of a decent minimum – is often argued to be an appropriate goal; priority for the worst-off is argued to be adequately action-guiding. The question of sufficiency, priority, or equality can be deferred to ideal theory; we need not agree on an ultimate goal in order to act. For example, if we can agree that AMR is likely to hit the worst-off the hardest, as the O’Neill report projects, then sufficientists, prioritarians, and egalitarians alike can focus their attention on alleviating its effects for the worst-off while still remaining faithful to their diverging commitments if they wish.

16.2 Health Inequalities and Health Egalitarianism: Definitions

In this chapter, I use the term “social inequality in health” to refer to inequalities in some health indicator across socioeconomic status (SES) or other category of interest to justice within countries. I will refer to life expectancy or mortality, but metrics of inequality include other key indicators, for example, infant mortality or workplace mortality. I will use “global health inequality” to refer to inequality in such indicators across low-, middle-, and high-income countries (typically referring to LMICs on the one hand and HICs on the other).¹ Granted that there is normatively significant variation in what counts as socioeconomic status and how it is measured, I speak broadly of socioeconomic inequalities in health, while not intending any specific version of the concept as fundamental. (I motivate/explain this below.)

The core commitment of a health egalitarian is that, all things being equal, a society in which persons of different socioeconomic status can lead full lives with minimization and mitigation of health-related disruptions to those lives is more just than a society in which the possibility of a healthy life is patterned by

¹The less cumbersome phrase “health equality” refers simply to the distribution of life years across a population, not correlated with any other variable of interest to justice. For example, Strømme and Norheim recently claim that both global and national health inequalities are shrinking (Strømme and Norheim 2017). They base this claim on a univariate measure of the distribution of a health indicator alone (age at death) within a population: their empirical claim is that the distribution of age at death is becoming more closely clustered around a value rather than spread widely or polarized while their implicit normative claim is that form of health inequality is what matters to justice. Such univariate measures of health inequality, however, capture nothing about who is dying early or late within that narrower distribution – for example, the rich or the poor, the racialized or the non-racialized, those of higher or lower educational attainment, or all social classes equally (Regidor 2004). Life expectancy could cluster around a given value without any change in the gap between the rich and the poor.

socioeconomic status. That is, a society in which service workers, manual labourers, or those excluded from labour market participation live lives as long and healthy as executives or professors is more just than a world in which this is not the case. On a global scale, a world in which such possibilities of health are not patterned by accident of global birth is more just than a world in which that is not the case.

Following Temkin (2000, 2003), I explore the health egalitarian commitment without assuming a specific view on whether this commitment should dominate feasibility considerations or other values that may conflict with the achievement of social equality in health or global health equality. For example, a commitment to cultural self-determination may outweigh a commitment to health egalitarianism in specific cases, granting the moral and political right of a community to pursue economic activity and social organization that exposes it to different supports for and risks to health, such that life expectancy differs from that obtained in urban settings in HICs.

The leveling down objection seems particularly acute for health egalitarians: while it may be acceptable to take financial resources from people for redistribution, can it ever be acceptable to worsen the health of some people in order to achieve some increment of improvement in the health of the less well off? Temkin's approach avoids the common use of this "leveling down" objection (Parfit 1997, 2012) to take egalitarianism off the table. We can explore the normative importance of social equality in health without *ipso facto* committing ourselves to the view that it has such normative weight that it trumps other considerations and values.

16.2.1 Toward a Multi-dimensional Account of Justice, Health, and Equality as a Normative Goal

A health egalitarian faces (at least) three substantial challenges: the leveling down objection (discussed in the previous section), the challenge that health inequalities *qua* natural can only be matters of justice insofar as they cause or are caused by unjust social inequalities, and the challenge of motivating normatively a concern with the abstract and interpersonal measure of inequality. These three challenges – the leveling down objection, the natural difference objection, and the formalism objection – are closely related. For example, one might focus on concrete normative concerns – suffering (and its alleviation) or sufficient health (and its achievement) – and, by adopting prioritarianism or sufficientism, avoid both the formalism and the leveling down objections (as in Anderson (1999, 2010) and other proponents of capabilities (Nussbaum 2006; Venkatapuram and Marmot 2013)). However, these objections are conceptually distinct. Filling out the concrete realities that are reflected in formal measures of inequalities might bolster rather than undermine the case for equality over sufficiency or priority as a normative goal.

In this paper I use examples drawn from antimicrobials and antimicrobial resistance to give content to concerns about social equality in health, showing that the

formalist challenge can be met without adopting a sufficientist or prioritarian alternative to egalitarianism. I do not offer or adopt a specific comprehensive theory of justice or even of justice and health; rather, using examples from antimicrobials and antimicrobial resistance, I explore different forms of justice and different relationships between justice and health. These are phenomena that an adequate account of health justice should capture, but what account of health justice in what form will do that adequately is not a question I attempt to resolve here.²

Certainly, injustices in domains other than health affect health outcomes; health states lead to injustices in other domains (e.g. fair opportunity, strict equality, reward for merit, reciprocity, respect for privacy or property, etc.). For these reasons, judgements of justice and injustice in other domains inform the normative evaluation of the justice or injustice of social inequalities in health and global health inequalities. But health needs also constitute specific claims for recognition, in response to which we should, as a matter of justice, express respect for equal human worth. That is, health inequalities, in addition to causing and being caused by other unjust inequalities, also constitute and express specific relations of equality and inequality that are of concern to justice.³

Furthermore, unequal responsiveness to health needs creates social inequalities that are *sui generis* and that are politically significant in *sui generis* ways. Consider that the inability to access medical treatment that could address a serious health condition creates desperation which may motivate people to enter into social relations they would not otherwise contemplate. For example, in moral reasoning tests, psychological researchers ask participants to evaluate a scenario in which a person needs a medication they cannot afford for their fatally ill spouse. This is the paradigmatic case in which otherwise socially unacceptable actions become reasonable and moral responses to inequality.

My pluralism about forms of justice is not in the first instance motivated by the idea that liberal public policy must avoid commitment where individual moral views diverge. Any claim to neutrality is dubious. Rather, it is an acknowledgement that conceptions of justice and fairness can take different contextually-relevant forms (e.g. fair reward for effort; fair opportunity; recognition of achievement; acknowledgement of and response to need), as can oppression (e.g. economic exploitation; exclusion from wealth or resource base; denial of voice). Inequality or oppression in any of these forms may be produced by other inequalities that themselves raise question of justice, and may produce further such inequalities. As Wolff and

²This complexity may not be captured by a “spheres of justice” view, where a given domain of human endeavour is governed by a single form of justice (Walzer 2008). Consider that educational policy must be responsive both to the importance of reward for merit and to the importance of equal opportunity for achievement of a reasonable standard of literacy for citizenship and fulfillment. No education system only rewards achievement or only brings the population to whatever minimal or reasonable standard can be achieved by all.

³Sen (2002) makes something like this point about the concept of health *equity* as a multi-dimensional concept: there are several forms that equity takes in relation to health and in relation to matters that have bearing on health and all of these must be taken into account in a treatment of health equity.

da-Shalit have argued, injustices that compound in these ways may be of particular concern (Wolff and da Shalit 2007).

Answering the formalist challenge involves contextualization and narrative exploration to evaluate the significance of what is portrayed in health statistics. The relevant narratives include individual lives (life-course narratives) within the context of social structures and broad changes in those structures – i.e. narratives of political economy. Both population level narratives of political economy and individual narratives of life courses contribute to understanding the human and normative significance of broad epidemiological changes in longevity and the social and global equality and inequality in these measures.

16.3 Examples

In this section, I show these multiple relations of health and justice by taking two examples from microbial disease, antimicrobials, and AMR.

16.3.1 *Example: AMR, Sex, and Gender*

Women's health as measured at the population level is strongly influenced by sexual and reproductive health, and these are in turn conditioned by reproductive autonomy or its absence, as a matter of technology and crucially as a matter of gender politics. (The influence of perinatal experiences on population health measures is substantial; to be discussed below.) At the level of individual life narratives, child-bearing is a normative, but of course not a universal, experience for women.

Antibiotics are used prophylactically in childbirth to address the risk of maternal and infant morbidity and mortality from infections. I have been unable to locate in the medical literature discussion of the implications of AMR for obstetric practice, such as discussion of whether prophylactic use constitutes a sustainable form of anti-microbial stewardship, under what conditions it might be abandoned by choice or triaged by need, or what the implications of its waning efficacy would be for women's health. Neither have I been able to locate discussions of the implications of AMR for handling the infections that will be more common if the efficacy of prophylactic antibiotics is lost. Presumably this would have a significant impact on women's reproductive health.

Childbirth is normative for women but not universal – many women give birth and there are cultural expectations whose negotiation characterizes women's lives whether they themselves give birth or not. There are different pathways by which women come through sexual intercourse to childbirth, with greater or lesser degrees of autonomy and under different conditions of gender-related and economic justice and injustice. Sexual assault is both a concern of justice as a criminal matter and a concern of political justice, insofar as it is an expression and a tool of gender-based

domination. The sequelae of sexual assault sometimes include health and social effects (e.g. sexual transmitted infections, pregnancy, trauma, altered social standing, and deep effects on current or future intimate relations, exposure to a criminal justice system that may be partly or entirely inadequate to victims' needs, etc.); these have further health and social effects (infection in childbirth, to return to the original example).

Some of the health-related harms of sexual intercourse are harms that we have been able to mitigate with antimicrobials (e.g. gonorrhoea, HIV/AIDS, infections arising from termination, infections arising in childbirth) for the last decades. These will be affected by AMR. Noting substantial disagreement about the moral and political status of sex work, sex workers and/or persons subject to sexual exploitation will be particularly affected by AMR. Some will take this as compounding the injustice of sexual exploitation and others will take it as compounding the injustice of the stigmatization of sex work. As such, AMR will alter the experience of sexual activity and affect concerns of justice in relation to sexual activity.

16.3.2 Example: AMR and Parasitic Infection

Hookworm is a parasitic infection caused by inadequate public health infrastructure (Pilkington 2017). It is virtually unknown in HICs; the United States is an exception to this, which may not be surprising given that it boasts the highest GINI co-efficient (greatest economic inequality) of HICs and captures a low proportion of its national income (30%) for state expenditure (Piketty 2014, pp. 475–6). Anthelmintic resistance (resistance to the anti-parasitic agents used in treatment) is a growing concern for hookworm (Harhay et al. 2010).

The conditions for hookworm arise directly from the legacy of indentured labour on large estates where land was held by a small elite, and so it is strongly conditioned by historical injustices in colonial and slave-holding societies. As a hygienic disease it is tied closely to place, and place is tied closely to identity for many groups subject to colonialism – whether they were brought as slaves to work in a place that is now home or they experienced colonial occupation and seizure of their lands, transforming their status as labourers on those lands.

In turn, hookworm has health sequelae detrimental to participation in the labour market and fulfillment of care responsibilities in the home (McKenna et al. 2017) and so it also has forward-looking intergenerational effects that are of concern for justice and the perpetuation of relations of economic inequality in post-colonial societies. This compounds the historical colonial relations that gave rise to the risk exposure.

These injustices are compounded by the fact that there is little or no investment in research to tackle this problem. Instead, anthelmintic drug development serves the agricultural industry, with the goal of increasing efficiencies in food production for the better-off, rather than serving the medical needs of the worse-off – human

beings who live in conditions that make them vulnerable to the parasite (Hu et al. 2013).

16.3.3 Summary of Examples

In these examples, justice concerns and health inequalities are intimately and complexly linked. A given health advantage or detriment can reflect justice or injustice in gender relations, in criminal justice matters, in labour relations, in global economic and colonial relations involving claims to land, resources, and sovereignty – in addition to the common justice-related concerns about the fair distribution of scarce resources within health care.

The forms of stigmatization to which infectious and hygienic disease are subject are paradigmatic and concrete forms of stigmatization. Shame involves the source of the infection (in sexual relations, or in place for historically constituted communities consigned to exposure to hygienic disease) and this extends to shame about the resulting health state, in ways closely tied to disease-related identities, to symbolic and quasi-symbolic stigma (denigration, shunning, isolation, social distancing) and to concrete stigmatization (violation of civil liberties, detention; situating waste disposal on “unproductive” land where this is land occupied by indigenous and poor communities).

AMR has its effects in these fields. As it renders infectious and hygienic diseases less susceptible to treatment, it will exacerbate the ongoing legacies of these historical harms and their forward-reaching effects, in part by compounding the relevant health effects, and in part by the effects of policy responses on marginalized populations. For example, persons exposed to STIs through sex work or sexual exploitation and persons exposed to hookworm through colonialism and its legacy of land marginalization may in turn be subject to increased state surveillance and control, even risk of criminalization, insofar as their health state is seen to pose a threat to others, or insofar as their health state gives them a claim resources that increasingly come to be seen and managed as scarce public or common goods (Smith and Coast, Chap. 17, this volume; Giubilini and Savulescu, Chap. 9, this volume).

In describing the examples, I draw on (not very detailed) meso-level narratives in which justice considerations abound – narratives that involve local manifestations of broader structural relations for specific communities. In these narratives, it is relatively clear how justice considerations relate to health and how health differentials can intrinsically constitute the justice or injustice of relevant relationships. But what connection can we draw from here to the broadest population metrics of health inequalities? What roles have antimicrobials played in these population narratives and what role might AMR play?

16.4 Health Inequalities: The Development Narrative

Recall the 10–20 year within-country differences in life expectancy between high- and low-income neighbourhoods and the 30–40 year differences in life expectancy between HICs and LMICs. Do the differences among groups captured in the population health metrics matter normatively, and are they a concern of justice? What role did antimicrobials play in generating these differences and how might AMR affect these differences?

Now, these formal measures might matter because those at the low end of the distribution are experiencing health deficits which we want to address as a matter of beneficence, or as a reciprocal obligation to supply a decent minimum arising from our economic inter-dependence – or they might matter because the *inequalities* of which they form one extreme matter. It is easy to elicit some kind of normative concern about these inequalities but much more difficult to specify exactly what matters about them as inequalities. Two persons might have different life expectancies because of accident or genetic endowment; it's not obvious why group differences matter. One possible starting place is the thought that if all else were equal the poor would be as healthy as the rich. That is, the poor do not constitute a separate natural kind with different potential to be healthy. If they are differentially unhealthy, it is because we fail to ensure that everyone has access to their potential to be healthy, because incomes are inadequate, housing poor, food of low quality, work hazardous, childbirth ill-supported, and access to care and social support for recovery from ill health limited. This line of thought is similar to the view of that health inequalities matter to justice when they are caused by or cause other injustices, but it maintains at its core the idea that health inequalities matter as such and can constitute injustice.

By analyzing the role of antimicrobials in broad trends for social inequality in health and global health inequality, I argue that understanding the causes and the narrative constitution of these trends renders sufficientism and prioritarianism less attractive as normative stands.

A common account of the broad trends in both global health and economic development in recent decades is that within-country inequalities are widening, but between-country inequalities are narrowing – a narrowing that is particularly dramatic since the 1950s for health and 1980s for economic status. The normative claim attached to this account (implicitly or explicitly) is a prioritarian or sufficientist claim that while things may look grim from the perspective of the middle classes of HICs, from the perspective of those who are truly the worst off, things have never looked better: more and more people in the world are relieved of the worst form of poverty (“absolute poverty”) and are achieving a sufficiency of health. In health, the worst off are doing even better: life expectancy is advancing faster than it did when the current HICs built their prosperous economies over the course of the nineteenth and twentieth centuries.

In the examples of the previous section (16.3), I outlined different ways that justice questions might reflect, be reflected by, or otherwise enter into health

inequalities, by tying life course narratives to narratives that matter to justice – political and cultural economy, including gender relations. In the same manner, I will approach the significance of population health metrics in relation to justice by exploring the meaning of these metrics in terms of the typical and divergent life courses of the members of a population and in terms of the political and cultural economy of the communities in question (within-country communities and global communities).

The common narrative reflecting the sufficientist or prioritarian reading of narrowing health inequalities is the development narrative (political economy) linked to life course narratives via “transition” theory (demography and epidemiology).

Demographers long ago observed the tendency of populations to pass successively through certain stages, tied to their economic development: populations move from having a high birth rate along with a high death rate (in foraging or pastoral economies), to a more stable and dropping death rate, while the birth rate remains high, resulting in a population explosion (from agricultural to early industrial economies), to a low birth rate-low death rate stage, which we see in the stable or shrinking populations of modern HICs (which depend at this stage on immigration for economic growth). Epidemiologists in the mid-twentieth century linked these demographic changes to patterns of health and disease: the first stage of “pestilence and famine” with its characteristic population swings is followed by a second stage of greater stability but low life expectancy conditioned by infectious and hygienic diseases, initially from the close co-habitation of animals and humans and then the increasingly crowded, eventually urban, living conditions of humans with one another. With improvements in living standards and public health infrastructure, we enter a third stage where chronic (“man-made and degenerative”) diseases of later middle age emerge as common causes of death (Omran 1971). A combination of so-called lifestyle changes (e.g. smoking cessation, moderation of red meat consumption) and advanced medical technologies (e.g. cancer treatment) have pushed back these diseases of midlife and created the ongoing extension in lifespan that HICs are now experiencing, which some describe as a “fourth stage” of epidemiological transition (Olshansky and Ault 1986).

These are the economic and epidemiological narratives behind how a non-transparent metric like life expectancy is read in health policy and understood to be a normative concern or a concern of justice. A life expectancy in the 40s reflects substantial maternal, infant, and child mortality caused by infectious and hygienic disease and the lack of empowerment of women to control their sexual and reproductive lives. A life expectancy in the 60s reflects a society in which heart disease and cancer are leading causes of death in later middle life, a phenomenon that emerged over the course of the twentieth century in HICs. A life expectancy in the 80s reflects improved prevention and treatment of these major killers and the emergence of new common forms of dying in advanced old age, e.g. frailty and dementia.

The dramatic narrowing of global health inequalities since the 1950s is called, within this narrative, the “accelerated transition,” reflecting the success of the international development agenda in achieving improvements in health status that outstrip the economic and political development of the countries in question – that is, that outstrip both growth in GDP and changes in the franchise and effective political

organization of workers to demand the health, education, and safety benefits of modern welfare states. By these means, industrialization and urbanization raised GDP while political change led to a larger proportion of the GDP being invested in the well-being of the population, in a process that involved the empowerment of workers and women, improving population health – although (given the dynamics of democratic pressure) achieving less success in addressing the needs of so-called minorities.⁴

On this narrative, it seems natural to see the changes in global economic and health equalities and inequalities in terms of the idea that some countries got a head start and some lag behind. A common economic belief is that open markets and the transfer of skills and technology will ensure that LMICs continue to advance towards (eventually) “catching up.” The common narrative in health is that some (both low and high tech) public health technologies could be transferred in advance of economic development, offering LMICs a leg up in the development process.

16.4.1 Is the Development Narrative True?

Is this development narrative true? Does it do the normative work it claims to do?

One important critique of formal measures of equality and inequality is that they are not transparently related to the underlying realities they measure (King et al. 2012; Harper et al. 2010; Mackenbach 2015, Mackenbach et al. 2016). King et al. point out that the same underlying reality can be represented as a narrowing of absolute inequalities or a widening of relative inequalities, for example. Similarly, the same numeric change may represent different causal pathways or encapsulate different social relations with different significance in terms of justice and injustice and different distributions of well being and suffering. This has implications for the normative concern that these measurements might inspire (which inequalities should we tackle?) and may even raise questions about the reality of abstract interpersonal measures (are inequalities simply imposed on the individual phenomena that, sufficientists and prioritarrians argue, should be the object of our moral concern?).

16.4.2 Underlying Realities

The narrative that LMICs are “catching up” suggests that they are achieving what HICs have achieved, but doing so later. However, this suggestion is false. The accelerated narrowing of global health inequalities represents fundamentally different epidemiological patterns, causal pathways, and relations of concern to justice.

⁴In the current HICs this process led to the state capturing 40–55% of national income for its spending (Piketty 2014, pp. 475–6).

I described above how a population's life expectancy in a given decade is "read" epidemiologically, and I noted that many different underlying patterns of health and disease can generate the same measure. Substantial infant and early childhood mortality in a subpopulation might depress life expectancy as much as widespread exposure of young adults to interpersonal violence, workplace hazards, tuberculosis, or HIV. Different narratives of political economy can in turn generate these patterns – the sub-population with elevated early childhood mortality may be indigenous or migrant; interpersonal violence may be a matter of warfare or the combination of lack of opportunity, crime, availability of guns, policing, and racialization.

The picture offered by transition theory is simplified (Frenk et al. 1991; Defo 2014). Researchers now emphasize that the same life expectancy in different populations may reflect different realities. They describe the transitions of LMICs as "incomplete" transitions, highlighting counter-transitions within LMICs and even within HICs. For example, LMICs did not leave infectious and hygienic disease behind. Rather, they are taking on the so-called diseases of affluence – diseases that arise from changes in work, nutrition, energy, and transportation – in addition to carrying an on-going burden of infectious and hygienic disease (Santosa et al. 2014; Defo 2014). Specific population groups within HICs experience the re-emergence of infectious and hygienic disease, while the emergence of so-called "diseases of despair" (suicide and substance abuse) may reverse health gains in HICs for some groups (Case and Deaton 2015) or for entire countries (some of the former eastern bloc). Global migration resulting from instability and lack of opportunity in LMICs and the need for low-wage workers particularly in the agricultural sector in HICs brings together the AMR diseases of LMIC and the population health profile of HICs (Suk et al. 2009).

Furthermore, insofar as LMICs have substantially reduced childhood and young adult mortality from infectious and hygienic diseases, these reductions did not come from the developments in political economy that led to such improvements in HICs. In HICs, rising GDP went along with political changes (universal suffrage extending beyond male property owners to labourers and women, and various political movements organized around these identities) and these brought about improvements in determinants of infectious and hygienic disease. In HICs, antibiotics joined and accelerated an existing process of decline in infectious and hygienic disease after the Second World War (Mackenbach 1996). In LMICs, on the other hand, growth in GDP resulting from urbanization has not been distributed or re-distributed and invested to improve living standards and public health infrastructure to the same extent. Political empowerment is limited, in part by the actions of the very same global corporations that bring (some) growth in income to LMICs. In its place, a global network of health philanthropy has delivered effective prevention with vaccines and mosquito nets and treatment with antimicrobials for infectious and hygienic diseases that remain endemic. Antimicrobials played an important role in this so-called "accelerated" transition. The infectious and hygienic diseases that result from crowding and exposure to waste are managed medically e.g. by vaccination for prevention or by antimicrobials for treatment, and not by improved housing for primordial prevention. This is not a lag in economic development or in the

uptake of health-related technologies; it is a different path of economic and social change. Even to describe it as “incomplete” is misleading, insofar as the term “incomplete” suggests that LMICs have reached a different point on the same pathway instead of achieving the partial benefits they have achieved from a different trajectory.

This is evident at the level of life course narratives. What a life expectancy of 60 looks like in a current MIC is not what a life expectancy of 60 looked like when HICs reached that stage. Parents in HICs may feel that childhood and adolescence are times of risk and danger, but very few children in HICs experience life-threatening diarrhea or pneumonia and virtually no adolescents and young adults experience TB. (The exceptions to this general picture are in communities within HICs that bear a heavy burden of colonialism such as indigenous communities (Orr 2013 and Møller 2010) and in the globally mobile working class (MacPherson et al. 2009), where migration is also conditioned by colonial histories in addition to current global supply chains.) Parents in LICs with superficially similar mortality figures continue to experience episodes in which their children’s lives threatened with diarrhea in infancy – but they now know how to treat it, as few people would have known in the HICs’ pre-transition period, and they have antibiotics available for managing severe cases where this is appropriate. Children in MICs do not enjoy a trouble-free childhood, but go through the distress of under-5 pneumonia or adolescent TB, while their parents experience the anxiety of trying to secure the antimicrobials needed to treat these conditions: for 5 million children with pneumonia in LMICs annually, their parents are unable to do this (Laxminarayan et al. 2016). The use of antimicrobials along with other readily transferable technologies sustain different underlying life course narratives in LMICs compared to those that typify HICs.

16.4.3 *Underlying Causes*

Without a basic understanding of the causal processes that characterize changes in population health and health inequalities, it is not possible to evaluate normative claims about the co-existence of narrowing global health inequalities and the within country widening health inequalities. Sampling changes in a given time period and presenting them as trends (or as trends that are causally linked – with the suggestion that health benefits are, as it were, transferred from the middle classes of HICs to the workers of LMICs) can misrepresent the broad causal picture as it unfolds.

The last 100 years, both globally and within country, constitute one period in a long-term process of *widening* social inequality in health. Broadly speaking, social inequality in health has risen ever since the Middle Ages (perhaps surprisingly), when nobles and peasants seem to have had similar life expectancies (Antonovsky 1967; Bengtsson and van Poppel 2011). The late 19th and early 20th century period – in which social inequalities in health narrowed within those countries that emerged as HICs – was an anomaly.

To relate the trends to transition theory, roughly speaking, we can say that pestilence and famine affect all social classes; as societies transition to agriculture, the wealthy still have surprisingly little protection from the infectious and hygienic diseases that characterize this stage of close co-habitation with animals and increased human crowding. This “agricultural transition” lowers life expectancy for individuals while increasing population size – a qualified form of “improvement” in population health. Urbanization and the initially slow but eventually rapid growth in economic productivity associated with it, by contrast, both raise the life expectancy of the population and increase its size. However, this improvement both for individuals and for populations benefits those of higher SES more than those of lower SES, opening up differences in life expectancy that persist and for the most part continue to grow.

The only period in which social inequalities in health narrowed for a time was the classic period of hygienic and sanitary reform at the end of the 19th and beginning of the 20th centuries – when initial steps to establish safety of the food supply, clean water, and sewage were taken in HICs (Soares 2007). At this point, the happy confluence of political change (increasingly wide suffrage), scientific development (the germ theory of disease), and growth in GDP contributed strongly to this narrowing.

The post-war growth of the welfare state, including systems of universal health coverage, by contrast, has at best slowed the growth of social inequality in health: it has not moved us in the direction of social equality in health (Sreenivasan 2007; Mackenbach 2012; Reid 2016). The better off get more out of the “fourth stage” of epidemiological transition by the differential benefit they derive from programs like universal health coverage. This is not to say that such programs do not promote social equality in health: it is plausible that the poor would have been left yet further behind without them (Reid 2016).

This sampling question is significant for the normative work that the development narrative is supposed to do. The narrative of local divergence (the almost-best-off falling a bit behind) and global convergence (the worst off catching up) relies on sampling HICs just after the one period in which inequalities narrowed (thereby excluding that narrowing) and sampling LMICs at a moment in history that includes the LMIC version of that era in which (in HICs) inequalities narrowed. The underlying dynamic is that as health improves, it improves more for the better off than the worse off, absent a period where we acted on the gains that could be made by providing the basic infrastructure of public health. The broad trend is the same globally and within country: it does not reflect a tradeoff in which we forgo goods for the already pretty-well-off and give them to the worse-off. On the contrary, as we saw in the previous section, we have taken a path to improving life expectancy in LMICs that seems likely not to lead to the same gains. The inference from a given period of narrowing to a broader pattern of a gap being closed is illicit.

16.4.4 *Implications for Global AMR Policy*

The narrative of catching up ignores longer-term trends and obscures differences in typical and various life courses that cause the life expectancy gains in LMICs. Waning antimicrobial effectiveness will reveal the different underlying causes of these gains.

Current approaches to addressing the role of social determinants of health (SDOH) in the impact of AMR, consistent with the model of global health that gave us the accelerated transition, is medicalized: medical technology transfer again takes the place of political development; inappropriate standards of evidence (the movement towards implementing evidence-based standards in development) direct efforts towards primary prevention and treatment and away from inter-sectoral cooperation on health-related primordial prevention. (See King, Chap. 19, this volume; Silva et al. 2020.) The WHO *Global Action Plan* (2015a) speaks, for example, of “effective prevention of infections transmitted through sex or drug injection as well as better sanitation, hand washing, and food and water safety” as “core components of infectious disease prevention,” (§36) and “more widespread recognition of antimicrobial medicines as a public good ... [being] needed in order to strengthen regulation of their distribution, quality, and use” (§41) to address inappropriate antimicrobial use, and the development of awareness and improved veterinary education to address the overuse of antimicrobials in agriculture.

Awareness and education are inadequate to address the struggles of LMICs to promote appropriate antimicrobial use. These countries often make do with half the tax revenues proportionate to GDP or national income that HICs expect: enforcement to tame diversion and over-the-counter sales of antibiotics or the for-profit healthcare sector (a substantial source of poor prescribing – Kuo et al. 2017; Haire, Chap. 3, this volume; Liverani et al., Chap. 5, this volume; Ho and Lee, Chap. 25, this volume) are not free. Neither can LMICs confront the globalized agricultural sector that moves agricultural practices that involve the overuse of antibiotics from the increasingly intolerant regulatory environments of HICs to their permissive regulatory environments. To confront this would in turn require an end to pressure from global supply chains serving HIC-consumers against environmental and labour regulation in LMICs (the justice dimensions of such dependencies are explored in the social connectionist model of Young 2006). Focusing innovation in anthelmintics, for example, on the needs of human beings vulnerable to parasites would change treatment possibilities (in accordance with the call of Shawa et al., Chap. 10, this volume), while reducing or eliminating agricultural use and improving health-related infrastructure – both of which involve political and economic change – would change the distribution of health benefits.

In addition, there is another global structural relationship in inequalities related to antimicrobial use, insofar as antimicrobials are a common or public good, as discussed elsewhere in this volume (Smith and Coast, Chap. 17, this volume; Giubilini and Savulescu, Chap. 9, this volume). LMICs cannot “catch up” in antimicrobial use because HICs are on track to use them up, for their own needs or in service of HIC-led policies that encourage antimicrobial use in LMICs instead of balanced development,

high taxation and regulation, and democratic empowerment, the context in which conservative antimicrobial use can be implemented as policy.

The problem of effective regulation and orientation of the pharmaceutical industry towards population needs is not isolated to LMICs. Generic drug shortages in HICs contribute to AMR by driving inappropriate prescribing (Shoham et al. 2016), and every action plan on AMR highlights the failure of industry to invest in new antimicrobials, and not the problem that new antimicrobials, when found, continue to be marketed and deployed in ways that encourage non-beneficial and marginally beneficial use.

16.4.5 AMR and Widening Within-Country Social Inequality in Health

Antimicrobials played a role in the so-called “fourth stage” of epidemiological transition, in which life expectancy has been extended by effective prevention and treatment for cancer and heart disease, among other medical conditions. Insofar as progress in addressing these large sources of disease burden for HICs involves advanced surgical and other tertiary care techniques (in addition to dietary change and tobacco control), this fourth transition relies on antibiotics that make surgical and immune-system suppressing chemotherapeutics possible. Even in countries with universal, comprehensive health care without financial barriers to access (like Canada), innovations in tertiary care provide more benefit to the better-off than the worse-off (Starfield 2011; Asada and Kephart 2007)⁵ – contributing to the return to growing social inequality in health despite universal health coverage in contemporary medical care.

At a superficial level, we could speculate that the development of AMR in HICs could undo a line of medical progress that has widened social inequalities in health. But there would be many opportunities for reassertion of the general pattern of the last several centuries, the pattern of the well-off capturing a greater share of benefits and experiencing a lower share of burdens. Moderating the use of antimicrobials to preserve their effectiveness calls on solidarity as a value (Holm and Ploug, Chap. 21, this volume); the implications of waning antimicrobial efficacy will put stress on this same value. For example, the tertiary care interventions of the fourth epidemiological stage are becoming increasingly expensive due to AMR (Smith and Coast 2013; Cosgrove 2006; Teillant et al. 2015). This will continue for some time as those interventions gradually take on an unfavourable intrinsic harm-benefit trade-off for the individual patient directly involved. It is only at this last stage (where the

⁵This is thought to be because the worse-off face barriers to access that are both practical and social (e.g. geographical proximity and social capital that generates attention to the expression of need and referrals); when they do access care, they have fewer resources that would enable them to benefit from it, e.g. the social and income support to enable recovery; furthermore, the care is less suited to their needs, given that complex chronic conditions have a social gradient.

harm-benefit tradeoff shifts) that the loss of this technology would potentially narrow health inequalities by de-implementation of “fourth stage” interventions that have widened social inequalities in health. The effects of specialty and disease interest group advocacy in the intervening period may well result in even greater capture of the resources of the system for the better-off. The increasing cost of supportive care to maintain current surgical interventions while responding to AMR may also feed a political discourse around system sustainability that contributes to eroding the comprehensiveness and depth of universal healthcare coverage. Social inequalities in health could continue to widen as services for those with less voice are eroded to enable the higher cost of coping with AMR in the tertiary care sector that has served higher income persons well.

This is not just a HIC story. The Millennial Development Goals focused on child mortality and mortality of late adolescence/early adulthood (TB; the infectious and hygienic diseases), while the Sustainable Development Goals (SDG) on which the WHO embarked in 2015 focus on developing universal health coverage (UHC) and access to tertiary care – important for delivering the care necessary for chronic diseases and causes of midlife mortality that middle income countries are beginning to experience (WHO 2015b). The expected health transition from a higher burden of infectious and hygienic diseases to a higher burden of chronic, noncommunicable disease has informed this policy move. However, as we saw, MICs in particular are subject to the double burden of emerging chronic noncommunicable diseases alongside persistent infectious and hygienic diseases; they also experience a heavy burden from counter-transitions as new infectious and hygienic burdens arise (Cook and Dummer 2004; Santosa et al. 2014; Defo 2014). There is evidence that the prevalence of hospital-based resistant microbes is inversely associated with national income (Alvarez-Uria et al. 2016), suggesting that LMICs will also bear a heavier burden of hospital-based AMR than HICs, at the same time that they face a heavier burden of community-based resistant diseases. These new health systems will face the same kinds of political struggles about universality, depth, and sustainability that are in play in HICs (Norheim et al. 2014). Given the extent of economic inequalities within these countries, they will face these political struggles without the social solidarity that is somewhat protective of the breadth and depth of UHC in HICs. Indeed, some have speculated that AMR could entirely derail the SDG of UHC (Jasovský et al. 2016).

16.5 Conclusion

The debate between sufficientists and prioritarians on the one hand and egalitarians on the other turns on deep relationships between concerns about the formalism of interpersonal measures and (by contrast) the evident strength of the moral claim of the needs of the worse off. It is true that formal interpersonal measures can mask different underlying realities that would engage different concerns about justice (and other important values). Nonetheless, a fully developed picture of those

underlying realities does not necessarily support the case for priority or sufficiency as goals – whether on normative grounds or on grounds of practicality. Perhaps putting the breaks on an underlying reality (the long term trend of growing social inequality in health) is not ultimately feasible: the role that antimicrobials have played in narrowing global health inequalities suggests as much.

The current narrowing of the global gap in life expectancy will not lead to the gap closing if there are fundamental barriers to narrowing the gap built into the path to the current achievement. What looks like a normatively satisfying narrowing of the gap is in reality a period in which a limited version of a familiar (and known to be temporary) reversal of a long term trend is playing out.

In the mid to late 20th century, it was thought that there was a limit to the long-term trend of growing health inequalities – perhaps a natural limit around 75, at which point the better-off would stop gaining life expectancy and then further gains would involve the worse-off (within and between countries) catching up. This has not come about: life expectancy at the top of the scale continues to advance and cautious observers no longer try to predict the upper limit. There is no known end to improvements in the upper limit figure, and so no natural limit to the growth of social inequality in health.

This growing gap is morally complex: Who can object to saving a life of a fellow citizen on the grounds that someone far away does not have access to the same treatment? But our failure to imagine the downside of some having access to lifesaving interventions in their 10th and 11th decades and beyond while others have their prospects for a long and healthy life compromised by social determinants is just that – a failure of imagination.

A century ago, social inequality in health meant that some buried half or more of their children before the age of 5 while others experienced this heartache less frequently. The moral concern we feel when learning of a gap in life expectancy between 40 and 70 is palpable; we are familiar with these narratives and the death of children is a tragedy for which children are not blamed. Social inequality in health now looks quite different. It may mean that some will enjoy long and active retirements approaching the length of their working lives, helping with grandchildren and greeting great-grandchildren, while others manage multiple morbidities related to chronic disease while in their later working lives, juggling this simultaneously with responsibilities to others – perhaps the mental health challenges faced by their children, the substance use entanglements of their partner, and the caregiving needs of their parents who are in turn suffering in their 70s from the cumulative effects of their own chronic conditions as the life narrative legacy of their exposure to the social determinants of ill health. These caregiving responsibilities lead to loss of mobility and skill upgrading, leading to missed work opportunities and, in a technology-driven economy, even loss of work – and so (in turn) to late-life poverty and death shortly after retirement (if retirement is an option at all).

Through the lens of literature, we can look back sympathetically at the concrete social shape that health inequalities took in earlier eras (with Dickens, for example); the form they are taking today are often presented in statistical terms and we have yet to develop a cultural narrative that explores the relations of domination and

subordination and shapes the sense of intrinsic moral concern that might be raised by these differences. We are likely to think that individuals bear responsibility for these conditions (utilitarian reformers of the nineteenth century likewise thought those who were worse off responsible for their poor health). Who fundraises by running a race for the cure in their 60s and who is crowd-sourcing to raise money for their own cancer treatment (for travel and loss of work income if that treatment is covered under a universal health system, or for expensive therapeutics not covered in that universal system) – and what micro, meso, and macro relations of power are embodied here?

The *prima facie* moral plausibility of a prioritarian or sufficientist commitment is placed in question by a long-term trend towards a world in which the well-off enjoy a life expectancy – perhaps – double that of the worse-off. Suppose that the situation continued such that the person running for the cure in their 60s would become the centenarian running for the cure, and so on. How long would one remain a sufficientist? At what point would the gap become large enough that an appeal to sufficiency would ring hollow, and closing the gap would become a worthy moral commitment? If AMR makes the tertiary care that has continued the widening of the gap in the fourth stage of epidemiological transition even more expensive, at what cost and opportunity cost will we pursue the continuation of that trend or resist its reversal?

Globally, the response to AMR must move beyond lip service to the most minimal social determinants of health (sanitation and water) and engage with the political and economic process of redistributing resources and power so that governments and professional bodies can effectively regulate pharmaceutical production, distribution, and prescribing across the public and private sectors, and so that the global working class and those living with the legacy of colonization and resource theft (Wenar 2008) – whose housing conditions and social security currently preclude them from benefiting from the primordial prevention of infectious and hygienic disease that most residents of HICs have at this point enjoyed for most of the past century – can survive and even flourish despite the loss of the contribution of antimicrobials to the so-called accelerated epidemiological transition.

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