

Maternal health, epidemiology and transition theory in Africa

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Introduction

Maternal health fits awkwardly within medical history, contemporary medical provision and epidemiological transition theory. Maternity is not a disease, yet it is one of the primary causes of death for women of reproductive age in much of the developing world; the lifetime risk of dying in pregnancy or childbirth for a woman from sub-Saharan Africa is one in thirty-six.¹ How maternal deaths have been defined has varied significantly over time, as the category expanded beyond deaths immediately connected to childbirth to include all deaths related to pregnancy and post-delivery complications within 42 days of a birth. Although the medical subfield is entitled maternal health, in Africa attention focuses heavily on maternal mortality, not morbidity. In addition, whereas maternity care was a medical priority for mission and secular medicine for much of the twentieth century, in recent decades maternal health across sub-Saharan Africa has been a secondary concern. Approximately a quarter of all international development aid in 1990 was designated for maternal healthcare; by 2017 this had fallen to around a twelfth, a decline unmatched among other health focus areas.

Since 2000 international aid has focused heavily on HIV/AIDS, malaria, tuberculosis, and newborn and child health. National governments and international agencies have recognised the relative neglect of maternal health so that, for example, the UN made reducing Maternal Mortality Ratios (MMRs) per 100,000 live births to 70 one of its Millennium Development Goals (MDGs). Kenya, like several other countries, has identified high maternal mortality as one of its national

health priorities. But national interventions have frequently been underfunded and public facilities have suffered intense shortages of staff and supplies. Only two African countries (Cape Verde and Rwanda) achieved their MDG maternal mortality target; 18 experienced very slow or no change between 1990 and 2015, with, for example, Kenya's MMR falling from 687 to 510 during this period. Across sub-Saharan Africa as a whole, MMRs had fallen by 45 per cent by 2015, but were still 34 times higher than that recorded in Europe. Africans' experience of maternity appears to fit uncomfortably with narratives of progress.² Even within Abdel Omran's initial development of epidemiological transition theory, his discussion was less concerned with maternal morbidity and mortality per se than with the impact of women's illness or death during their reproductive years on overall levels of fertility.³

This chapter will suggest that the incongruity that characterises maternal health may also reveal particular flaws within theories of epidemiological transition. First, there exists the possibility that the recent identification of African divergence from a global maternal mortality norm of improvement is a statistical artifice, generated by the mass institutionalisation of delivery, rather than changing prevalence of morbidity and mortality per se. This hypothesis will be tested by examining the enormous decline in institutional maternal mortality in the 1950s and 1960s within East Africa. While this transformation seemingly fits the model of transition, it is possible that apparent improvements were a product of the rapid change in the frequency of institutional delivery which occurred over this period. It is necessary to consider whether there existed consistency over time related to whether patients felt particular conditions merited institutional care, and how such institutions recognised and recorded medical problems. If variation in the availability, accessibility and understanding of (potentially successful) treatment did exist, and if trends within individual institutions were affected by fluctuations in levels of referral, then it seems unlikely that such inconsistency will have been confined to the maternal field. The narratives of evolution which underlie epidemiological transition theory may then be based upon statistical trends that are partially misleading. Second, maternal mortality has been categorised by epidemiological transition theorists as one of the Group 1 (ancient) causes of death, alongside perinatal, communicable and nutritional mortality.⁴ In recent years, however, medical researchers have focused on the growing incidence of maternal mortality attributed to non-communicable (Group 2) diseases.⁵ Yet, while there exists a broad narrative of transition from maternal death due to infection or undermanaged risk, towards a pattern

dominated by problems associated with chronic conditions such as diabetes or obesity, there is, within East Africa, extreme variation by region (and within region) in the causes of maternal mortality. The national trend is an aggregate of extremely diverse local trends, and generates a false impression of consistent, teleological change. Third, transition theory, in its later iterations, has tended to exaggerate the centrality of the present, the individual and the cohort. Yet, for some women, maternal health-seeking behaviours are influenced by corporate or discordant advice from senior kin, that is, in part by experiences and knowledge which date from one or two generations earlier.

Since the early twentieth century, maternal mortality has featured prominently, but never centrally, in Africa's 'epidemiological imagination'. As early colonial regimes emerged from their initial, existential struggles with outbreaks of sleeping sickness, smallpox and other contagions, maternal health symbolised European empires' self-proclaimed mission to move African societies towards a future defined by morality and rationality. Maternal deaths within communities were held up as the inevitable outcomes of indigenous ignorance, squalor or superstition. Preventing such 'waste' reflected a culture of governance shaped by the logics of national efficiency. Africa's colonial governments were typically pro-natalist, anxiously combating the perceived causes of supposed population decline, and dependent on social stability. Maternal deaths threatened these core goals, and helped to justify policies characterised by radical interventionism. In reality, however, the relative rarity of maternal mortality, and the limited efficacy of biomedical obstetrics before the 1950s, ensured that it was only one part of a package of medical problems that justified sweeping reform. Women were encouraged to attend ante-natal and post-natal clinics, mothercraft clubs and delivery suites out of risk-averting self-interest. But secular and mission medicine regarded maternal healthcare primarily as a vehicle to achieve other ends. These larger goals evolved over time, reflecting the changing ambitions of church and state before and after decolonisation. Between the wars, the reduction of infant mortality, the improvement of sexual morality and an increase in levels of fertility typically took priority. After 1945, attention shifted towards utilising maternal health provision as a means of stabilising marriage and addressing endemic childhood health problems such as malnutrition. After independence, new goals, including meeting international targets for childhood immunisation, monitoring and controlling HIV infection, and, in some cases, developing a new model of postcolonial citizenry, increasingly took precedence. Over this century of shifting goals, the moral politics of

maternal mortality has evolved. Narratives of individual and communal failing have not disappeared, but they have been supplanted in recent decades by a rights-based discourse of governmental and medical neglect, within which maternal deaths have been portrayed as avoidable and emblematic of gendered and generational health inequalities.⁶

This chapter will illustrate how these broad themes played out in local contexts through an examination of two case studies. It will compare the recent history of Kisumu County, formerly part of Nyanza Province, in western Kenya, with the experiences of mid-twentieth-century Buganda, the region around Kampala in Central Uganda. These two societies, lying on the eastern and western shores of Lake Victoria/Nyanza, were intimately linked in the mid-twentieth century by rail and steamer, migration and trade. At that time, both regarded themselves as educationally advanced, economically significant and politically crucial to their respective countries' futures. Both societies have experienced fluctuating fortunes since independence but, since the late 1960s, Kisumu has consistently defined itself as structurally marginalised, whereas Buganda has driven Uganda's economic resurgence since the late 1980s. The first part of the chapter focuses on Buganda during the middle decades of the twentieth century. This was a time when the rapid development of missionary and secular maternity units, in combination with the emergence of a cohort of research-oriented physicians linked to East Africa's first university at Makerere, created a body of archival material of exceptional richness. The chapter's later sections focus on Kisumu's more recent past, and draw on a series of interviews and focus groups to supplement a documentary record which has not yet been fully disciplined by the archivist's structuring of knowledge. In both cases, attention focuses on women's changing views and practices in relation to pregnancy and birthing. While epidemiological transition theory places emphasis on the role of lifestyle choices in shaping patterns of morbidity and mortality in the recent past, this chapter suggests that neither choice nor trends are straightforward phenomena. The past is not abandoned in the process of cultural shift, but is actively reimagined in the creation of new opportunities and constraints. Indigenous foodstuffs, for example, are redefined in relation to diabetes and hypertension; traditional birth attendants repackage themselves as nurturing companions in contrast to the technical impersonality of biomedical midwifery. Above all, the meaning of care is endlessly debated within societies experiencing the marketisation of health provision, the repurposing of families and peer groups, and the recategorisation of who and what is deserving and undeserving. Shifts in

the values attached to care, and in its accessibility, underlie both what is recorded and how trends are shaped.

Measuring a transition

Since 1990 the UN has sought to standardise how maternal mortality is categorised and recorded around the world. That its major report on this project was subtitled 'Estimates by WHO, UNICEF, UNFPA, the World Bank and the United Nations Population Division' is suggestive of the multiple techniques used to measure MMRs, and their limitations. Most of the report focused on the difficulties in estimating MMRs rather than on discussing their causation. Indeed, only 18 per cent of African countries recorded data on maternal causes of death. Nonetheless, the report was able to state with some precision on page 1 that sub-Saharan Africa accounted for 62 per cent of global maternal mortality. On page 39 it stated that Kenya had made 'insufficient progress' since 1990, given that its recorded MMR had declined by only 17 per cent by 2013.⁷ However, given that maternal health has been made a national priority over this period, with a series of high-profile policy innovations including the decision to make delivery in public units free, it is necessary to consider whether the changes in national MMRs should be taken at face value. To what extent might the popularisation of institutionalised childbirth have skewed the data on institutional maternal mortality?

To address this question, this chapter will begin by evaluating a body of historical data from East Africa, analysing the rapid decline in institutional maternal mortality seen in central Uganda from the late 1940s into the 1960s. Maternal mortality was reported to be extremely common in the kingdom of Buganda in the early twentieth century. European doctors, such as the great medical missionary Albert Cook, frequently bemoaned the huge loss of life associated with pregnancy and childbirth. Medical experts, typically employing rather dubious statistical evidence, associated reproductive failure with immorality and ignorance. It was often claimed that almost all Ganda were syphilitic, and that traditional birthing practices were unhygienic and dangerous to both mother and baby.⁸ Arguing that the Ganda faced extinction unless their reproductive health improved, medical professionals enlisted the support of the missions and both colonial state and local chiefs in a campaign to press Ganda women to seek ante-natal guidance and to give birth in the clinic. By the early 1920s an impressive network of maternity centres had been created, but they were far from overwhelmed

with eager new mothers. Rather, early reports indicate that initially the women who did seek their help were probably not very representative of the female population as a whole. One constituency consisted of the great and good of Ganda society, wives of chiefs and mission workers, for whom medicalised childbirth formed part of a package of demonstrated modernity and devotional Christianity. The majority of attendees though could be characterised as the desperate. It was common for doctors to comment on women's tragic reproductive histories. In 1919 at Mengo hospital one woman reported that she had had seven successive miscarriages. Another woman had had seven live births, but all her babies had died in infancy. Overall women attending the hospital in that year reported that 65 per cent of the children they had previously given birth to had already died.⁹

Between the wars, giving birth in the clinic grew only gradually in popularity. Maternity cases at Mengo in the 1930s were about 40 per cent higher than in the previous decade, a rate of increase far inferior to that of non-maternity medical attendances. This relative lack of enthusiasm among expectant mothers reflected in part the limited efficacy of biomedical maternity provision in Africa in this period. In Mengo between the wars the proportion of women who died during childbirth remained more or less constant at around 5,000 per 100,000. Neo-natal mortality among newborns fluctuated between 4 and 10 per cent. The proportion of babies which were stillborn meanwhile rose steadily from 9 per cent in 1919 to 14 per cent in 1939. All in all, these were grim statistics given that this was the leading maternity hospital in East Africa. Hospital maternity centres were regarded by many women with a degree of antagonism in this period. Women believed that being required to give birth while lying on your back was more painful than the traditional method, resting on all fours. Some resented the moral criticism they received when they were tested positive for syphilis – with good reason given that the consensus in the 1950s was that interwar STD testing was systematically inaccurate. And they associated the clinic with death.¹⁰

After the Second World War, however, the popularity of medicalised childbirth soared. The proportion of all births which took place in a medical facility in Buganda rose from approximately 20 per cent in 1947 to 30 per cent in 1958 and 40 per cent in 1967. No doubt the exceptional availability and visibility of maternity services facilitated the growth in attendances. As early as 1926 there were 19 maternity centres, state and mission, in rural Buganda. By 1959 Buganda had 969 maternity beds in 45 centres. Throughout Uganda an enormous expansion in ante-natal

and mother and child services had begun in the early 1950s, successfully portraying institutionalised childbirth as a normal part of modern life, not something reserved for the elite or the despairing. Nsambya mission hospital in Kampala accordingly saw the number of deliveries increase by 600 per cent between 1954 and 1969.¹¹

This expansion in both the demand for, and the provision of, medicalised childbirth coincided with a remarkable reduction in pregnancy-associated mortality, contrasting sharply with what has happened in Kenya since public maternity care was made free in 2013. Comparing outcomes from Kampala's mission hospitals in the decades before and after 1950, the proportion of babies that were stillborn fell from 13 to 3 per cent, neo-natal deaths fell from 8 per cent of all live births to 3 per cent, while the maternal mortality rate per 100,000 fell from c.4,500 to 500. Doctors at the time believed that the key innovations that facilitated this huge improvement in survivorship were the use of penicillin to reduce post-partum infection, the introduction of blood transfusions to respond to haemorrhage, and the adoption of the lower segment caesarean section and, subsequently, vacuum extraction to deal with cases of obstructed delivery and foetal distress. It is likely though that a steady increase in birthweights over this period would also have played a role in increasing babies' robustness, while Buganda's educational advantages meant that adult female literacy had reached 36 per cent by the 1950s, greatly enhancing the likelihood that women would be able to look after their health during pregnancy.¹² This would seem then to reinforce the argument developed in Simon Szreter's chapter, that focused medical interventions, supported by the state or religious institutions, can have very rapid effects on morbidity and mortality, particularly where technological change broadly aligns with social change.

Yet there remains the very real possibility that this apparent improvement in outcomes in Buganda was simply a function of changes in the population at risk. It is conceivable that a lower proportion of women and babies died during and immediately after assisted childbirth because hospitals were suddenly swamped with normal women, rather than those with tragic reproductive histories or chronic poor health. This factor must have had some impact on the outcomes, but there are several approaches which indicate that survivorship probably did improve significantly during the later colonial period.

The first is that Mengo and Nsambya from the 1920s through to the 1960s served as referral hospitals for a network of rural maternity centres scattered across Buganda. Frequent references to referrals within

the maternity registers indicate that this referral system was still fully functional – if anything it is likely that it operated more effectively given the huge expansion in ante-natal care that began in the 1940s. Women who were identified as high risk because of their history or stature were despatched to Kampala for expert assistance. That this system worked well is indicated by data from the 1930s which showed the rural mission centres achieving rates of stillbirth and neo-natal and maternal mortality that matched those of England and Wales – an exceptional performance, but one achieved in large part by the rapid despatch of any abnormal cases. Yet survival rates at the rural centres declined three times more slowly through the 1950s and 60s than in the Kampala referral hospitals, suggesting that it was technical improvements in care at the higher level units which lowered mortality rates.¹³

The second method which can be employed to evaluate to what degree the decline in recorded institutional mortality rates reflected actual trends is to examine cause-specific mortality. If patients with the same condition experienced declining mortality rates over time, then that could suggest that specific medical interventions were reducing maternal deaths overall. The best example to use is the treatment of obstructed delivery. Buganda was famous in obstetric circles during the colonial period for having the highest recorded rates of obstructed delivery, and of mortality relating to it, in the world. In the 1930s it was found that an unusually large proportion, 18 per cent, of Ganda women had compressed pelvises, probably due to childhood malnutrition. Overall the average Ganda pelvic outlet was 14 per cent smaller than that of women in England and Wales, yet the average foetal skull was only 5 per cent smaller. It seems that the improved diet and health of small-framed women had resulted in a sharp increase in birthweights, and therefore in the size of babies' skulls, provoking a situation where disproportion was endemic. Maternal exhaustion and uterine rupture, followed by shock, haemorrhage and infection, meant that disproportion was the most important cause of maternal death and stillbirth in Uganda's hospitals before the 1950s. Surgical interventions between the wars were notable for their lack of success. Babies stillborn due to cranial injury following the use of forceps appeared in the registers with depressing regularity. By the 1950s the crisis had eased. The average Ganda pelvis was now 14 per cent bigger than it had been in the early twentieth century. Better nutrition in utero had been sustained through to adulthood. As babies' birthweights had only increased by 4 per cent, the frequency of disproportion reduced but, just as importantly, the medical response to the problem improved radically. Women of small

stature were automatically identified during ante-natal checks as requiring assisted delivery, while the introduction of the lower segment caesarean section in the 1950s, and vacuum extraction in the 1960s, resulted in the proportion of ruptured uterus cases in Kampala ending in maternal death falling from 90 per cent in 1951 to 29 per cent in 1959. Much of the improvement in survival rates in this period then was due to enhanced treatment for this one condition, which was only indirectly affected by the general expansion of maternity care.¹⁴

How does this historical perspective shape our understanding of Kenya's MMR situation of recent decades? It is of course risky to compare institutional MMRs from different countries and periods. Intense pressure on bedspace in Kisumu's referral hospitals since delivery was made free to the user has led to patients being discharged a few hours after being delivered, fostering the impression that the current system prioritises quantity over quality. By contrast, in the 1960s, patients were typically retained for a day. Therefore, the likelihood that a maternal death would occur in hospital today is lowered simply because the period of risk has been reduced. Moreover, cultures of data recording may also have fluctuated over time. It is possible that the recent shift towards performance-related funding would encourage the false recording of (successful) admissions into the medical system. Whether such motivations would affect maternity cases, given the exceptional detail required for maternity admissions, including cross-referencing to carefully monitored data such as HIV status, is uncertain. What seems more likely, as suggested in various conversations with Kisumu senior medical staff, is that the attempt to reduce maternal mortality by implementing intensive reviews of each institutional death, as well as growing community anger at the frequency of maternal death, had encouraged staff at lower-level institutions to pass patients with complications up the referral chain, even where a transfer was not in the patient's best interests. The desire to avoid responsibility for maternal mortality, in other words, acted to increase MMRs overall, but particularly in the referral hospitals. Referral, moreover, is also more likely to occur where complications relating to a non-communicable disease (NCD) are present. The increasing perception among high-level specialists that NCDs are on the rise may reflect a referral system of increasing efficiency rather than radically changing prevalence.¹⁵ There are therefore forces at work skewing institutional rates in different directions, making assumptions about epidemiological transition over time problematic.

Nonetheless, it does seem striking that institutional MMRs in Kenya's major referral hospitals during this decade are similar to, or

higher than, those recorded in Uganda's referral hospitals in the 1960s. Kenyatta National Hospital's MMR in 2017–18 was 700 per 100,000. National rates, too, may have fluctuated to some degree since 1990 in East Africa, but they are not substantially lower than the figures from the 1960s. If these figures are comparable, then their congruity is unusual. Indeed, since 2000 in Kenya, MMRs and the intimately related Neonatal Mortality Rate have declined much more slowly than other major health indicators. Strikingly, for example, Kenya's Crude Death Rate is now lower than Europe's.¹⁶ While maternal mortality may be revealing, it is important to note that it may not be representative of wider statistical trends. But the relative exceptionalism of maternal health trends is suggestive of gendered disadvantage, a phenomenon characteristic of more extreme 'counter transitions'.¹⁷

NCDs and maternal mortality

Epidemiological transition theorists tend to assume that their model of change is universally applicable. Societies, it is argued, tend to move in the same direction, both in comparative terms and with regard to internal consistency. It is more the pace of change on which scholars have focused, since Omran first identified three models of transition: the classical western, the accelerated, and the delayed.¹⁸ It is natural that the measurement of progress or regress in health indicators is organised by the nation-state. The nation-state legitimises itself in part by its capacity to assemble data, which can be used to evaluate its position in regard to its peers. Yet the internal representativeness of data compiled at the level of the nation-state is not the same everywhere. While the nation-state emerged in Europe several centuries ago as part of a project aimed at the achievement of domestic cohesion, rarely have pressures towards cultural homogenisation been sustained for long in sub-Saharan Africa. Given Africa's exceptional ethnic diversity, and the extreme regional inequality of socioeconomic development which is part of its colonial legacy, there exists a fundamental flaw in the national statistics used by governments and international agencies to measure changes in health trends. In Uganda, for example, 43 indigenous languages are spoken, and regional variation from the national mean is extreme. Thus, in 2017, the per capita share of GDP in that country's wealthiest region, South Central Uganda, was 10.9 times higher than in the region of Karamoja, where 61 per cent of the population lived in absolute poverty. In 2016 female literacy across Uganda also varied sharply, again from

high of 92 per cent in Kampala and 82 per cent in South Central to a low of 18 per cent in Karamoja.¹⁹ In most African countries a national average is an amalgam of wildly fluctuating local rates and trends. Relatively few regions are located near the mean, so that there exists little real sense of a norm in relation to a range of indicators. This is as true of measurements of health and demography as it is of social and economic development. Thus in Kenya, for example, the 2014 DHS report indicated that the national Total Fertility Rate was 3.9, but local rates ranged widely from Kirinyaga's 2.3 births per woman to Wajir's 7.8. HIV prevalence averaged 6 per cent but ranged from 0.4 per cent in Wajir to 26 per cent in Homa Bay. Childhood diarrhoea averaged 15 per cent but ranged from 3 per cent to 28 per cent.²⁰ And in terms of maternal mortality ratios in 2010 Kenya's national average was 495 deaths per 100,000 births, but the range varied from Manderu's enormous 3,795 to Nairobi's 160. If the timing of maternal mortality is considered, again major differences can be seen, with post-partum mortality accounting for 43 per cent of all maternal deaths in Nyanza Region, but only 15 per cent in Northeastern Kenya. Even if these internal differences were ignored, it would be difficult to derive any sense of transition from reported national MMRs, which fell from 590 per 100,000 in 1990 down to 414 in 2003, but then rose to 495 in 2010.²¹

Policymakers in Kenya are well aware of these extremes, and the impossibility of developing national plans which can encompass the range of situations found across the country. 'Manderu and Kirinyaga are like two different countries' was how one demographic advisor to the Kenyan government put it.²² Yet national plans are required, and within Kenya's policy on maternal health, growing emphasis has been placed on the risks associated with NCDs, particularly diabetes, hypertension and obesity.²³

The increasing significance of NCDs in Africa should not be ignored, and they remain under-researched and underfunded in a continent where the structural primacy of infectious disease continues.²⁴ With specific reference to maternal mortality, NCDs such as anaemia, cardiovascular conditions and diabetes are implicated in increasing numbers of pregnancy-related deaths across the global south, with obesity identified as an underlying factor of growing significance. Moreover, women of African descent suffer disproportionately from pre-eclampsia compared to those from other parts of the world.²⁵ It should be noted though that, where NCDs do affect maternal health, their manifestation is often indicated as an episode of crisis, rather than chronic illness, further complicating visions of transition. It is also necessary to consider whether

the perception that changes in diet and lifestyle have fundamentally altered patterns of morbidity and mortality has, to some degree, deflected attention away from pre-existing, perhaps more mundane, causes of maternal illness and death. It is not unusual in western Kenya for people to initially emphasise that the local diet used to be extremely healthy when asked why maternal deaths occur. Contamination of foodstuffs and rising consumption of processed staples are significant health risks in Kenya but, in this region, the incidence of obesity and diabetes among women is relatively low (6.8 per cent and 0.7 per cent, far below the national rates), and hypertensive disorders are important but not the primary causes of maternal mortality. Nyanza region had the second-lowest level of hypertension among women of reproductive age in Kenya in 2014. Moreover, eclampsia and pre-eclampsia are the result of a range of factors, including genetic predisposition and stress.²⁶ To consider stress as a fundamentally modern phenomenon is problematic in itself; to assume that causes of stress during pregnancy are universal is even more dubious. Pregnancy in western Kenya is often the factor which leads to women discovering they are HIV positive; it is commonly expected that women continue with their normal work until childbirth; verbal and physical abuse of maternity patients is far from unusual; and most women know that emergency medical care is of uneven quality and availability. To go into labour at night when it is raining, a far from unusual situation, in many cases makes transportation impossible. In recent research Jane Plastow asked dozens of women near Kisumu what their emotional response was to their most recent pregnancy; almost all reported fear and anxiety.²⁷

This tendency to highlight NCDs is not confined to popular discourse. Opportunities for specialism, advancement and research funding shape policy and practice. So, too, do the patterns of morbidity observed in research-oriented referral hospitals. The finding that hypertensive disorders were the primary cause of death at Kenyatta National Hospital has been interpreted by Kenya's leading obstetricians as an indication of a major shift from haemorrhage to eclampsia/pre-eclampsia reflecting underlying change in morbidity patterns and improvements in the treatment of severe bleeding. Country-wide statistics which show that this transition is confined to the institution at the apex of the national referral system are acknowledged, but not with the enthusiasm reserved for the new.²⁸

This intellectual interest in the emerging problem of NCDs among maternal health experts contrasts with the assumption among the broader elite of Nairobi that high maternal mortality among the Luo

was simply a product of HIV, poverty and what is perceived as a stubborn traditionalism, reinforced by low educational standards.²⁹ Such assumptions broadly tally with what are categorised as indirect causes of maternal death, which undoubtedly do play a role in the former Nyanza region's high MMRs. In 2013, for example, HIV was implicated in a third of all maternal deaths in one study in rural Nyanza. Arguably, it was the catastrophic scale of the HIV epidemic which turned Luo culture inwards, and certainly in the past the Luo were among Kenya's best-educated ethnic groups. Despite decades of impoverishment in terms of income and public school provision, the former Nyanza region falls in the middle rather than at the bottom of Kenya's education scale. This false sense of unchanging 'backwardness' distracts attention from a core issue within the current crisis of high maternal mortality ratios: why has substantial investment in maternal health since 2010 seemingly not reduced mortality rates more significantly? How should the similarity in institutional maternal mortality rates in the recent past to those recorded in East Africa 40 to 60 years ago be understood? Are such medical data comparable over time, and if so, how should this apparent consistency be interpreted?³⁰

Epidemiological transition theory, the present and the individual

Epidemiological transition theorists have often made assumptions about disease risk, patterns and interventions which exaggerate the centrality of the current period, the autonomy of the individual or the capacity of a cohort to act in social isolation. Such suppositions were not expressed overtly in Omran's original 1971 statement, although they were implicit in his theory's deterministic logic, and his reference to the impact of modernisation on 'national and individual aspirations'. In Omran's later writings, however, his analysis of epidemiological change moved beyond the societal level, noting variation by large social categories, such as class, age group, gender or ethnicity, and associating the introduction of female schooling with enhanced childcare.³¹ Still, it is in the writings of other scholars that what was implicit in Omran's work has been more fully drawn out. Assessments of the factors which put individuals at risk of developing specific NCDs have placed heavy emphasis on individual life choices such as smoking, unhealthy diets and lack of exercise. Mental illness, suicide, substance abuse, cirrhosis of the liver and other conditions have been labelled as socio-pathological and lifestyle-related by scholars

such as Rogers and Hackenberg. This stress on individual action (or inaction) has been accompanied by a recognition that individual risk is shaped by socioeconomic context, with, for example, the sharp declines in heart disease and stroke observed in various Northern societies in recent decades being much more evident among groups of higher social status. Scholars such as Salomon and Murray have modelled how variation in income levels shapes mortality levels by cohort over the life course.³²

This is not to deny that factors such as income, education or employment significantly influence an individual's health status. However, for some women in East Africa maternal health-seeking behaviours are influenced by mothers, aunts or mothers-in-law, or their own or their partner's grandmothers or great-aunts. Receiving information about maternal health from traditional birth attendants (TBAs), who are often elderly women, also remains extremely common. This engagement with the elderly seems to occur less often among women who are well-educated and relatively financially stable, where peer groups seem to carry more influence, but even among such relatively autonomous women the role of elders is frequently significant.³³ In other words, the response to medical problems in the present is in some cases shaped partly by experiences and knowledge which date from one or two generations ago.

The durability of beliefs and attitudes around maternity is perhaps unsurprising, given how emotionally and physically extreme experiences of childbirth typically are. During interviews, very elderly women could relate the story of their first births, which occurred sometimes six or seven decades previously, in great detail.³⁴ For women who had very negative experiences, lessons learned were to be shared, not retained. One woman recounted how one evening, at the age of 16, she went to the regional referral hospital as soon as her labour pains started. On admission she was told she was not yet ready to deliver and should wait. No-one attended her through the night – the informant believed the nurses were sleeping – even when she called for help as her contractions strengthened. Only when she was in the final stages of childbirth did her screams attract attention, and her baby was delivered by a nurse-midwife. As the terror of the night subsided, the morning brought intense resentment. She resolved that she would never deliver again in a hospital, and shared her experiences with her own daughters, warning them of the dangers of putting themselves in the care of those viewed as uncaring.³⁵

Even more common than the sharing of narratives of neglect is the recounting of stories of abuse. Elderly grandmothers contrasted their

experiences of childbirth supervised by a TBA with those where they had been institutionalised. In these morality tales, TBAs comforted and reassured women, whereas nurse-midwives humiliated those who failed to fit their model of the ideal mother. Recurring themes included accounts of nurse-midwives slapping and pinching women who made too much noise during contractions, complaining that village women smelt 'bushy', and questioning the sexual self-control of both very young and very old mothers. Many women reported that when they asked for attention during labour, nurse-midwives asked if they had needed their help on the night they had conceived.³⁶ Of course, not all women had negative experiences of medicalised childbirth in the past. But even some of these women used their positive memories to counsel their daughters and granddaughters about the risks of attending the clinic. Within this cohort it was generally agreed that nursing staff in the past had typically been conscientious and that 'only a few bad ones' abused patients. Today, by contrast, elders held that rudeness and carelessness had become the norm. Nursing, it was agreed, was no longer a calling, but a job for those who had nothing else to do.³⁷

Such intergenerational transfer of wisdom is not always welcomed, and even where its relevance is acknowledged, pregnant women in western Kenya do not necessarily follow the advice given. Since the Kenyan government made delivery in public hospitals (technically) free in 2013, the proportion of women who give birth in a medical unit has risen by 20 per cent, and more than 90 per cent of women attend an ante-natal clinic at least once. But these statistics convey a false sense of compliance, or indeed transition. Many younger women who engage with maternity services do so reluctantly. They attend ante-natal only once, to be registered in the system, because they know they might otherwise be refused admission to the delivery ward should their homebirth develop complications. Some fail to attend the recommended post-natal checkups, deterred by their own negative experiences of the maternal healthcare system.³⁸ Elderly TBAs reported that, while they were no longer called upon so frequently to assist during childbirth, their services during pregnancy were as popular as ever. That most of these services were nurturing (reassurance, counselling, massage) is indicative of the perceived failings of the biomedical system, which help explain why patient engagement with it is often limited.³⁹

The repurposing of the TBA is suggestive of some of the complexities at play in the evolution of narratives and support mechanisms around reproduction in western Kenya. Elderly informants tend to highlight the tenderness of the TBA for the purpose of condemning the coldness of

the biomedical professional. When elderly women were asked to tell their own birth stories, it was not unusual for TBAs to be presented in a different light. Luo women might have been relatively cosseted during their pregnancies, but delivery itself was defined as an opportunity to demonstrate both physical and emotional endurance. TBAs' role in part was to train Luo women to adopt the self-control of motherhood, by teaching them to avoid displaying fear or discomfort: 'the first birth is always painful; it just needs courage'. One informant remembered her treatment in the 1960s and 1970s, 'Well mine wasn't that bad since I was very strong. Some could abuse you, slap you and all sort of things.'⁴⁰ Since TBAs were forbidden from delivering women as part of Kenya's push for universal institutionalised delivery, they have redefined their roles, shifting away from discipline towards the provision of emotional and physical comfort. This has been accompanied by a monetisation of their services. In the past, the TBA was rewarded for her services with gifts of food or small stock. In recent years, theirs has been a cash-based service. Not all TBAs have managed these transitions effectively but, for those who have, their removal from the act of childbirth itself seemingly has not significantly affected their income levels. Some younger informants sought massage and counselling from TBAs every fortnight through their pregnancies, such that the most successful providers of these services struggled to manage demand.⁴¹ The traditional birth attendant today is not so traditional. Narratives of change within the biomedical world should be considered in relation to the separate, but intersecting, evolution of 'traditional medicine'.⁴²

While this chapter has so far argued that intergenerational influence challenges the linear assumptions which underpin transition theory, it is important to note that relationships between the generations are also subject to change. The sub-group which is most vulnerable to risk of maternal mortality today consists of adolescent girls. Teenage mothers are at risk not only because of their physiological immaturity, but also because of the lack of support they receive from medical staff *and* their senior kin. Kisumu County has one of the highest rates of teenage pregnancy in Kenya, which seems to have sharpened rather than reduced social condemnation. Very young mothers repeatedly report being mocked when they attended ante-natal clinics, by older mothers in the waiting area, and then by medical staff: 'Come and see this! A baby having a baby!' Teenage girls state that it is the norm for their fathers to beat and verbally abuse them, and often to drive them away. This is not because the age of sexual debut has changed significantly over the decades – in one focus group of six Luo grandmothers all had conceived

by the age of seventeen – nor even that sex before marriage is a new phenomenon. But in the past only non-penetrative pre-marital sex was legitimate, and early marriage for girls was the norm. The age at marriage has risen, and *codo* (adolescent thigh sex) has been forgotten, but pre-marital conception remains much more of a taboo among the Luo than is the case in many other East African societies.⁴³

In the past the role of guiding adolescent Luo girls towards womanhood typically fell to grandmothers, particularly where, as was often the case, girls moved from their parental home to live with their grandparents on reaching puberty. Grandmothers today feel sharply their failure to sustain this practice. From their perspective, young women have chosen to isolate themselves from familial support. A recurring theme of the elders' focus groups was that 'the world has turned sour because people have lost their morals.'⁴⁴ In grandmothers' narratives, that 'the world is nowadays rotten' was linked to their assertion that their granddaughters 'are digital so they don't ask [for guidance] ... I haven't seen them coming'. In fact, further discussion revealed that conversations did occur, but seemed unproductive. 'These modern women can't be taught. [I just] tell them to go to the hospital because if I try to explain anything traditional to them then they get furious and can start war with you.' 'Sometimes you'd wonder what is up with the woman, she came when she's okay, later on you realize it is the chemicals they insert in their bodies.'⁴⁵ This reference to chemical imbalance relates to a larger sense of the inauthenticity of the young Luo woman related within elders' accounts. Several focus groups referred to the young as being digitized. The common use of contraceptive implants across Kenya was associated with a loss of personhood. 'What is more dangerous to our daughters-in-law, granddaughters and even you is the digitalisation of the world. These metals [implants] inserted in the body ... And this metal also kills babies nowadays ... The metal has a chemical that I don't understand how it works. It has been a cause of death amongst young women.' From elders' perspective, these women were lessened rather than enhanced by their bionic status. 'Nowadays, you see, your daughter-in-law is brought and she gives birth to only how many kids? One. Then she swears not to give birth again.'

This weak maternal instinct was, in grandmothers' eyes, often compounded by moral and physical inadequacy: 'you can find a woman with the metal [implant] in her arm and the husband is not even aware.' Then, if she does become pregnant, 'she is unable to give birth [naturally] and she is operated', because young women are too weak to push.⁴⁶ The insufficiency of the young was blamed, in part, on their bodily

contamination by medicine and diet that was synthetic, convenient and therefore corrupting. 'Maybe it is what the young eat, and the medicine they take, but those days there weren't as many maternal deaths as today.' The healthfulness of the traditional lifestyle was contrasted repeatedly in interviews with that experienced by the young – farmwork rather than urbanity, herbal medicines rather than chemotherapeutics, boiled rather than fried food, millet not maize, porridge not tea, ghee instead of oil of doubtful provenance. Young women 'take light foods that can't strengthen them during birth. Sometimes you find the baby is heavier, therefore they lack the strength to push the baby.'⁴⁷

It is not unique to Luoland, nor to the recent past, to find the elderly complaining of the corruption of the young in East Africa.⁴⁸ In this case, what elders observe is not a complete disengagement between the young and their seniors, nor the absolute individualisation of health-related decision-making. Rather, it seems to be more a shift from young women relying primarily on guidance from grandmothers, towards a greater engagement between adjoining generations. Until the mid-twentieth century, Luo women's lives were shaped by normative rules that sought to impose a degree of separation between post-pubescent girls and mothers. As one elderly informant remembered, 'When a girl was old enough to start her menstrual cycle then you were not allowed to sit on your mother's bed, not even in her bedroom for if the blood spilled on your mother's bed then it was believed that this may prevent the girl from being able to give birth. A girl was only allowed to sleep in her grandmother's hut who taught her everything.'⁴⁹ In recent years, according to female elders, they tend only to hear of their granddaughters' reproductive lives indirectly. 'Most of them, they only believe their mothers are the ones to help them.' 'Their mother is the one who can tell you.' Yet for all the agency that female elders believe young women to have, young mothers often presented a sharply different perspective during interviews. Rather than achieving autonomy over their bodies and the making of decisions about their health, marriage had placed them under the authority of their mothers-in-law. Recently pregnant Luo women asked by Jane Plastow to identify key themes for a community theatre production about maternal health stated that the change they desired most was a reduction in the extent to which their husbands' mothers controlled their reproductive lives. Not all young women feel able to express their resentment. Nurse-midwives frequently complained that young women of limited education felt unable to authorise medical interventions. One interview in a hospital was interrupted when the senior nurse was called to persuade a first-time mother that she did not

need her mother-in-law's permission to have a caesarean section. As the nurse recounted afterwards, 'I explained that she had rights as an adult to make the decision. She said "Do I?" Still, I had to phone the mother-in-law and husband so she could hear them say it was OK.'⁵⁰ Reliance on elders' experience of maternal health has not disappeared, then, but nor is it an unchanging obstacle to the smooth transition towards some form of epidemiological modernity.

That individuals make health-related decisions following discussions with their relatives should not in itself be a cause for concern. A person's medical treatment often has implications for other family members, while navigating through Kenya's healthcare system without the benefit of lay experience is a difficult task. Maternal health is an especially complex sector within the medical system, as a series of policy changes have left many women unsure of their currently valid entitlements and choices. Rutenberg and Cotts Watkins have observed that women's desire for non-expert guidance in their reproductive health planning is above all a reflection on the often opaque, disengaged and generic nature of the medical information provided by health professionals.⁵¹ But women do not always seek or desire guidance, and unsolicited familial instruction is less welcome than the requested sharing of peer experience. It is argued here that the cross-generational nature of familial advice-giving works against the logic of epidemiological transition theory. Focusing on shifts in medical technology or coverage is of more relevance for some health categories than others – for fields such as maternal health, societal attitudes and mechanisms of knowledge transmission are also key. Large-scale changes in 'development' indicators, such as the proportion of births attended by a medical professional, do not automatically translate into substantially different health patterns. Maternal mortality remains so high in western Kenya largely because of late diagnoses of, or responses to, emergencies. Some of these crises result from underlying diseases commonly associated with modernisation, such as diabetes, hypertension, and of course AIDS. Others can be linked to understaffing and under-resourcing. But an underappreciated factor seems to be the conflictual relationships, tying present to past, which shape childbirth for so many women.

Care has been contested throughout the past century, in terms of its meaning, provision and gatekeeping. Maternity presents health challenges which are measured out in a series of fixed, relatively short-term, consecutive phases – three trimesters of pregnancy, three stages of childbirth, and the six weeks of the post-partum period. But the monitoring of progress and management of risk is shaped not only by the

immediacy of gestation and recovery, but also by longer-term narratives, shaped locally by perceptions of cultural change, and nationally by policy development influenced by notions of epidemiological transition.

Conclusion

Epidemiological transition theory, which emerged out of modernisation and demographic transition theories, argues that all societies will replicate the western transition from epidemics of infectious disease to a health pattern dominated by chronic, lifestyle conditions.⁵² A series of important works have critiqued the epidemiological transition model, arguing that African experience does not fit a linear pattern of change. Notkola, Timaeus and Siiskonen, for example, offer an unusually detailed case study of falling mortality within one society. They note that the African ‘transition’ varied from the standard model both in the unusually high mortality among adults in the past, and in the resurgence of infectious disease since the 1980s, in the form of HIV/AIDS.⁵³ Whether the distinctive character of chronic disease in Africa, meanwhile, is best explained by ancient genetic adaptations to infectious disease, local socioeconomic adaptation to changes in food preparation and availability, or contemporary global inequalities remains as yet uncertain. But the theme of inequity applies beyond the realm of income and property, with Prince and Marsland, and Livingston illustrating how chronic conditions are neglected within a medical system which remains heavily focused on contagion. Livingston further challenges Omran’s model by noting that chronic conditions in Africa often result from infection and criticising universalist epidemiological theories which underplay the significance of local contexts of disease causation and response.⁵⁴

An analysis of maternal mortality reinforces many of these critiques, but it reminds us that adult mortality patterns are heavily gendered, and that NCDs are rapidly increasing in significance within high-level policy discussions. It also permits an engagement with epidemiological transition theory’s emphasis on the role of cultural shift in the rise of NCDs, in the form of individual or cohort choices around lifestyle and consumption. Maternal healthcare is perhaps unusually shaped by local cultural assumptions, by intergenerational relations and knowledge transfer, and by group decision making.⁵⁵ But such factors are certainly not limited to pregnancy and childbirth.

A focus on maternal health also reinforces criticisms of depictions of epidemiological transition as a homogeneous global phenomenon.

But it further highlights the sharp divergence which can be observed in patterns of morbidity and mortality between different regions within many African countries. In the field of maternal health, extreme sub-national variation exists firstly in the timing of maternal death: whether this occurs most frequently during pregnancy, childbirth or the post-partum period. Secondly, while sub-Saharan Africa suffers the largest number of maternal deaths due to indirect causes in the world, within African countries different indirect causes dominate in different regions. In Kenya, for example, most indirect causes around Kisumu relate to infectious diseases such as HIV and malaria, whereas NCDs such as diabetes are dominant in the central region.⁵⁶

An examination of maternal mortality over time, and as it is discussed between the generations, highlights other problematic aspects of epidemiological transition theory, such as its assumptions of a linear relationship between, for example, education and health attitudes, and that health-related decision making is best understood in terms of logic and rational choice.⁵⁷ In rural Kenya health options are often poorly explained, and what may appear as a choice may prove in practice to be unavailable. Patients, unsurprisingly, frequently seek, or receive, advice and reassurance elsewhere, often from senior kin. Sometimes such lay guidance aligns with current medical recommendations. Not uncommonly, however, lay advice reflects the experiences or moral codes of previous generations, challenging the idea of clear chronological progression which lies at the heart of epidemiological transition theory. Achieving good healthcare, therefore, requires negotiation in domestic but especially institutional settings. Personal networks as well as educational attainment influence how effectively individuals navigate through a highly complex system of healthcare provision, constantly remade through decentralisation, experiments with vouchers, 'free' care, and the incorporation, exclusion and repurposing of TBAs. Meanwhile the trust which underlies logic-based choice is, often, tentative. Reproductive health in Kenya is a subject of intense scepticism in many communities, where rumours of malintent and malpractice are recurrently, but ephemerally, challenged by public health interventions, from radio advertising campaigns to the provision of free goods to patients.⁵⁸ In contrast to the neatness of transitions, rumours disrupt the periodisation and localisation central to historical reconstruction. Moral narratives, like rumours, spread and survive shaping behaviours far from the time and place where lessons to be learned applied directly. Attitudes and behaviours are governed by moral debates as well as 'hard' data. Elders see changes differently from statisticians – they may

recognise, for example, that AIDS mortality has fallen significantly, but HIV remains high and narratives of crisis and moral decline remain relevant. Equally, MMRs are unlikely to be higher today than half a century ago, yet they are highly publicised in the media now, they occur in public spaces rather than private homes, and again they are discussed within a moral framework of decadence. Clinical advances in societal health can be complicated by perceptions of societal decline.

Notes

- 1 This research was funded by the AHRC-MRC award 'Maternal Mortality in East Africa' (MC_PC_MR/R024502/1). Filippi et al., 'Levels and Causes of Maternal Mortality'.
- 2 Dieleman et al., 'Spending on Health and HIV/AIDS'; WHO, UNICEF, UNFPA, World Bank and United Nations Population Division, 'Trends in Maternal Mortality'; Alkema et al., 'Global, Regional, and National Levels and Trends in Maternal Mortality'.
- 3 Omran, 'The Epidemiologic Transition: A Theory'. See Weisz and Olszynko-Gryn, 'The Theory of Epidemiologic Transition', for discussion of Omran's use of epidemiological transition to promote population control. Omran did note that maternal mortality affected the relative risk of female survival over a woman's life course.
- 4 Murray and Lopez, *The Global Burden of Disease*.
- 5 See for example McCaw-Binns, 'Epidemiologic Transition in Maternal Mortality and Morbidity'.
- 6 Hunt, *A Colonial Lexicon of Birth Ritual*; Doyle, *Before HIV*; Prince, 'Introduction: Situating Health and the Public in Africa', 3.
- 7 WHO, UNICEF, UNFPA, World Bank and United Nations Population Division, 'Trends in Maternal Mortality'; UN, 'The Millennium Development Goals Report 2015'. In many African countries the quality of the data collection was so poor that little confidence should be placed in the precision of the reported change between 1990 and 2015. In Nigeria, for example, the point estimate for the relative reduction in MMR 'suggests a decrease of 39.6 per cent', according to one study. But the estimates generated with 80 per cent uncertainty intervals indicate that Nigeria's MMRs might have fallen by more than 80 per cent, or risen by 5 per cent; Alkema, 'Global, Regional, and National Levels'.
- 8 Cook, 'An Urgent Need in Uganda'; Lambkin, 'Mission to the Uganda Protectorate'; Cook, 'Obstetric Medicine in Uganda'; Cook, 'Recent History'; Uganda, 'Annual Medical Report, 1932'. For broader discussion see Tuck, 'Venereal Disease, Sexuality, and Society in Uganda'; Vaughan, *Curing their Ills*.
- 9 Cook, 'A Social Purity Campaign in Uganda'; Mengo Maternity Register for 1919; Musisi, 'Transformations of Baganda Women'. See also Summers, 'Intimate Colonialism'.
- 10 Mengo Maternity Registers 1919–39, Mengo Hospital Archive, Albert Cook Library, Mulago, Kampala; Interview (Int.) HW, Female (F), retired doctor, UK, 31 July 2008 (all interviewees were promised anonymity, so names have been changed and abbreviated); Billington, 'Neurosyphilis in Natives of East Africa', 32; Davies, 'Pathology of Central African Natives'; Davies, 'Causes of Death in African Children', 228; Doyle, *Before HIV*, 260–78.
- 11 Uganda Protectorate, *Annual Report of the Medical Department, 1947*; Uganda Protectorate, *Annual Report of the Medical Department, 1958*; Grech et al., 'Maternal Mortality in Uganda'; Buganda Annual Report 1926; Franciscan Missionary Sisters of Africa, 'The History of our Mission Work'.
- 12 Doyle, *Before HIV*, 273–5, 294, 302–4; Rendle Short, 'Causes of Maternal Death'; Everett, 'Causes of Stillbirth'; Grech, 'Review of the Treatment of Ruptured Uterus'.
- 13 Annual Medical Report Mengo District 1958; Grech et al., 'Maternal'; Nsambya Maternity Registers 1945–69; Nkokonjeru Maternity Registers 1954–69; Doyle, *Before HIV*, 262.
- 14 Rendle Short, 'Rupture of the Gravid Uterus'; Mengo Hospital Maternity Records, 'Report of the Lady Coryndon Maternity Training School'; Allbrook, 'Some Problems'; Billington, *A Tune*,

- 13, 92–7; Int. HW, F, retired doctor, UK, 31 July 2008; Rendle Short, 'Causes'; Everett, 'Causes'; Marasha, 'Causation and Prevention of Stillbirths and Postnatal Deaths', 20, 32; Akerele, 'Review of Present MCH Services', 23; Grech, 'Review', 508–15.
- 15 Workshop on Maternal Mortality in East Africa, Kisumu, 7 Aug. 2018. See also Adams' work on the sometimes deliberate miscategorisation of deaths. Adams, 'Saving Tibet?'
- 16 Workshop on Maternal Mortality; 'Statistics Kenya'.
- 17 Salomon and Murray, 'The Epidemiologic Transition Revisited', 207.
- 18 For an early statement, see Preston, *Mortality Patterns in National Populations*; Omran, 'The Epidemiologic Transition: A Theory of', 732. The possibility of divergence is emphasised by McMichael et al., 'Mortality Trends and Setbacks'.
- 19 Rafa et al., *Estimating District GDP in Uganda*, 13; Uganda Bureau of Statistics, 'Uganda Demographic and Health Survey 2016', 55. Kampala, Uganda's capital city, was excluded from these calculations. It contained the best-educated but not the wealthiest population.
- 20 Kenya National Bureau of Statistics, 'Kenya Demographic and Health Survey 2014'; National AIDS Control Council, Kenya HIV County Profiles 2016. See also Okiro, 'Estimates of Subnational Health Trends in Kenya'.
- 21 UNFPA, 'Burden of Maternal Mortality'; Muchemi et al., 'Trends in Health Facility Based Maternal Mortality', 259; Akhasakhala et al., 'Estimating Maternal Mortality in Kenya'.
- 22 Int. JA, M, Kisumu, 7 Aug. 2018.
- 23 Kenya National Bureau of Statistics, 'Women and Men in Kenya'.
- 24 Livingston, *Improvising Medicine*.
- 25 Say et al., 'Global Causes of Maternal Death'; Nakimuli et al., 'Pregnancy, Parturition and Preeclampsia'.
- 26 Focus Group Discussion Tura 1151, F, 19 Oct. 2018; Kenya National Bureau of Statistics, 'Kenya Demographic and Health Survey 2014', 178, 259; Anorlu et al., 'Risk Factors for Preeclampsia in Lagos'. In 2018 concerns around refined foods and contamination in the Kenyan diet converged with the revelation that the nation's sugar supply had been contaminated with mercury. *Daily Nation*, 'Contraband Sugar Contains Mercury'.
- 27 Personal communication, Jane Plastow.
- 28 Workshop on Maternal Mortality in East Africa.
- 29 Personal communication, CM and JA.
- 30 Desai et al., 'An Analysis of Pregnancy-Related Mortality'; Kenya National Bureau of Statistics, 'Kenya Demographic and Health Survey 2014', 26; Salomon and Murray, 'The Epidemiologic Transition Revisited'.
- 31 Omran, 'The Epidemiological Transition: A Theory of', 754; Omran, 'Epidemiological Transition: Theory'.
- 32 Rogers and Hackenberg, 'Extending Epidemiologic Transition Theory'; Murphy and Di Cesare, 'Use of an Age-Period-Cohort Model'; Salomon and Murray, 'The Epidemiologic Transition Revisited'.
- 33 Int. CMN, F, Nyeri, 11 Dec. 2017.
- 34 Focus Group Discussion, Konywera 1327, 12 Sept. 2019.
- 35 Focus Group Discussion 2, 9 Aug. 2018.
- 36 Focus Group Discussion, 29 July 2018; Focus Group Discussion 3, 9 Aug. 2018.
- 37 E.g. Focus Group Discussion 1, 9 Aug. 2018.
- 38 E.g. Focus Group Discussion, 2 Aug. 2018.
- 39 Focus Group Discussions 1 and 2, 7 Aug. 2018.
- 40 Focus Group Discussion, Central Bwanda Kabonyo Kanyagwal, 17 Sept. 2018.
- 41 Int. MAO 1328, F, Bondo, 16 Jan. 2019; Focus Group Discussion, Ahero, 4 July 2018. For discussion of the ebb and flow of institutionalised childbirth globally, see Adams et al., 'Alternative Accounting in Maternal and Infant Global Health', 280.
- 42 See Janzen, 'Ideologies and Institutions', 320.
- 43 Personal communication, Saudah Namyalo; Evans-Pritchard, 'Marriage Customs of the Luo of Kenya'; Doyle, *Before HIV*.
- 44 Focus Group Discussion Tura 1316, 27 Oct. 2018.
- 45 Focus Group Discussion Tura 1119, 27 Oct. 2018; Focus Group Discussion Kogony 1144, F, 29 Oct. 2018; Focus Group Discussion Central Bwanda Kabonyo Kanyagwal, F, 17 Sept. 2018.
- 46 Focus Group Discussion Central Bwanda Kabonyo Kanyagwal, 17 Sept. 2018.
- 47 Focus Group Discussion Tura 1119, 27 Oct. 2018; Focus Group Discussion Kogony 1144, 29 Oct. 2018; Focus Group Discussion Central Bwanda Kabonyo Kanyagwal, 17 Sept. 2018.

- 48 See for example Berman and Lonsdale, 'The Labors of "Muigwithania"'.
 49 Focus Group Discussion Konywera 1327, F, 12 Sept. 2018; Focus Group Discussion Central Bwanda Kabonyo Kanyagwal, 17 Sept. 2018; Focus Group Discussion Tura 1119, 27 Oct. 2018. Even where informants agreed that grandmothers were designated as the primary source of information on womanhood in the past, they observed that following this norm was not always possible due to migration or mortality. Moreover, grandmothers were not granted exclusive rights of communication on reproductive and sexual morality, with various elderly informants reporting conversations in their adolescence with other senior relatives, including paternal uncles. Nor is the marginalisation of elders universal: one young woman whose mother had died and who had no aunts received advice on pregnancy from her grandmother. Int. SA, F, Tura, 27 Oct. 2018.
 50 Focus Group Discussion Central Bwanda Kabonyo Kanyagwal, 17 Sept. 2018; Focus Group Discussion Tura 1119, 27 Oct. 2018; personal communication, Jane Plastow; Int. CO, F, Bondo, 23 May 2019.
 51 Rutenberg and Cotts Watkins, 'The Buzz outside the Clinics'.
 52 For a classic introduction see Omran, 'Epidemiologic Transition: Theory'.
 53 Notkola et al., 'Impact on Mortality of the AIDS Epidemic'.
 54 Cruickshank et al., 'Sick Genes'; Prince and Marsland, *Making and Unmaking Public Health*; Livingston, *Improvising*.
 55 See Bledsoe, *Contingent Lives*; Boddy, *Wombs and Alien Spirits*; Hunt, *A Colonial Lexicon*; Johnson-Hanks, *Uncertain Honor*.
 56 Say, 'Global Causes', e328.
 57 Barrett et al., 'Emerging and Re-emerging Infectious Diseases'; Omran, 'The Epidemiological Transition: A Theory', 749.
 58 Int. PO, F, Kisumu, 15 May 2019. On rumours and healthcare see White, 'They Could Make Their Victims Dull'.

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