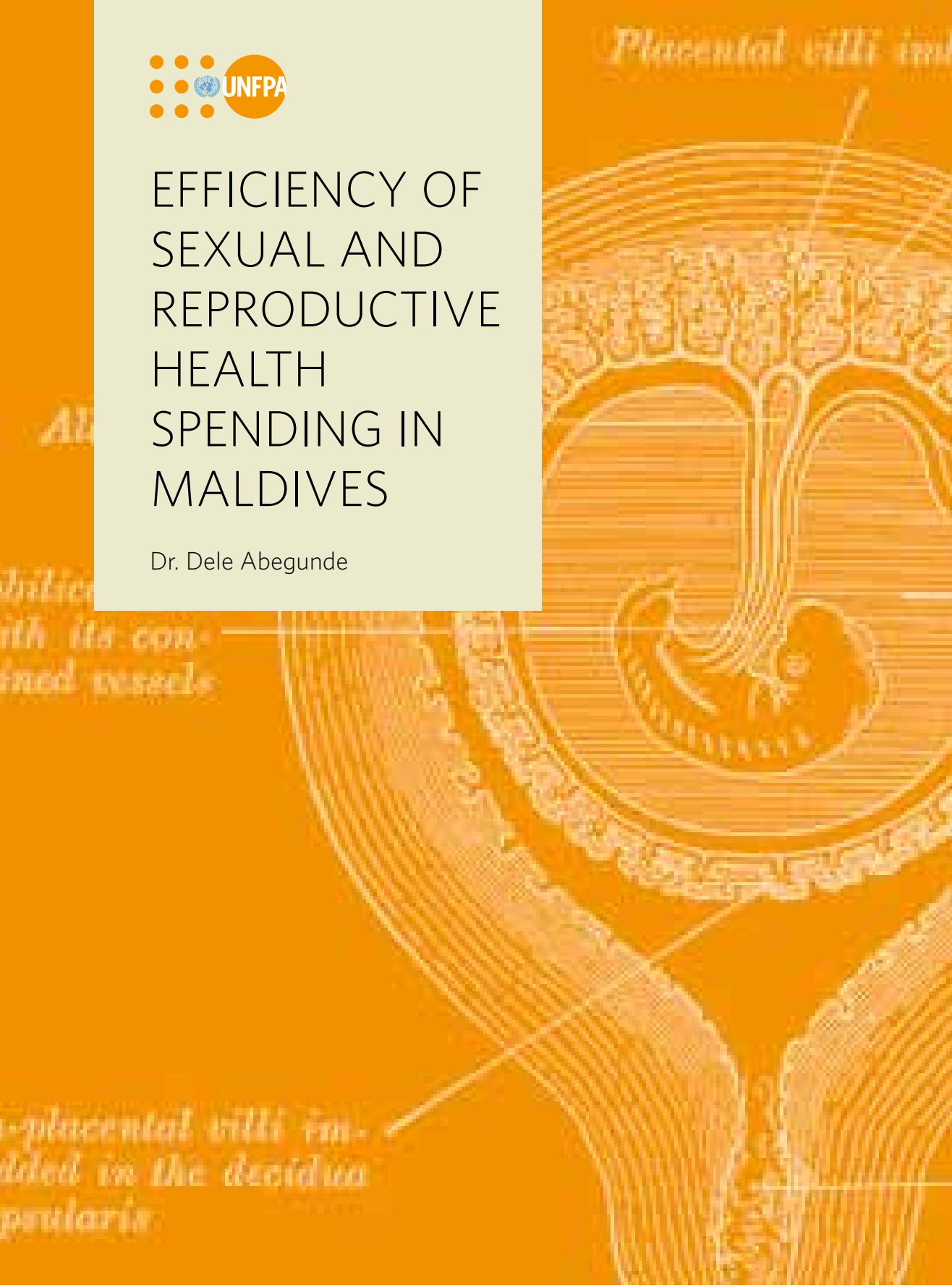

# EFFICIENCY OF SEXUAL AND REPRODUCTIVE HEALTH SPENDING IN MALDIVES

Dr. Dele Abegunde

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VIII

A main goal is to provide the **evidence-base**, useful for supporting policy **decision options** for improving health outcomes. The evidence obtained will support the **optimization** of investments for **health** for an improved balance of **curative and preventive** health thereby improving **efficiency** in public health investments.

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# EFFICIENCY OF SEXUAL AND REPRODUCTIVE HEALTH SPENDING IN MALDIVES

Dr. Dele Abegunde

United Nations Population Fund
Maldives 2016

Fat
Lobule un-
ravelled
Lobules

Lactiferous tubule
Ampulla
Loculi in connective tissue

# FOREWORD

The Maldives is now classified as an upper middle income country thanks to the remarkable economic and social development improvements that have taken place. In the past decades the reduction of Maternal Mortality Rates (MMR) and the coverage of reproductive health services have improved significantly, leading to many changes in the overall health system. It must be noted that these results were only achieved with high level political commitments, as evident from the overall health masterplans and reproductive health strategies.

As we enter the UN's 2030 Agenda for Sustainable Development, the emphasis is on the bottom 40 per cent - to ensure that no one is left behind from enjoying the benefits of development. More than half the population is below 25 years, most of them will transition to adulthood in the next fifteen years. With empowerment, education and employment, young people can accelerate development in the course of a generation – an effect known as the demographic dividend.

The Maldives health expenditure is high with an emphasis and focus on the development of curative care. In addition, the provision of specialized health services at provincial, regional and atoll levels with smaller populations require large per capita investments relying on expatriate doctors and nurses with high turnover rate.

In this context, the United Nations Population Fund (UNFPA), together with the Ministry of Health of Maldives embarked on this study to provide policy options to determine the optimal mix of interventions in response to youth Sexual Reproductive Health (SRH) and Gender based violence (GBV) in the Maldives that delivers the most cost-effective health benefit.

Based on the existing health infrastructure and recurrent costs, this report looks at the most cost-effective recommendations for the next five years. It also points to institute a systematic focus on inclusion, acting on all factors that would normally leave behind the vulnerable.

I would like to express my deepest gratitude to the Maldivian Government, the Ministry of Health, Dr. Dele Abegunde and Dr. Anderson Stanciole for their hard work, cooperation and contribution to this report that aims to improve the sexual and reproductive health of the Maldivian people.

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**Maldives**

# EXECUTIVE SUMMARY

A collaboration between UNFPA and the Ministry of Health of Maldives aimed to promote equity in access to SRH services and information. In furtherance of this collaboration, UNFPA is supporting the study of the efficiency of SRH spending, an economic evaluation of benefits against costs of SRH service delivery as planned in the Maldives' National Reproductive Health Strategy of 2014-2018. A main goal is to provide the evidence-base, useful for supporting policy decision options for improving health outcomes. The evidence obtained will support the optimization of investments for health for an improved balance of curative and preventive health thereby improving efficiency in public health investments.

Sexual and reproductive health services, facilitate women and couples to have the desired number of children, when they are wanted; to deliver their babies safely and have healthy newborns; and to have healthy sexual lives, free from HIV and other sexually transmitted infections (STIs). Reduction in rates of unintended pregnancies, lower rates of death and disability among women and newborns, and lower incidence of HIV and other STIs are some of the proximate health benefits that accrue from responsive SRH services. Long-term benefits range from greater family savings to stronger national economies. The Maldivian Health Master Plan (2006-2015) and the National Reproductive Health Strategy (NRHS) 2014-2018 prioritized sexual and reproductive health to include, the strengthening of the adolescent-friendly health services in conjunction with the life-skills education in schools and the establishment of services for the health sector response to gender-based violence as stipulated in the Domestic Violence Act (2012).

This study purposed to develop policy options for the Maldives Ministry of Health to determine optimal mix of interventions in response to youth SRH and GBV in the Maldives that delivers the most cost-effective health benefit. The results will inform the implementation of the National Reproductive Health Strategy (NRHS) 2014-2018 by providing costs of different levels of SRH service delivery as planned under the NRHS, compared to the potential benefits of improved SRH service and information, including economic benefits as well as impact on health outcomes (such as lives saved, unwanted pregnancies averted and GBV cases averted).

An accounting of monetized resource inputs (costs) and linked

outputs (impacts) is essential for this analysis. A first step was the framing of the conceptual framework which forms the scope of the analysis. The next step was the determination of the list and scope of the key interventions in the sexual and reproductive health programs and Gender Based Violence programs as prioritized in the Health Master Plan (2006-2015) as well as the National Reproductive Health Strategy (NRHS) 2014-2018. Over 50 evidence-based interventions were grouped into seven broad packages following plausible program structures in Maldives. These broad categories include: family planning, maternal and newborn health, malaria, HIV, immunization, and child health, youth and adolescent health and Gender Based Violence. We estimated the costs of the six groups of interventions along with their program and systems costs required to deliver these interventions including the potential effects of these interventions using the OneHealth Tool which integrates the assessment of cost and health benefits incorporating the interlinked epidemiological models such as the Lives Saved Tool (LiST), the AIDS Impact Model for HIV/AIDS interventions, and the FamPlan model which relates contraceptive use and the total fertility rate (Bongaarts and USAID FamPlan).

An estimated 20% of the data required for a full estimation of the cost and benefits have been so far imputed into model. Efforts are ongoing to improve the robustness of the estimates particularly in the collation of coverage data projections that are critical for the LiST and other estimation components in the OneHealth modeling tool and the required microcost data. A caveat to the estimates in this report is necessary to the extent that the work is still ongoing to increase the robustness of the analysis. Estimates are merely indicative and may at this time not be construed as near final or final estimates.

Ultimately, three strategies were evaluated as options: the base case (counterfactual) scenario representing the SRH business as usual; the expanded family planning scenario in which family planning SRH services are provided for the reproductive age group in the population – the expanded family planning option and; the adolescent and youth friendly SRH (A&YFSRH) option in which SRH services are limited to the age group between 14 and 30 years old. The cost and impact of interventions in each of the strategies were estimated annually and projected from 2014 to 2018 representing the current strategic planning year and further projected to 2023. Estimated were cost of infrastructure (hospitals, primary care centers and health post) and their maintenance, service delivery personnel

including in schools, health care commodities; medicines, family planning consumables and materials. The impact measure include: Number of unintended pregnancies averted due to modern method use; Number of maternal deaths averted due to modern method use; Number of abortions; Number of unsafe abortions; Number of safe abortions; Number of unsafe abortions averted due to modern method use; and total number of deaths averted.

Estimates showed that between 2014 and 2023, the base case will cost MVR 4156 million and 31 deaths averted, the expanded family planning option will cost MVR 4015 million to avert 32 deaths while the A&YFSRH option will cost MVR 953 million to avert 32 deaths. Cost-effectiveness in the base case scenario was MVR 134 million per death averted, MVR 127 million per death averted for the expanded family planning scenario and MVR 30 million per death averted in the A&YFSRH scenario.

In conclusion, upscaling the adolescent and youth friendly option is estimated to be the most cost-effective strategy to scale up sexual and reproductive health in Maldives. This will involve streamlining the existing health care infrastructure and interventions to more efficiently deliver sexual and reproductive health services and actively targeting youths and adolescents. Adolescent and youth SRH requires that services are provided in manners acceptable and attractive to youths. Training of school counselors to provide counseling services to youth and adolescents and retraining health care providers to better provide SRH services are potential strategies to upscale adolescent and youth SRH in Maldives.

It is recommended that this exploration should be further pursued with exploration to improve the data accessibility and quality in the future. It is envisaged that circulation of this report might motivate sufficient interest among stakeholders such that would improve readiness to provide access to relevant data.

**Upscaling** the **adolescent and youth friendly** option is estimated to be the most **cost-effective strategy** to scale up sexual and reproductive health in Maldives.

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# LIST OF ABBREVIATIONS

**A&YSRH**
Adolescent and youth friendly sexual and reproductive health

**AIDS**
Acquired immuno deficiency syndrome

**ANC**
Antenatal care

**ASFR**
Age-specific fertility rate

**BBS**
Biological Behavioral Survey

**CPR**
Contraceptive prevalence rate

**C-section**
Caesarean section

**FP**
Family planning

**FSW**
Female sex worker

**GBV**
Gender-based violence

**HC**
Health centre

**HDI**
Human development index

**HIS**
Health information system

**HIV**
Human immuno-deficiency virus

**HMP**
Health Master Plan (2006-2015)

**HPA**
Health Protection Agency (HPA)

**HPV**
Human papilloma virus

**ICPD**
International Conference on Population and Development

**IDUs**
Injecting drug users

**IGMH**
Indira Gandhi Memorial Hospital

**IPV**
Intimate partner violence

**IUD**
Intra-uterine device

**IVF**
In-vitro fertilization

**KAP**
Key affected populations

**LBW**
Low birth weight

**LGA**
Local Government Authority

**MARPs**
Most at risk populations (for HIV infection)

**MDGs**
Millennium Development Goals

**MDHS**
Maldives Demographic Health Survey

**MISP**
Minimum initial service package

**MMR**
Maternal mortality ratio

**MNH**
Maternal and newborn health

**MoH**
Ministry of Health

**MRF**
Maldivian Rufiyaa (local currency)

**MSM**
Men having sex with men

**NGOs**
Non-government organizations

**NMR**
Neonatal mortality rate

**PCOS**
Polycystic ovarian syndrome

**PMR**
Perinatal mortality rate

**PMTCT**
Prevention of mother-to-child transmission (of HIV infection)

**PPH**
Postpartum haemorrhage

**RH**
Reproductive Health

**RHS**
Reproductive Health Survey

**SAARC**
South Asian Association for Regional Cooperation

**SARA**
Service availability and readiness assessment

**SRH**
Sexual and reproductive health

**STI**
Sexually transmitted infection

**T-3**
Trimester-3 (of pregnancy)

**TFR**
Total fertility rate

**THE**
Total health expenditures

**TT**
Tetanus toxoid

**UN**
United Nation

**VCT**
Voluntary counseling and testing (for HIV)

**VIA**
Visual inspection with acetic acid

**YFSRH**
Youth friendly sexual and reproductive health

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Auditory vesicle
Facial and acoustic Ns.
Trigeminal N.
Glossopharyngeal N.
Vagus N.
Accessory N.
Hypoglossal N.
Trochlear N.
Cerebral hemisphere
Rhinencephalon
Heart
Liver
Vitelline loop
Tail
1. Coccygeal
1. Lumbar

Heart
Hyoid arch
Fore
bular arch
rocess
ye
Yolk Sac
Hind-limb

The **developments** of the Maldivian health system in the past decade have notably **focused** on the **curative** care sector arguably **at the expense** of the **preventive** primary health care and public health care sectors.

# BACKGROUND

The Maldivian Health Master Plan (2006-2015) and the National Reproductive Health Strategy (NRHS) 2014-2018 prioritized sexual and reproductive health to include, the strengthening of the adolescent-friendly health services in conjunction with the life-skills education in schools and the establishment of services for the health sector response to gender-based violence as stipulated in the Domestic Violence Act (2012). eHealth services were to be linked with other support services from relevant sectors. Sexual and reproductive health services in countries, facilitate women and couples to have the desired number of children, when they are wanted; to deliver their babies safely and have healthy newborns; and to have healthy sexual lives, free from HIV and other sexually transmitted infections (STIs). Reduction in rates of unintended pregnancies, lower rates of death and disability among women and newborns, and lower incidence of HIV and other STIs are some of the proximate health benefits that accrue from responsive SRH services. Long-term benefits range from greater family savings to stronger national economies [1].

The developments of the Maldivian health system in the past decade have notably focused on the curative care sector arguably at the expense of the preventive primary health care and public health care sectors. Expectedly, community participation in health promotion, preventive health services and utilization of the skills of trained community-based public health workers have been poor for meaningful contribution into the health of the citizens. Health services provision at the provincial, regional and atoll levels, which have smaller populations, are skewed towards specialized services that rely mainly on expatriate human resources (doctors and nurses) with the attendant high turnover rates of these cadre of health personnel. The introduction of the national health insurance scheme - Asandha may have driven an over-utilization of curative health services and have limited the investments in preventative care.

Relative to countries with comparable development indicators in national budgets for health and the young, the Maldivian public sector investment in health and youth may be comparatively high although these investments have not been sufficiently reflected in the key health indicators. Improved spending and efficient allocation and management of the available but limited resources could provide

increased health outcomes, better achieve the reproductive health rights and improve (reproductive) goals without additional strains on public finance.

UNFPA has collaborated with the Ministry of Health of Maldives to promote equitable access to SRH services and information. In furtherance of this collaboration, UNFPA is supporting the study of the efficiency of SRH spending, an economic evaluation of benefits against costs of SRH service delivery as planned in the Maldives' National Reproductive Health Strategy of 2014-2018. A main goal is to provide evidence-base that is useful for supporting policy decisions options, ultimately improving health outcomes. It is envisaged that the evidence obtained will support the optimization of investments in sexual and reproductive health for an improved balance of curative and preventive health thereby improving efficiency in public health investments.

## Maldivian Sexual Reproductive Health situation

An island nation consisting of a chain of about 1190 coral islands, Maldives is geographically divided into 26 double-chain natural atolls in six regions, organized into 20 administrative atolls. These regions include: the North Region consisting of three atolls, the North Central Region consisting of four atolls, the Central Region consisting of two atolls, the Male' Region with two atolls, South Central Region with five atolls and South Region with four atolls.

Only 187 of the islands are inhabited. With a total population of 402,071 its annual Gross Domestic Product (GDP) growth has ranged between 6% and 8% over the last two decades. Its 2012 GDP per capita of USD 6,488 rank her among the upper middle income countries. Maldives achieved five out of the eight Millennium Development Goals (MDGs) and ranks 104 out of 187 countries on its Human Development Index (HDI) in 2012. Life-expectancy at birth has increased from 46.5 years in 1976 to 73 years for males and 75 in females in 2014.

The Ministry of Health (MoH) shifted the focus of its maternal and child health programme to the broader concept of reproductive health program since 2008 emphasizing and promoting the continuum of care along the life course - from pre-pregnancy, pregnancy, childbirth, postpartum and neonatal periods; as well as reproductive health needs during adolescence, adulthood and that

Maldives achieved **five** out of the eight **MDGs** and ranks **104** on its **HDI** (out of 187 countries) in 2012. **Life-expectancy** at birth has **increased** from 46.5 years in 1976 to **73 years** for **males** and **75** in **females** in 2011.

of the elderly. This continuum straddles all levels of care from household level up to primary care and referral levels. Interventions in the continuum of care approach when linked together and included as integrated programmes, can lower costs, promote greater efficiencies, reduce duplication of resources and provide opportunities for promoting related health services while engendering equity in both access to quality health care and health status. Five core components have been established in the implementation of the Maldivian SRH strategy to include: i) family planning; ii) maternal and newborn health; iii) preventing unsafe abortion; iv) prevention and management of sexually transmitted infections (STIS)/HIV; and v) promoting sexual health. Adolescents and young people are given special attention in consideration for the group's vulnerability relative to other population groups.

Other components of RH include, infertility, RH needs of specific groups (e.g. young people, men, the elderly, etc) and cancers related to RH system including gender based violence which is closely related to RH such as in emergency situation.

The health services in Maldives are provided through a 4-tier health system that include: i) health centres and health posts as primary health-care level facilities; ii) atoll hospitals that function as first level referral facilities and provide emergency obstetric services; iii) regional hospitals as secondary level referral facilities; and iv) tertiary care hospitals – there are two in Male': Indira Gandhi Memorial Hospital (IGMH, public hospital) and ADK Hospital (private hospital). There are more than 160 health centres with more than 24 health posts, 14 atoll hospitals with many of them staffed by one or more obstetricians and pediatricians, and six regional hospitals, besides many private medical centres. The majority of the specialists in the outer atolls are expatriates, whereas majority are Maldivians at the tertiary care hospital. A high proportion of people in islands and atolls seek and utilize health services in Male'. For instance, more than 50% of deliveries in the country occur in Male', especially in the tertiary care hospitals. Also, a high proportion of normal childbirths are assisted by a specialist. Hospital bed occupancy rates vary and are low in the Atolls ranging from 5% to 11%. Regional hospitals have occupancy rate ranging from 22% to 74%. Outpatient visit is also low ranging from 11 to 18 visits per day in some Atoll hospitals.

**Youth friendly SRH**

There are a number of age definition of the youths. The UN defines it as age between 15-24 years, UN habitat defines youths as young people between the ages of 15-32. UNICEF/WHO/UNFPA defines young people as those between 10 and 24 and youths as between 15 and 24, while the Maldives defines youth using the age bracket of 18-35 years. Youths and adolescence would typically have peculiar SRH needs. A youth friendly sexual and reproductive health will generally have a number of characteristics: Health care providers that are trained in adolescent development and working with young people, providing family planning services; effective and respectful communication with the youths, with confidentiality policies regarding privacy and nondisclosure of health information in the service delivery points. Services delivery sites are accessible and open at convenient hours within an enabling youth friendly environment that provides for appropriate waiting and consulting areas with available youth-appropriate information and communication materials; Service delivery site marketing services to young people in areas and through mechanisms that young people access such as; mass and social media, youth clubs and schools; and there is youth participation in developing, implementing and evaluating/assessing services. A minimum package of services as defined by the World Health Organization (WHO), is provided on-site or through referrals to other youth-friendly services. A system for referring young people is in place for health and other social services. The YFHS should include: sexual and reproductive health (SRH) services; general health services; psychological counselling; information, education and communication (IEC) activities; referrals, and outreach work.

While there are yet limited evidence to active programming of A&YFSRH in the Maldivian health services delivery system, sexual and reproductive health services targeting the young appear to be subsumed into the existing health system with an option value. As such the available services may not be sufficiently youth friendly for effective coverage.

An estimated 47% of the Maldivian population is younger than 25 years. Gross enrolment rate for both sexes in lower secondary schools was as much as 94.6% in 2013 and 26.8% in higher secondary schools in the same year [2]. In addition to delivering A&YFSRH services in the existing health systems, a scale-up could therefore be feasible through schools and communities as new foci. Although the sexual and reproductive needs of this group is

The **UN** defines youth as age between **15-24 years**, **UN habitat** defines youth as between **15-32 years**. **UNICEF/WHO/UNFPA** defines **young people** as between **10-24 years** and **youth** as between **15-24 years**, while the **Maldives** defines youth as between **18-35 years**.

recognized in the National Reproductive Health Strategy of 2014-2018, there remains to be established a dedicated national A&YFSRH program in Maldives. A&YFSRH service delivery is subsumed in the health care system's delivery of the general SRH. The consideration of youth friendly SRH in Maldives therefore, is guided by the WHO-minimum package for A&YFSRH to include the following components:

- Information and counseling on sexuality, safe sex and reproductive health;
- Contraception and protective method provision (with an emphasis on dual protection);
- STI diagnosis and management;
- HIV counseling (and referral for testing and care);
- Pregnancy testing and antenatal and postnatal care;
- Counseling on sexual violence and abuse (and referral for needed services);

- Post-abortion care (PAC) counseling and contraception (with referral when necessary).

Synchronizing services deliverable in schools (such as counselling, dissemination of IEC) with those that are delivered in existing health services will potentially scale up A&YFSRH.

**Family Planning**

Evidence from the Maldivian Demographic Health Surveys (MDHS) 2009 [3] indicates that the total fertility rate (TFR) was 2.5 in 2009 (declining from 6.40 children in 1990 to 2.46 children in 2014 based on census figures [4]). TFR is lower in urban (2.1 births per woman) than the rural women (2.8 births per woman). Rural urban disparities in the age specific total fertility rates are highest in the 20-24 years and 35-39 years. Based on census figures, the total fertility rate (TFR) declined from 6.40 children in 1990 to 2.46 children in 2014.

Contraceptive Prevalence Rate (CPR) was 35% for any method or 27% for modern method only, unmet need for family planning (FP) was 29%. The use of any method by currently married women has decreased from 42% in the 1999 Reproductive Health Survey (RHS) to 35% in the 2009 DHS. Female sterilization is the most commonly used method with a prevalence of 10% in 2009 up from 7% in 2004 [5]. A high divorce rate, abortions, high infertility rates and use of traditional contraceptive methods may account for the unusual combination of a low TFR and high unmet need.

**Maternal and newborn health**

Maternal Mortality Ratio in Maldives declined from 500 per hundred thousand live births in 1990 to 70 per hundred thousand live births in 2015. Because MMR can fluctuate in small populations, combining information from MMR with absolute numbers of maternal deaths may provide a fuller picture. For instance there were only six and eight maternal deaths in 2009 and 2011 respectively with causes ranging from eclampsia (4 cases), complications of abortion (3 cases), postpartum haemorrhage (2 cases), puerperal sepsis (2 cases), amniotic fluid embolism (2 cases) and rupture of uterus (1 case) between 2009 and 2011. Only about 65% of pregnant women

The **caesarean-section** rate is as high as **32%**. The coverage of **postpartum /postnatal visit** was **94%**, with **67%** received a **postnatal checkup** within two days of delivery.

took iron supplements during pregnancy for more than 90 days, 7% took iron tablets for fewer than 60 days. The prevalence of anaemia among women was 15.1% in 2007. Antenatal care (ANC) was as high as 97% in 2007 with insignificant disparities in rural-urban and wealth and educational levels. In general, the coverage of all basic maternal health services in health facility is more than 90% reflecting the low level of MMR in Maldives.

The total number of live births was 7182 in 2011, 3988 of which occurred in Malé and 3156 in atolls [6]. The majority of births (95%) occurred in a health facility, 85% in a public facility and 10% in a private health facility. Malé and the South Central Region have the highest proportion of institutional deliveries (98%), while the North Central Region has the lowest (90%). The proportion of births assisted by a skilled attendant was 95%, with 71% assisted by a gynaecologist; 9% by a doctor and 14% by a nurse or midwife. Across the regions, it ranged from 89% in North Central and Central regions to 99% in Malé [3]. The caesarean-section rate is as high as 32% [3]. The coverage of postpartum/postnatal visit was 94%, with 67% received a postnatal checkup within two days of delivery with no significant discrepancy in postnatal care among region, socio-economic status or residence and about 92% of women received a postnatal checkup from a gynecologist, doctor or nurse/midwife.

In 2009, the MDHS estimated that the neonatal mortality rate (NMR) was 20 per thousand live births in the urban compared with 15 per 1000 live births in the rural areas [3]. Estimates by the MOH are lesser and showed that NMR has been declining from 11 per thousand live birth in 2001 to 7 per thousand live birth in 2011.

**Unsafe abortions, STI and HIV/AIDS**

Complicated abortion is a leading cause of maternal death in Maldives. There were 3 abortion-related deaths of the 8 maternal deaths in 2010; two were septic abortions and one was a post- abortion uterine rupture. Though surveillance for sexually transmitted diseases is limited, in 2013 the health protection agency (HPA) reported a total of 524 STIs through the national STI/HIV surveillance system. Of the 18 HIV positive cases reported among Maldivians in 2012, only two were females.

Although the prevalence of HIV/AIDS is low, certain risk behaviours such as sex work and intravenous drug use, which are seen to be increasing, pose increased risk of contracting HIV in these at-risk populations [3]. Expert opinion indicates that only about 18 case of

HIV/AIDs currently exist in Maldives.

The target with respect to Prevention of Mother To Child Transmission (PMTCT) of HIV infection is to achieve 90% of pregnant women visiting ANC clinics having comprehensive knowledge on HIV infection and prevention and access to PMTCT programme by 2016. Though the HIV test is mandatory, as a part of the national standard for ANC service, in 2012 only 5065 women were tested, while in 2009 there were 2024 women tested (14% of all HIV tests conducted)[7]

**Gender Based Violence**

About 19.5% of women aged 15-49 who had ever been in a relationship, reported experiencing physical and/or sexual violence by an intimate partner while 29% of ever-partnered women aged 15-49 reported experiencing emotional abuse by an intimate partner. About 26% of cases are emotional violence, 15% were physical violence, 5% were sexual violence and about 18% were a combination physical and sexual violence. About 6% of ever pregnant women aged 15-49 reported being physically or sexually abused during pregnancy and 41% of them being kicked or punched in the abdomen. Common sequelae of GBV is shown I Chart 1.

## The purpose and objectives

The purpose of this study is to develop policy options for the Maldives Ministry of Health to determine optimal mix of interventions in response to youth SRH and GBV in the Maldives that delivers most health benefit at minimal cost. This study will inform the implementation of the National Reproductive Health Strategy (NRHS) 2014-2018 by providing costs of different levels of SRH service delivery as planned under the NRHS, compared against the potential benefits of improved SRH service and information, including economic benefits as well as impact on health outcomes (such as lives saved, unwanted pregnancies averted and GBV cases averted)

**CHART 1**

## Gender Based Violence and its Sequelae

| VIOLENCE AGAINST WOMEN | | |
|---|---|---|
| Rape, Sexual harassment, Domestic violence, Physical assault, Psychological abuse | | |
| **NON-FATAL OUTCOMES** | | **FATAL OUTCOMES** |
| Physical health consequences: | Mental health consequences: | |
| STDs/HIV | Depression | Suicide |
| Injury | Anxiety | Homicide |
| PID | Sexual dysfunction | |
| Unintended pregnancy | Psychological abuse Eating disorders | |
| Miscarriages | Multiple personality disorder | |
| Chronic Pelvic pain | Obsessive compulsive disorder | |
| Headaches | | |
| Gynaecologicical problems | | |
| Alcohol/drug abuse | | |
| Partial or permanent disability | | |
| Injurious health behaviors | | |

Skin
Dartos tunic
Interomral fascia
Cremasteric fascia
Infundibuliform fascia
Parietal tunica vaginalis
Visceral tunica vaginalis
Tunica albuginea
A lobule of the testis
A septum
Mediastinum testis
Sinus of epididymis
Spermatic vein
Epididymis
Ductus deferens
Artery to ductus
Internal spermatic artery
Internal muscular tunic

# METHODS

An accounting of monetized resource inputs (costs) and linked outputs (impacts) is essential for this analysis. A first step was the framing of the concepts which underlie and forms the scope of the analysis. The next step was the determination of the list and scope of the key interventions in the Sexual and Reproductive health programs and Gender Based Violence programs as prioritized in the Health Master Plan (2006-2015) as well as the National Reproductive Health Strategy (NRHS) 2014-2018. Specifically, key interventions of interest include:

- The strengthening of the adolescent-friendly health services in conjunction with the life-skills education in schools.

- Established services for the health sector response to gender-based violence as stipulated in the Domestic Violence Act (2012).

- The linkages between health services with other support services from relevant sectors.

## Conceptual framework

The broad conceptual framework adopted for this study builds on previous work by Abegunde et al. that linked effect of a disease group to economic impact through labour supply and GDP. More specifically, the recent work by Stenberg et.al provided a detailed framework of factors and linkages that underpin the development of global investment for Women' and Children's health [8]. The framework considers costs in relation to both the enabling factors and high-impact interventions acknowledging the need to estimate the health gains in terms of mortality reductions (lives saved) and morbidity averted (healthy life). It also recognizes that health gains can lead to wider societal gains in areas such as education, environment, gender equality, and human rights, and that these can in turn lead to health benefits. Abstracting from Stenberg et.al, we constructed a modified framework to guide this estimations. This modified framework primarily considers the overall health and development context, identifying four broad dimensions driving health outcomes: policy, health system, community engagement and innovation. These are considered key for scaling up essential interventions in a politically, financially, technically, and socially sustainable way (Figure 1).

Within this framework were identified a package of evidence-based SRH and GBV interventions which already existed in the Maldives health system and on which there is consensus about the beneficial effects for the health of women and adolescent girls; mothers and newborn babies; and infants and children younger than 5 years. These groups may overlap in certain respects. Within the framework were identified health gains including; lives saved from maternal, newborn, child, and stillbirths averted; healthy life as a consequence of reduced illness, disability, and stunting; and demographic dividends from low dependency ratio and increased labour force participation as a result of reduced Total Fertility Rates (TFR). Conceptually, the scale up of intervention will in the long run, engender wider social and economic gains.

FIGURE 1

## Conceptual and Analytical Framework

**CONTEXT** Existing health systems and service delivery, current levels of health expenditure, epidemiological and demographic transitions, changes in the level and distribution of wealth, food security, climate change, migration, and conflict

| ENABLING FACTORS | PROGRAMS AND INTERVENTIONS | HEALTH GAINS FROM SRH DIMENSION | BENEFITS |
|---|---|---|---|
| **Enabling Policy and Legislations** Legislations, policies, and political commitment. equitable access. | **Women and adolescent girls** Prevention of unintended pregnancy and birth through contraception and reproductive health | **Lives Saved** Maternal, newborn, child, and stillbirths averted | **Social & Economic developments** Increased human capital and education; Increased employment, productivity, and income per person; social value of improved health; and reduced healthcare costs |
| **Health system enablers** Improving management of health workers, commodities, financing, and data for decision making | **Mothers and newborns** Effective care during pregnancy, birth, and postnatal period | **Healthy life** Reduced illness, disability, and stunting | **Enhanced political and social capital** Empowered women and girls and stronger communities and societies |
| **Community engagement** Knowledge transfer and demand generation. | **Adolescent SRH** Sexual and reproductive health education, Counselling, HPV vaccination | **Reduced Total Fertility Rates** Demographic gains, Low dependency ratio, Increased labour force participation etc. | **Environmental gains** Through reduced population pressure on resources |
| **Innovation** Research and development, implementation service | **Infants and children** Child health, nutrition, and development | | |

**CROSS-CUTTING ISSUES** Social determinants of health including education, living environment, roads, transport and sex as well as equity and human rights

Shaded boxes are those included in the quantitative analysis.

## Scope of the estimation

Because of the modelling challenges and limitation in the available data, not all components of the conceptual framework were covered in the quantification. For instance, cost and benefits of legislations, policies, and political commitment, innovations and development of health policies were not considered quantitatively.

## Perspective of the estimation

The estimation was conducted in the perspective of the government as the purchaser of health care. We conveniently aligned the period of our analysis to the Maldives' National Reproductive Health Strategy 2014-2018 [5], extending our estimates to 2018 in the first instance and to an additional five-year horizon which extends to 2023. This extension is to cover the next five-year SRH and GBV strategic planning period to which estimates from this study would provide useful evidence.

## Costing interventions

We included health sector interventions that are known to directly improve sexual and reproductive health including maternal, newborn, and child health as identified in previous similar studies and reviews [8, 9]. To facilitate the matching and modelling of outcomes to interventions, we concentrated on interventions for which data on effectiveness were available. Over 50 evidence-based interventions were grouped into seven broad packages following plausible program structures in Maldives. These broad categories include: family planning, maternal and newborn health, HIV/AIDS, immunization, and child health, youth and adolescent health and Gender Based Violence. The assumption was that these interventions were delivered at all delivery points reflecting the 4-tier of health services delivery system including schools in Maldives although to varying intensities. These delivery points include: i) health centres and health posts as primary health-care level facilities; ii) Atoll hospitals that function as first level referral facilities and provide emergency obstetric services; iii) regional hospitals as secondary level referral facilities; and iv) tertiary care hospitals in Male' (the Indira Gandhi Memorial Hospital (IGMH) a public hospital and ADK Hospital which is a private hospital) [5].

## Intervention scenarios

Three main intervention scenarios were projected and configured for costing and impact estimation in the OneHealth tool. These include: the base-case (counterfactual) scenario representing business as usual sexual and reproductive health interventions targeting child bearing age group (14-50 years old) of the Maldivian; the expanded family planning (ExFP) intervention scenario which focuses on the delivery of core but limited family planning interventions to reproductive age group of 14- 50 years and; the adolescent and youth friendly sexual and reproductive health (A&YFSRH) intervention scenario which limits family planning interventions to youths and adolescents of age 14- 30 years (Table 1). Key intervention group in the base case scenario included: Family planning, maternal and newborn health, HIV, Sexually transmitted diseases, immunization and child health interventions listed in Table 1. Extended family planning intervention scenario excluded mainly retained family planning and maternal and child health interventions to reproductive age groups while the A&YFSRH restricts these major interventions to 14 -30 age group and includes school counseling and counseling for youths who are out of school.

We estimated the costs of these groups of interventions along with their program and system costs required to deliver these interventions including the potential effects of these interventions using the OneHealthTool. OneHealth tool integrates the assessment of cost and health benefits incorporating the interlink between the epidemiological models such as the Lives Saved Tool (LiST),[10] the AIDS Impact Model for HIV/AIDS interventions, [11, 12] and the FamPlan model which relates contraceptive use and the total fertility rate (Bongaarts and USAID FamPlan). The OneHealth tool takes into account population growth, reduced mortality, and reduced incidence or prevalence of disorders in the process of scaling up interventions.

**TABLE 1**

## Scenarios of interventions: Base-Case, Expanded Family planning, Adolescent and youth Friendly Sexual and Reproductive Health

| Scenario | BC | EFP | A&YSRH |
|---|---|---|---|
| Eligible population | Child bearing age women and men 14 – 49 yrs | | Adolescent and Youths only focus 14 – 30 yrs |
| **Service delivery channels** | | | |
| Schools | | | ● |
| Health centres | ● | ● | ● |
| Atoll hospitals | ● | ● | ● |
| Regional Hospital | ● | ● | ● |
| Tertiary Hospitals | ● | ● | ● |
| PROGRAM AND INTERVENTIONS | | | |
| **Family planning** | | | |
| Modern family planning methods (pill, condom, injectable, IUD, implant, female sterilization, male sterilization, LAM, vaginal barrier method, vaginal tablets, and other contraceptives) | ● | ● | ● |
| **Counseling** | | | |
| Schools counseling | | | ● |
| Counseling for youth out of school | | | ● |
| **Maternal and newborn health** | | | |
| Safe abortion | ● | ● | ● |
| Post-abortion case management | ● | ● | ● |
| Ectopic pregnancy case management | ● | ● | ● |

| Scenario | BC | EFP | A&YSRH |
|---|---|---|---|
| Multiple micronutrient supplementation | ● | ● | ● |
| Syphilis detection and treatment in pregnant women | ● | ● | ● |
| Balanced energy supplementation | ● | ● | ● |
| Management of pre-eclampsia (magnesium sulphate) | ● | ● | ● |
| Detection and management of diabetes in pregnancy | ● | ● | ● |
| Detection and management of fetal growth restriction | ● | ● | ● |
| Skilled birth assistance during labour | ● | ● | ● |
| Active management of the third stage of labour | ● | ● | ● |
| Management of eclampsia with magnesium sulphate | ● | ● | ● |
| Neonatal resuscitation | ● | ● | ● |
| Kangaroo mother care | ● | ● | ● |
| Antenatal corticosteroids for preterm labour | ● | ● | ● |
| Antibiotics for preterm premature rupture of membranes | ● | ● | ● |
| Induction of labour (beyond 41 weeks) | ● | ● | ● |
| Neonatal infections or newborn sepsis—full supportive care | ● | ● | ● |
| Preventive postnatal care | ● | ● | ● |
| Periconceptional folic acid supplementation | ● | ● | ● |
| Calcium supplementation for prevention and treatment of pre-eclampsia and eclampsia | ● | ● | ● |

| Scenario | BC | EFP | A&YSRH |
|---|---|---|---|
| **HIV** | | | |
| Prevention of mother to child transmission | ● | ● | ● |
| ART (first-line treatment) for pregnant women | ● | ● | ● |
| Cotrimoxazole for children | ● | ● | ● |
| Sexually transmitted diseases | ● | ● | ● |
| **Immunization** | | | |
| Tetanus toxoid vaccine (pregnant women) | ● | | |
| Rotavirus vaccine | ● | | |
| Measles vaccine | ● | | |
| DPT vaccine | ● | | |
| Haemophilus influenzae type b vaccine (Hib) vaccine | ● | | |
| Polio vaccine | ● | | |
| BCG vaccine | ● | | |
| Pneumococcal vaccine | ● | | |
| Meningitis vaccine | ● | | |
| **Child health** | | | |
| Oral rehydration therapy | ● | | |
| Zinc for diarrhoea treatment | ● | | |
| Antibiotics for treatment of dysentery | ● | | |
| Pneumonia treatment in children 0–4 years | ● | | |
| Vitamin A for measles treatment in children 0–4 years | ● | | |

| Scenario | BC | EFP | A&YSRH |
|---|---|---|---|
| **Breastfeeding counselling and support** | | | |
| Rates of exclusive breastfeeding modelled: 1–5 months | ● | | |
| Complementary feeding counselling and support | ● | | |
| Management of severe malnutrition in children 0–4 years | ● | | |
| Vitamin A supplementation in infants and children 6–59 months | ● | | |
| Average coverage across 50 interventions | ● | | |
| **Gender Based Violence** | | | |
| Management of intimate partner sexual violence | ● | | |
| Management of Rape cases | ● | | |
| Average coverage across all GBV interventions. | ● | | |
| **Adolescence Health** | | | |
| HPV vaccination | ● | | |

## Estimation of socio-economic returns on investment

Benefits from scaling up health interventions may accrue from: 1) lives saved (mortality averted), 2) morbidity averted both of which ostensibly increase labour force participation and ultimately increase productivity and 3) reduction of unintended pregnancies and as Stenberg et.al argued, increase rates of savings [8].

## Economic benefits from demographic dividends of decreasing fertility

Decreased fertility rates and reductions in unintended pregnancies provide benefits though reduction in dependency ratio, increased total GDP by the working age group in the population. GDP per capita will increase with reduced dependency ratio. Also reduced birth increases potential for labour force participation for women. Household productivity, savings and increased investment in schooling, may increase with decrease fertility rates. Similarly from Stenberg and colleagues [8], we were guided by the methods of Ashraf and colleagues (2013) to quantify the demographic dividend [13]. This could be a potential extension of this estimation.

**CHART 2**

## Cost components to be included under each cost category

### RMNCH SPECIFIC COSTS

Commodities
Drugs, vaccines, laboratory tests, and medical supplies based on treatment guidelines

RMNCH programme management costs
In-service training activities, development of pre-service training materials, distribution of printed information materials, mass media campaigns, supervision of community health workers, routine programme management

Improving adolescents' accessibility to health services
General programme coordination at national and district level, development and distribution of national standards for Adolescent Friendly Health Services (AFHS), in-service training on AFHS, information and communication activities, upgrade of infrastructure and equipment to adolescent friendly standards

### SERVICE DELIVERY COSTS

Inpatient care
Inpatient care, including the running costs of the inpatient facilities such as infrastructure operations and maintenance, and health worker costs, but excluding drugs, vaccines, laboratory tests, and food/food supplements

Outpatient care vs community and outreach
Outpatient care, where a proxy amount intends to cover the running costs of the community-based care and outreach activities, including transport operations and maintenance, and health-worker-related costs

Outpatient care—primary level facilities
Outpatient care, including the running costs of the inpatient facilities such as infrastructure operations and maintenance, and health worker costs, but excluding drugs, vaccines, laboratory tests, and food supplements.

Outpatient care—hospital level
Outpatient care, including the running costs of the inpatient facilities such as infrastructure operations and maintenance, and health worker costs, but excluding drugs, vaccines, laboratory tests, and food supplements.

**HEALTH SYSTEM INVESTMENTS**

Infrastructure investments
Capital investments in infrastructure, primarily related to construction of hospitals, facilities and health posts. Capital investments are assumed to take place through to 2023.

Supply chain
Operational costs for transporting additional RMNCH commodities throughout the supply chain

Health information systems
Investments in equipment and procedures for better health information management

Health financing policy
Administration of social health insurance in selected countries

Governance
Investments in procedures for improved governance and management of resources

Coverage projections were aligned to the time frame of the National Reproductive Health Strategy **2014 - 2018** and **projected** to an **additional 5-year** period to represent an additional **planning** period.

## Coverage level data

Critical to our estimation of cost and impact are the levels of coverage of the interventions. Our initial evaluation of data availability showed that the interventions existed in Maldives health services delivery systems amorphously and were mostly not organized into clear intervention programs. The Maldivian health information systems appear to be in its nascent form. Consequently, though health services consumption data may exist in some forms at the service delivery points, existing active data centralization processes were not sufficiently robust to provide ready estimates of the coverage of many of the interventions or groups. Baseline coverage projections were obtained from reviews of a number of sources including the National Reproductive Health Strategy 2014 -2018 [5], Maldives Demographic Health Survey 2009 [3] National Strategic Plan for the Prevention and Control of HIV/AIDS, Republic of Maldives 2012-2016 [7], The Maldives Health Statistics 2012 [6]. We also surveyed the World Wide Web for possible publications or grey literature related to sexual and reproductive health and gender based violence in Maldives.

Coverage projections were aligned to the time frame of the National Reproductive Health Strategy 2014 -2018 [5] and projected to an additional 5-year period to represent an additional planning period. This way, the estimates will provide evidence for the current (2014-2018) and next SRH planning (2019 – 2023) periods. We have not considered projections beyond 2023 because the assumptions underlining the estimation become unwieldy, infeasible and may hold poorly when extended far into the future. Secondly uncertainties in the coverage estimates increase as the projection limits extends.

## Data sources, management and analysis

We have obtained data for this estimation from a number of sources. An initial scoping exercise by a national consultant revealed the challenges that were to be experienced with this estimation. A second follow-up data scoping exercise by the national and international consultant further defined the scope and narrowed the focus with respect to data. An outcome from this second exercise was arriving at a pragmatic choice of the best method for the exploration given the state and availability of relevant prices and quantities, scope and coverage of existing interventions. Though existing interventions cover majority of the SRH and GBV needs in Maldives, they have not been programmatically defined. In Maldives, SRH interventions are provided in the health systems that is steeped towards the curative sector. This is a significant challenge for this exploration. Delineating quantities used for SRH and GBV, allotting costs, personnel time, overheads etc., became really challenging.

The primary data sources of prices, quantities and expenditures were reports and accounts of key informants from relevant bodies and organizations in Maldives including officials of Ministry of Health and Gender, the National Health protection Agency, Asandha – the national health insurance agency, Family Protection Agency (FPA), the Police department, Ministry of Gender and Family (MGF), tertiary care hospitals: Indira Gandhi Memorial Hospital and ADK Hospital. We obtained information and reports from UNFPA and WHO in Maldives. Informed by the reports and interviews, we followed up the data scoping process with deliberately designed questionnaires. Questionnaires were also applied to regional hospitals and sampled facilities in the Atolls to obtain operational data relevant to SRH and GBV.

We obtained additional data from other secondary sources including the Maldivian Demographic Health Surveys, peer reviewed publications and grey literature in the World Wide Web. We have substituted missing data with expert opinion in some cases. Collaboration with the Asandha for access to the operational data which as it is envisaged, would significantly bridge data gaps remain largely unexplored.

## Analysis

The OneHealth modeling tool was configured to reflect the three scenarios each. Cost, coverage and epidemiological data were then entered as available in all the relevant modes. Projections were done to obtain the cost and impact of the various options and scenarios. Available data was not sufficiently robust for carrying out a classical cost-effectiveness analysis on GBV interventions, because these cases are poorly reported and prevalence estimates and coverage do not exist. Secondly, impact data are scarce. The cost-effectiveness ratio of each of the scenarios were estimated and compared.

Ureter
Ductus deferens
Bladder
Rectum
Bulb
Scrotum

Overall, the **projected** estimates showed that **scaling up** the counterfactual **A&YFSRH** will cost **MVR 4156 million** in recurrent costs between **2014** and **2023**.

# FINDINGS

The estimates from the model are reflective of the state and availability of the relevant data in Maldives. This is in spite of intensive efforts to improve the robustness of the estimates particularly in the collation of coverage data projections that are critical to the LiST and other estimation components in the OneHealth modeling tool.

The key initial findings from the data scoping exercise indicated that coverage is fairly high in some interventions. For instance antenatal care (ANC) was a high as 97% in 2007, institutional deliveries was a high as 98%. The majority of births (95%) occurred in a health facility. The proportion of births assisted by a skilled attendant was as high as 95%, with 71% assisted by a specialist. Caesarean-section rate is as high as 32%. The coverage of postpartum/postnatal visit was 94%, 67% received a postnatal checkup within two days of delivery and about 92% of women received a postnatal checkup from a gynecologist, doctor or nurse/midwife. Given these scenarios, there is little margin for improvement (about 3-5 percentage point) left, with the implication that projections and estimates might equally be really marginal especially if juxtaposed with that the population of interest. However there are interventions such as in family planning and in gender based violence where the present coverage leaves greater margins for improvement. Subsequent analysis for estimation will be concentrated on these areas.

## Base case estimates of cost and health impact of investing YFSRH

Overall, the projected estimates showed that scaling up the counterfactual A&YFSRH will cost MVR 4156 million in recurrent costs between 2014 and 2023 (Table 2). The recurrent expenditure per capita decreased from MVR 2356 in 2014 to MVR 67 by 2022 as the population is projected to gradually increase from 357,015 in 2014 to 384,120 by 2023.

Estimated costs were mainly recurrent costs as there were no capital projects proposed for A&YFSRH in the National Reproductive Health Strategy (NRHS) 2014-2018. Secondly it was considered that in scaling up A&YFSRH in Maldives, the existing health services infrastructure appear to be sufficiently well distributed across the

Atolls and Islands. What is necessary is to improve the quality of services and motivate and increase patronage particularly shifting services utilization from Male' back to regions and Atolls where delivery of A&YFSRH is limited relative to Male'.

The projection showed that 75.7% of the total cost estimate of A&YFSRH between 2014 and 2018 will be due to direct program costs. These are costs that would be expended in schools, health centers and primary care centers, Atoll hospitals and regional hospitals. Human sources constitute 16.8% while medicines and supplies constitute 7.6%.

Regarding the health impact from this investment, the estimated under 5 mortality attributable to SRH was 9 per 1000, from 2014 to 2017 dropping to 8 per 1000 in 2018 through to 2023. Neonatal mortality rate remained stable at 5 per 1000 from 2014 to 2023 while infant mortality rate was estimated at 8 per 1000 in 2014 and 2015, declining to 7 per 1000 in 2016 to 2023. Estimated total child death averted also ranged from 2 to 3 in all the years. Only a cumulative of 9 AIDS deaths were averted in all the years. One AIDS death was averted every year from 2014 to 2022.

Estimate showed that significant number of abortions were prevented annually from improved use of contraceptive materials. These were 2415, 2494, 2419 and 2350 in 2014, 2015, 2016 and 2017 respectively, dropping to its lowest of 2060 abortions that were prevented in 2018 and gradually increasing to 2170.

## Estimates for Expanded Family Planning program

Estimates are for the provision of family planning services for reproductive age women excluding the management of ancillary diseases associated with the provision of comprehensive sexual and reproductive health such as the treatment of AIDS, many of the childhood illnesses and so on. Similarly to the counterfactual scenario, the projection showed that focusing of family planning interventions for the eligible population will cost MVR 4,015 million between 2014 and 2023 – the projection period (Table 3); this being only about 3% less than the estimated for the counterfactual. Incremental cost relative to the current Health budget also range from MVR 2767 million in 2014 to MVR 2860 million in 2018, there after decline to MVR 1914 by 2023. Estimated total cost per capita was MVR 2388 in the base year, averaged MVR 1214 per capita.

## Adolescent and Youth Friendly Sexual and Reproductive health

Projected estimates show a total cost of A&YFSRH intervention projected to 2023 to be MVR 953 million (see table 10 in the appendix and figure 2). Total cost per capita averaged MVR 287 for the projected period between 2014 and 2023 and MVR 394 in the initial period between 2014 and 2018 (Table 4).

## Impacts

First group of impacts were considered and estimated for the three categories of interventions (base case, Family planning and YFSRH) these include:

- Number of unintended pregnancies averted due to modern method use;
- Number of maternal deaths averted due to modern method use;
- Number of abortions;
- Number of unsafe abortions;
- Number of safe abortions; and
- Number of unsafe abortions averted due to modern method use.

Unintended pregnancies that were averted due to use of modern contraceptives rose from 4477 in 2014 to 10968 in the base case and the expanded FP scenarios, between 2014 and 2023 (Table 5, Figure 2) totaling 89032 in the base case and the EFP scenarios. Similarly for the A&YFSRH scenario, averted unintended pregnancies rose from 4138 in 2014 to 10031 in 2023, cumulating to 82281 by 2023 (table 5)

Estimates for the number of maternal deaths averted in all the scenarios were less than unitary but are comparable for all the three scenarios. The number of abortions, unsafe abortions and safe abortions generally decreased to 2023, they were slightly more for the A&YFSRH scenario. However the averted unsafe abortions increased to 2023 and are more in the A&YFSRH scenario than the base case and the Family planning scenarios (Table 5)

**Deaths Averted**

Deaths that were averted although were small and non-unitary in some cases, generally increased to 2018 and thereafter decreased to 2023. Majority of the deaths were averted in the childhood category followed by deaths averted among the AIDS cases. Maternal deaths averted were the least (Table 5, Figure 3). Averted deaths were comparable in the three scenarios, however averted maternal deaths were relatively much more in the A&YFSRH category than in the others. The small magnitudes of averted deaths are mainly due to already high coverage of most of the SRH interventions and the relatively nifty eligible population size (figure 8).

**TABLE 2**

## Base Case Estimates of Costs and Output

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2014-2023 Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Costs** | | | | | | | | | | | |
| Total cost of plan (in millions) | 840.95 | 513.20 | 647.05 | 789.04 | 934.51 | 88.43 | 69.84 | 49.03 | 25.67 | 0.00 | 3957.73 |
| Total population | 357,015 | 363,031 | 367,892 | 371,466 | 373,847 | 376,019 | 378,113 | 380,161 | 382,164 | 384,120 | |
| Recurrent expenditures per capita (MVR) | 2,356 | 1,414 | 1,759 | 2,124 | 2,500 | 235 | 185 | 129 | 67 | 0 | |
| Total cost per capita (MVR) | 2,356 | 1,414 | 1,759 | 2,124 | 2,500 | 235 | 185 | 129 | 67 | 0 | |
| Total cost per child aged 0 to 4 (MVR) | 22,868 | 13,975 | 18,288 | 24,150 | 32,476 | 3,575 | 3,338 | 2,691 | 1,532 | 0 | |

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2014-2023 Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Impacts** | | | | | | | | | | | |
| Under 5 mortality rate | 9 | 9 | 9 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | |
| Neonatal mortality rate | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| Infant mortality rate | 8 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | |
| Total fertility rate | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| | | | | | | | | | | | |
| Total child deaths averted (ages 0-4) | 0 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | |
| Total maternal deaths averted | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| AIDS deaths averted (all ages) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | |

**TABLE 3**

## Expanded Family Planning Strategy

| Metrics | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2014-2023 Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cost** | | | | | | | | | | | |
| Total cost of plan (in millions) | 852.4 | 526.7 | 656.7 | 801.02 | 945.54 | 88.433 | 69.83 | 49.03 | 25.67 | 0 | 4,015 |
| | | | | | | | | | | | |
| Total population | 357,015 | 363,032 | 367,893 | 371,468 | 373,850 | 376,022 | 378,117 | 380,165 | 382,168 | 384,124 | |
| Recurrent expenditures per capita (MVR) | 2,388 | 1,451 | 1,785 | 2,156 | 2,529 | 235 | 185 | 129 | 67 | 0 | |
| Capital expenditures per capita (MVR) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total cost per capita (MVR) | 2,388 | 1,451 | 1,785 | 2,156 | 2,529 | 235 | 185 | 129 | 67 | 0 | 1,214 |
| Total cost per child aged 0 to 4 (MVR) | 23,179 | 14,343 | 18,561 | 24,517 | 32,859 | 3,575 | 3,337 | 2,691 | 1,532 | 0 | 13,844 |

| Metrics | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2014-2023 Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Impacts** | | | | | | | | | | | |
| Under 5 mortality rate | 9 | 9 | 9 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | |
| Neonatal mortality rate | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| Infant mortality rate | 8 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | |
| Total fertility rate | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Total child deaths averted (ages 0-4) | 0 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 23 |
| Total maternal deaths averted | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AIDS deaths averted (all ages) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 7 |

TABLE 4

## Adolescent and Youth Friendly Sexual and Reproductive health

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2014 - 2023 Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cost** | | | | | | | | | | | |
| Total cost of plan | 175.31 | 154.58 | 143.19 | 130.46 | 116.30 | 88.43 | 69.83 | 49.03 | 25.70 | 0.00 | 952.83 |
| Total population | 357,015 | 363,041 | 367,934 | 371,544 | 373,960 | 376,115 | 378,173 | 380,174 | 382,128 | 384,034 | |
| Recurrent expenditures per capita (MVR) | 491 | 426 | 389 | 351 | 311 | 235 | 185 | 129 | 67 | 0 | |
| Capital expenditures per capita (MVR) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total cost per capita (MVR) | 491 | 426 | 389 | 351 | 311 | 235 | 185 | 129 | 67 | 0 | |
| Total cost per child aged 0 to 4 (MVR) | 4,767 | 4,208 | 4,043 | 3,984 | 4,026 | 3,561 | 3,330 | 2,696 | 1,543 | 0 | |

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2014 - 2023 Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Impacts** | | | | | | | | | | | |
| Under 5 mortality rate | 9 | 9 | 9 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | |
| Neonatal mortality rate | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| Infant mortality rate | 8 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | |
| Total fertility rate | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Total child deaths averted (ages 0-4) | 0 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 23 |
| Total maternal deaths averted | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AIDS deaths averted (all ages) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 7 |

**TABLE 5**

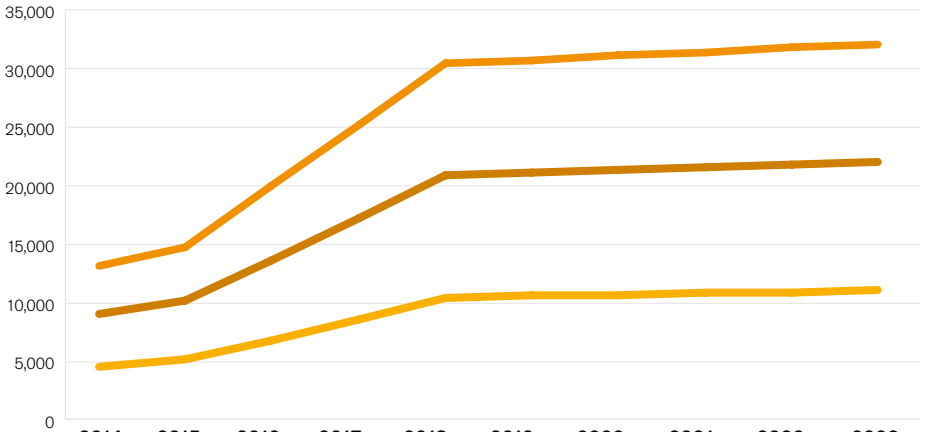
## Estimates of deaths and averted deaths from the three scenarios, 2014 to 2023

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Number of unintended pregnancies averted due to modern method use** | | | | | | | | | | | |
| Base case | 4477 | 5041 | 6799 | 8588 | 10410 | 10517 | 10635 | 10743 | 10854 | 10968 | 89032 |
| Exp. Family planning | 4477 | 5041 | 6799 | 8588 | 10410 | 10517 | 10635 | 10743 | 10854 | 10968 | 89032 |
| A&YFSRH | 4138 | 4659 | 6283 | 7937 | 9621 | 9719 | 9828 | 9928 | 10031 | 10137 | 82281 |
| **Number of maternal deaths averted due to modern method use** | | | | | | | | | | | |
| Base case | 0.01 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 | 0.29 |
| Exp. Family planning | 0.01 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 | 0.29 |
| A&YFSRH | 0.01 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.27 |
| **Number of abortions** | | | | | | | | | | | |
| Base case | 2415 | 2494 | 2519 | 2350 | 2060 | 2081 | 2104 | 2126 | 2148 | 2170 | 22469 |
| Exp. Family planning | 2415 | 2494 | 2519 | 2350 | 2060 | 2081 | 2104 | 2126 | 2148 | 2170 | 22469 |
| A&YFSRH | 2543 | 2638 | 2713 | 2595 | 2357 | 2381 | 2407 | 2432 | 2457 | 2483 | 25006 |

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Number of unsafe abortions** | | | | | | | | | | | |
| Base case | 1568 | 1619 | 1625 | 1504 | 1318 | 1332 | 1347 | 1361 | 1375 | 1389 | 22469 |
| Family planning | 1568 | 1619 | 1625 | 1504 | 1318 | 1332 | 1347 | 1361 | 1375 | 1389 | 22469 |
| A&YFSRH | 1650 | 1712 | 1750 | 1661 | 1508 | 1524 | 1541 | 1556 | 1572 | 1589 | 25006 |
| **Number of safe abortions** | | | | | | | | | | | |
| Base case | 848 | 875 | 894 | 846 | 742 | 749 | 758 | 765 | 773 | 781 | 8032 |
| Ex. Family planning | 848 | 875 | 894 | 846 | 742 | 749 | 758 | 765 | 773 | 781 | 8032 |
| A&YFSRH | 893 | 926 | 963 | 934 | 848 | 857 | 867 | 876 | 885 | 894 | 8942 |
| **Number of unsafe abortions averted due to modern method use** | | | | | | | | | | | |
| Base case | 1368 | 1540 | 2077 | 2624 | 3180 | 3213 | 3249 | 3282 | 3316 | 3351 | 27199 |
| Ex. Family planning | 1368 | 1540 | 2077 | 2624 | 3180 | 3213 | 3249 | 3282 | 3316 | 3351 | 27199 |
| A&YFSRH | 1264 | 1423 | 1920 | 2425 | 2939 | 2969 | 3003 | 3033 | 3064 | 3097 | 25137 |

**FIGURE 2**

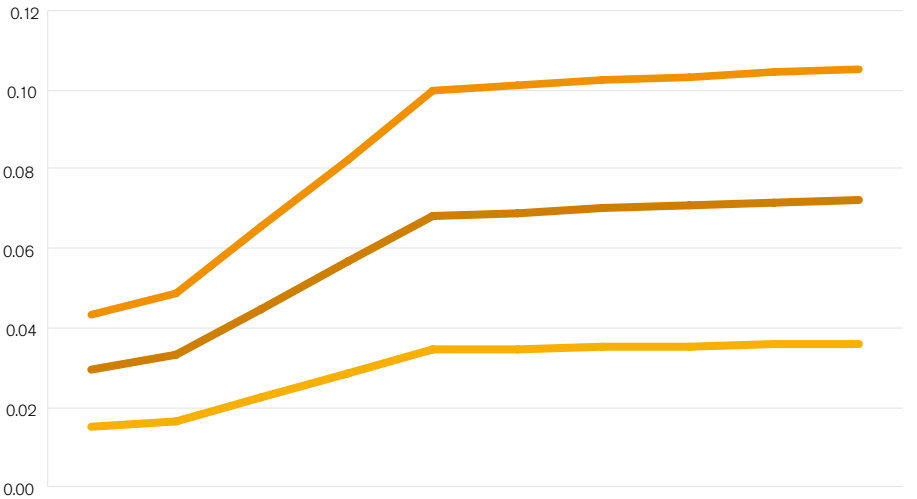
## Number of unintended pregnancies averted due to modern method use




| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|
| YFSRH | 4,138 | 4,659 | 6,283 | 7,937 | 9,621 | 9,719 | 9,828 | 9,928 | 10,031 | 10,137 |
| Family planning | 4,477 | 5,041 | 6,799 | 8,588 | 10,410 | 10,517 | 10,635 | 10,743 | 10,854 | 10,968 |
| Base case | 4,477 | 5,041 | 6,799 | 8,588 | 10,410 | 10,517 | 10,635 | 10,743 | 10,854 | 10,968 |

**FIGURE 3**

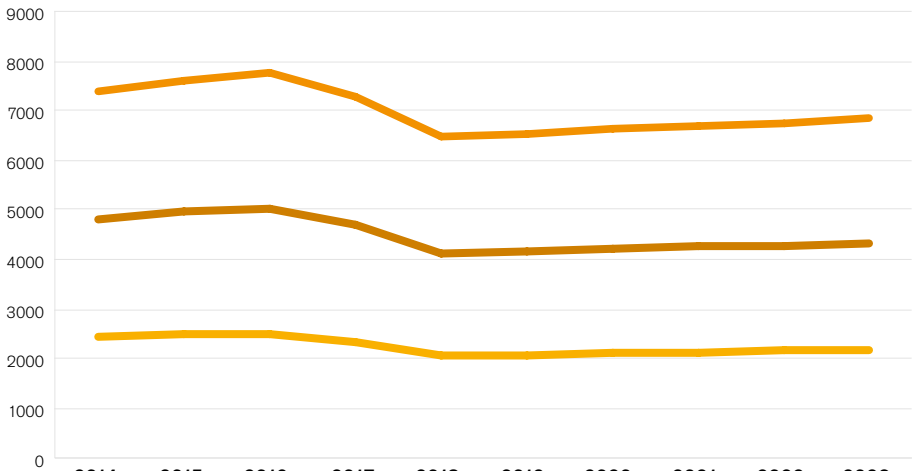
## Number of maternal deaths averted due to modern method use




| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|
| 0.01 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| 0.01 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 |
| 0.01 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 |

**FIGURE 4**

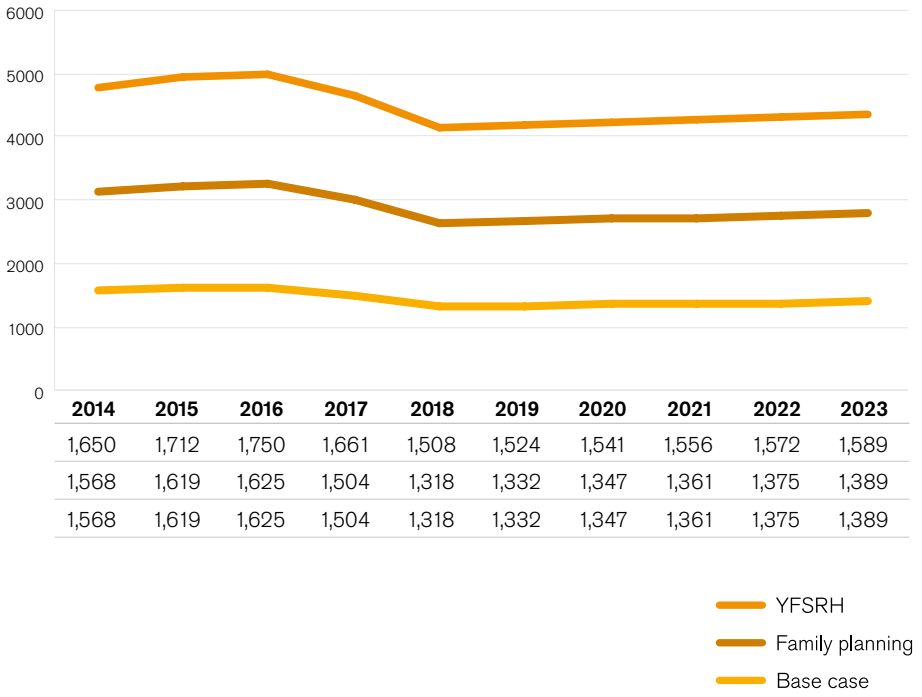
## Number of abortions




| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|
| 2,543 | 2,638 | 2,713 | 2,595 | 2,357 | 2,381 | 2,407 | 2,432 | 2,457 | 2,483 |
| 2,415 | 2,494 | 2,519 | 2,350 | 2,060 | 2,081 | 2,104 | 2,126 | 2,148 | 2,170 |
| 2,415 | 2,494 | 2,519 | 2,350 | 2,060 | 2,081 | 2,104 | 2,126 | 2,148 | 2,170 |

**FIGURE 5**

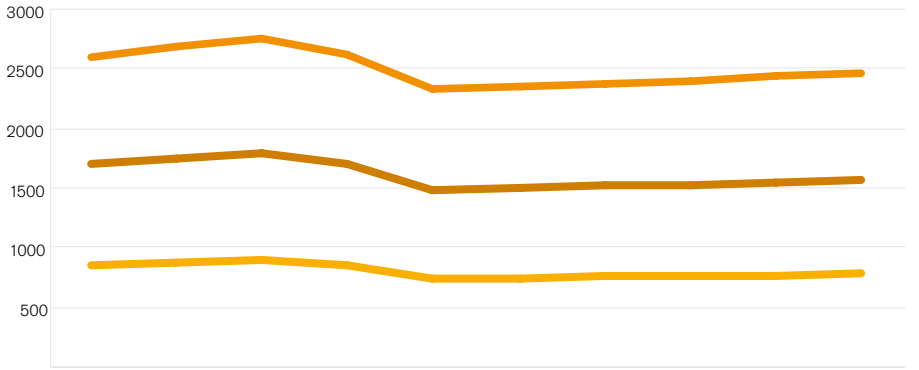
## Number of unsafe abortions




| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|
| 1,650 | 1,712 | 1,750 | 1,661 | 1,508 | 1,524 | 1,541 | 1,556 | 1,572 | 1,589 |
| 1,568 | 1,619 | 1,625 | 1,504 | 1,318 | 1,332 | 1,347 | 1,361 | 1,375 | 1,389 |
| 1,568 | 1,619 | 1,625 | 1,504 | 1,318 | 1,332 | 1,347 | 1,361 | 1,375 | 1,389 |

**FIGURE 6**

## Number of safe abortions

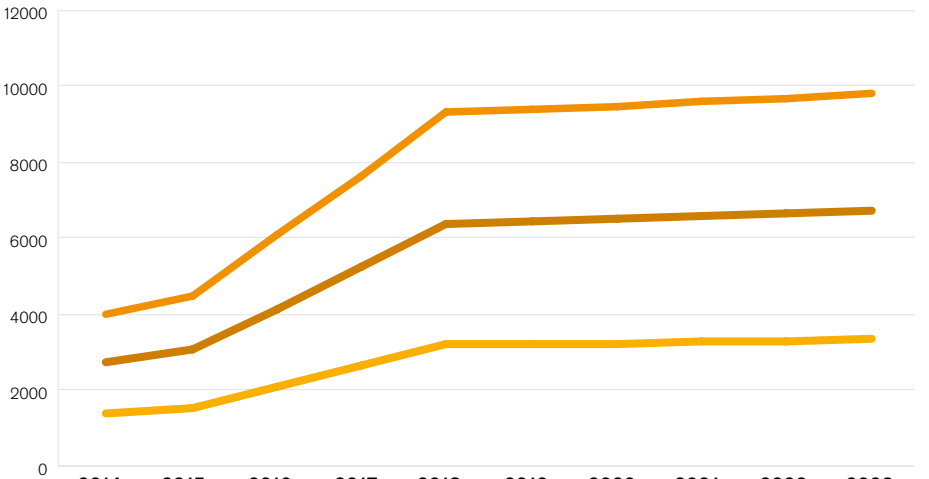



| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|
| 893 | 926 | 963 | 934 | 848 | 857 | 867 | 876 | 885 | 894 |
| 848 | 875 | 894 | 846 | 742 | 749 | 758 | 765 | 773 | 781 |
| 848 | 875 | 894 | 846 | 742 | 749 | 758 | 765 | 773 | 781 |

YFSRH
Family planning
Base case

**FIGURE 7**

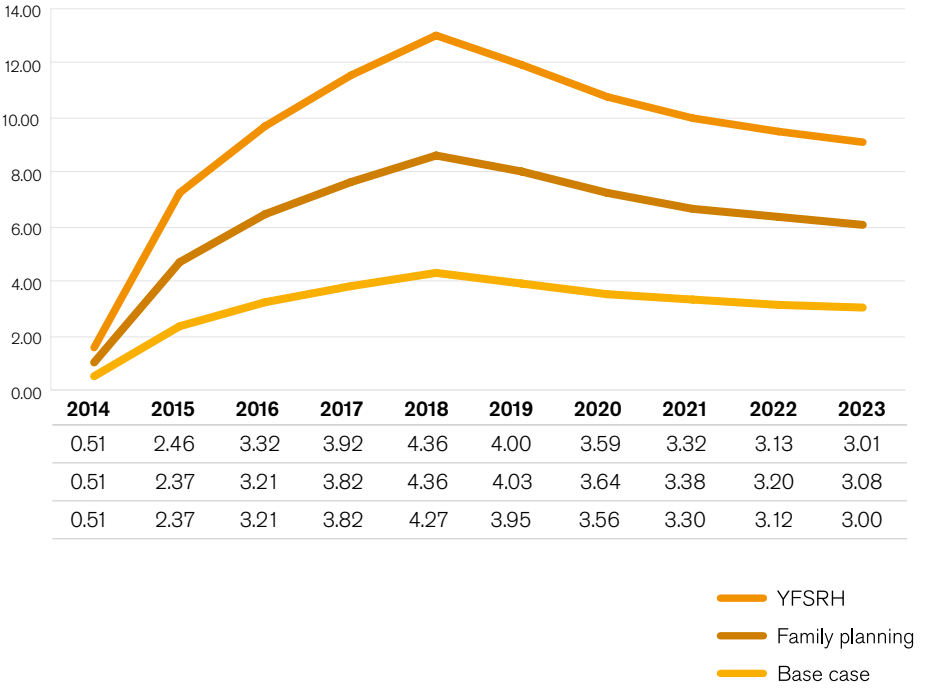
## Number of unsafe abortions averted due to modern method use




| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|
| 1,264 | 1,423 | 1,920 | 2,425 | 2,939 | 2,969 | 3,003 | 3,033 | 3,064 | 3,097 |
| 1,368 | 1,540 | 2,077 | 2,624 | 3,180 | 3,213 | 3,249 | 3,282 | 3,316 | 3,351 |
| 1,368 | 1,540 | 2,077 | 2,624 | 3,180 | 3,213 | 3,249 | 3,282 | 3,316 | 3,351 |

**FIGURE 8**

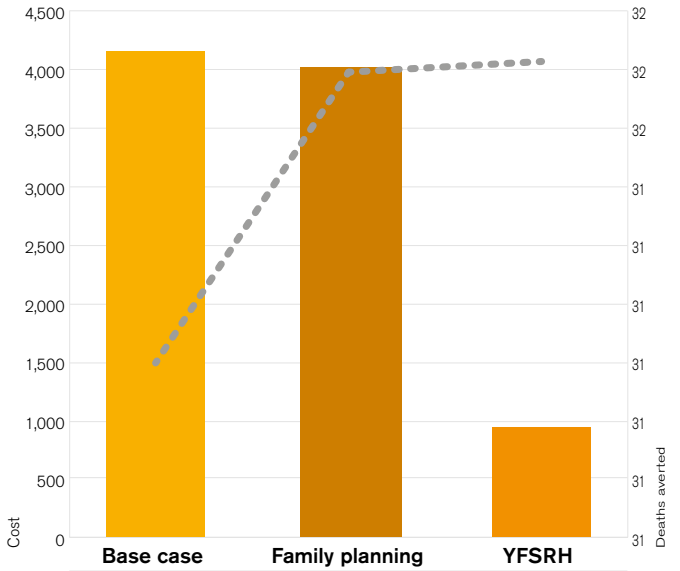
## Total child, maternal and AIDS deaths Averted




| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|
| 0.51 | 2.46 | 3.32 | 3.92 | 4.36 | 4.00 | 3.59 | 3.32 | 3.13 | 3.01 |
| 0.51 | 2.37 | 3.21 | 3.82 | 4.36 | 4.03 | 3.64 | 3.38 | 3.20 | 3.08 |
| 0.51 | 2.37 | 3.21 | 3.82 | 4.27 | 3.95 | 3.56 | 3.30 | 3.12 | 3.00 |

**FIGURE 9**

## Cost and Deaths Averted




| | Base case | Family planning | YFSRH |
|---|---|---|---|
| Cost in millions MVR | 4,156 | 4,015 | 953 |
| Deaths averted | 31 | 32 | 32 |

Head
Neck
Perforator
eting piece
Tail
End-piece
Hea
Anterior ex
Posterior e
Spiral thre
Mitochondr
Terminal d
Axial filam

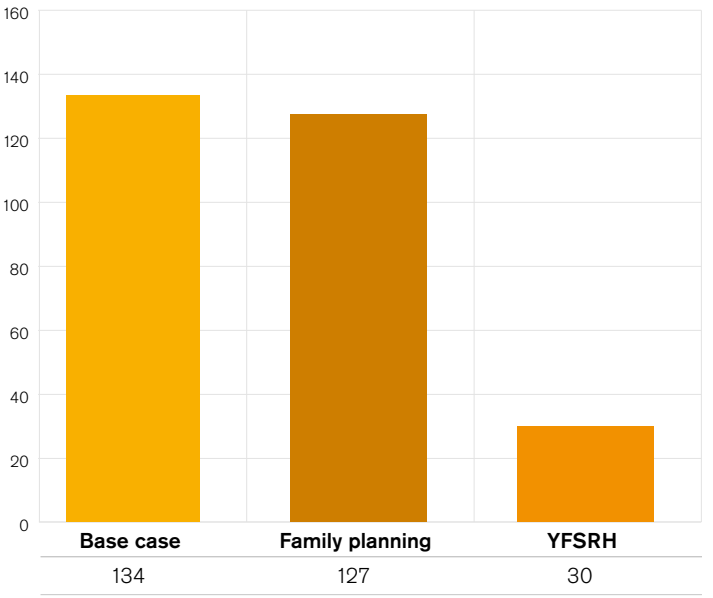
# COST EFFECTIVENESS

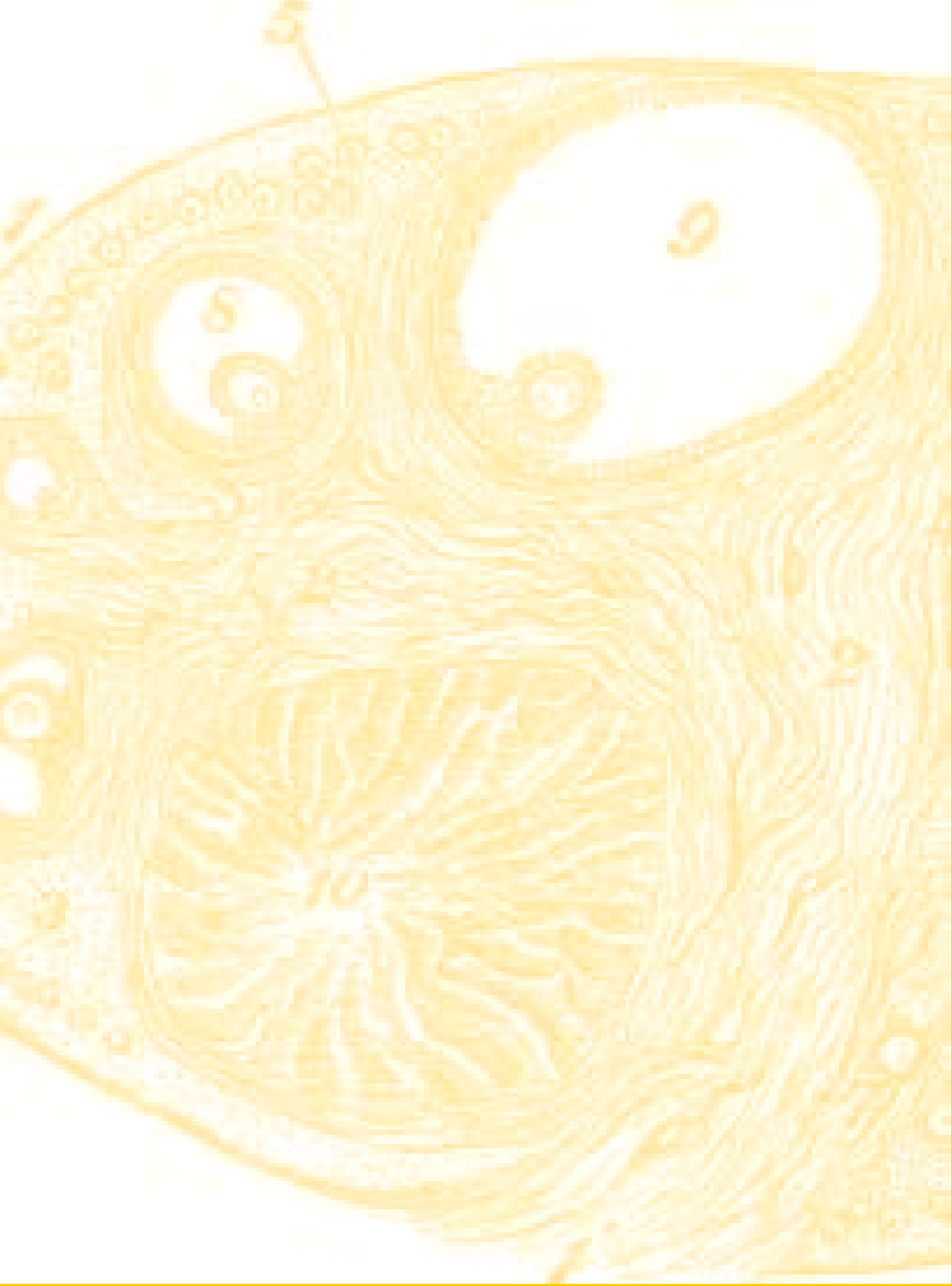
## Cost per deaths averted

The estimates indicate that the base case (counterfactual) scenario cost on average, MVR 134 million for each death averted, MVR 127 million in the family planning scenario and MVR 30 million per averted death in the A&YFSRH scenario (figures 9 & 10)

**FIGURE 10**

### Cost effectiveness ratio





The estimates showed that the **adolescent and youth friendly sexual and reproductive health** option is the **most cost effective** option at MVR 30 million per averted death.

# DISCUSSION

The primary purpose of this estimation was to explore policy options for delivering adolescent friendly sexual and reproductive health in Maldives, exploring cost-effective mix of youth friendly SRH and GBV interventions in the Maldives that delivers most health benefit. The goal is to provide the evidence base to inform the implementation of the National Reproductive Health Strategy (NRHS) 2014-2018, providing costs of different combination of intervention strategies useful for SRH service delivery as planned under the NRHS, compared against the potential benefits of improved SRH service, health, including economic benefits as well as impact on health outcomes.

Three sexual and reproductive health intervention scenarios have been evaluated as potential strategies that could be considered in scaling up SRH in Maldives: 1. the base case (the counterfactual) reflecting the current state of SRH service provision including an expanded list of interventions for maternal, newborn and reproductive health, family planning, AIDS, such that is akin to SRH programs; 2. A family planning only scenario which concentrates of comprehensive provision of family planning and diminishing the provision of maternal and neonatal services but maintaining the child bearing age (14-50 years) as eligible age; and 3. A third scenario which focused family planning services on adolescents and youths of age between 15 and 30 included school delivery for SRH counselling

We have used the OneHealth tool for the exploration to project and estimate the costs and impacts obtainable from each of the three scenarios. The estimates showed that the adolescent and youth friendly sexual and reproductive health option is the most cost effective option (MVR 30 million per averted death) relative to the option that focuses on delivering mainly family planning to the child bearing age population (MVR 127 million per death averted) and the base case which provide comprehensive intervention to reproductive age population (MVR 134 million per death averted). This result could be partly explained by the fact that the counterfactual and the family planning options have more interventions. In addition, the eligible population in the adolescent and youth friendly sexual and reproductive health option is much more contracted than the two other less cost-effective options. These estimates therefore, is an indication that investing in adolescent and youth friendly SRH

strategy provides an efficient means of scaling up SRH in Maldives.

Cost estimations were mostly recurrent costs and have not taken into account capital cost in all three intervention scenarios. Capital development plans have not been explicitly indicated in the National Reproductive Health Strategy 2014-2018. Given that there are more than 160 health centers, 24 health posts, 14 Atoll hospitals, six regional hospitals and two main tertiary level hospitals, which are mostly well staffed, it would appear that a cost-effective strategy to upscale SRH in Maldives should focus on restructuring and realigning existing infrastructure, utilizing existing capacity to more effectively deliver and upscale SRH interventions. The existing health infrastructure and health personnel can be considered as sufficient for adequately delivering A&YFSRH services considering the Maldivian population of 344,023 (2014) and the size of the eligible population. The available data indicate underutilization of the capacity in the health system particularly in the Atolls, service delivery is not adequately structured into a referral system that streamlines clients efficiently in the service delivery system. More than 50% of deliveries occur in Male', especially in the tertiary care hospitals and high proportion of normal childbirths are assisted by a specialist, suggesting inefficiencies in the application of human resources for health. Hospital bed occupancy rates in the Atolls are as low as between 5% and 11%. Regional hospitals have occupancy rates ranging from 22% to 74%. Outpatient visit is also low ranging from 11 to 18 visits per day in some Atoll hospitals. Strategies to upscale adolescent friendly youth SHR should include the increased utilization of the existing service capacity and streamlining service delivery for efficient referral system.

The total base case estimate of MVR 876.6 million represents about 27.4% of the estimate 2011 Total Health Expenditure estimates (THE) (Maldives Health profile 2016), of MVR 2767million (2011) inflated to be MVR 3203 million in 2014 with an assumed average domestic inflation rate of 5%. This providing a basis for evaluating the validity of the estimates, should question whether fully funded SHR should actually cost up to 27% of total health expenditure. In reflecting on this, it should be noted that the OneHealth estimations were unconstrained in anyway other than the coverage, the population (eligible) etc. They can be viewed as frontier estimates, could be viewed as what should be expected given full availability and application of resources. THE are ex-post data based on values that had been constrained by resource availability and the budgeting and allocation process. Except it can be assumed that all health

needs have been met, estimates of SHR from the OHT tend to be higher than the actual. However, the base case cost estimates is not implausible given that the eligible population considered in the base case, consisted of women and men in the reproductive age bracket which are most sexually active in any population and neonates and young children. These groups are up to 60% of general population.

## Limitations

Three major challenges confronted this exploration: First is the limited availability of and access to data required for adequately expounding this projection and estimation. This constrained the extent of the analysis and the options for exploration. OneHealth tool has been conveniently adopted for the exploration because some country specific data such that was useful for the projections were already embedded in the tool since it has been programmed with established links between the interventions and impacts. The robustness of the estimations and projections could be much improved if access to costing data have not been particularly limited. Second is the relatively compact population which is just about a third of a million. Estimates, particularly impact estimates were commensurately small, counterintuitive in some cases and did not differ significantly across the options. Thirdly, the greater the difference between the baseline and the end-line coverage of the interventions, the bigger is the effect size of the impacts. Maldives reached her health MDG goals achieving over 90% and in some cases, up to 97% coverage in the SRH interventions. Consequently, this limits the size of the achievable improvements that is obtainable with the interventions. It also constrained the headroom for projections and the extent to which intervention scenarios and strategies can be explored. When this situation is combined with the small population size challenge, the projections and estimations tend to produce small achievable impact size. Notwithstanding these challenges, the OneHealth tool that was adopted for the estimation provided significant analytical resource for mitigating the effects of the challenges on the outcome of the exploration.

## Conclusions and Recommendation

Upscaling the adolescent and youth friendly option is estimated to be the most cost-effective strategy to scale up sexual and reproductive health in Maldives. This will involve streamlining existing health care infrastructure and interventions to more efficiently deliver sexual and reproductive health services and to actively target and include youths and adolescents. Adolescent and youth SHR requires that services are provided in manners acceptable and attractive to youths. Training of school counselors to provide counseling services to youth and adolescents and retraining health care providers to better provide SRH services are potential strategies to upscale adolescent and youth friendly SRH in Maldives.

It is recommended that this exploration should be further pursued with exploration to improve the data accessibility and quality in the future. It is envisaged that circulation of this report might motivate sufficient interest among stakeholders such that would improve readiness to provide access to relevant data.

# ACKNOWLEDGEMENTS

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Ligament of ovary

Epoöphoron
Ovary
Ostium abdominale
Ovarian fimbria
Ovarian vessels

# NOTES

# NOTES

# NOTES

Wall of uterus
Umbilical cord
Cervix uteri

The **purpose** of this study is to **develop policy** options for the **Maldives Ministry of Health** to determine optimal mix of **interventions** in response to **youth SRH and GBV** in the Maldives that delivers **most health benefit** at **minimal cost**.


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every young person's
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