

Investing in three transformative results

REALIZING POWERFUL RETURNS



This publication focuses on new research to estimate the benefits of investing in three transformative results: (a) ending preventable maternal deaths, (b) ending the unmet need for family planning, and (c) ending gender-based violence and all harmful practices, including child marriage and female genital mutilation.

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Foreword

In the wake of the COVID-19 pandemic and amid mounting global crises, development finance is under intense pressure. It is more important than ever to define investments that make the greatest and most lasting contributions to the achievement of the global Sustainable Development Goals and the commitments of the 1994 Programme of Action of the International Conference on Population and Development (ICPD) and its follow-up processes.

Among the most important investments that any country can make are in three transformative results fundamental to sexual and reproductive health, and to human rights and well-being. The three encompass ending unmet need for family planning, ending preventable maternal deaths, and ending gender-based violence and harmful practices, including female genital mutilation and child marriage.

Current financial and fiscal pressures are intense. Official development assistance for sexual and reproductive health and reproductive rights has trended down. Economies and budgets are under enormous pressure. Early estimates suggest that spending on health care in general will fall by approximately 20 per cent in low- and lower-middle income countries between 2019 and 2026.

This report offers a strong case for not just holding the line on investment in the three transformative results but moving beyond it as integral to the response and recovery from the current downturn. Using a series of sophisticated models, the report calculates that each of the three not only saves lives but generates a multitude of socioeconomic benefits. These range from increased education to greater labour force productivity, advances needed now more than ever.

I invite readers to explore where the data lead and the possibilities that come from making the right investment choices. I hope that this will unlock finance, internationally and domestically, for three transformative results that matter in people's lives in the world – right now and looking towards the future.



**Arthur Erken, Director
Policy and Strategy
Division, UNFPA**

I Introduction

Investment in sexual and reproductive health and rights is one of the most powerful accelerators of human progress, delivering strong returns to economies and societies through lasting benefits for individuals and families. Spending on sexual and reproductive health should be central to health system budgets but underfunding is common, for a variety of reasons. This report shows why that is a miscalculation. It presents a series of benefit-cost calculations that make a clear case for greater investment.

In Asia and the Pacific and Africa, for example, every dollar invested in reproductive, maternal, newborn and child health interventions delivers a \$14-30 return (Foster et al., 2012; Sheehan et al., 2012). A 2014 analysis of 74 developing countries with high maternal and child mortality showed economic returns of \$8.70 per dollar invested by 2035, reaching \$38.7 per dollar in 2050. The rate of return from each dollar spent was higher in lower-middle-income countries (\$11.30) and low-income countries (\$7.20) compared to upper-middle-income countries (Stenberg et al., 2014). Substantial economic gains also come from reducing child marriage through specific interventions, with an average benefit-cost ratio of 7.4 for 31 countries (Rasmussen et al., 2019).

The benefits of such investments cover many socioeconomic dimensions. Providing women and adolescents with access to voluntary contraceptive services will reduce unintended teenage pregnancies. This helps ensure that girls can continue their education and develop their professional skills, and increases women's participation in the economy and society. When pregnancies



and female genital mutilation are prevented, and women who do become pregnant can access services essential to them, death and disability rates fall. This results in increased years of healthy living, which can contribute to a dynamic female labour force.

The following report centres on three transformative results at the heart of the mission of UNFPA, as the United Nations sexual and reproductive health agency. By 2030, with its partners, UNFPA aims to end unmet need for family planning, end preventable maternal deaths and end gender-based violence and harmful practices, including female genital mutilation and child marriage. All three transformative results are integral to the 2030 Agenda for Sustainable Development and the commitments made under the landmark 1994 Programme of Action of the ICPD and its follow-up 2019 Nairobi Summit commitments.

UNFPA's Strategic Plan 2022-2025 is explicitly dedicated to accelerated action on the three transformative results. For this to happen, all involved actors must make the results central to policies, programmes, budgets and accountability mechanisms. Analysing investment costs and demonstrating related high returns can drive momentum in that direction.

In 2019, UNFPA and its partners released a preliminary global estimate of the cost of achieving the three transformative results by 2030. This current publication calculates benefit-cost ratios for the transformative results related to ending unmet need for family planning, preventable maternal deaths, female genital mutilation and child marriage.

Benefits, or gains from investment in monetary terms, include costs averted due to successful interventions as well as socioeconomic benefits. These were estimated through 2050. Costs were estimated as the sum of intervention costs for each transformative result from 2022 to 2030, using the same interventions for ending unmet need for family planning and preventable maternal deaths, female genital mutilation and child marriage by 2030 from the original 2019 estimate. This analysis does not include the costs and benefits of ending gender-based violence as models to estimate these were under development at the time of this report writing; they are now available at www.impact40.org.

1

Returns from investing in ending unmet need for family planning and ending preventable maternal deaths

Ending unmet need for family planning and ending maternal deaths from preventable causes are cornerstones of the ICPD Programme of Action and important indicators in meeting the Sustainable Development Goals. During the past 25 years, despite substantial progress in making family planning available to women and reducing maternal mortality, achieving this transformative result by 2030 requires accelerating progress.

Investment in voluntary family planning services averts unintended pregnancies and reduces demand for and the cost of maternal and other health services. Similarly, investment in maternal health can have major benefits beyond simply reducing mortality, leading to lower morbidity and health complications associated with childbirth. The reduction of unintended pregnancies, in turn, can ensure that girls can continue their education and develop their professional skills, thus increasing women's participation in the economy and society.

Acknowledging these synergistic effects between increased contraceptive prevalence and improved coverage of essential maternal health interventions, and building on the 2019 global investment estimate by UNFPA and its partners, this analysis estimated the benefit-cost ratio of investing in family planning and maternal health care to end unmet need for family planning and preventable maternal deaths in 120 low- and middle-income countries by 2030.

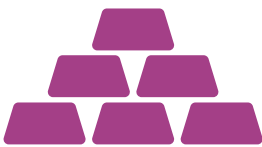
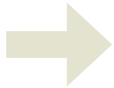
From 2022 to 2030, it is estimated that these countries will need to spend an additional \$79 billion to end unmet need for family planning and preventable maternal deaths. This entails scaling up the coverage of 29 essential maternal health interventions to a 95 per cent coverage rate in 2030.





AVERTS:

- **400 million** unplanned pregnancies
- **1 million** maternal deaths
- **6 million** stillbirths
- **4 million** newborn deaths



\$79 billion

additional investment
(2022-2030)

\$660 billion

in economic benefits
(2022-2050)

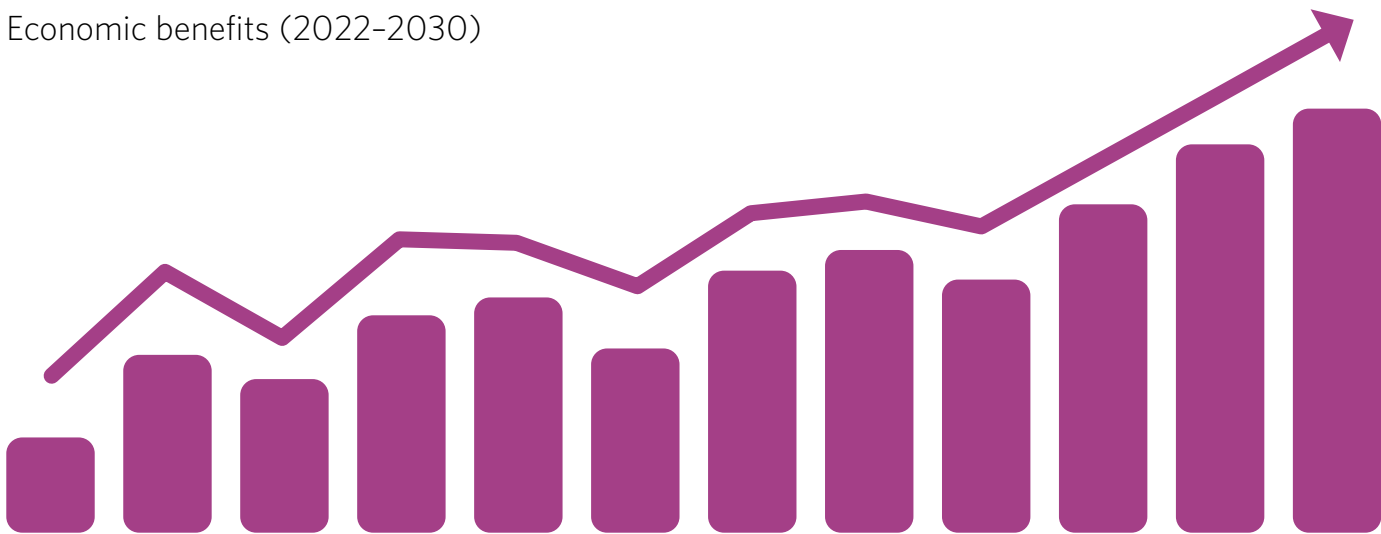
BENEFIT-COST RATIO

\$1

Total additional cost (2022-2030)

\$8.4

Economic benefits (2022-2030)



2

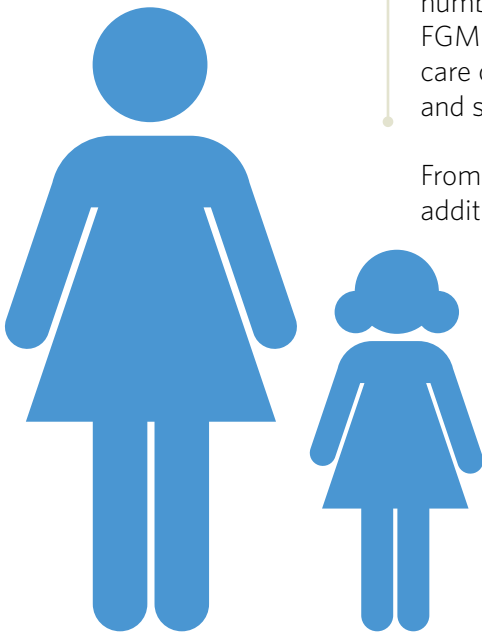
Returns from investing in ending female genital mutilation

The UNFPA-UNICEF Joint Programme on the Elimination of FGM estimates that over 200 million girls and women alive today have experienced FGM, and between 2015 and 2030 in 25 countries where FGM is routinely practiced and data are available, an estimated 68 million girls will be cut unless concerted and accelerated action is taken.¹ The practice causes multiple mental and physical harms, including pain, bleeding, infection, complications in childbirth, issues with sexual function and psychological distress. In some cases, it leads to death.

In the 2030 Agenda for Sustainable Development, the fifth of 17 Sustainable Development Goals is to achieve gender equality. Under Goal 5, target 5.3 calls for eliminating harmful practices, including female genital mutilation.

Estimates of the cost and impacts of programmes to end FGM drew from previous work to calculate costs for scaling up prevention in 31 countries with high rates of the practice. Impact of programming is based on the projected number of FGM cases averted due to implementing interventions to prevent FGM in 31 high-incidence countries. The estimates were converted into health-care costs avoided, healthy years of life gained, and associated economic and social benefits.

From 2022 to 2030, it is estimated that these countries will need to spend an additional \$2.751 billion to end FGM.

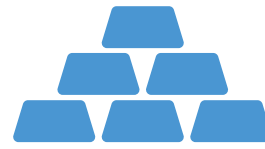


¹ <https://www.unfpa.org/unfpa-unicef-joint-programme-female-genital-mutilation>



AVERTS:

- **20 million** cases of female genital mutilation



\$2.8 billion*

additional investment
(2022-2030)

\$27.9 billion**

in economic benefits
(2022-2050)

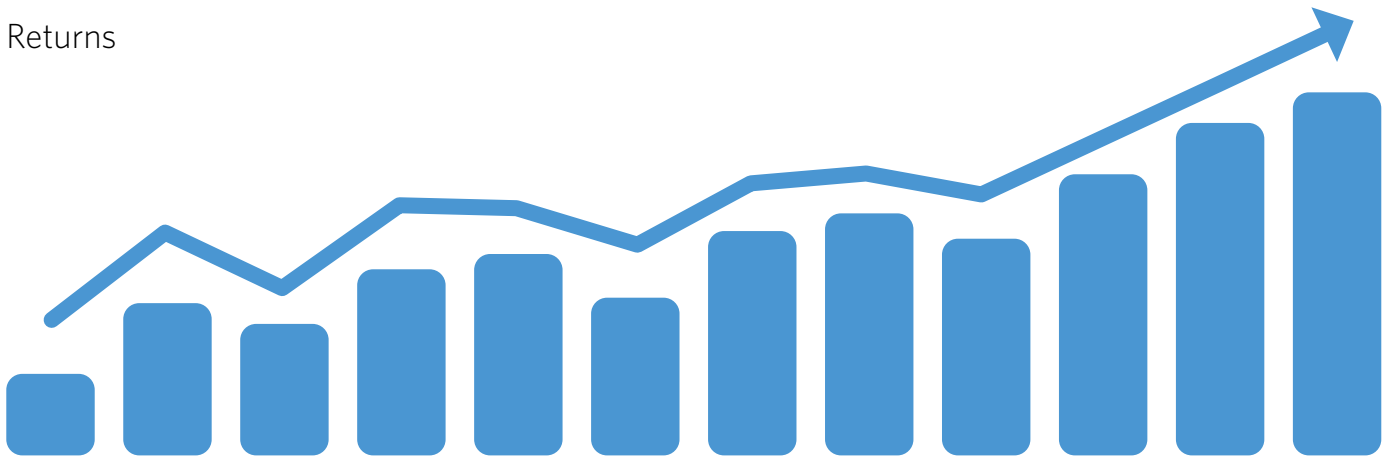
BENEFIT-COST RATIO

\$1

Spent

\$10.1

Returns



* Note: this figure has been rounded from \$2.751 billion
 ** Note: this figure has been rounded from \$27.866 billion.

3

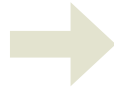
Returns from investing in ending child marriage

Child marriage is a human rights violation depriving girls of their education, health and security. Child brides often drop out of school and have diminished economic opportunities. They are at elevated risk for domestic violence and adolescent pregnancy, and maternal and newborn death and injury. Child marriage also has intergenerational impacts as young brides and mothers pass their disadvantages on to their children.

Ending child marriage is a target under the fifth Sustainable Development Goal. Taking the 2019 global cost estimate, the benefit-cost ratio of investing in a suite of prevention interventions to eliminate child marriage by 2030 was calculated. The model included 70 countries and 13 states in India with the largest numbers of child marriages.

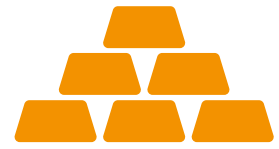
It is estimated that these countries will need to spend an additional \$38 billion from 2022 to 2030, with continued investment thereafter to sustain programming and educate children. Overall, an additional \$151.7 billion is needed from 2022 to 2050 to continue programming to end child marriage beyond 2030, and to educate children.





AVERTS:

- **230 million** cases of child marriage averted
- **386 million** girls completing school



\$151.7 billion*

\$38 billion additional investment (2022-2030)

\$151.7 billion* (2022-2050)

\$5.1 trillion

in economic benefits (2022-2050)

BENEFIT-COST RATIO

\$1



Spent

\$33.6



Returns



* Achieving estimated benefits beyond 2050 requires keeping programmes going as well as education for children beyond 2030. The estimated cost from 2022 to 2050 is \$151.7 billion.

Detailed methodology

As much as possible, the methodology for estimating the benefit-cost ratio of investing in meeting the transformative results was standardized across the different results. The cost and impact estimates build on the 2019 global estimate of the cost of achieving the three transformative results by 2030 conducted by UNFPA and its partners. Due to the lack of a clear understanding on how to quantify additional costs within humanitarian settings and fragile States, this analysis does not consider the unique costs of meeting the transformative results in these settings but rather reflects costs in development

settings. For each transformative result, costs were considered from 2022 to 2030, while economic benefits were considered out to 2050. Economic benefits were discounted at 3 per cent per year and are presented in 2020 US dollars.

The sections below detail the specific methodology used to estimate the benefit-cost ratio for each transformative result. Table 1 presents the global parameters and assumptions used to calculate economic benefits. Country-specific parameters and assumptions used for the economic benefit calculations are in Table 2.

Estimating the benefit-cost ratio in ending unmet need for family planning and preventable maternal deaths

Scenarios

To estimate the benefit-cost ratio of investing in family planning and maternal health interventions across 120 countries, this study compared two scenarios:

- **Baseline/business-as-usual**, where intervention coverage starts at the most recent estimates and is maintained at the same level over 2022–2030.
- **Full scale-up**, where intervention coverage increases linearly between 2022–2030 to achieve a 95 per cent coverage rate for maternal health care and zero unmet need for family planning by 2030.

Increasing access to family planning methods³ can raise the contraceptive prevalence rate and prevent unintended pregnancies, which not only results in fewer maternal deaths, stillbirths and neonatal deaths, but also reduces the cost of maternal health services. Investment in maternal health interventions not only decreases maternal mortality but also diminishes maternal morbidity and health complications associated with childbirth, which can cut health costs and avert economic events such as loss of income.

Investment

The cost of ending unmet need for family planning was estimated using the number of modern contraceptive method users from 2022 to 2030 and the unit cost per modern method user by scenario.⁴ Impacts from investment in family planning were estimated in the form of pregnancies

3 Reducing unmet need for family planning requires additional demand-side interventions including those targeting social and gender norms.

4 The cost per modern method user was estimated based on estimates of countries' total expenditure on family planning programmes published by FP2020.

averted, maternal deaths averted and maternal years lived with disability averted. The Lives Saved Tool was used to estimate the cost (i.e., commodities, service delivery, programmes) and impact (i.e., maternal and neonatal deaths averted and stillbirths prevented) of ending preventable maternal deaths.

Benefits

The economic benefits of investing in family planning and maternal health interventions were considered across four domains, following the framework used in *Investing in Maternal Health and Family Planning in Small Island Developing States* (UNFPA, 2021):

- **Health benefits:** Years of life gained from maternal deaths, stillbirths and neonatal deaths prevented
- **Workforce participation:** Increases from more years of life and averted unintended pregnancies
- **Labour force productivity benefits:** Average increases in years of school completed due to averting unintended pregnancies among adolescents, which would raise productivity and earnings in the workforce
- **Social:** Preventing maternal deaths, stillbirths and newborn deaths, which would reduce lost years of life and maternal years lived with disability

Benefits were considered up to 2050, but only for the population cohort receiving interventions from 2022 to 2030. Some benefits are not captured immediately. For example, averting unintended pregnancies among adolescents leads to greater education and increased earnings but only once they enter the workforce.

Health benefits: years of life gained

The modelling derived maternal deaths, stillbirths and child deaths prevented in each year from 2022 to 2030 due to increased coverage of maternal health interventions from the Lives Saved Tool. Greater family planning coverage was assumed to result in averting maternal deaths, which were calculated according to maternal mortality rates among current pregnancies, including a reduction in mortality over time due to scaling up maternal health interventions.

Economic benefit calculations were based on total years of life gained in each calendar year rather than from the number of deaths averted. A population model converted annual deaths averted to annual age-specific years of life gained.

The population model was stratified in single-year age brackets. Each year, people could enter the model if their death was averted, turn a year older and be removed due to all-cause mortality. Stillbirths and newborn deaths averted entered the model at age zero, and maternal deaths averted entered the model according to the age-distribution of all pregnancies. There is some debate about years of life gained from averting stillbirths (more specifically, disability-adjusted life years gained).⁵ For this analysis, years of life gained were considered for 50 per cent of stillbirths averted, which is the global estimated percentage of stillbirths that are intrapartum.⁶

In each year, the total number of people in the population model represents the years of life gained in the year they would otherwise have lived. This figure was used to calculate workforce and social benefits. The model can be run for an arbitrary duration to capture the longer-term benefits of deaths averted in the 2022–2030 window.

5 Jamison et al., 2006.

6 Lawn et al., 2016.

Workforce participation economic benefits

Economic benefits from increased workforce participation can be calculated from years of life gained. For people aged 18-65 years, average salary was estimated as gross domestic product (GDP) per worker and then scaled for workforce participation rates among women (for maternal deaths averted) or the whole population (for child deaths averted).

The model assumed that averting unintended pregnancies among women younger than age 18 increased workforce participation. It assumed that pregnancy removed a woman from the labour force for three months, based on maternity leave policies.⁷ This economic benefit was calculated as 0.25 multiplied by GDP per worker, scaled for workforce participation rates among women.

Labour force productivity benefits

Reductions in unintended pregnancies from family planning services were assumed to increase average schooling obtained by girls.⁸ The model used estimates of the age distribution of pregnancies to calculate the share of all unintended pregnancies averted among girls under age 18. This share was assumed to lead to an average increase in education based on the expected schooling disruption as a result of pregnancy and birth. More schooling leads on average to increased lifetime earnings; each additional year in education is associated with a median 10 per cent increase in per capita income.⁹ GDP per worker was used as a proxy for the average wage, which was multiplied by the percentage income increase to obtain an economic benefit for each working year. These benefits were applied from the year girls turned 18 until retirement age, scaled for workforce participation rates among women.

Social benefits

Social benefits from any year of life saved, regardless of age, were calculated following methods from Stenberg et al. (2014) in which the benefit was computed as 0.5 times the average GDP per capita. The social benefit computation used the average GDP per capita of all 120 countries, in line with Stenberg et al. (2014). Social benefits were also calculated from estimates of years lived with disability averted.

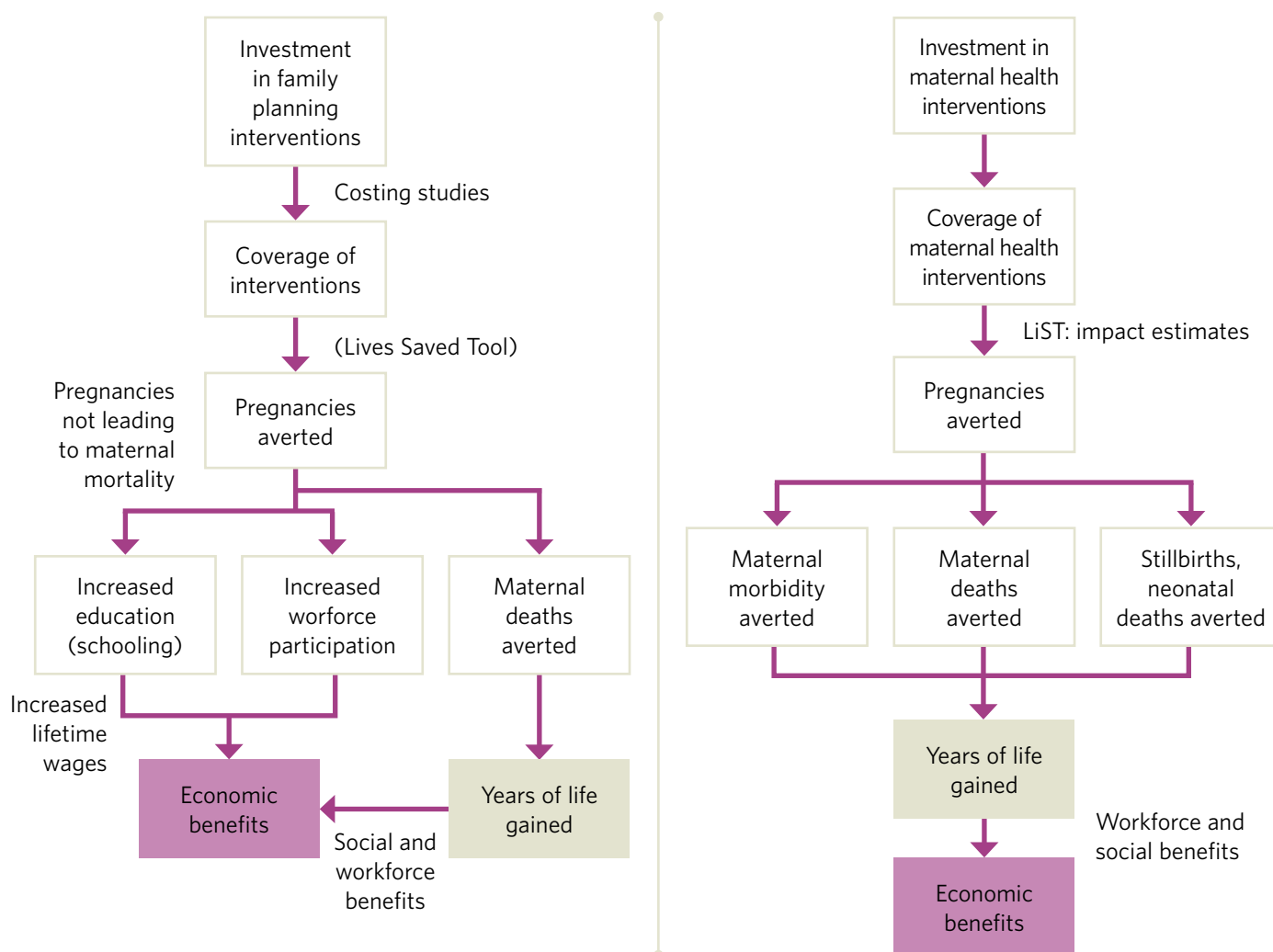
GDP per capita was assumed to increase at 1.5 per cent per year.

7 AECID, 2014.

8 Stenberg et al., 2014.

9 Montenegro and Patrinos, 2014.

Modelling framework



Results

		Benefit breakdown by type	Benefit breakdown by impact averted (2020-2050)
Total additional cost (2022-2030)	\$79 billion		400 million unplanned pregnancies 1 million maternal deaths 6 million stillbirths 4 million newborn deaths
Total return (2022-2050)	\$660 billion	Workforce participation: \$350 billion ¹⁰ Labour force productivity: \$106 billion Social: \$204 billion	Maternal deaths averted: \$90 billion Stillbirths averted: \$109 billion Neonatal deaths averted: \$123 billion Adult pregnancies averted: \$229 billion Teenage pregnancies averted: \$106 billion Maternal morbidity averted: \$2 billion

10 Due to rounding, these do not add up to \$660 billion.

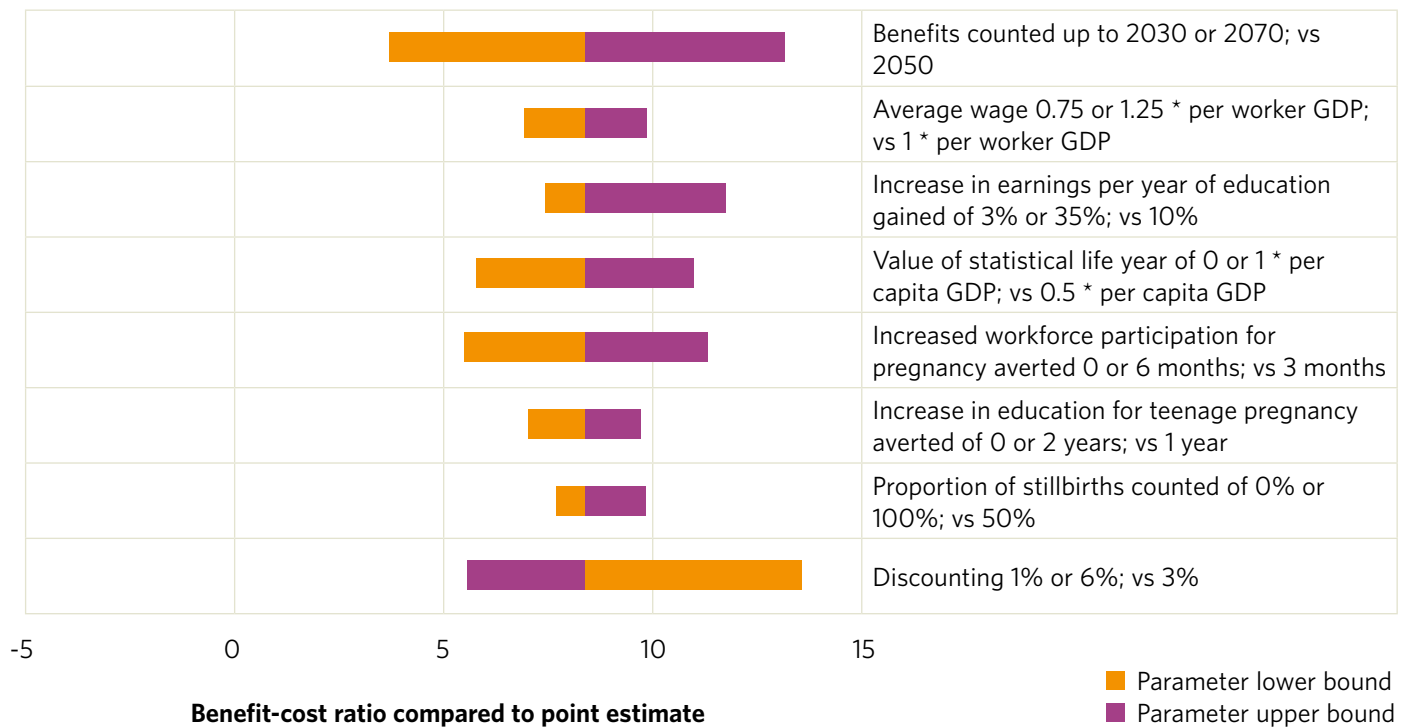
Limitations and sensitivity analysis

The costs of interventions to end unmet need for family planning and preventable maternal deaths were calculated using an ingredients-based approach and were not validated by each country. The same intervention effect sizes were used for each country based on global literature (i.e., the same relative impacts but for different baseline burdens). In reality, however, there may be some variations among settings driven by context-specific factors. Quality implementation of interventions is also necessary for achieving the estimated impact. The full scale-up scenario

requires a sufficient health workforce and health system to deliver interventions. Additional benefits from investing in family planning are not included in this analysis (e.g., environment, hunger, poverty, water and sanitation, etc.). The analysis does not include opportunity costs within the health sector (e.g., prevention of sexually transmitted infections and HIV, better access to and use of integrated health services, etc.).

Additional assumptions were explored in the calculation of the benefit-cost ratios. The sensitivity analysis shows the impact of these assumptions.

Sensitivity analysis for benefit-cost ratio



Estimating the benefit-cost ratio of ending female genital mutilation

Estimating the economic benefits of investing in preventing female genital mutilation built on previous work to calculate the costs of scaling up prevention, care and treatment, and protection programmes and the expected number of cases averted in 31 high-burden countries. These estimates informed an ambitious scale-up scenario where direct or indirect prevention programmes and legal protection, care and other services reached all communities where surveys found support for female genital mutilation surpassing 50 per cent. Cases averted were estimated compared to a scenario with no programme scale-up. The analysis converted estimates of cases averted into health-care costs averted, estimates of healthy life years gained and associated economic and social benefits.

Benefits from averting cases fall in four domains:

- Lower disability associated with having had female genital mutilation
- Economic benefits from increased workforce participation due to gains in healthy years of life
- Social benefits from lower rates of stillbirths and neonatal mortality, leading to fewer lost years of life and maternal years lived with disability
- Obstetric care costs averted since women with female genital mutilation experience higher rates of obstetric complications

Benefits of programmes implemented from 2022 to 2030 would stretch beyond that period. For example, pregnancies among women who could have undergone female genital mutilation in 2022–2030 would in many cases take place from 2030–2050, and economic benefits would also occur during the same time period since those who could have undergone female genital mutilation are likely to have many of their working age years between 2030–2050. Benefits were accordingly considered

through 2050 but only for populations receiving interventions from 2022–2030.

Economic benefits were discounted at 3 per cent per year and are presented in 2020 dollars.

Health benefits: years of life gained

Women and girls subjected to female genital mutilation experience effects including dyspareunia or sexual dysfunction, anxiety, higher rates of urinary tract infections and bacterial vaginosis, and obstetric complications. Estimating the loss of healthy years of life due to female genital mutilation involved applying a disability weight to each year lived with it. The weight varied by the different types of female genital mutilation.

The analysis calculated the lifetime number of births per woman with female genital mutilation and associated higher rates of additional stillbirths and neonatal deaths due to it. This involved applying stillbirth death rates and infant mortality rates with and without female genital mutilation to cases that could be averted. Averting cases was assumed to avert associated stillbirths and neonatal deaths. The deaths were converted to healthy years of life gained using healthy life expectancy estimates. Years of life gained were considered for 50 per cent of stillbirths averted, which is the global estimate for stillbirths assumed to occur intrapartum.

Economic benefits

The economic benefits of averting female genital mutilation come from increased workforce participation, calculated based on years of life gained. Years of life gained were multiplied by average salary, estimated as GDP per the labour force, and scaled for workforce participation.

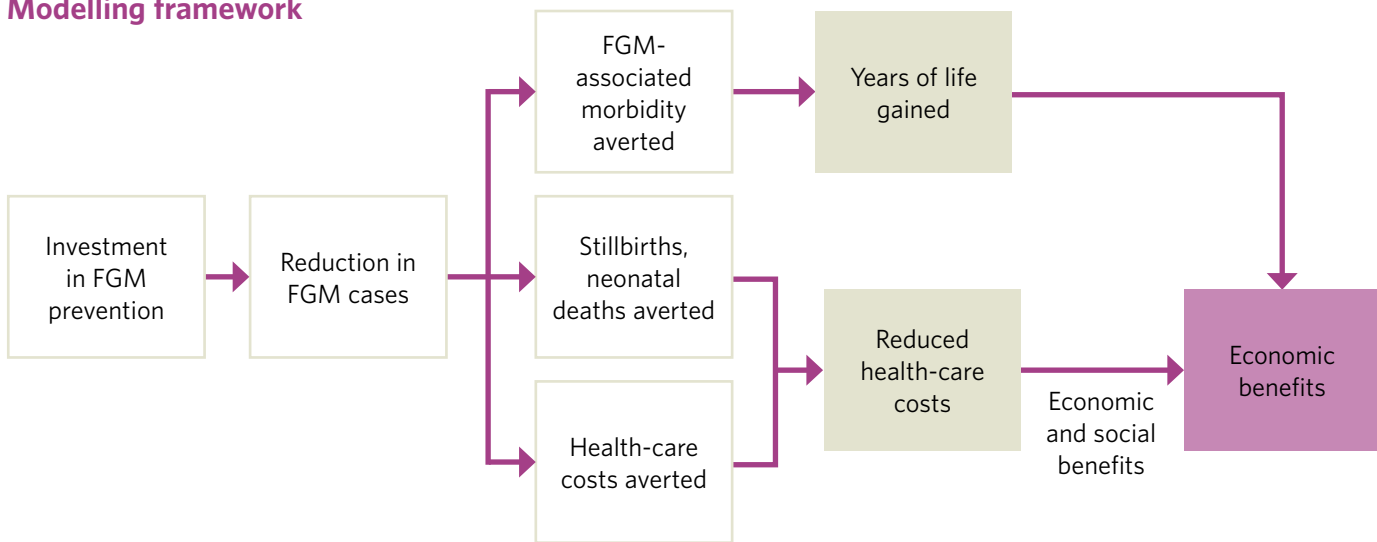
Social benefits

Social benefits follow a similar calculation to one in Stenberg et al. (2014) and for other transformative results in which the benefit is computed as 0.5 times the population-weighted average GDP per capita across 120 countries to calculate years lived without a disability.

Health-care costs averted

The analysis estimated additional health-care costs for women with female genital mutilation based on work by the World Health Organization and its partners. This encompassed additional costs for immediate health consequences as well as other issues through the life cycle, including those requiring reproductive urogynaecological and psychosocial care.

Modelling framework



Results

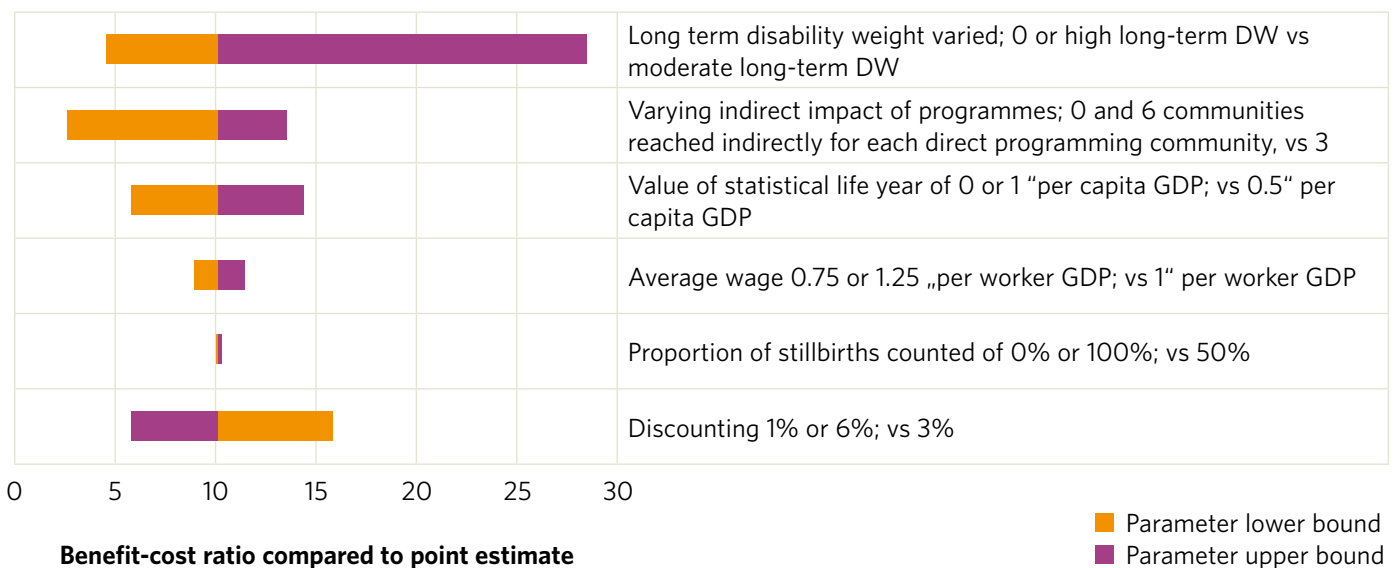
		Benefit breakdown by type	Benefit breakdown by impact averted (2020-2050)
Total additional cost (2020-2030)	\$2.751 billion		20 million female genital mutilation cases averted by 2050
Total return (2020-2050)	\$27.866 billion	Economic: \$14 billion Social: \$12 billion Health-care costs: \$2 billion	Female genital mutilation morbidity averted: \$13 billion Neonatal deaths averted: \$12 billion Stillbirths averted: \$1 billion Health-care costs avoided: \$2 billion

Limitations and sensitivity analysis

Consensus estimates of disability weights are not available. This analysis relied on proxies established with the UNFPA female genital mutilation programme team for the year at which the operation was performed, followed by a moderate disability weight for the rest of the time through 2050. As part of sensitivity analysis, the duration and level of the disability weight was varied, as well as the reach of indirect benefits, value of a statistical life year, and the average wage and discount rate. Analysis was relatively

conservative as several female genital mutilation outcomes were not included due to insufficient data. For example, female genital mutilation may be associated with higher rates of sexually transmitted infections and HIV but not enough data were available to affirmatively make this link. As another case of a likely relationship that cannot be confirmed with hard evidence, some countries report girls miss school for female genital mutilation to be performed. They then have difficulty re-entering education or are considered ready for marriage, which leads to withdrawal from school.

Sensitivity analysis for benefit-cost ratio



Estimating the benefit-cost ratio of ending child marriage

This section summarizes the analysis and assumptions used to estimate the benefit-cost ratio of investing in child marriage prevention in 70 countries and 13 states in India based on their population sizes and numbers of child marriages. The economic benefits largely arise from increased schooling, leading to greater productivity and formal employment. Prevention interventions involved greater access to education, especially programmes that reduce dropouts due to early marriage, as well as specific measures to delay marriage.

The modelling selected an optimal set of interventions, that is, the least cost for the greatest benefit, for each country. This resulted in higher benefit-cost ratios than in previous estimates, such as Rasmussen et al. (2019).

Reducing child marriage rates was assumed to result in an increase in average years of schooling and secondary school completion. The length of schooling leads on average to higher lifetime earnings; each additional year of education boosts income. Since the employment benefits of greater education are long term, benefits were considered up to 2050.

Two scenarios were compared:

- Baseline/business-as-usual where intervention coverage starts at the most recent estimates of child marriage based on cohabitation rates from household survey data, which are maintained over 2022–2030.
- Full scale-up where interventions increase linearly over 2022–2030 to achieve an average 5 per cent child marriage rate for 17-year-olds by 2030.

Investments

The cost of preventing child marriage entails funding two sets of intervention programmes. One set, which includes providing economic incentives, life skills and community mobilization programmes, is directed specifically at reducing child marriage. The other is a set of education programmes to keep girls in school, which include improved access to school, “girl-friendly” schools, better teaching and economic incentives to stay in school.

Benefits

The economic benefits of investing in child marriage prevention arise from:

- Education: Measures to reduce school dropouts, which were assumed to effectively prevent child marriage and keep more girls in school
- Formal employment participation and productivity: Increased formal employment and greater productivity, which arise from higher levels of education and secondary school completion

The positive effects on employment were modelled through more accessible education programmes that reduce dropouts due to early marriage as well as specific interventions to delay marriage. Reduction of child marriage rates results in an increase in average years of schooling and secondary school completion.

Length of schooling leads to an average increase in lifetime earnings, with each additional year in education associated with greater per capita income. A higher level of schooling also leads to more employment in the formal sector. These are the largest components of the economic benefits from reduced child marriage. Since higher levels of

education lead to increased earnings only for those who enter the workforce, labour force participation was estimated using age- and sex-specific rates for each country.

Economic benefits were discounted at 3 per cent per year and are presented in 2020 dollars.

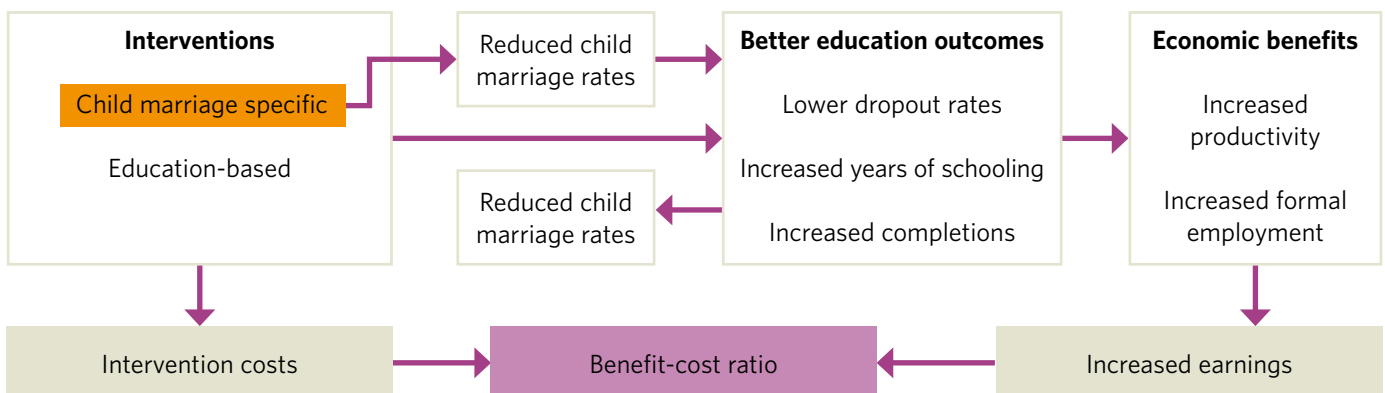
Modelling framework

The modelling framework had several components. First, it used parameters from the literature to estimate the impact of interventions on the child marriage rate as well as intervention costs. Three interventions had direct impacts. Five had indirect impacts through educational interventions that improve school attendance through reduced dropout rates. There is an interdependence between child marriage and education illustrated in the figure below. First, increased enrolments tend to reduce child marriage. Second, reduced child marriage increases likely enrolments. Both effects are modelled.

The second step, for the direct interventions, was to estimate the impact of reduced child marriage on educational outcomes, notably early dropouts, years of schooling and the completion of secondary schooling. This used an education model similar in type and structure to one in Wils, Sheehan and Shi (2019). For girls who stay longer in school due to educational interventions, the model assumed that reduced dropout rates occurred in the same proportion among those who would otherwise have been married or unmarried out of school. Country-specific dropout rates were estimated.

A third step was to use the results from the education model in an employment model based on Sheehan et al. (2017). This estimated the economic benefits of better educational outcomes for girls, namely, country-specific higher productivity and access to formal employment, leading to higher GDP per labour force participant.

Modelling framework



Results

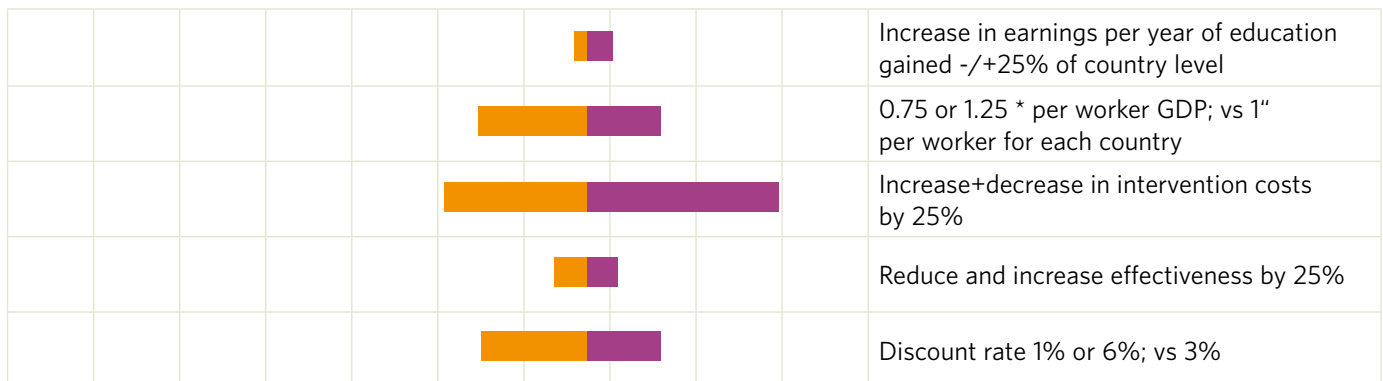
		Benefit breakdown by type	Benefit breakdown by impact averted (2020-2050)
Total additional cost (2020-2030)	\$38 billion		230.2 million child marriages averted 386 million girls completing school
Total return (2020-2050)	\$5.1 trillion	Interventions in education: \$3.1 trillion Specific child marriage interventions: \$2 trillion	

Limitations and sensitivity analysis

Limitations in estimating returns on investment in preventing child marriage include a limited number of studies on which to base the cost and

effectiveness of interventions. Further, interventions evaluated in one context may not have the same results in others. These limitations are included in the sensitivity analysis shown below.

Sensitivity analysis for benefit-cost ratio



0 5 10 15 20 25 30 35 40 45 50

Benefit-cost ratio compared to point estimate

■ Parameter lower bound
■ Parameter upper bound

Table 1. Global parameters and assumptions used for economic benefit calculations

Key indicator	Value	Source/comments
Social value of life year	0.5 GDP per capita; population weighted over 120 countries in analysis	Stenberg et al., 2014
Discounting	3 per cent per annum	
Years of education gained due to teenage pregnancy averted	1	Assumed to be the difference in expected years of schooling between males and females in the least developed countries in 2019 (10.4 years compared to 9.4 years) ¹¹
Additional earnings per year of education gained	10 per cent	Montenegro and Patrinos, 2014
Time out of workforce due to pregnancy	3 months	Based on average maternity leave policy
Proportion of stillbirths that are intrapartum	0.50	Lawn et al., 2016
Disability weight (type 1 female genital mutilation)	0.02	Weight for dyspareunia/sexual dysfunction (Haagsma et al., 2015)
Disability weight (type 2 female genital mutilation)	0.13	Proxy is the weight for moderate anxiety (IHME 2020)
Disability weight (type 3 female genital mutilation)	0.32	Proxy is the weight for obstructed labour (IHME 2020)
Health-care costs per year per case of female genital mutilation	\$11.42	Tordrup et al., 2022
Years of education gained due to child marriage averted	1	Calculated from the reduction in dropout rates. Each additional year of education is assumed to be a child marriage averted for a year. Dropout rates were determined by a multiplicative interaction of between one and eight interventions (Rasmussen et al., 2019).
Additional earnings per year of education gained due to child marriage averted	Variable	Returns to education in developing countries (Patrinos and Psacharopoulos, 2020).

11 UNDP, 2020.

Table 2. Country-specific parameters and assumptions used for economic benefit calculations

Parameters	Source	Note
Population	World Bank, World Development Indicators	Indicator of “population, total”; value in 2020 or most recent available value
GDP per capita	World Bank, World Development Indicators	Indicator of “GDP per capita (current US\$)”; value in 2020 or most recent available value
Average annual salary	World Bank, World Development Indicators	Calculated using “GDP (current US\$)”/“labour force, total”; value in 2020 or most recent available value
Proportion of women who participate in the workforce	World Bank, World Development Indicators	Indicator of “labour force participation rate, female (percentage of female population ages 15+) (national estimate)”; value in 2019–2020 or most recent available value; where a national estimate was unavailable, a modelled ILO estimate in the most recent year was used
Labour force	World Bank, World Development Indicators	Indicator of “labour force participation rate, total (% of total population ages 15+) (national estimate)”; value in 2020/2019 or most recent available value
Age-specific fertility rate for each age group	United Nations, 2019a	Annual number of births to women of a specified age or age group per 1,000 women in that age or age group
Average age of pregnancy	United Nations, 2019b	Mean age of childbearing in 2015–2020
All-cause mortality for each age group	Institute for Health Metrics and Evaluation/Global Health Data Exchange	Value in 2019. Note, for the group age 65 and over, the all-cause death rate of 65–89 years was used
Maternal mortality rate	Institute for Health Metrics and Evaluation/Global Health Data Exchange	Maternal mortality ratio (all ages) (national estimate, per 100,000 live births) in 2019
Neonatal mortality rate	World Bank, World Development Indicators	Mortality rate, neonatal (per 1,000 live births) in 2019
Stillbirth rate (stillbirths per 1,000 total births, live and stillbirths)	World Health Organization Global Health Observatory	Value in 2019
Activity status	International Labour Organization	Percentage of non-school female population aged 20–24 years in formal and informal employment by country
School quality	Variable	Based on the Trends in Maths and Science Study and Program for International Student Assessment survey results.
Age grade distribution	Variable	Household data from Demographic and Health Surveys and Multiple Indicator Cluster Survey results.
School quality	Variable	Based on Trends in Maths and Science Study and Program for International Student Assessment survey results.
Enrolment data	Variable	UIS Statistics
Education system structure	Variable	UIS Statistics
Education expenditure	Variable	UIS Statistics

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