Impact on child mortality of removing user fees: simulation model

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Abstract

Objective To estimate how many child deaths might be prevented if user fees were removed in 20 African countries

Design Simulation model combining evidence on key health interventions' impacts on reducing child mortality with analysis of the effect of fee abolition on access to healthcare services.

Results Elimination of user fees could prevent approximately 233 000 (estimate range 153 000-305 000) deaths annually in children aged under 5 in 20 African countries.

Conclusion Given the relatively low cost of abolition, replacing user fees with alternative financing mechanisms should be seen as an effective first step towards improving households' access to health care and achieving the millennium development goals for health.

Introduction

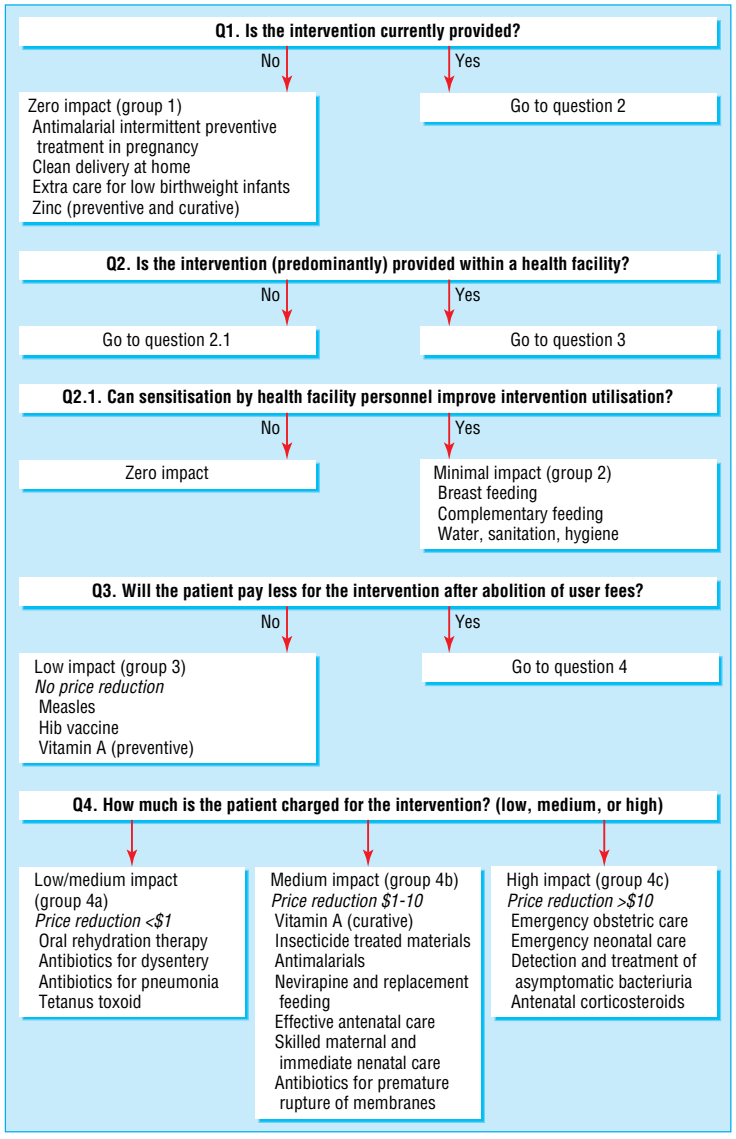
User fees—charges for health care at the point of use—are in place in most sub-Saharan African countries. Their introduction was justified as a pragmatic solution to severe under-funding, as well as part of a broader ideological shift in health policy that emphasised efficiency. However, evidence from a broad range of African contexts indicates that fees have rarely generated large amounts of revenue, are unlikely to have improved (and might even have worsened) allocative efficiency, and have too often disproportionately affected poor people.[1] Perhaps more striking than this evidence on implementation of user fees is the potential magnitude of gains from their abolition in terms of lives saved. We aimed to model how many child deaths might be prevented if user fees were removed in 20 African countries.

Methods

We estimated the number of deaths in children aged under 5 years that could be prevented through abolition of user fees by combining evidence on the impact that key health interventions have in reducing child mortality[2 3] with analysis of the potential of such abolition to increase the proportion of the population benefiting from these interventions. This analysis can only give a first estimate of the likely impact of abolition of fees, as the context of individual countries will determine the exact nature of the changes seen.

Our approach can be summarised as follows (see appendix on bmj.com for full details). In a first stage, we developed a classification system for key interventions to improve child survival. This classified 26 interventions according to whether their use is expected to increase after abolition of fees and if so by how much (figure). We based this grouping primarily on the expected magnitude of price reduction after fee abolition, but it also incorporates effects on health promotion. The classification is based on representative prices across the region, rather than exact figures from any one country. However, in some countries (or regions within countries) a flat rate fee may be charged, at least in principle. We therefore also did a sensitivity analysis to reflect this situation. Importantly, the model assumes improvements in access after removal of fees, even if countries have waiver or exemption mechanisms for children under 5 and pregnant women (as is the case, for example, in Tanzania), as widespread evidence shows that these have generally been ineffective.[4 5]

An appendix describing methods is on bmj.com



Expected positive effects of abolition of user fees on access to key child health interventions

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In the second stage of model development, we combined this intervention classification system with evidence from Uganda, South Africa, Madagascar, and Kenya on more generalised changes in use of health services after fee abolition,[3 6–10] to produce estimates of expected changes in utilisation rate for each of the 26 interventions (table). We did this by adjusting the generalised utilisation changes from these four countries downwards or upwards, according to each intervention's classification. We explored two basic scenarios: the Ugandan experience (analysed separately because of its more detailed data) and other post-fee abolition studies. For both, we also estimated expected higher increases in utilisation by poor people—poor (and near poor) people have typically been the most responsive to price changes and have higher rates of illness[11–13]—giving four scenarios in total.

In a third stage, we converted these estimated increases in use of different health interventions into plausible reductions in mortality in children under 5. We did this by inputting estimates of expected proportional increases in the coverage of each intervention from 2003 levels into the updated Bellagio child survival impact model. This model estimates effects on child

Estimated changes in utilisation rate (URΔ) after abolition of user fees, based on experience in four countries. Values are percentages

	Scenario 1: Uganda experience							Scenario 2: Other post-fee abolition studies				
	URΔ observations: intervention proxies							URΔ observations: intervention proxies				
	Burnham et al[6]*		Deininger and Mpuga[7]†		Nabyonga et al[5]‡		URΔ estimates§: intervention specific	Wilkinson et al[10] (South Africa)¶		Fafchamps and Minten[9] (Madagascar), Mwabu et al[9] (Kenya)**		URΔ estimates§: intervention specific
Child survival interventions	Intervention proxy	URΔ	Intervention proxy	URΔ	Intervention proxy	URΔ		Intervention proxy	URΔ	Intervention proxy	URΔ	
Group 1 interventions	No intervention proxies and zero impact, as not currently provided						0					0
Group 2 interventions	No intervention proxies and zero impact, as no evidence						0					0
Group 3 interventions:												
Vitamin A (preventive)	Average (preventive)	24.9	Vitamin A supplementation	61.0	Preventive	0	12.5	Preventive	0	General, all ages	21 and 41	10.5
Measles vaccine	Immunisations	17.2	Average (preventive)	36.3	Preventive	0	8.6	Preventive	0	General, all ages	21 and 41	10.5
Hib vaccine	Immunisations	17.2	Average (preventive)	36.3	Preventive	0	8.6	Preventive	0	General, all ages	21 and 41	10.5
Group 4a interventions:												
Oral rehydration therapy	Curative, under 5	27.3	Curative, under 5	18.5	Curative, under 5	40	20.5	Curative, all ages	77	General, all ages	21 and 41	30.8
Antibiotics for dysentery	Curative, under 5	27.3	Curative, under 5	18.5	Curative, under 5	40	20.5	Curative, all ages	77	General, all ages	21 and 41	30.8
Antibiotics for pneumonia	Curative, under 5	27.3	Curative, under 5	18.5	Curative, under 5	40	20.5	Curative, all ages	77	General, all ages	21 and 41	30.8
Tetanus toxoid	Immunisations	17.2	Average (preventive)	36.3	Preventive	0	12.9	Preventive	0	General, all ages	21 and 41	15.8
Group 4b interventions:												
Vitamin A (curative)	Curative, under 5	27.3	Curative, under 5	18.5	Curative, under 5	40	27.3	Curative, all ages	77	General, all ages	21 and 41	41.0
Insecticide treated materials	Average (preventive)	24.9	Average (preventive)	36.3	Preventive	0	24.9	Preventive	0	General, all ages	21 and 41	21.0
Antimalarials	Curative, under 5	27.3	Curative, under 5	18.5	Curative, under 5	40	27.3	Curative, all ages	77	General, all ages	21 and 41	41.0
Nevirapine and replacement feeding	Average (preventive)	24.9	Average (preventive)	36.3	Preventive	0	24.9	Preventive	0	General, all ages	21 and 41	21.0
Effective antenatal care	Antenatal care	25.3	Antenatal care	12.0	Preventive	0	12.0	Preventive	0	General, all ages	21 and 41	21.0
Skilled maternal and immediate neonatal care	Antenatal care	25.3	Average (antenatal + postnatal)	23.0	Preventive	0	23.0	Preventive	0	General, all ages	21 and 41	21.0
Antibiotics for premature rupture of membranes	Antenatal care	25.3	Average (antenatal + postnatal)	23.0	Preventive	0	23.0	Preventive	0	General, all ages	21 and 41	21.0
Group 4c interventions:												
Emergency obstetric care	Curative, under 5	27.3	Curative, under 5	18.5	Curative, under 5	40	41.0	Curative, all ages	77	General, all ages	21 and 41	61.5
Emergency neonatal care	Curative, under 5	27.3	Curative, under 5	18.5	Curative, under 5	40	41.0	Curative, all ages	77	General, all ages	21 and 41	61.5
Detection and treatment of asymptomatic bacteriuria	Antenatal care	25.3	Antenatal care	12.0	Preventive	0	18.0	Preventive	0	General, all ages	21 and 41	31.5
Antenatal corticosteriods	Antenatal care	25.3	Average (antenatal + postnatal)	23.0	Preventive	0	34.5	Preventive	0	General, all ages	21 and 41	31.5

*Data on utilisation changes in preventive care given for antenatal care, family planning, and immunisations.
†Data on utilisation changes in preventive care given for antenatal care, postnatal care, weighing, and vitamin A supplementation.
‡Data on utilisation changes in preventive care given only for first antenatal visits.
§Estimates adjusted upwards by 60% for poor people (thus giving an extra set of utilisation rate changes for each of the two basic scenarios). Estimates calculated by applying the weighting factors (see appendix on bmj.com) to the median of the individual studies' published estimates.
¶Near zero changes observed for all preventive care (antenatal care, immunisations, and under 6 growth monitoring).
**Only changes in general attendance (for all types of care) reported.

mortality by bringing together estimates of mortality in under 5s by country and cause, national coverage data for all interventions of proved efficacy, and estimates of cause specific efficacy for each intervention.[2 3] We restricted the analysis to the 20 African countries with more than 50 000 child deaths annually and with user fees in place as of 2003. The model assumed that increased contacts with health facilities occur when a child is sick and at risk of dying, a seemingly plausible assumption given that travel and other non-healthcare costs will remain even after abolition of fees.

Results

This three stage analysis shows that abolition of fees could prevent approximately 233 000 deaths (estimate range 153 000-305 000) annually in 20 African countries. This amounts to 6.3% (range 4.1-8.2%) of deaths in children under 5 in these countries. The point estimate given reflects the application of the Ugandan experience, where poor people are assumed to be the main beneficiaries of such a policy (the range around this represents the other scenarios outlined in the methods section). Sensitivity analysis reflecting a single flat rate fee before abolition produced slightly higher estimates of the number of preventable deaths—approximately 15% higher in all the scenarios.

Most of these lives would be saved by increased use of simple curative interventions, such as antimalarials and antibiotics combating dysentery and pneumonia. Reduced deaths are also possible from increased use of preventive services, but these are of a lower magnitude and not guaranteed.

Discussion

Abolition of user fees can have an immediate and important impact on reducing child deaths. Evidence on the positive relation between out of pocket and catastrophic health expenditures suggests that it may also help to stabilise household incomes,[14] although only if fees make up a substantial proportion of the costs of ill health.

However, these gains will only be sustainable if policy makers establish viable alternative financing mechanisms, which also account for increased demand for services. Without these, problems of quality (such as drug shortages and low staff motivation) may occur, which can partially or fully offset any gains from reduced prices. Even so, given that user fees have generated on average only about 5% of recurrent expenditures,[15] the extra money needed to make up for lost fee revenues and increased resource use would probably be very low relative to the benefit of lives saved.

Future research should analyse the costs of abolition of fees in different country contexts, while also exploring the feasibility of alternative financing options. Replacing user fees with more equitable financing methods should be seen as an effective first step towards improving children's access to healthcare services and achieving the millennium development goals for health. It is by no means a complete solution—investment and policies to improve the quality of health care are urgently needed, along with better management of implementation processes. Nevertheless, as the recent UN Millennium Project emphasised, abolition of user fees is likely to represent a "quick win."[16]

What is already known on this topic

User fees (charges for health care at the point of use) are in place in most sub-Saharan African countries

Such fees do not generate much revenue, are unlikely to improve allocative efficiency, and often disproportionately affect poor people

What this study adds

Abolition of user fees could have an immediate and substantial impact on child mortality, preventing an estimated 233 000 deaths annually in 20 African countries

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