

Bridging the accountability divide: male circumcision planning in Rwanda as a case study in how to merge divergent operational planning approaches

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When voluntary medical male circumcision (MC) was confirmed as an effective tool for HIV prevention in sub-Saharan Africa in 2007, many public health policy makers and practitioners were eager to implement the intervention. How to roll out the tool as part of comprehensive strategy however was less clear. At the time, very little was known about the capacity of health systems to scale delivery of the new intervention. Today, nearly all countries prioritized for the intervention are far behind their targets. To contribute to the discourse on why this is, we develop a historical analysis of medical MC planning in sub-Saharan Africa using our own experience of this process in Rwanda. We compare our previously unpublished feasibility analysis from 2008 with international research published in 2009, which suggested how Rwanda could reduce HIV incidence through a rapid MC intervention, and Rwanda's eventual 2010 official operational plan. We trace how, in the face of uncertainty, operational plans avoided discussing the details of feasibility and focused instead on defining optimal circumcision capacity needed to achieve country level target reductions in HIV incidence. We show a distinct gap between the targets set in the official operational plan and what we determined was feasible in 2008. With actual data from the ground now available, we show our old feasibility models more closely approximate circumcision delivery rates to date. With an eye toward the future of long-term policy planning, we discuss the mechanics of how accountability gaps like this occur in global health policy making and how practitioners can better create achievable operational targets.

Keywords Decision-making, health planning, evidence-based policy, developing countries, aid, prevention, HIV

KEY MESSAGES

- We show, through a historical analysis of male circumcision policy planning in Rwanda, how feasibility and optimization modelling approaches can produce starkly contrasting conclusions.
- Optimization modelling can be more prone to assumptions, which can abstract planning from a conception of constraints as policy planning moves forward. Static optimization modelling is less operationally applicable in low capacity and high uncertainty settings.

- We show how empirical tools can be used as political devices. We also show how empirical evidence can create unrealistic mandates and leave implementers to balance between obvious international enthusiasm and derivative ramifications for resource mobilization while still juggling feasibility.
- Our research shows that feasibility analysis could be the missing truss in bridging the divide between aspirational policies for resource mobilization and plans that can be held accountable to their targets, opening a path to more balanced policy setting.

Background

Male circumcision (MC) is not a novel procedure—It's recent application as a biomedical intervention to fight the spread of HIV/AIDS, however, is. Following evidence from randomized control trials in South Africa (Auvert *et al.* 2005), Uganda (Bailey *et al.* 2007) and Kenya (Gray *et al.* 2007) that showed a reduction in HIV incidence by approximately 60% in circumcised males (WHO/UNAIDS 2007), the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS) both promote circumcision as one aspect of a complete HIV prevention strategy package (UNICEF ESARO *et al.* 2007). Most recently, the US government, the largest development aid donor to Africa, released a renewed and expanded pledge to fight HIV/AIDS, in part by reaching 4.7 million men for voluntary medical MCs on the continent (Kaiser Family Foundation 2011).

How to effectively implement a new large-scale MC programme in sub-Saharan Africa, however, has not been well established. In 2007 the WHO and UNAIDS selected 13 priority countries in sub-Saharan Africa for rapid scale-up, including Botswana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe (WHO/UNAIDS 2007). In 2009, the U.S. Agency for International Development (USAID) Health Policy Initiative in collaboration with UNAIDS even developed a pre-formatted spreadsheet planning tool, called the Decision-Makers' Program Planning Tool (DMPPT) to enable decision makers to understand the costs and impacts of policy options. In research that helped define policy planning programmes for MC application, the international development research organization, Futures Institute, used the DMPPT to demonstrate how many circumcisions would be needed to reach 80% of adult (ages 15–49 years) and newborn males by 2015 across the 13 priority countries as well as in Rwanda specifically (Bollinger and Stover 2009a and 2009b). However in the years since, scale-up has been inconsistent (Dickson *et al.* 2011).

By the end of 2010, 5 years before the DMPPT-driven 2015 target deadline, approximately 3% of the 80% coverage level had been achieved (Dickson *et al.* 2011). Some countries have had more success than others; nonetheless, implementing MC programmes has not been as quick and clear an intervention as many would have hoped. Researchers interested in investigating why this has been struggled to find data and anecdotal information about the MC scale-up process in these priority countries (Dickson *et al.* 2011). More broadly, literature review research on health policy analysis in low- and middle-income countries has shown a major focus on the earlier stages of policy development rather than implementation and is lacking narratives of the policy making and implementing experience (Gilson and Raphaely 2008). Concerning these research gaps, our investigation is of relevance. While we will not attempt to

speak on behalf of decision makers in Rwanda, our research aims to shed some light on the operational scale-up process for MC as an HIV prevention intervention in sub-Saharan Africa, using Rwanda as an example.

Rwanda with an HIV prevalence hovering around 3% (National Institute of Statistics of Rwanda and ORC Macro 2006) provides an interesting case for analysing the influence of uncertainty on planning for MC. The WHO considers the public health impact of MC to be greatest in countries with low circumcision prevalence and high HIV prevalence above 15% (WHO/UNAIDS 2007). In countries with a lower HIV prevalence, the procedure is still thought to have some positive impact, but because the general risk of HIV infection is lower, the cost–benefit balance is less clear (Weiss *et al.* 2008; Binagwaho *et al.* 2010; Njeuhmeli *et al.* 2011). In Rwanda for example, MC was found to be only robustly cost-effective in newborn populations and it was found to be neither cost-effective nor cost-saving in adult males (Binagwaho *et al.* 2010). With donor funds at the ready and lives to be saved, however, the country proceeded with its programme planning.

Rwanda was amongst the early adopters of MC as an HIV prevention strategy; health officials began planning a national MC policy in 2007 (All Africa 2007). Rwanda has comparatively reliable health statistics, strong health governance and is often cited as a model for effective health systems in Africa (Management Sciences for Health 2009; McNeil 2010; Rosenberg 2012; Emery 2013). In 2007, however, little was known about the capacity of the country's health system to operationalize a national MC policy, the acceptability of circumcision in Rwanda, or the prevalence of circumcision in the general population (Ministry of Health, Republic of Rwanda 2009; Gasasira *et al.* 2012).

In 2008, while based at the Rwandan Centers for Infectious Disease Control, known in Rwanda as the Centre for Treatment and Research on AIDS, Malaria, Tuberculosis and Other Epidemics (TRACPlus), we set out to answer the most salient gap in decision-making data: how many circumcisions can the country deliver? The details of financing and impact were thought to all be derivative of that basic question. In the years since beginning to try to answer this question, we were surprised to find few other detailed feasibility studies. Now, as actual data are available by which to compare our formerly unverified results, we find a review of this entire history illuminating and important.

Methods

In 2008, we faced extreme uncertainty in knowing how many circumcisions Rwanda could deliver. We employed a broad scenario analysis to give a range of possibilities, which varied

depending on high, medium and low projections for the male population and scale-up capacity. This was achieved through the following methods.

Population projections

Raw population projection data from the most recent population report in Rwanda (National Institute of Statistics of Rwanda 2009) were used to create best-fit curves for high, medium and low estimates of various male population age cohorts. These included the total male population, a male cohort of 15- to 49-year olds, and the newborn male population. The 15–49 age cohort population changes as those males younger than 15 age and move into the target group and those males that turn 50 move out. The number of newborns was added to the 15–49 population to accommodate for the likely policy option of circumcising both newborns and adult males in a Rwandan circumcision promotion intervention. When these calculations were started, it was believed that about 10% of the male population was circumcised (National Institute of Statistics of Rwanda *et al.* 2006). Thus, these population projections were then reduced by 10%. This was also applied to the newborn figures. This was done so the figures plotted would demonstrate the additional capacity needed over the base line rate of circumcision already performed in Rwanda.¹

Scale-up scenarios

Figure 1 displays three scale-up scenarios developed in 2008 and refined with updated population data since. Estimates of circumcisions per day per health facility were derived from discussions in 2008 with colleagues at TRACPlus who were nurses and doctors that had performed MCs in Rwanda. At the time, there were very little data on circumcision rates in other African countries with which we could compare our figures. We found one other published case, a teaching hospital in Lusaka, Zambia and our estimated rates were very reasonable by comparison (World Health Organization 2007; National Institute of Statistics of Rwanda *et al.* 2008).^{2,3}

A residual circumcision is defined in the scenarios as the difference between the projections for the target population and the number of circumcisions, as defined by the scale-up rate, performed on that group per year. The number of performed circumcisions was repeatedly subtracted from the dynamic populations projections, year on year, until there were no residual circumcisions left and circumcision capacity was higher than new entrants into the target group, or until the year 2038—30 years after commencement of the hypothetical intervention. This specific year was chosen arbitrarily, but is a point at which it becomes clear that the intervention either will or will not be able to reach certain cohorts of interest. In the latter case, population growth outpaces the feasible scale-up rate. We were less confident in projecting data for national circumcision capacity far into the future, not knowing what the healthcare delivery landscape would look like in Rwanda 30 years into the future. The variance in population estimates further exacerbates the uncertainty in defining projections further into the future.

We included health centres and hospitals in our analysis because they were the facilities most likely to offer the basic services package and could be reasonably expected to deliver circumcision. At the time of these calculations, Rwanda had

389 health centres and 43 hospitals (National Institute of Statistics *et al.* 2008).⁴ It is important to note that these facilities have a varying degree of capacity and include rural sites that are, at times, without running water or electricity. Our analysis assumed that all these facilities would be able to perform circumcision. The reasonableness of this assumption has increased since 2008, as the Official Rwandan Operational Plan determined that all these health facilities in addition to more delivery sites should be equipped to perform circumcision (Ministry of Health, Republic of Rwanda 2010). The figure used in our models for circumcisions per month is an aggregate of all circumcisions performed in all facilities in the country. Hence, if some facilities under-perform the targets others would have to over-perform to maintain the specified rate. The scenarios all assume 260 working days a year, with circumcisions performed 5 days a week, 52 weeks per year. The below details of the circumcision rates were all defined in tangible terms of how many circumcisions could be performed by each facility type per year. The circumcision rate increases linearly, year on year, until reaching a maximum capacity as this was thought most operationally feasible.

High scale-up scenario rates

Year 1 includes all hospitals performing five circumcisions per day. Year 2 includes the addition of 30 health facilities performing five circumcisions per day and the original hospitals increasing performance to 10 circumcisions per day. Subsequent years add 30 more clinics performing five circumcisions per day until all health facilities are incorporated; hospitals all perform 10 circumcisions per day. The rate of including 30 new health facilities per year was determined in thinking that each administrative district of the country, of which there are 30, would add new facilities to the programme every year to maintain a decentralized approach. The same inclusion rate for facilities by type is used for all three scale-up rate scenarios.

Medium scale-up scenario rates

Hospitals are the first to be included in Year 1 and perform three circumcisions per day. In Year 2, non-hospital health facilities are enrolled in the MC scale-up; newly enrolled facilities perform two circumcisions per day and hospitals increase to a maximum of five circumcisions per day. After the first year of enrolment non-hospital health facilities increase to a maximum of three circumcisions per day.

Low scale-up scenario rates

Hospitals are the first to be included in Year 1 and perform one circumcision per day. In Year 2, non-hospital health facilities are enrolled in the MC scale-up; newly enrolled facilities perform one circumcision per day and hospitals increase to a maximum of three circumcisions per day. After the first year of enrolment non-hospital health facilities increase to a maximum of two circumcisions per day.

Results

The scale-up scenarios aim to capture the range of feasible MC delivery rates in Rwanda into the near future. Our results showed that even under optimistic assumptions reaching the

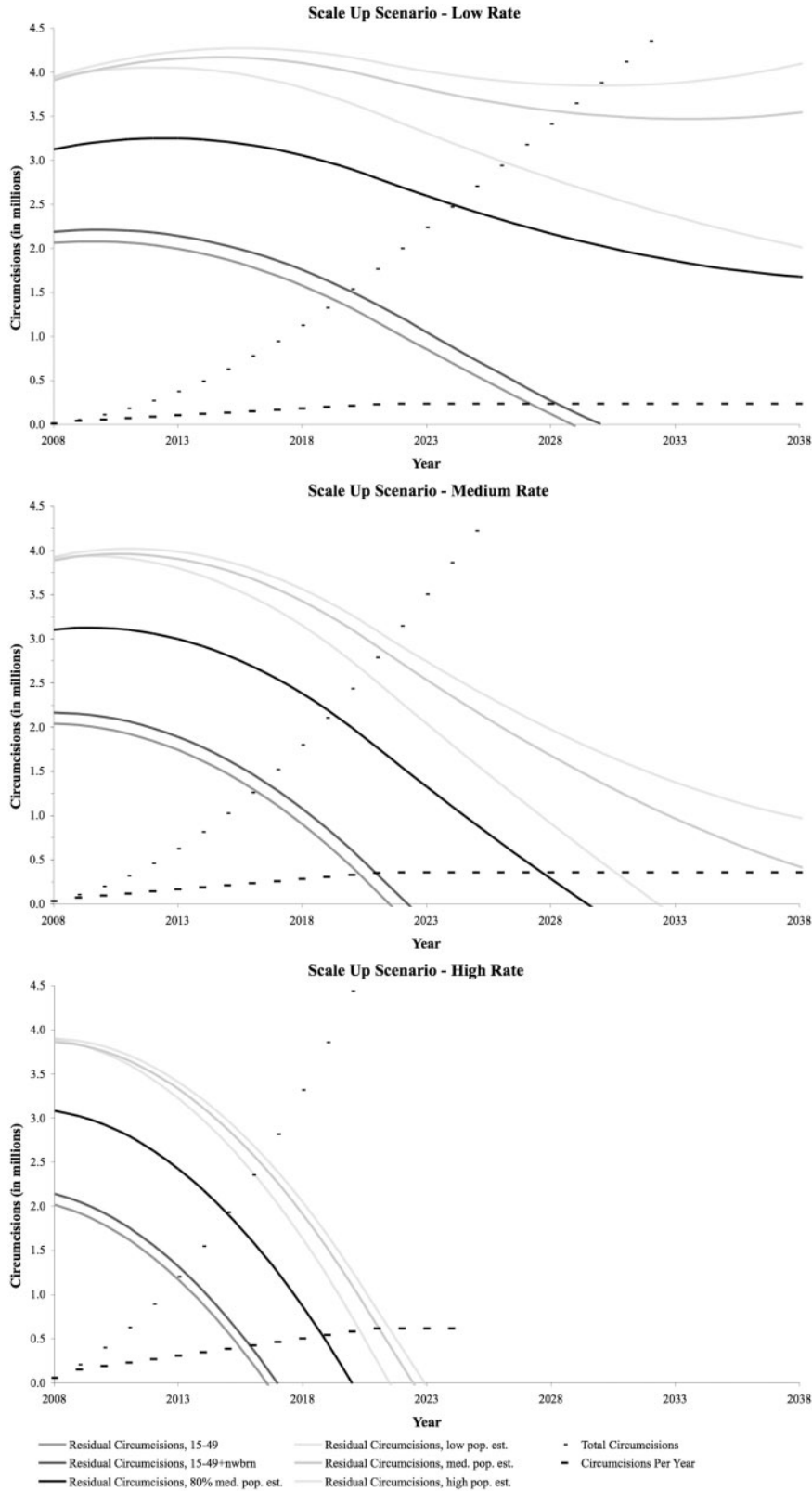


Figure 1 Scale-up scenarios. Age groups include, from smallest to largest: 15- to 49-year-old males, 15- to 49-year-old males plus newborns, 80% of the entire medium male population projection and 100% of the low, medium and high male population estimates as determined by Rwandan population projections (National Institute of Statistics of Rwanda 2009). The 80% of the medium population estimate was included for comparability with other studies that suggest public health and cost benefits accruing at that level of circumcision prevalence (Njehumeli *et al.* 2011). The 100% figures are shown to demonstrate the upper bounds of the male population.

15–49 male age cohort would take 9 years, from 2008 to 2017; at the medium scale-up rate this would take 13 years, from 2008 to 2021; and at the low scale-up rate reaching the 15–49 male age cohort would take 21 years, from 2008 to 2029. All scenarios demonstrated that it was achievable to reach the 15–49 age cohort as well as neonates, be it in the longer-term. Meanwhile the WHO, UNAIDS and international researchers at the Futures Institute and USAID were guiding approaches to a 2015 target through the use of their DMPPT.

The country-specific inputs the DMPPT requires include demography, HIV prevalence and sexual behaviour trends. Target MC coverage levels and rates of scale-up are built in as adjustable scenarios but require no information about feasibility. The model's 'target year' input could be informed by a feasibility study but if this variable is constrained there are little options for adjusting scale-up rate beyond the model's 'slow', 'fast', 'linear' and 'S-shaped' curve fitting options (Futures Institute 2009; Bollinger *et al.* 2009). With an intervention target deadline fixed at 2015, procedures delivered are an output rather than an input that could be a limiting factor in its large aggregating optimization function.

To create a common framework for talking about our feasibility models and the DMPPT model, we demonstrate where the outputs of both approaches fall along a range of fathomable circumcision rates. In Figure 2, we show a snapshot of the time to reach zero residual circumcisions determined by applying a wide range circumcision rates to the 80% medium male population estimate in Rwanda in 2010. The best guess estimate developed by international researchers for the baseline rate of circumcision in Rwanda prior to programme scale-up is demonstrated with the dashed line near 1000 circumcisions per month (Bollinger and Stover 2009a).⁵ At this rate, reaching the static medium male population in 2010 would take over 250 years. Obviously, this timeline is absurd in terms of policy planning. What this plot is helpful in demonstrating is the stark contrast between the slopes of the curve at low and high capacity. At low capacity, a small change in the circumcision capacity yields huge changes in project time line, whereas at high capacity the opposite is true.

Figure 3 is the product of performing the calculations in Figure 2 not with a static population estimate but with the new male population every year into the future, from 2010 to 2020. Year in the future appears on the *y*-axis and time to achieve zero residual circumcisions now appears on the *z*-axis. Figure 3 was built to aid practitioners in grasping the relationship between population growth, MC capacity and project timeline. Early on in planning, in 2008, an often-raised question without clear answer was how long MC scale-up would take. The answer then was that it depended on several parameters that had not yet been determined, including Rwanda's capacity to deliver MC and the effect of population growth dynamics on defining a target group. Facing this uncertainty we built analytical tools that were able to accommodate both variables. These tools are widely applicable and still relevant. The picture in Figure 3 would be similar for any setting with a burgeoning youth population like Rwanda and practically every other country in sub-Saharan Africa.

The resulting spectrum of project timeframe bands in Figure 3 demonstrates, in 2-year intervals, how long it would take to reach zero residual circumcisions at any national circumcision

capacity along the same rate spectrum seen in Figure 2. At high circumcision delivery rates, the time bands are wide, showing that relatively large changes in the circumcision delivery rate within this range of the capacity spectrum have little effect on the time it takes to achieve zero residual circumcisions. Here, the project timeline extends or contracts by a matter of months compared with the number of years it can extend or contract by at the lower end of the spectrum, with a change in national circumcision capacity of the same magnitude. Figure 3 re-conceptualizes the inelastic relationship between project parameters at high capacity and the elastic relationship at low capacity, as was seen in Figure 2.

In Figure 4, on the same axes as Figure 3, we overlay the circumcision rates specified in our 2008 scale-up scenarios with figures from a 2009 USAID/Futures Institute circumcision policy paper specific to Rwanda that employs the DMPPT; the 2010 Official Rwandan Operational Plan; and newly acquired data points for circumcision delivery rates in Rwanda before and after the circumcision scale-up commenced, as reported from all public and faith-based health facilities as well as some private health facilities (TRAC Plus 2012; TRACnet 2013).⁶ The convergence between the official operational plan and research of the prominent international development organizations and their concurrent divergences with actual delivery rates and our 2008 scale-up scenarios is clear.

Discussion

These divergent operational policy perspectives are the result of the two different analytical approaches, each framed by a different set of questions. The Futures Institute/USAID study and the Rwandan Official Operational Plan are framed by the question of what circumcision rate is needed to achieve a pre-specified coverage level, and its modelled effects on HIV reduction and project costs, by a certain deadline. This approach aims to identify the *minimum* value of the decision variable (in this case, circumcision rate) necessary to achieve pre-determined coverage and deadline goals. When applied before further information on capacity constraints is acquired, this approach can abstract the policy issue from a conception of constraints as policy planning moves forward. In a high capacity environment, this decontextualization is perhaps less egregious; however, in a low capacity setting, where the intervention possibility curve is elastic and small changes in capacity can have a huge effect on project timelines, this can lead to the formulation of very unrealistic policy goals. In the case of circumcision as an HIV prevention tool in Rwanda, an optimization approach allowed practitioners to create models—which then formed the basis of operational plans—that back calculated service delivery rates from the number of procedures needed to reach pre-determined project targets, without incorporating an analysis of feasible scale-up rates.

The feasibility approach we followed, in contrast, places logistical constraints at its centre and makes fewer pre-determined goals and assumptions. Feasibility modelling answers the question of what is the *maximum* circumcision rate possible given what we know about constraints and capacity. In cases of lacking data, this approach highlights uncertainty rather than assuming it away.

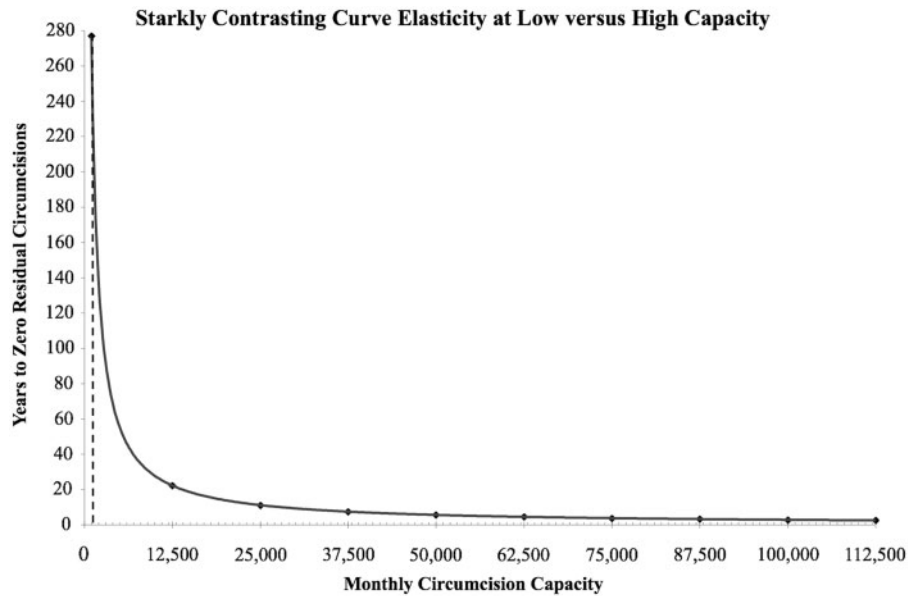


Figure 2 The intervention possibility curve. This figure demonstrates the intervention possibility frontier in 2010—that is, how long it would take to circumcise 80% of the medium male population estimate in 2010 within a broad range of circumcision capacity.

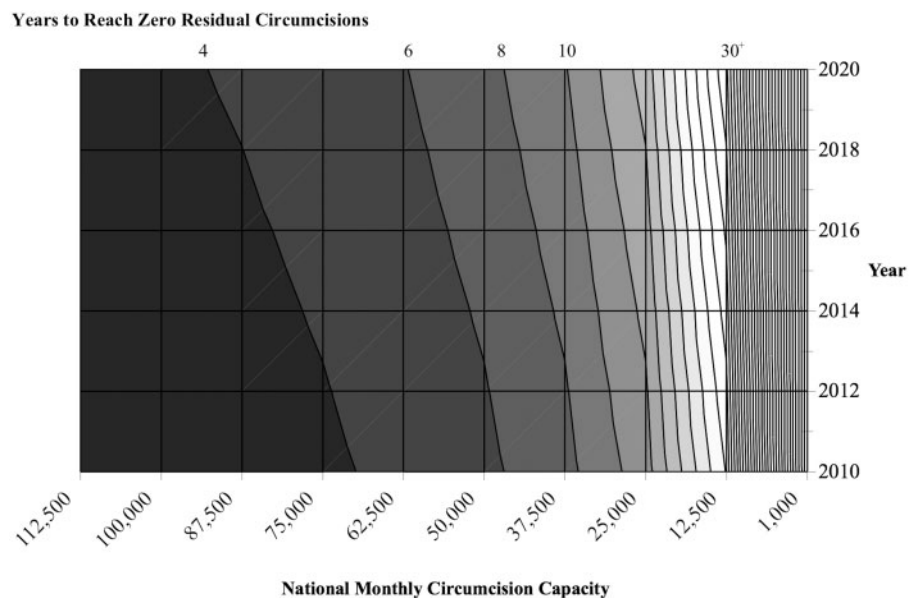


Figure 3 If we do not know country capacity or year the project will start, what can we say about project timeline? This figure was created by converting circumcisions per month to circumcisions per year and dividing the dynamic 80% medium male population estimate by that figure as the population changes into the future, from 2010 to 2020. It demonstrates the complex relationship between circumcision capacity, the year the project is started and population growth dynamics.

Understanding feasibility takes time as well as a lot of local knowledge, two precious commodities in the world of global health policy. Global health policy planning is a field perpetually bedeviled by the twin burden of poor data and the pressure to produce answers quickly. This pressure stems from a multitude of sources, man-made and otherwise, which include the mandates of international development institutions charged with maintaining momentum globally with a particularly promising intervention; the way budgeting timelines are structured at development institutions; as well as the pressure of abating the onslaught of a disease epidemic.

This research focuses only on our experience in Rwanda but we believe has simple conclusions of relevance for a global context. The decision curves we demonstrated in Figures 2 and 3 are applicable for many settings, thanks to uncertainty at the time mandating we accommodate a broad range of possibilities. While there are contributing political elements involved in the slow scale-up of MC programmes in the priority countries, we feel a major contributing factor to slow scale-up was ease in accessing basic data to guide identification and successful implementation of a realizable MC policy.

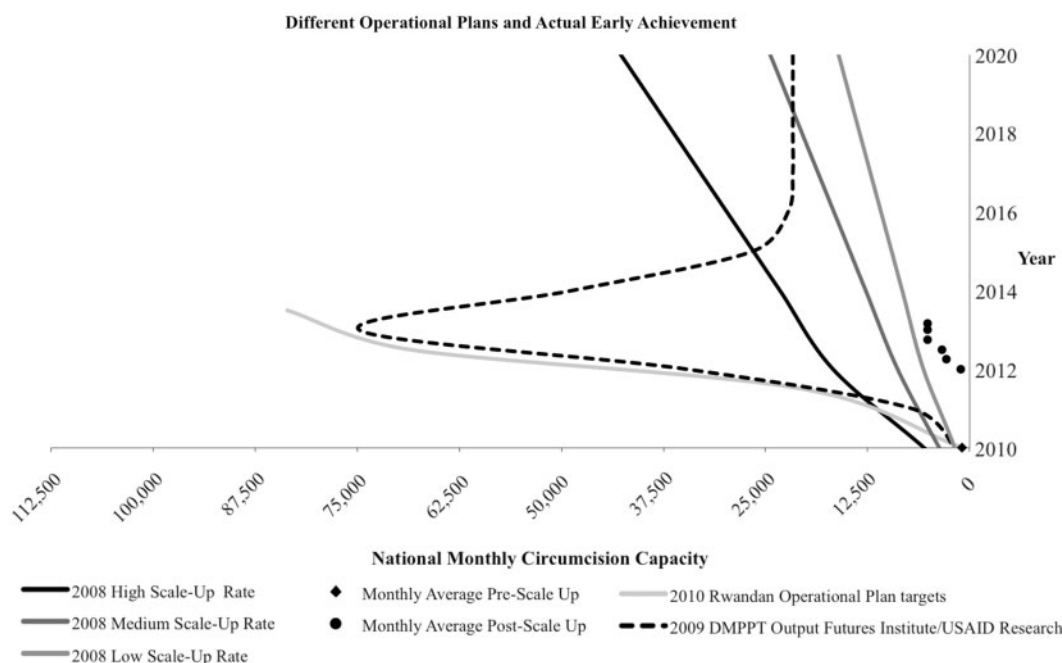


Figure 4 Comparing feasibility analysis and optimization models with early actual achievement. This figure superimposes monthly circumcision rates specified in the 2008 scale-up scenarios, the 2009 Futures Institute/USAID paper and the 2010 Rwandan Operational Plan and data on current achievement. These are displayed on the same axes as seen in Figure 3 to also roughly demonstrate within which project timeline bands these service delivery rates would fall. We reset the commencement dates of the 2008 feasibility study and the Futures Institute/USAID data to match the start-date of the Official Operational Plan, in 2010.

Country ownership and sustained leadership have been identified as major contributing factors to the most successful MC programmes (Dickson *et al.* 2011). Why stronger direction was not given to undertake more feasibility analysis in Rwanda and other countries may indeed be political. We should note that the information to build our models was collected over a period of 2 months in 2008 and could likely have been collected with more precision and speed by a well-supported team. Our research suggests how empirical evidence, specifically the DMPPT constrained by a 2015 target deadline, was used as a political tool to steer policy planning along international directives, contributing to a strategy that would be very difficult to achieve on the ground, especially without creating ancillary service points outside the national health system.

The DMPPT is a powerful instrument that could be used in conjunction with a feasibility analysis to build a robust national policy and operational plan. So how did the DMPPT get stuck on 2015? The original Conclusions and Recommendations of the WHO/UNAIDS Technical Consultation on Male Circumcision and HIV Prevention make no mention of a 2015 deadline (WHO/UNAIDS 2007). The Futures Institute reports make no rationalization for the 2015 timeline, other than a seemingly underlying faster-the-better motivation (Bollinger and Stover 2009a and 2009b). The year 2015 has become a lingering global deadline in the development world, as it is the target year to achieve the Millennium Development Goals. So too, the original working group that condoned the DMPPT concluded that all their models showed a rapid expansion would ‘result in earlier and larger effects on HIV incidence’ with ‘fewer circumcisions required to avert one infection and more infections averted at a lower cost per infection averted

over time’ (UNAIDS/WHO/SACEMA 2009; WHO 2010). The empirical evidence directed towards fast implementation but left a paradox for implementers to answer on how to balance between obvious international enthusiasm for fast scale-up and derivative ramifications for resource mobilization while still juggling feasibility.

Further, early WHO operational guidelines figured the DMPPT prominently, while trumpeting feasibility and attainability in undetailed terms. National strategies and operational plans, according to these guidelines, could be used as advocacy and resource mobilization tools, and may include ‘broad aspirational goals’ but they should also be feasible, attainable and cost-effective (WHO/UNAIDS 2008). We argue one should consider whether such recommendations are not skirting the lines of mutual exclusivity and place the greatest burden on those who would wish to follow and implement them. As we saw, the DMPPT with fixed coverage and deadline yielded hard to achieve results in Rwanda’s case and we must not forget how MC was shown not to actually be cost-effective in adult male cohorts due to the low prevalence of HIV in Rwanda. Again, across all countries scale-up is not only slow, it is paltry when compared with the 80% coverage level to achieve by 2015. We argue that this is not coincidence.

Positivist methods and mathematical modelling do not operate in a sterile world rid of political dynamics and influence (Bell 1976; Bayer and Edington 2009; Granich *et al.* 2009; Wagner and Blower 2009). Through close connection to on-the-ground realities and knowledge of the history of the MC intervention in Rwanda, we were afforded special insight into the unfolding of how exactly quantitative modelling tools can be used as political devices. We provide empirical evidence for

how the outputs of modelling exercises, particularly when used in conjunction with global targets set without any conception of feasibility, can lead to unrealistic mandates. Whose job it is then to operationalize those mandates and whom should be held accountable for targets, if missed, is a point of deliberation.

There are several interesting questions that remain. One major counterfactual question is whether Rwanda would have achieved higher results had it followed a feasibility approach. Non-counterfactual questions include, despite the lacking results thus far in terms of the intended intervention across the priority countries, are there any positive spillover effects of the programme that may inadvertently contribute to the intended outcome of the intervention, namely a reduction in HIV incidence? One such possibility would be that MC programme funds are used to strengthen health systems overall, which may have more sustainable benefits for reducing HIV and other diseases in the long term. If so, this leads to the next question of if we are targeting the best measure of success in focusing on circumcisions delivered. If we want to achieve target global deadlines for specific interventions that are obviously going to stretch health systems, we must then answer, in context, should and how can Rwanda and other countries operate auxiliary rapid intervention delivery programmes to achieve priority projects such as MC. We must also further study how international development resource mobilization and budgeting timelines are possibly pitted against country plans that can reasonably be held accountable to their targets. How global health and development practitioners can have fruitful discussion on how priorities are defined and policies are set against a backdrop of general low capacity, lacking data and plethora of public health ailments is another important final question.

Conclusion

We argue optimization modelling constrained by global targets but not informed by data on feasibility, while a relevant conceptual tool, is less operationally applicable in low capacity and high uncertainty settings. As the timelines of policies extend in the shift towards longer-term planning in global health, better tools to project outcomes into the future for decision-making purposes will be needed. Questions of feasibility and uncertainty, however, will be continual points of debate in policy making and operational planning. Uncertainty can be a useful convening point for both local and international actors. Through identifying and further analysing uncertain aspects of a given development approach, risks will be better understood and operational planning may be better able to incorporate divergent perspectives of what is theoretically possible and feasibly attainable.

We suggest defining project goals after some feasibility analysis is undertaken in situations of lacking data as well as aligning budgeting timelines to accommodate such an effort. We should ensure that development and global health policy-making does not drive a wedge between the political negotiation process at the international level and local reality. Our research shows that feasibility analysis could be the missing truss in bridging the divide between aspirational policies for resource mobilization and plans that can be held accountable to

their targets, opening a path to more balanced policy setting. How development and health policy specialists define budget timelines, institutional objectives and use empirical evidence in the future will demonstrate whether feasibility and optimization modelling are used in conflicting or constructive ways in policy setting and operational planning. Determined actions for improved policy formulation *and* implementation are required from the international to local level.

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Endnotes

- ¹ The Rwandan Interim Demographic and Health Survey from 2007-08, published in 2009, stated that 12% of the male population was circumcised. Thus, these population figures would be slightly lower but were left to maintain the data picture health officials were facing in 2008.
- ² The University Teaching Hospital (UTH) in Lusaka, Zambia had operated an MC service for 3 years in 2007 and was able to offer circumcision at a rate of 50–80 circumcisions a month. This rate would translate to 2.3–3.7 circumcisions a day according to our methodology for operating days per month. At that time, UTH hoped to increase this rate to 200 circumcisions a month, or approximately 9.2 circumcisions per day. The lowest rate in our scenarios was one circumcision a day and the highest was 10 circumcisions per day.
- ³ Shortly after our initial feasibility models were produced, the Rwandan Services Provision Assessment reported that, 'on average, there are about three MCs performed per facility per month'.
- ⁴ As of July 2013, there were 487 sites reporting to the country's electronic medical records system, which includes all public facilities, faith-based health facilities and some private health centres.
- ⁵ The exact figure is 917 circumcisions per month or 11 000 circumcisions per year.
- ⁶ We believe that this is the vast majority if not all health facilities in the country performing MC and is the best available data coming from the country's own central electronic medical records system. Since 2012, Rwanda has operated a single pooled fund for health, lead by financing from the Global Fund—the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) has allocated its funding for MC to the Ministry of Health as well. There is now a trend of Non-governmental organization (NGOs) scaling back operations in the country and there is no longer direct support of health sites by external programmes and organizations.

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